

# **The World Medicines**

## **Situation 2011**

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# **The World Medicines Situation Report, 2011**

## **3rd edition**

### **Introduction**

Medicines play a major role in protecting, maintaining and restoring people's health. The provision of appropriate medicines of assured quality, in adequate quantities and at reasonable prices is therefore a concern of global and national policy makers and agencies implementing health activities and programmes.

Since 1975, achievements have been made in improving access to essential medicines. Special attention was given to developing countries where problems in ensuring equitable access to quality assured medicines and promoting rational use have persisted despite efforts by governments, development agencies and WHO. Reforms in health sector financing, globalization and periods of economic recession have impacted on securing access to essential medicines.

In 1988 and again in 2004, the World Health Organization published reports on the World Medicines Situation. The first report was brief and described the beginning of the Essential Medicines movement. In 2004, a more comprehensive report was issued which contained nine chapters that reviewed all aspects of medicines in both developed and developing countries.

In 2009, the decision was made to produce a third edition of the World Medicines Situation Report. Current efforts to document and improve sharing of information have paved the way to accessing information that was not possible a decade ago, such as disaggregated data on pharmaceutical expenditures, consumption, drug prices and insights on policies and impacts on improving access to medicines. The aim of this publication is to gather relevant information comprehensively in a single site and publication.

This report contains chapters each written by different authors, covering topics related to production and consumption, innovation, and safety. There are chapters about selection, procurement, supply management, rational use, financing and pricing. There are cross cutting chapters related to household medicines use, access and human rights, good governance, human resources and national medicines policies.

The process for producing these chapters involved identifying lead authors who frequently created teams to work with them. After a first draft was produced, there was an extensive review process involving members of the WHO Expert panel, WHO country staff, academics and staff of NGO's who work on essential medicines issues.

The 2011 report contains a collection of a wide range of data and information and is being published electronically.



# THE WORLD MEDICINES SITUATION 2011

## GLOBAL HEALTH TRENDS: GLOBAL BURDEN OF DISEASE AND PHARMACEUTICAL NEEDS

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- This Chapter provides information as to how future health systems and medicines supply organizations will have to adapt to demographic and disease burden changes, more specifically to the global increase in chronic noncommunicable diseases.
- Increases in life expectancy, changes in fertility and disease risk factors will contribute to a change in pharmaceutical use and health-care delivery over the next 20 years.
- The DALY burden of chronic disease already outweighs that for acute disease and will do so over the next 20 years. Low- and middle-income countries in the WHO African Region are the only group of countries in which mortality rates due to acute disease are expected to remain in excess of those for chronic disease.
- The relative contribution to the global burden of disease of HIV/AIDS, of TB and malaria, is relatively low. However, the regional impact of these three infectious diseases is still huge, specifically in the WHO African Region.
- Mortality for chronic conditions is expected to increase over time due to increases in mortality rates in the WHO Regions of the Americas, South-East Asia and the Western Pacific, as their populations age.
- The implications for the delivery and use of pharmaceuticals are profound, as there will be a continuing increase in demand for chronic disease medicines, regularly provided and used for the lifetimes of individuals with these chronic diseases.

**1.1****INTRODUCTION**

*A key challenge for health systems and medicines supply organizations will be to find better and more cost-effective ways of delivering medicines and related health care to the growing number of people with chronic conditions, especially in the rapidly urbanizing centres of the developing world.*

Most countries are currently facing a shift in their disease burden, away from one that is dominated by acute diseases towards one dominated by chronic diseases. This change has profound implications for medicines supply and use. The reality of the changing disease burdens, which are entirely predictable, will require suppliers and providers of health care to adapt their current operating models and systems. A key challenge for health systems and medicines supply organizations will be to find better and more cost-effective ways of delivering medicines and related health care to the growing number of people with chronic conditions, especially in the rapidly urbanizing centres of the developing world.

The focus of this Chapter is an analysis of the key drivers behind the shifting patterns in the burden of disease and the consequent health system and medicines demands. These drivers are both demographic and epidemiologic, such as the ageing population and changes in risk factors leading to increased chronic disease (e.g. smoking and obesity). Many countries will face a double burden, in that health systems will have to be responsive to both infectious and noncommunicable chronic diseases. This Chapter also speculates about the key issues for medicines in the next few decades that need to be addressed if countries are to meet the challenges created by these demographic and epidemiologic shifts, particularly leading to increasing noncommunicable chronic diseases.

**1.2****PRESENT SITUATION AND FUTURE TRENDS****1.2.1****The key drivers of the increasing burden of chronic diseases****Demographic changes**

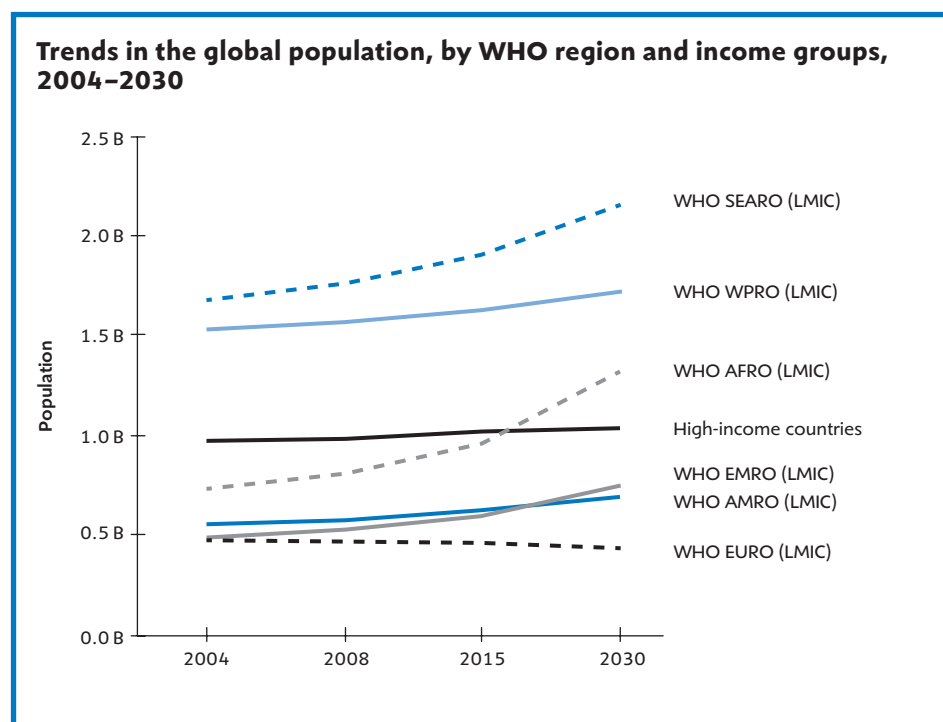
*It is evident that whereas most WHO regions can expect continued population growth up to the year 2030, the group of high-income countries and the low- and middle-income countries of Europe are likely to experience a stagnation or even a decline in the size of their population in the decades to come.*

Figure 1.1 shows projected changes in population in different WHO regions of the world, separated according to income level. It is evident that whereas most WHO regions can expect continued population growth up to the year 2030, the group of high-income countries (HIC) and the low- and middle-income countries (LMIC) of Europe are likely to experience a stagnation or even a decline in the size of their population in the decades to come.

The divergent patterns of population growth shown in Figure 1.1 stem from regional variations in two key demographic drivers, namely declining fertility and increasing longevity. The number of births per woman worldwide has dropped from an average of 5.0 in 1955 to 2.7 in 2005 (1). In the developed world (exemplified by the category of “high-income countries” in Figure 1.1), the already low fertility rate of 2.8 dropped still further over this same period, to just 1.6, a rate which is below the replacement rate of 2.1 births per woman. In the less developed countries, fertility has dropped by more than half, from an average of 6.2 in 1955 to 2.9 in 2005. Within these regions, however, there are large variations in the rate of fertility declines. The world’s countries with the youngest populations (e.g. in Africa and some countries in Central America) continue to have high fertility levels that have only recently begun to decline (1).

At the same time, life expectancy has increased significantly almost everywhere, and continues to drive population growth. In 1955, worldwide, people could expect to live to be 46 years old. By 2005, the average lifespan had increased to 66 years (2). Gains have been especially dramatic in developing country regions, but even in the more developed countries (e.g. Japan, the USA and countries in Europe), life expectancy has steadily increased, reaching 76 years in 2005, with an 82 year average lifespan projected for 2050 (2).

FIGURE 1.1



HIC = High-income countries; LMIC = Low- and middle-income countries.

Sources: WHO (4), WHO (7).

See Annex 1 for documentation and links to spreadsheets with the data for all of the figures.

There are also substantial differences in lifespan between men and women. A man's life expectancy remains, on average, 7–8 years shorter than that of a woman (3). The female life expectancy advantage can be as great as 12–13 years in some countries of the former Soviet Union (3) but averages slightly less than 5 years in most developing countries. Projected gender gaps in life expectancy vary depending on the models and assumptions used to make such projections, making it difficult to say with any certainty whether the female advantage will increase or decrease in developed and developing countries in the coming decades (1).

The combination of worldwide increases in life expectancy and sharp declines in fertility rates is producing rapid population growth and an increase in the proportion of the population among the older age groups. Some experts are predicting that by 2050, 16% of the projected 9 billion people comprising the global population at that time will be aged 65 years or over (2). This means that within 10 years, and for the first time in human history, the number of over 65s will exceed the number of under fives (4). While people aged 80 years and over currently represent a relatively small proportion of the global population, they are the fastest growing population segment. Northern, western and southern European countries have the largest proportion of such “oldest-old” people, while China has the largest absolute number (5).

The fact that the world's population is growing steadily older has huge social and economic implications. For our purposes, however, it is sufficient to appreciate that as a country's population ages, demand for health-care provision and demand for medicines increase, and so too will overall health-care costs. Moreover, the ratio of the number of working-age citizens (who contribute to social service funds) to the number of elderly citizens (who do not) will decrease (the so-called “age-dependency ratio”). Unless there is a dramatic fertility increase or some innovation that saves labour, the decreasing age-dependency ratio will over time inevitably result in an increase in the unit costs of health-care outputs (6).

*The fact that the world's population is growing steadily older has huge social and economic implications. For our purposes, however, it is sufficient to appreciate that as a country's population ages, demand for health-care provision and demand for medicines increase, and so too will overall health-care costs.*



*Urbanization, and rapid urbanization in particular, is significant because it affects not only the pattern of diseases experienced but also the way in which health services, including pharmaceuticals, are delivered and used.*

## Urbanization

Urban growth is driven by a combination of factors, among them geographical location, natural population growth, rural-to-urban migration, infrastructure development, national policies, corporate strategies, and other major political, social and economic forces, including globalization. Urbanization, and rapid urbanization in particular, is significant because it affects not only the pattern of diseases experienced but also the way in which health services, including pharmaceuticals, are delivered and used.

The pace of urbanization has progressed to such an extent that, for the first time in human history, half of humankind now lives in cities (8). Urban growth is currently most rapid in the developing world, where all cities combined gain an average of 5 million residents every month (8). By 2050, the urban population of the developing world is expected to reach 5.3 billion (8). Asia alone will host 63% of the world's urban population, (or 3.3 billion people) while Africa, with a projected urban population of 1.2 billion in 2050, will be home to a further quarter of this total. In sharp contrast, the urban population of the developed world, including the countries of the Commonwealth of Independent States, is expected to remain largely unchanged, rising only slightly from just over 900 million in 2005 to 1.1 billion in 2050. This trend is attributed to relatively low rates of natural population increase in these countries coupled with more decentralized patterns of urban development (8). The projected trends mirror those shown in Figure 1.1 for total population.

The process of "urbanization" can take several forms. In sub-Saharan Africa, for example, urbanization is characterized by slum formation. In Asia, a new trend is seen, especially in large Indian cities, in which urban populations are relocating to suburban locations or satellite towns linked to the main city through commuter networks. Urban development in Latin America and the Caribbean, currently the most urbanized region in the developing world, means that one fifth of the region's urban residents now reside in cities with populations of 5 million or more (8).

### 1.2.2

## Changes in health risk factors

In addition to changes in the size and distribution of human populations, there have been a number of changes in certain risk factors that affect the health of populations and that have a bearing on the distribution of the disease burden. Addressing these risk factors, either through prevention or treatment activities, may well impact on morbidity and mortality patterns, but will certainly impact on the way in which medicines are delivered and consumed (see also Section 1.3.2).

## Obesity

Obesity has been identified as a risk factor for many chronic diseases. The risk of coronary heart disease, ischaemic stroke and type 2 diabetes grows steadily with increasing body mass, as do the risks of cancers of the breast colon prostate and other organs. Chronic overweight contributes to osteoarthritis – a major cause of disability. Globally 44% of diabetes burden, 23% of ischaemic heart disease burden and 7–41% of certain cancer burdens are attributable to overweight and obesity. In south-east Asia and Africa, 41% of deaths caused by high BMI occur under age 60 compared with 18% in high-income countries (10).

In a 2011 *Lancet* article, Finucane et al., reported that between 1980 and 2008 age-standardized mean global BMI increased 0.4–0.5 kg/m<sup>2</sup> per decade in men and women. Quoting data from 2008, they reported that the BMI in men was highest in North America and Australasia. The lowest rates were in sub-Saharan Africa (apart from southern Africa). Women

in the USA, New Zealand and Australia had the greatest increase in BMI in high-income countries.

Age-standardized prevalence of obesity was 9.8% in men and 13.8% in women in 2008, almost double that found globally in 1980. An estimated 205 million men and 297 million women over age 20 were obese in 2008, with the greatest prevalence in North American men and southern African women. Female obesity prevalence was over 30% in North America and in three low- and middle-income sub-regions. South-Asian men and women had the lowest prevalence of obesity, followed by central and east Africa for men, and high-income Asia-Pacific and central and east Africa for women (11). For more detailed information and analysis of obesity trends see Kelly et al. (9) and James et al. (12).

### Smoking

Although estimates are fraught with uncertainties, it is considered that as many as 5.2 million deaths worldwide are attributable to smoking (estimate based on 2004 data). Of these, just under one third (1.5 million deaths) occur in HIC, while the remainder (3.7 million deaths) occur in LMIC (10).

Currently, more men than women die as a result of smoking. In 2004, there were 3.6 million smoking-attributable deaths among men (2.7 million in LMIC and 0.9 million in HIC) and 1.6 million among women (1.0 million in LMIC and 0.6 million in HIC) (13). The leading causes of death due to smoking include cardiovascular diseases (1.7 million deaths), chronic obstructive pulmonary disease (COPD) (1.3 million deaths) and lung cancer (0.94 million deaths). In the year 2000, smoking and oral tobacco use accounted for 4.1% of all healthy life years lost in 2004 (13). (More recent estimates suggest that, globally, smoking causes about 71% of lung cancer, 42% of chronic respiratory disease and nearly 10% of cardiovascular disease). It is responsible for 12% of male deaths and 6% of female deaths in the world.

Based on an analysis of current data and trends, morbidity and mortality associated with smoking is expected to rise substantially in the decades to come. Current projections indicate a doubling in the number of deaths every year from tobacco use, from around 5 million in 2005 to 10 million in 2020 (7). Recent data for adolescents (i.e. those aged 13–15 years) from 131 countries plus the West Bank and Gaza Strip (14), revealed surprisingly small differences between boys and girls in their patterns of tobacco use in many regions of the world. If the similarity in smoking rates by sex persists as these young people age into adulthood, this shift in behaviour compared with older groups will have important implications for the global burden of chronic diseases (14). Other features that emerged for this age group was a high use of tobacco products other than cigarettes, a high susceptibility to smoking among never-smokers, and widespread exposure to second-hand smoke (14).

*Tobacco use has already been labelled as one of the most important global health hazards, and the future outlook, in terms of the scale of adverse outcomes caused by smoking, is not encouraging.*

At present, men in industrialized countries of Europe, North America and the Western Pacific have the largest accumulated hazards of smoking. Young men and middle-age men in many regions of the developing world also have large smoking risks (15). This shows that as people (mostly men) who began smoking over the past three decades in developing countries become older, mortality caused by smoking is likely to rise further. Indeed, the current risks caused by smoking in this setting were highly concentrated among men (15).

Given that most of the growth in global population is expected to take place in the developing world (Figure 1.1), the health losses associated with smoking look likely to escalate (15). Tobacco use has already been labelled as one of the most important global health hazards, and the future outlook, in terms of the scale of adverse outcomes caused by smoking, is not

encouraging. To avoid a massively increased burden on health-care systems, there is clear need for effective prevention and treatment interventions, such as pharmaceutical cessation support. There will be an increased demand for nicotine replacement therapy as people try to give up smoking.

### 1.2.3

### The global disease burden: the continuing epidemiologic transition

We can visualize the impact of changing demographic patterns and health risk factors by looking at the burden of disease disaggregated according to “acute” and “chronic” conditions. Table 1.1 lists the world’s five most common acute and chronic conditions, ranked by DALY rate (i.e. the number of years of potential life lost due to premature mortality plus the number of years of productive life lost due to disability per 1000 persons).<sup>1</sup> Data refer to 2008. Annex 1 contains the raw data used to create Table 1.1.

**TABLE 1.1 Top five global acute and chronic conditions by DALY rate (DALYs lost per 1000 persons), 2008**

Condition	DALY burden (DALYs lost per 1000 persons)
<i>Acute conditions (communicable)</i>	
Infectious and parasitic diseases	39.24
Perinatal conditions	17.49
Respiratory infections	12.18
HIV/AIDS <sup>a</sup>	9.65
Diarrhoeal diseases	8.35
<i>Chronic conditions (noncommunicable)</i>	
Neuropsychiatric conditions	30.60
Cardiovascular diseases	22.84
Unintentional injuries	20.13
Sense organ diseases	13.64
Malignant neoplasms	12.37

Source: WHO (7). Figure 1.2 is a ‘stacked’ column to save space.

<sup>a</sup> While HIV/AIDS are communicable diseases, they are also chronic diseases in that there is no cure yet.

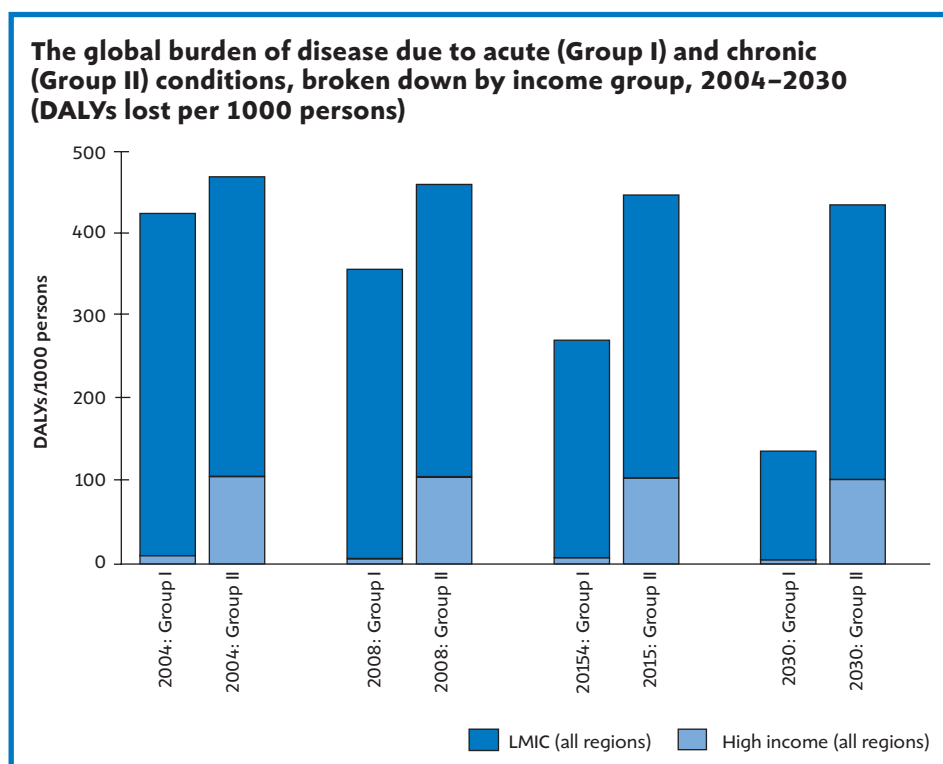
*“... relatively speaking, chronic diseases will account for an increasing share of the global burden of disease worldwide. The WHO African Region is the major exception.”*

Figure 1.2 reflects the distribution of the burden of acute and chronic disease across income groups (expressed in terms of the total number of DALYs lost per 1000 persons) over time. These data indicate that, globally, the total DALY rate is expected to rapidly decrease over time for acute conditions but stay relatively constant for chronic conditions. This means that, relatively speaking, chronic diseases will account for an increasing share of the global burden of disease worldwide. The WHO African Region is the major exception; in this Region it is predicted that acute/infectious conditions will continue to predominate, at least up to 2030 and possibly beyond (see Annex 1). Box 1.1 provides a brief summary of how WHO makes these estimates and projections.

<sup>1</sup> DALYs = Disability Adjusted Life Years: The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability. One DALY can be thought of as one lost year of “healthy” life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.



FIGURE 1.2



Sources: WHO (3).

HIC = High-income countries; LMIC = Low- and middle-income countries.

BOX 1.1

### WHO's Global burden of disease estimates and projections

Global projections of future health trends rely on relatively simple models, partly because of the lack of information on the many separate direct determinants or risk factors for diseases that more complex models would require. The projections presented here are based on models which employ projections of economic and social development, coupled with historically observed relationships between development and cause-specific mortality rates to estimate disease rates (16). The models consider the following socioeconomic variables, all of which are considered to be indirect determinants of health:

- average income per capita, measured as per capita gross domestic product (GDP);
- the average number of years of schooling in adults (referred to as "human capital");
- time, a proxy measure for the impact of technological change on health status.

The "time" variable includes a component which takes account of the impact of accumulating knowledge and technological development.

Table 1.1 and Figures 1.2 and 1.3 show the preponderance of chronic diseases. The relative contribution to the global burden of disease of HIV/AIDS, and certainly of TB and malaria, is relatively low. However, the regional impact of these three infectious diseases is still huge, although not uniformly distributed.

Figure 1.3 shows the percentage of total DALY burden (in 2008) for HIV, TB and malaria for all countries (all incomes), for all HIC, and for (LMIC) in the various WHO regions. This figure clearly shows that, globally, these three infectious diseases are infrequently associated with HIC. In contrast, the LMIC of the WHO African Region have a disproportionate share

*“... the global average mortality rate caused by chronic conditions is expected to increase over time, in large part due to increasing chronic disease mortality rates in the low- and middle-income countries of the African, South-East Asia and Western Pacific Regions.”*

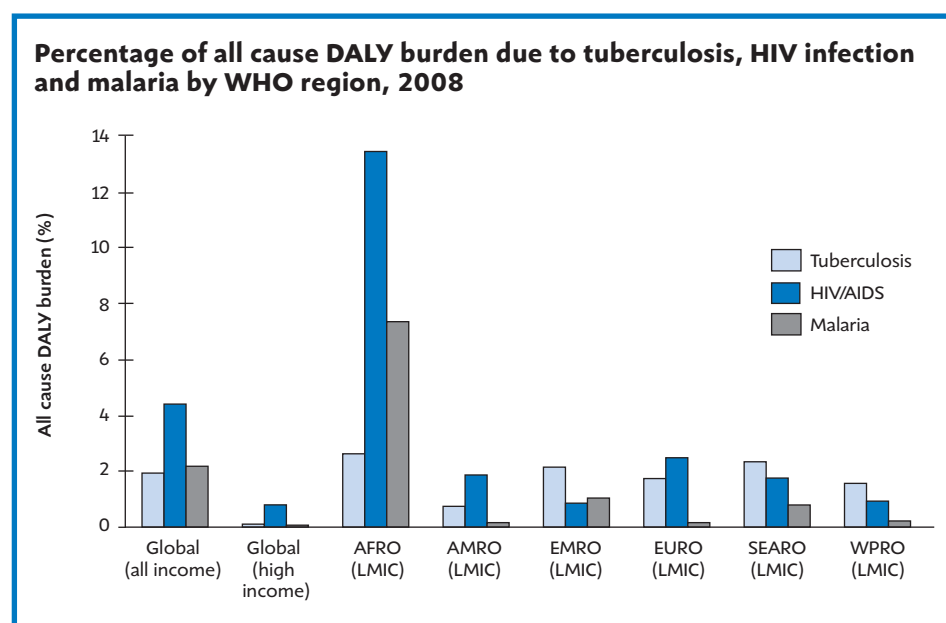
of the DALY burden of these conditions, especially HIV/AIDS, relative to the other WHO regions. As AIDS is treated for life this implies that the demand for antiretroviral therapy (ART) is likely to continue to increase. TB, malaria and HIV/AIDS will continue to be key problems in many developing countries, particularly those in Africa, and are thus widely acknowledged as global priorities. Moreover, the emergence of multi-drug resistant strains of the infectious agents which cause these diseases, especially malaria and TB, will demand newer and more effective medicines to bring them under control in these areas of the world.

Figure 1.4 compares projected trends in mortality rates (deaths per 1000 people) for acute and chronic conditions in all HIC and all LMIC. Broadly speaking, the implications of the mortality analysis are similar to those of the DALY analysis (Figure 1.2), apart from the fact that the global average mortality rate caused by chronic conditions is expected to increase over time, in large part due to increasing chronic disease mortality rates in the LMIC of the African, South-East Asia and Western Pacific Regions (see Table in Statistical Annex). However, the number of deaths per 1000 people from acute conditions is expected to decrease. In large part this is due to the improving situation in LMIC, in particular in the WHO African Region (see Annex 1), and notwithstanding the general increase in the Region's population (Figure 1.1).

Figure 1.4 also shows that in HIC mortality rates due to chronic diseases far outweigh those caused by acute diseases. In fact, LMIC in the WHO African Region are the only group of countries in which mortality rates due to acute disease are expected to remain in excess of those for chronic disease over the next 10–15 years. However, the projection is that by 2030 this difference will essentially disappear (see Annex 1).

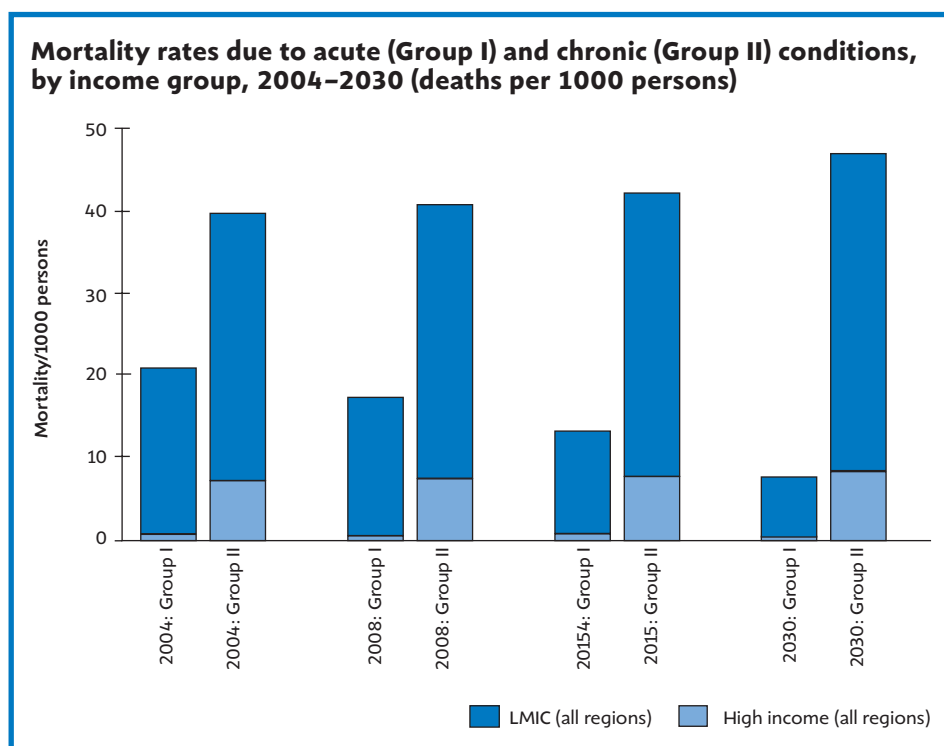
Box 1.2 is a short case study showing how the demographic and epidemiologic changes will drive up the chronic disease burden and increase demand for medicines, as exemplified by the growing global epidemic of diabetes.

FIGURE 1.3



Source: WHO (7).

FIGURE 1.4



Sources: WHO (4), WHO (7).

## BOX 1.2

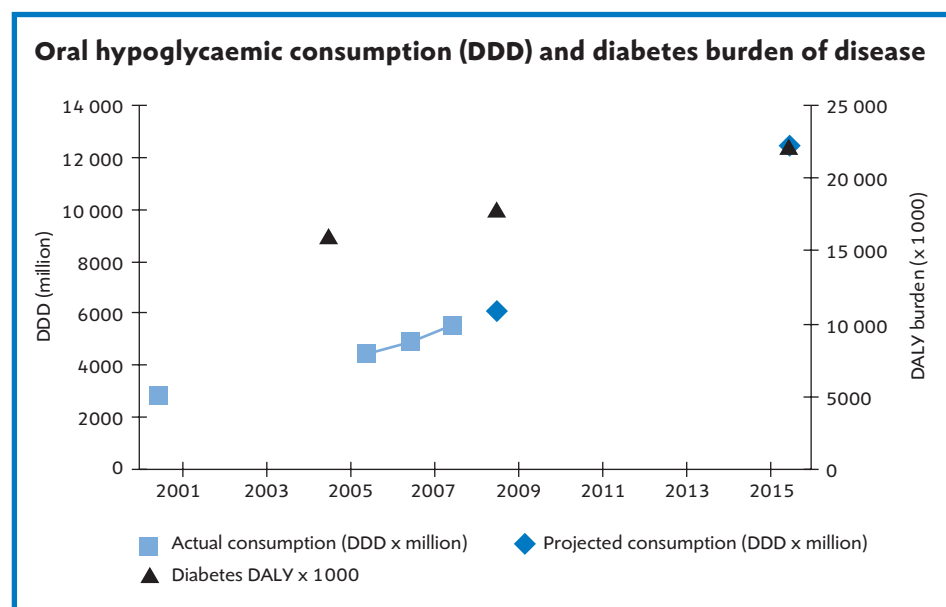
### Case study: Diabetes and pharmaceutical consumption

Along with population ageing and rising levels of obesity, the anticipated increase in the world's urban population (8) is expected to be a key driver of a projected rise in global diabetes prevalence from 2.8% in 2000 to 4.4% by 2030 (17). The link between diabetes and urbanization is likely related to lifestyle factors such as changes in dietary patterns, physical activity patterns and lifestyles. These in turn are probably a function of socioeconomic developments associated with a rise in car ownership, increased consumption of high-fat, calorie-dense foods, refined sugar and salt, and higher rates of smoking. Even if the prevalence of obesity remains stable until 2030, which seems unlikely, it is anticipated that the number of people with diabetes will more than double as a consequence of these interrelated drivers.

Such rising rates of disease will drive up production and consumption of selected pharmaceuticals, not only oral hypoglycaemics but also medicines for treating the other co-morbidities that are frequently associated with diabetes (e.g. hypertension) in patients who fail to control their diabetes. Figure 1.5 shows actual consumption of oral hypoglycaemics in LMIC for 2000, 2005, 2006 and 2007 (light blue) and projected consumption in 2008 and 2015 (blue diamonds). The burden of diabetes in these countries (expressed in terms of the DALY rate) in 2004, 2008 and 2015 (projected) is also plotted (black triangles). (See also Annex 1 for data tables). Ironically, better access to pharmaceuticals, and therefore increased rates of survival, may actually contribute to the increasing prevalence of diabetes in the future, especially in the more developed countries (17).



FIGURE 1.5



Sources: WHO (5), WHO (7), Wild et al. (17), Volman (18).

### 1.3

#### FACING THE FUTURE: CHALLENGES AND ISSUES IN MEDICINE INNOVATION, DELIVERY AND USE

Chronic, noncommunicable diseases currently account for more than 60% of all deaths worldwide, of which the vast majority occur in LMIC (1). Anticipated demographic and epidemiologic changes are likely not only to increase the share of chronic diseases in the global burden of disease further but also to drive up the cost of health care. Add to this the possibility of promising but costly new medical technologies and the fact that suppliers of health care have more market power than those on the demand side (6) and policy-makers everywhere are faced with several dilemmas as they plan health-care provision and delivery. How will end-users (e.g. the uninsured and those on fixed incomes, such as the elderly) and their governments afford chronic disease medicines in the future? How should governments allocate scarce funds among prevention and treatment programmes? Which low-cost interventions are best for chronic conditions?

The rising burden of chronic diseases puts pressure on suppliers of medicines to find more cost-effective treatment options and more efficient supply strategies. All of this translates into a need for innovation, not just in medicines, but also in health-care delivery models/systems. These are briefly discussed in the following sections.

For some developing countries, especially those in Africa, the challenges are even more acute. Low-income countries face the prospect not only of an increase in the burden of chronic diseases, but also the ongoing burden of treating illnesses such as AIDS, TB, malaria and other infectious diseases, the so-called “double burden”. In countries with high rates of these infectious diseases (see Figure 1.3), the proportion of health resources that is spent on anti-infective medicines is likely to rise as patient numbers continue to rise and resistance to treatment expands. Furthermore, as new medicines are developed and better health systems are established, the continuing demand for anti-infective medicines will create even more competition for limited resources.

*Low-income countries face the prospect not only of an increase in the burden of chronic diseases, but also the ongoing burden of treating illnesses such as AIDS, TB, malaria and other infectious diseases, the so-called “double burden”.*

## 1.3.1

**Innovation in noncommunicable chronic disease medications**

Great opportunities exist for developing and introducing new and innovative therapies for many chronic diseases and conditions. The development of multi-component fixed-dose combinations for the prevention and treatment of cardiovascular disease represents one such opportunity. Indeed, the development of multi-component combination drug therapies (19,20), especially high-volume, low-cost products based on proven, off-patent generic agents, is supported by scientific evidence and has potentially sizeable public health benefits. Development of heat stable insulin and drug-based therapies for improved obesity control would also be important advances in public health. At present, development of drug treatment for obesity is compromised by severe side-effects and the consequences of regulatory withdrawals from the market. Development is also challenged by the lack of long-term data on the effect of medications on obesity-related morbidity and mortality (21).

Depression is another high burden disease for which pharmaceutical treatments often have severe side-effects. Efficacy of these treatments in adolescents and the elderly is especially problematic. Longer-lasting, sustained release versions of medicines for depression would be another public health advance (22). Two other chronic conditions, both set to become increasingly prevalent, largely as a consequence of the demographic transitions outlined here, are osteoarthritis and Alzheimer disease, neither of which have particularly effective drug treatments at present (22).

There are three groups of patients for which the need for innovation in medicine warrants special mention, namely, the elderly, women and children. Polypharmacy is a well-recognized problem in the elderly. There thus exists a need to develop formulations for medications to be used by the elderly which might, in some circumstances, be fixed-dose combinations. Certainly, there is a need for pharmaceutical care programmes to be tailored to the needs of the elderly (22). It is important to improve the knowledge of drug effects in the elderly by including them in clinical trials, something that is rarely done today. Special guidelines or regulatory requirements should be drawn up to stimulate the inclusion of people aged 70 years and over in clinical trials.

Women, like the elderly, are often underrepresented in clinical trials thereby weakening the knowledge base relating to how medicines affect women, particularly in terms of safety and efficacy. Gender-specific analyses are required to detect gender differences in the effects of pharmaceutical interventions, but these too are seldom performed. Women's health care is also often compromised by the lack of sex-specific information about dosing of medicines and the uses of certain drugs unique to women, such as contraceptives. There are, however, several opportunities for innovation in this field; current research is exploring the potential of alternative targets for intervention (23), chemical compounds that have estrogenic effects such as tibolone, a synthetic steroid (24), and new drug delivery systems (e.g. vaginal rings, injections) (24). Given adherence is a major determinant for effective contraception, the development of long-acting or controlled-release formulations is another worthwhile aim, as are investment and innovation in other methods of contraception that give women more choice and control.

*To improve medicines development for children, there is a need to invest more in basic paediatric research, to increase the participation of children in clinical trials and to reverse the underfunding of research on child-specific medicine formulations.*

Children are subject to many of the same diseases as adults and are often treated with the same medicines. However, doses are often simply adjusted to account for a smaller weight, ignoring the fact that children not only differ from adults in pharmacokinetic and pharmacodynamic aspects, but also in adherence to therapy and other factors that influence the effectiveness of medicine use (25). To improve medicines development for children, there is a need to invest more in basic paediatric research, to increase the participation of children in

clinical trials, and to reverse the underfunding of research on child-specific medicine formulations (25). There is also a need for more information on drug safety and efficacy in children and adolescents, especially with respect to drugs used to treat mental disorders, which account for a high burden of disease (e.g. depression and anxiety disorders) in this group.

### 1.3.2

### Delivery of health care, including medicines

*“... the inherent complexity in the relationships between the health, social and environmental aspects of cities means that any analysis that isolates a feature of urban living and health is inevitably going to be too superficial.”*

Innovation in medicines development will only go so far in countering the challenges posed by demographic and epidemiologic transitions. Parallel development and innovation in health care and pharmaceutical supply systems will also be required. Many urban areas serve as referral centres for surrounding communities, and as such there is often greater availability of health and social services in urban areas. Thus, at first glance, it may seem easier, and cheaper per capita, for governments and other agencies to provide health services (however limited) to people living in cities than to the rural poor who are often dispersed over vast geographic areas (26,27). Indeed, some services and interventions, such as early childhood vaccinations, may well be more readily available to an urban population (28). However, the inherent complexity in the relationships between the health, social and environmental aspects of cities means that any analysis that isolates a feature of urban living and health is inevitably going to be too superficial. Specific features of some cities may affect certain diseases adversely, while other features may offer protection (27).

One distinguishing feature of urban health systems is the prominence of the private sector with various fee-for-service arrangements. Rural services on the other hand are often provided at nominal fees using public health-posts and clinics (29). Notwithstanding the fact that, even in the poorest countries, cities tend to have more health and social services (30,31) in practice, services often have different and sometimes even divergent goals. Moreover, the existence of well-equipped and well-paid private practice opportunities in a city may well decrease the likelihood that service providers will work in lower-paid, public service clinics. As a consequence, the urban poor without cash in hand tend to be at a disadvantage when it comes to gaining entry to hospitals, clinics and well-trained providers. As a result this sector of the population often presents with conditions that are more clinically advanced than they would otherwise have been (29), and are often missed by health development programmes, both public and private.

*“... for current systems to adapt to the positive and negative effects of rapid urbanization, and the growth of NCDs, a more fundamental change in approach to health-care provision needs to take place, from reliance on reactive acute care systems towards chronic care systems which perceive the patient as an empowered, active participant rather than a passive recipient of acute health care.”*

Thus, health-care delivery in a crowded urban area may not be any easier or more efficient than in settings where the population is relatively less dense. The fact remains that health and social services for disadvantaged or marginalized populations in any country are at the mercy of changing fiscal realities irrespective of where they reside (32).

There are several challenges to overcome in this regard (33). First, health-care resources have to be better aligned with the needs of the patient, especially for underserved patients and this includes systems of payment at the level of the patient visit, practice, and in the hospital. Second, systems of primary care should be created that provide sufficient time, space and the interpersonal relationships necessary to ensure high-quality care (33).

Thus, for current systems to adapt to the positive and negative effects of rapid urbanization, and the growth of NCDs, a more fundamental change in approach to health-care provision needs to take place, from reliance on reactive acute care systems towards chronic care systems which perceive the patient as an empowered, active participant rather than a passive recipient of acute health care. Underpinning most chronic care models is the notion that health care should facilitate an ongoing relationship between provider and patient which



helps patients to make full use of their own and their community's resources for health (28). In principle, treatment of chronic conditions rests on continuing care delivered by a well-functioning team that creates active patients and professionals working together to improve functions and clinical outcomes (34,35).

However, for the vast majority of countries, especially those in the developing world, an acute care model of health-care delivery still predominates, providing fragmented care that is primarily reactive, not proactive. Moreover, many regions have to contend with the double burden of both infectious and chronic diseases, coupled with limited resources and inadequate access to medicines. The need for this shift in focus from acute to chronic health-care models comes at a time when advances in information technology, particularly mobile telephones, are reaching every corner of the world. In the context of facilitating the implementation of chronic care models, the role of mobile phone technology, together with several other recent developments relating to the supply of pharmaceuticals, is briefly considered below.

### Self-monitoring and over-the-counter preparations

Many patients with chronic conditions self-manage their illnesses. The unfortunate truth is that most people, left to their own devices, will not and/or cannot adequately manage their own conditions, with poorer health outcomes being the inevitable consequence (36). Reversing problems associated with incorrect use of medications and poor adherence to treatment requires a new form of patient-professional partnership, one which involves a programme of collaborative care and patient education (36,37). This in turn requires health-care staff suitably trained and equipped to support patients in managing their long-term diseases.

Unfortunately, today's health-care-systems often lack the capacity to provide lifelong preventive and promotive care (via health education and patient empowerment) and treatment to an entire population. Selling chronic disease medications without a prescription, i.e. "over-the-counter" (OTC), is one possible solution to this lack of capacity. Although compelling, provision of OTC sales of medicines is not without difficulties. Countries will have to deal with the possible lack of data on benefits and risks in the target population, the inability of consumers to make appropriate self-selection decisions, a lack of ability to pay for the poorest families, a lack of appropriate monitoring, and inadequate regulatory control over advertising and marketing. The latter two concerns are especially pertinent to LMIC (38).

### Issues of access and re-supply for chronic disease medicines

The distribution of pharmaceuticals for communicable and noncommunicable diseases within many developing countries is inadequate to meet the health-care needs of large sectors of the population. A major obstacle confronting individuals who need pharmaceuticals is availability – the drug delivery infrastructure is often inadequate (see the Chapter on Supply Chain Management). Problems exist across the entire range of drug management, from procuring medicines at the national level, to ordering medicines at lower levels of the health-care system, to receipt, storage, distribution through to re-supply. If there is to be a shift away from reactive care models for acute conditions, it will be critically important to have well functioning pharmaceutical management systems in place. Reliable re-supply of medicines is especially important for chronic conditions which are not intended to be treated episodically. Improved methods of tracking and logistics will also need to be developed.

### Role of information technology

In HIC, the use of electronic medical records and other information technology (IT) systems is now routine. Extensions of the application of such systems to improve management of

*The unfortunate truth is that most people, left to their own devices, will not and/or cannot adequately manage their own conditions, with poorer health outcomes being the inevitable consequence.*

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chronic diseases in LMIC are easily imagined. For instance, diagnostic support systems that allow for automated introduction of clinical care pathways tailored to the needs of the individual (and fed with information about vital signs and pharmacological and physiological responses to therapy) already exist. In hospitals, information about the patient's medication needs can be fed directly to the pharmacy to facilitate supply and treatment.

Mobile phone technology, in ready supply in most LMIC, (39) may make these same or similar scenarios a less daunting proposition in these LMIC. A clinician might use a mobile device to access digital health records, write and transmit prescriptions, and interact with patients. Medicines administration can be streamlined by allowing patients who are capable of self-medication to do so and auditing their drug administration through use of a bar-code scanning system using mobile phones. Prescribers wishing to deviate from the predetermined care pathway can access all the information necessary to ensure their choices are evidence-based from a smart phone linked into a web-based virtual library.

*In principle, IT-based systems have the potential to reduce medication errors, ensure appropriate re-supply and by checking medicines and patient details against prescription records help minimize risks to patients.*

In principle, IT-based systems have the potential to reduce medication errors, ensure appropriate re-supply and by checking medicines and patient details against prescription records, help minimize risks to patients. Cell phones and other information technologies are already transforming health-care service delivery in some parts of the world. For example, a mobile phone medicine authentication method is in use in parts of Africa (40). Box 1.3 summarizes other examples of the use of IT technologies to exchange information (so-called "telemedicine") in the clinic, in education and research, which is likely to expand. Mobile telephone-based primary health-care management systems are within reach. The impact of the economic savings alone from using mobile IT in the treatment of chronic diseases could be enormous. However, scaling-up and sustaining these so-called "m health" services will require a sustainable health-care business model and the collaborative participation of the telecommunications, health-care and insurance industries.

#### BOX 1.3

##### **Transforming health-care delivery using mobile technology: case studies**

In South Africa, a mobile phone system has been developed, in the first instance to support the provision of antiretroviral medicines to patients with HIV/AIDS. However, the system could easily be modified for other conditions. The system relies on text messaging services (SMS) and cell phone technology for information management, transactional exchange and personal communication. The cell phone makes use of a normal issue SIM card across any existing cell phone network.

In a geographically diverse region of Indonesia, existing Internet communication equipment is used for telediagnosis, remote consultation, and collection and recording of patient information. There are two linked units: the mobile telemedicine unit on the patient side, and a hospital/doctor unit at the medical service centre. Telediagnosis is facilitated through provision of instruments for monitoring blood pressure, an electrocardiogram and Doppler fetal-diagnosis equipment at the patient end. Exchange of data between the patient and the hospital is performed via cell phones and fixed-line telephones. In this way, people living in rural areas or remote settlements can benefit from periodic medical examinations without having to make a long journey to a distant hospital.

Further examples of these and similar technologies can be found at:

[http://www.ehealth-connection.org/files/conf-materials/mHealth\\_%20A%20Developing%20Country%20Perspective\\_0.pdf](http://www.ehealth-connection.org/files/conf-materials/mHealth_%20A%20Developing%20Country%20Perspective_0.pdf)

## REFERENCES

1. *World population prospects: The 2006 revision*. New York, United Nations Department of Economic and Social Affairs, Population Division, 2007. Available at:  
<http://huwu.org/esa/population/publications/wpp2006/wpp2006.htm>
2. Kinsella K, He W, eds. *An aging world: 2008*. International Population Reports, P95/09-1. Washington, D.C., United States Government Printing Office, 2009. Available at:  
<http://www.census.gov/prod/2009pubs/p95-09-1.pdf>
3. *Men, ageing and health: Achieving health across the life span*. Geneva, World Health Organization, 2001. Available at:  
[http://whqlibdoc.who.int/hq/2001/WHO\\_NMH\\_NPH\\_01.2.pdf](http://whqlibdoc.who.int/hq/2001/WHO_NMH_NPH_01.2.pdf)
4. *The global burden of disease: 2004 update*. Geneva, World Health Organization, 2008. Available at:  
[http://whqlibdoc.who.int/publications/2008/9789241563710\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241563710_eng.pdf)
5. Murray CJL, Lopez A. Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *Lancet*, 1997, 349:1498–1504.
6. Reinhart UE. Does the aging of the population really drive the demand for healthcare? *Health Affairs*, 2003, 22:27–39. Available at:  
<http://content.healthaffairs.org/cgi/content/full/22/6/27>
7. Projections of mortality and burden of disease: 2002–2030 [downloadable data files]. Geneva, World Health Organization, 2010. Available at:  
[http://www.who.int/healthinfo/global\\_burden\\_disease/projections2002/en/index.html](http://www.who.int/healthinfo/global_burden_disease/projections2002/en/index.html)
8. *State of the world's cities 2008/2009: Harmonious cities*. Nairobi, United Nations Human Settlements Programme (UN-Habitat), 2008. Available at:  
<http://www.unchs.org/pmss/listItemDetails.aspx?publicationID=2562>
9. Kelly T et al. Global burden of obesity in 2005 and projections to 2030. *International Journal of Obesity*, 2008, 32:1431–1437.
10. *Global health risks: mortality and burden of disease attributable to selected major risks*. Geneva, World Health Organization, 2009. Available at:  
[http://www.who.int/healthinfo/global\\_burden\\_disease/GlobalHealthRisks](http://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks)
11. Finucane MM et al. National, regional and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet*, 2011, 377:557–567.
12. James PT et al. Overweight and obesity (high body mass index). In: Ezzati M et al., eds. *Comparative quantification of health risks, global and regional disease attributable to selected major risk factors*, Vol. 1. Geneva, World Health Organization, 2004. p. 497–596.
13. Ezzati M, Lopez AD. Smoking and oral tobacco use. In: Ezzati M et al., eds. *Comparative quantification of health risks, global and regional disease attributable to selected major risk factors*, Vol. 1. Geneva, World Health Organization, 2004. p. 883–958.

14. Warren CW et al. Global Tobacco Surveillance System (GTSS) Collaborative Group. Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet*, 2006, 367:749-753. Available at: DOI:10.1016/S0140-6736(06) 68192-0 or at:  
[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(06\)68192-0/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(06)68192-0/fulltext)
15. Ezzati M, Lopez AD. Measuring the accumulated hazards of smoking: global and regional estimates for 2000. *Tobacco Control*, 2003, 12:79-85. Available at:  
<http://tobaccocontrol.bmj.com/content/12/1/79.full>
16. Mathers CD, Loncar D. *Updated projections of global mortality and burden of disease, 2002-2030: Data sources, methods and results. Evidence and Information for Policy Working Paper*. Geneva, World Health Organization, 2005. Available at:  
<http://www.who.int/healthinfo/statistics/bodprojectionspaper.pdf>
17. Wild S et al. Global prevalence of diabetes: Estimates for the year 2000 and projections for 2030. *Diabetes Care*, 2004, 27:1047-1053. Available at:  
<http://care.diabetesjournals.org/cgi/reprint/27/5/1047>
18. Volman B. *Direct costs and availability of diabetes medicines in low-income and middle-income countries: 2007-2008*. Amsterdam, Health Action International, 2008. Available at:  
<http://www.haiweb.org/medicineprices/02012009/Aug08-Policy-Paper-Access-to-Diabetes-Medicines-FINAL.pdf>
19. Masiga J. Effect of introduction of fixed-dose combinations on the drug supply chain: Experiences from the field. In: *Fixed-dose combinations for HIV/AIDS, tuberculosis and malaria*. Geneva, World Health Organization, 2003:113-118. Available at:  
[http://whqlibdoc.who.int/publications/2003/a86263\\_part6.pdf](http://whqlibdoc.who.int/publications/2003/a86263_part6.pdf)
20. Wald N, Law M. A strategy to reduce cardiovascular disease by more than 80%. *British Medical Journal*, 2003, 326:1419-1425. Available at:  
<http://www.bmj.com/cgi/reprint/326/7404/1419>
21. Pagotto U et al. Pharmacological therapy of obesity. *Giornale Italiano di Cardiologia*, (Italian Journal of Cardiology) 2008, 9:83S-93S. (Article in Italian, abstract in English).
22. Willemen MJC, Jansen PAF, Leufkens HGM. Pharmaceuticals and the elderly. In: Kaplan W, Laing R, eds. *Priority medicines for Europe and the world: A public health approach to innovation*. Geneva, World Health Organization, 2004:90-91.  
[http://whqlibdoc.who.int/hq/2004/WHO\\_EDM\\_PAR\\_2004.7.pdf](http://whqlibdoc.who.int/hq/2004/WHO_EDM_PAR_2004.7.pdf)
23. Johansson EDB. Future developments in hormonal contraception. *American Journal of Obstetrics and Gynecology*, 2004, 190(Suppl.1):S69-S71.
24. Willemen MJC, Ververs FFT, Leufkens HGM. Pharmaceuticals and women. In: Kaplan W, Laing R, eds. *Priority medicines for Europe and the world: A public health approach to innovation*. Geneva, World Health Organization, 2004:93-95. Available at:  
[http://whqlibdoc.who.int/hq/2004/WHO\\_EDM\\_PAR\\_2004.7.pdf](http://whqlibdoc.who.int/hq/2004/WHO_EDM_PAR_2004.7.pdf)
25. Willemen MJC, Ververs FFT, Leufkens HGM. Pharmaceuticals and children. In: Kaplan W, Laing R, eds. *Priority medicines for Europe and the world: A public health approach to innovation*. Geneva, World Health Organization, 2004:91-93. Available at:  
[http://whqlibdoc.who.int/hq/2004/WHO\\_EDM\\_PAR\\_2004.7.pdf](http://whqlibdoc.who.int/hq/2004/WHO_EDM_PAR_2004.7.pdf)

26. Leon DA. Cities, urbanization and health. *International Journal of Epidemiology*, 2008, 37:4–8.
27. Sandro Galea S, Vlahov D. Urban health: Evidence, challenges, and directions. *Annual Review of Public Health*, 2005, 26:341–365.
28. Moore M, Gould P, Keary BS. Global urbanization and impact on health. *International Journal of Hygiene, Environment and Health*, 2003, 206:269–278.
29. Montgomery MR. Urban poverty and health in developing countries. *Population Bulletin*, 2009, 64:1–20. Washington D.C. The Population Reference Bureau. Available at: <http://www.prb.org/pdf09/64.2urbanization.pdf>
30. Casey MM, Thiede-Call K, Klingner JM. Are rural residents less likely to obtain recommended preventive healthcare services? *American Journal of Preventive Medicine*, 2001, 21:182–188.
31. Felt-Lisk S, McHugh M, Howell E. Monitoring local safety-net providers: Do they have adequate capacity? *Health Affairs* (Millwood), 2002, 21:277–283. Available at: <http://content.healthaffairs.org/cgi/reprint/21/5/277>
32. Andrulis DP. Community, service, and policy strategies to improve health care access in the changing urban environment. *American Journal of Public Health*, 2000, 90:858–862. <http://www.ajph.org/cgi/reprint/90/6/858>
33. Fiscella K. Healthcare reform and equity: Promise, pitfalls and prescriptions. *Annals of Family Medicine*, 2011, 9:78–84.
34. *Innovative care for chronic conditions: Building blocks for action*. Geneva, World Health Organization, 2002. Available at: <http://www.who.int/diabetesactiononline/about/icccglobalreport.pdf>
35. Holman H, Lorig K. Patients as partners in managing chronic disease. *British Medical Journal*, 2000, 320:526–527. Available at: <http://www.bmj.com/cgi/content/short/320/7234/526>
36. Epping-Jordan J et al. The challenge of chronic conditions: WHO responds. *British Medical Journal*, 2001, 323:947–948. Available at: <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1121495&blobtype=pdf>
37. Tinetti ME. Patient self-management of chronic disease in primary care. *Journal of the American Medical Association*, 2002, 288:2469–2475. Available at: <http://jama.ama-assn.org/cgi/reprint/288/19/2469>
38. Bodenheimer T et al. Over-the-counter sales of statins and other drugs for asymptomatic conditions. *New England Journal of Medicine*, 2008, 358:2728–2732. Available at: <http://nejm.highwire.org/cgi/reprint/358/25/2728.pdf>
39. Kaplan WA. Can the ubiquitous power of mobile phones be used to improve health outcomes in developing countries? *Globalization and Health*, 2006, 23:1–14. <http://www.globalizationandhealth.com/content/2/1/9>
40. MPedigree web site: <http://www.mpedigree.org/home/>



## **ABBREVIATIONS**

AIDS	Acquired immunodeficiency syndrome
AFRO	African Region (WHO)
AMRO	Region of the Americas (WHO)
ART	Antiretroviral therapy
ARV	Antiretroviral
BMI	Body mass indices
COPD	Chronic obstructive pulmonary disease
DALY	Disability-adjusted life year
EMRO	Eastern Mediterranean Region (WHO)
EURO	European Region (WHO)
GDP	Gross domestic product
HIC	High-income countries
HIV	Human immunodeficiency virus
IT	Information technology
LMIC	Low- and middle-income countries
OTC	Over-the-counter
SEARO	South-East Asia Region (WHO)
TB	Tuberculosis
WHO	World Health Organization
WPRO	Western Pacific Region (WHO)



# THE WORLD MEDICINES SITUATION 2011

## PHARMACEUTICAL CONSUMPTION

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**World Health  
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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- This Chapter examines medicine consumption by volume within the non-hospital sector. Usage patterns across 84 countries in all income categories and with a variety of different health-care systems are described.
- Consumption has grown in countries of all income categories. The percentage growth is higher in low-income countries than high-income countries, although in absolute terms the picture is reversed.
- Medicines to treat chronic disease are taking a larger proportion of total volume in the non-hospital sector. Projections indicate that chronic disease medicine volumes will need to increase dramatically if access is to be provided to those who need these medicines.
- Usage of medicines included on the WHO Model List of Essential Medicines is similar across countries of all income categories, at about 25–35%. Higher country income is not associated with different use of the Model List products, and out-of-pocket expenditure is not necessarily associated with lower rates.
- There is considerable variation in the share of original and licensed brand products both within and across product categories and countries as compared with other brands and unbranded products. This variation may represent an opportunity for policy intervention to encourage a shift in consumption to the generally cheaper unbranded categories of products.
- Analysis of consumption is complicated by the diversity of databases and classification systems. While the different systems can be viewed as being complementary, consumption patterns, and the impact of pharmaceutical policy in aggregate, could be clearer if data from the public and private sectors were combined. The need for more comprehensive information is particularly acute in low-income countries.

## 1.1

## BACKGROUND/INTRODUCTION

Medicines are key to maintaining good health. In many developing countries medicines are effectively unaffordable or inaccessible (1). As shown elsewhere in the chapter on Medicine Expenditures, in low-income countries total pharmaceutical expenditure constituted around 30% on average of total health expenditure (range 7.7% to 62.9%). The expense of serious family illness, including medicines, is a major cause of household impoverishment (2).

This chapter focuses on consumption within the non-hospital sector and looks at whether and how the situation has changed over the last 10–15 years. Usage patterns across a large number of countries are examined and the proportions of medicines to treat chronic and acute diseases compared. The extent to which medicines included on the WHO Model List of Essential Medicines are used and the use of generics is discussed. These analyses highlight issues for policy-makers in low- and middle-income countries that affect both infrastructure and policy.

## 1.1.1

## Data sources and methods of medicine classification

Analysis of information on volumes of medicines consumed is difficult as such information is often collected in different ways for different purposes by different organizations using different definitions (see Box 1.1). Procurement organizations may collect or report information from purchases or tenders (3). Health insurance or reimbursement organizations are likely to report expenditures and volumes of specific or of categories of products (4), but only for those products approved for reimbursement. Market research organizations are likely to report purchases by pack but rarely for low-income countries, and in such countries, public sector information is often omitted. Analysis of information on expenditures is interesting, however, it cannot provide a complete picture of consumption. The reason is that prices vary greatly for the same product across countries, over time and under different circumstances – as is shown in the Chapter on Medicines Prices, Availability and Affordability.

*Analysis of information on expenditure is interesting, however, it cannot provide a complete picture of consumption. The reason is that prices vary greatly for the same product across countries, over time and under different circumstances.*

Governments have used commercially available databases such as those from IMS Health to investigate medicine consumption across countries (5). Both EuroMedStat (6) and European Surveillance of Antimicrobial Consumption (ESAC) (7) have used and compared the data available produced by national health systems with those collected by IMS for particular therapeutic categories. In high-income countries the information on volumes from administrative databases and that collected by IMS is similar. For middle- and low-income countries, however, IMS data consist of either a combination of both public and private sector sales, or private sector sales alone (see Annex 1). In these countries, conclusions drawn only from administrative data may be very different from those based on IMS data.

IMS data and classifications were used in this Chapter for two reasons – first, ease of use and comparability as discussed above, and secondly, the need to look at long-term trends. In many middle- and low-income countries, long-term trend information has often not been collected from the public sector – if only because public sector reimbursement of medicines, particularly those used in the non-hospital sector, has generally been a relatively new phenomenon. IMS data are therefore often the only source of data on consumption in earlier periods.

This Chapter focuses on consumption within the non-hospital sector. This is not because the hospital sector is unimportant but because volume information in the hospital sector is, at least within high-income countries, often unavailable, even within commercial databases. The non-hospital sector information can generally be split from the hospital sector within



the IMS databases, and usually constitutes the larger volume. Given the lack of available hospital data for many countries, therefore, analysis was restricted to the non-hospital sector. Although in order to extend country coverage, a minority of the countries' data used (6 out of 84) related to both hospital and non-hospital sectors, or to the hospital sector alone (Denmark, Malaysia, Singapore, Slovenia, Sweden and China – see Annex 1). Robust data on volumes or particular categorizations were not available for all 84 countries in every year. The lowest number of countries included in any analysis was 73. Information on which countries' data were unavailable is given in each section.

A summary table describing the data sources used in this Chapter is given in Annex 1. In interpreting the volume trends described below the following comments should be borne in mind:

- IMS collects relatively few data relating to consumption of medicines in Central and East Africa, despite good coverage of French-speaking Africa and also parts of North Africa. The patterns of medicine consumption described here for low-income countries as a group could be very different if more comprehensive data were available.
- The decision to focus on the non-hospital sector does not mean that the same set of medicines or conditions were always being compared, particularly over different time periods. The range of medicines distributed in the non-hospital sector differs by country and has differed over time. In some countries, for example, Bulgaria and China, medicines used within hospitals are sometimes purchased from the non-hospital sector.
- The IMS non-hospital sector data for high-income countries show that payment is almost entirely through some form of taxation or insurance. In middle-income countries, the IMS data tend to reflect a mix of funding sources and in low-income countries, the data generally reflect out-of-pocket expenditure alone. This does not prevent comparisons being made but it will affect the types of questions that can be asked and the conclusions that can be drawn.
- Changes to the distribution system can also affect the range of medicines monitored by IMS, as will changes to IMS' coverage of that system.
- IMS data represent either purchase or dispensing by the supply chain, rather than actual consumption by patients.

### 1.1.2

### Definitions

This Chapter uses a number of different concepts to classify medicines and countries, as described below.

#### Medicines

*Protection:* Medicines are classified according to whether or not a product has benefited from protection from competition in the form of, for example, product patents or data exclusivity.<sup>1</sup> “Protected” products are those that are currently protected from competition. Products that are categorized as “No Longer Protected” are products that once benefited from protection, but for which this protection has now ceased or expired. Products that are categorized as “Never Protected” are products that have never benefited from protection. Classification

<sup>1</sup> One SU equals one tablet, one capsule, one suppository or pessary, one pre-filled syringe/cartridge, pen, vial or ampoule, one dose of an inhaled medicine or 5ml of an oral syrup or suspension. The definition of an SU of topical treatments, granules, powders, pellets, eye and ear preparations varies depending on the exact composition of the product but can be based on millilitres or grams. A Standard Unit has been defined for every product for which data are collected by IMS.

## BOX 1.1

**Standardization of pharmaceutical volumes**

There are two systems that have attempted to standardize data collection on pharmaceutical consumption by volume. The first is the WHO-ATC/DDD system coordinated by the WHO Collaborating Centre in Oslo (8). This centre has defined a five level system of classifying medicines by Anatomical, Therapeutic and Chemical criteria. Each molecule can be described by a unique alphanumeric code. A Defined Daily Dose (DDD) has been defined as the assumed average maintenance dose per day for a pharmaceutical used for its main indication in adults.

The European Pharmaceutical Market Research Association (EphMRA) developed and maintains the EphMRA ATC which classifies medicines into four levels (9). The first level is the broadest group, for example, "C", drugs working on the "Cardiovascular System". The fourth level is the narrowest group, for example C2A1, "Antihypertensives plain, mainly centrally acting".

Work has continued since 1991 to align the WHO and EphMRA ATC systems for all mono-substances in a given class as listed in the WHO ATC Index, mainly at the 3rd level and above. In this Chapter, analyses are carried out at either the first level or third level.

These two systems (WHO ATC/DDD and EphMRA ATC/IMS SU) should be seen as complementary. Each has been developed for a particular purpose but both allow comparisons of volume or medicines consumed to be made.

IMS developed and maintains the Standard Unit (SU) as a measure of volume.<sup>a</sup> The IMS Standard Unit is a measure of volume based broadly on an assumption about the smallest identifiable dose given to a patient, dependent on the pharmaceutical form. The SU thus attempts to describe the likely dose taken by a patient at any one time whilst the DDD is an estimate of the total amount of a drug that an "average" patient would take in a day for the drug's main indication. A DDD may therefore be equivalent to an SU, or a multiple of an SU, depending on the strength of, for example, a tablet.

Data from IMS can be converted to WHO ATC/DDD data formats but this has to be done at a molecule level, taking regard of the pharmaceutical form and the strengths, quantities or volumes within each pack. This might be done when data are to be compared with data from other sources, for example from public sector systems. This is possible for a single therapeutic group but cannot reasonably be done for all medicines across many therapeutic classes and countries.

<sup>a</sup> One SU equals one tablet, one capsule, one suppository or pessary, one pre-filled syringe/cartridge, pen, vial or ampoule, one dose of an inhaled medicine or 5ml of an oral syrup or suspension. The definition of an SU of topical treatments, granules, powders, pellets, eye and ear preparations varies depending on the exact composition of the product but can be based on millilitres or grams. A Standard Unit has been defined for every product for which data are collected by IMS.

depends on the availability of robust information on patents. This information is only available in the IMS data for 25 countries and these are described in the relevant section below.

*Licensing:* Medicines are also classified separately according to the relationship between the originator of the molecule and the company that is marketing the product. Products that are marketed by the originator of the molecule are defined as "original brands". Products that are marketed under the terms of a licensing agreement with the originator are defined as "licensed brands". "Other brands" constitute two different types of product. The majority of "other brands" are branded products that are either manufactured and/or marketed by a company that is not the originator of the molecule, and for which there is no evidence of a licensing agreement, for example, branded generics, pirate products and copy products. A number of "other brands" are also branded products that contain ingredients for which there are no originators, i.e. the ingredients are derived from naturally occurring substances.

Examples are vitamins, homeopathic medicines and infant milks. Some insulins are also classified as “other brands”. “Unbranded products” are products that are manufactured and/or marketed under the generic name of their ingredient molecule(s), rather than a brand name. This classification applies even if the product is launched before the estimated patent expiry date of the active molecule ingredient, and/or marketed by the molecule ingredient originator and a licensee of the originator. These definitions are applied as the product is launched and do not change with, for example, patent expiry. An “original or licensed brand” may therefore be “protected” or “no longer protected”. The licensing categorization is available in all but 10 of the country data listed in Annex 1 (Algeria, Croatia, Estonia, India, Kuwait, Latvia, Lebanon, Lithuania, Romania and Ukraine).

*Chronic/Acute:* Third-level EphMRA ATC classes are categorized according to whether that class was thought to be more likely to treat chronic disease or acute disease. The classification was based principally on an analysis of 14.6 million prescriptions issued to 1.1 million patients in the 12 months up to September 2008 taken from a sample of General Practices in the UK. Classes were first defined as acute or chronic on the basis of the average number of prescriptions written per patient in that year. If the average for a class exceeded two prescriptions, the class was assigned to “chronic”. For example, most antibiotics and analgesics were classified as acute whereas asthma and diabetes medicines fall into the chronic disease category. Some classes with less than an average of two prescriptions per patient per year were also assigned to “chronic” following review. The classes that were reassigned tended to be specialist products that are less likely to be recorded as being used within a General Practice database but which are nevertheless used to treat chronic disease. The full categorization is given in Annex 2.

*Essential medicines:* The definition of essential medicines was derived from the WHO Model List (10). For the latest data period (2008), the most recent WHO Model List available at the time was used (the 2007 List). For earlier periods, the List most appropriate to that time period was used. The WHO Model List contains a core and a complementary list and both lists contain medicines that may be substituted by any other medicine within the same pharmacological class. Those medicines that may be substituted are marked by a square box symbol. The WHO Model List specifies the molecule name, the form and the strength of the medicine. In this Chapter, medicine volumes are attributed to WHO Model List usage on the basis of molecule name and form alone. Strength was not used to filter out volume. This analysis will therefore tend to over-estimate WHO Model List usage as all strengths, rather than just those shown in the WHO Model List, are included. Substitutable medicines were defined in this Chapter as those medicines falling in the same EphMRA ATC3 class.

## Countries

*Income:* World Bank income categories for 2008 were used to classify countries (11). These ratings were also applied to data from earlier years, which means that comparisons over time represent comparisons between the same set of countries. In some cases data from IMS were only available as groups of countries. The data from Central America, for example, is an aggregate of six countries (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama), and the data from French-speaking Africa is an aggregate of 10 countries (Benin, Burkina Faso, Cameroon, Congo, Côte d’Ivoire, Gabon, Guinea, Mali, Senegal and Togo). These countries fall into different income categories. For the purposes of this Chapter the aggregate data were classified according to which income category was predominant. Thus French-speaking Africa was categorized as low-income (7 out of the 10 countries are low-income countries), and Central America as lower-middle-income (4 out of the 6 countries fall into the lower-middle-income category).

## 1.2

## 1.2.1

*Growth in  
consumption in the  
non-hospital sector  
occurred across  
all income  
categories*

## SITUATION ANALYSIS

## Pharmaceutical consumption in the non-hospital sector

## Per capita consumption

Table 1.1 shows the change in median pharmaceutical consumption per capita according to countries' level of income between the years 2000 and 2008. The earliest year for which the majority of countries' data are available was 2000, and 2008 was the latest calendar year for which data were available at the time of analysis. Growth in consumption within the non-hospital sector occurred across all income categories. High-income countries as a whole consumed very much more than lower-income ones, although some higher-income countries did post volume declines over this period, notably France. It should be remembered that these data reflect patterns in the non-hospital sector only and that volumes for the public sector in the low-income countries are not included.

Growth in volume was highest in the low-income countries. In middle-income countries growth followed the gradual expansion of public sector financing of medicines into the non-hospital sector. In low-income countries, however, where out-of-pocket expenditure is the main source of finance for the consumption shown here, other factors must be at work. One factor affecting all countries is the growing burden of chronic disease. The impact of chronic diseases on consumption patterns is examined specifically in later sections.

**TABLE 1.1 Per capita pharmaceutical consumption in the non-hospital sector by country income category (by volume, 2008 in SU).**

	Median per capita consumption, 2008	Multiple of median SU per capita to that of low income countries	% change in median annual per capita consumption (2000 versus 2008)
High (n=31)	1042	7.7	18.6%
Upper-middle (n=15)	515	3.8	20.4%
Lower-middle (n=19)	214	1.6	22.9%
Low (n=12)	135	1.0	29.3%

Of the 84 countries listed in Annex 1, the following were excluded from this analysis: Israel, the Netherlands, Puerto Rico (high-income), Croatia, the Russian Federation (upper-middle income) and Algeria and Ukraine (lower-middle income).

For the rate of growth in volumes between these two dates, see Annex 3.

## Analysis of consumption by EphMRA ATC class

Just five classes of medicines account for more than two thirds of total volume and four of them are common to all income groups in both 2000 and 2008 (see Table 1.2 below and Annex 4).

Systemic general anti-infectives (Class J) are used more widely in low-income countries, where this class had a higher share (7.3%) compared to cardiovascular medicines (Class C) (4.3%). The importance of infectious diseases in low-income countries is reinforced by an examination of medicines used in the treatment class P (Parasitology). These medicines are almost absent in 2008 within high- (0.2%) and upper-middle- (0.4%) income countries but take a relatively high volume share in low-income countries (3.5%).

**TABLE 1.2 Consumption of major classes of medicine by country income category in the non-hospital sector, 2008**

EphMRA ATC class	% total consumption by major classes of medicine, 2008 (growth compared to 2000)			
	High (n=31)	Upper middle (n=15)	Lower middle (n=19)	Low (n=12)
A alimentary tract and metabolism	16.6 (-1.7)	17.4 (-1.7)	22.7 (-0.9)	23.9 (0.3)
C cardiovascular system	15.6 (3.0)	11.9 (1.3)	7.7 (1.4)	4.3 (0.8)
N central nervous system	16.6 (2.5)	12.9 (-1.4)	9.1 (-0.6)	13.7 (-0.4)
R respiratory system	12.8 (-2.5)	19.8 (0.3)	14.5 (-0.7)	17.3 (1.9)
S sensory organs	12.8 (0.4)	12.2 (0.3)	13.2 (-1.1)	12.7 (-2.4)

Growth compared to 2000 is shown in brackets. Of the 84 countries listed in Annex 1, the following were excluded from this analysis: Israel, the Netherlands, Puerto Rico (high-income), Croatia, the Russian Federation (upper-middle income) and Algeria and Ukraine (lower-middle income).

For percentage growth in volumes between these two dates, see Annex 5.

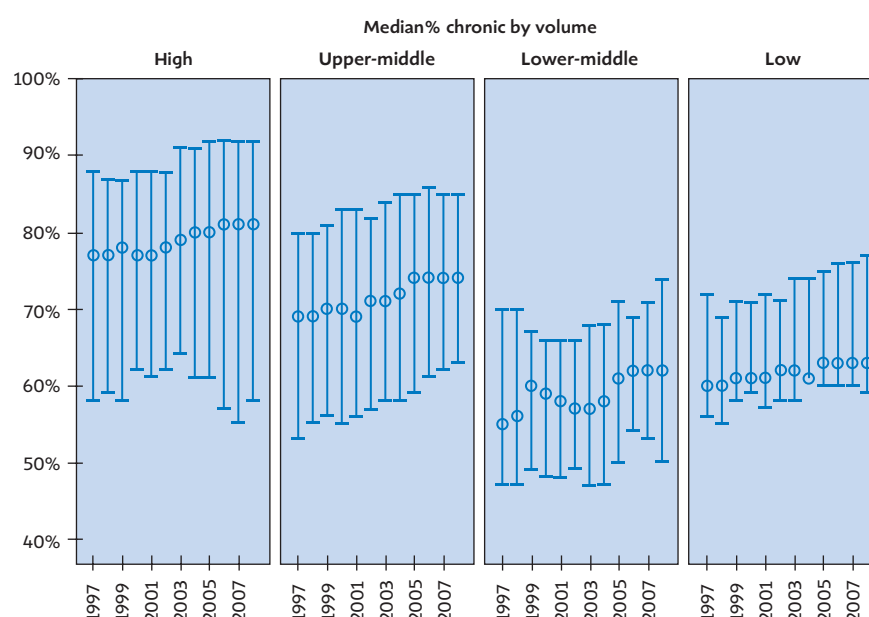
### Consumption of acute and chronic disease medicines

In this analysis, groups of medicines at EphMRA ATC Class 3 level were classified as being used to treat mainly either acute or chronic disease (for methods and definitions, see Section 1.1). From Figure 1.1 it can be seen that those medicines classes used mainly to treat chronic disease constitute an increasing proportion of total volume across all income categories,

**FIGURE 1.1**

*Medicines classes used mainly to treat chronic disease constitute an increasing proportion of total volume across all income categories, although acute disease maintains a significant share.*

### Comparison of medicine classes used to treat chronic diseases in the non-hospital sector as a proportion of total volume among different WHO country income categories between 1997 and 2008 (median and range)



For the list of countries' data included in each year, see Annex 6.



although acute disease maintains a significant share. The median percentage of products used to treat chronic disease is consistently less for lower-income countries than for higher-income countries, reflecting the greater burden of infectious diseases in lower-income countries.

The growth in chronic disease medicine volumes is not unexpected. Chronic disease is forecast to increase dramatically in the developing world. The projected impact of chronic disease has been estimated for the 23 developing countries with more than 80% of the chronic disease burden in 2005. Deaths due to chronic disease were projected to rise by 48% between 2005 and 2030, and disease burden (Disability-Adjusted Life Year (DALY) lost) by 20%. A DALY is a summary measure that combines years of life lost due to premature death and years of life lived with disability (12).

## BOX 1.2

### Type 2 diabetes and its impact on morbidity and mortality

The study used information on treatment volumes collected by IMS from the public sector in South Africa and the public and private sectors in Brazil. Information on prevalence and current access to treatment were derived from the literature. Analysis was restricted to the public sector in South Africa due to the absence of information on prevalence of diabetes in patients treated in the private sector. Analysis covered both the public and private sectors in Brazil.

Target levels of usage of antidiabetic medicines were derived from the cohort of patients placed on an intensive glycaemic control programme as described in the ADVANCE trial, a factorial randomized, controlled trial conducted at 215 Collaborating Centres in 20 countries from Asia, Australasia, Europe and North America (15). At the time of the analysis, intensive treatment had been found to provide a 10% relative reduction in the combined outcome of major macrovascular and microvascular events as compared to standard control regimens, although more recently published trials may appear now to give a different picture.

The estimated change to current volumes if intensive treatment were introduced is shown in Table 1.3 below. Estimates are given for two levels of patient access – 15% and 60%. If a 60% target is chosen, the estimated required increases (in WHO DDDs) for oral antidiabetics in Brazil is more than 200% and well over 300% in the public sector in South Africa. Negative values indicate that current volumes exceed those needed to reach target levels in that level of patient access.

TABLE 1.3

#### Estimated change to current volumes if intensive treatment for Type 2 diabetes was introduced in South Africa and Brazil, two middle-income countries

		Increase in volume needed to intensively treat	
		Only 15% of all diabetes patients	Only 60% of all diabetes patients
South Africa (public sector)	Melformin	16.50%	366%
	Sulfonylureas	48.80%	495%
	Insulin	-62%	52%
Brazil	Melformin	-13%	248%
	Sulfonylureas	-12%	254%
	Insulin	44%	475%

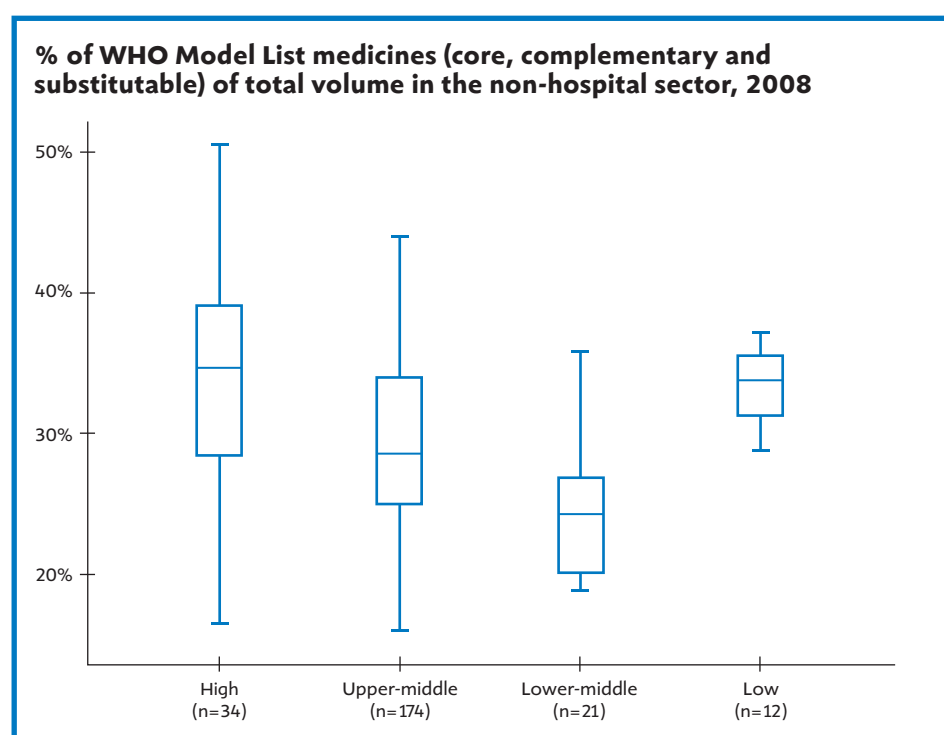
The impact of such growth on absolute volumes, as opposed to expenditure, is relatively unexplored. An analysis was therefore carried out to estimate the absolute volume increase needed to treat patients with Type 2 diabetes in two middle-income countries, and indeed what effect wider usage would have on morbidity and mortality (13). Diabetes is a significant cause of chronic disease burden and by 2025 approximately three quarters of those with diabetes will live in developing countries (14). The methodology and results are described in Box 1.2.

### The use of essential medicines by country income category

The WHO Model List of Essential Medicines is a guide for the development of national and institutional essential medicines lists. Medicines were categorized according to whether or not they were included within the WHO Model List (for more information on essential medicines and the WHO Model List see the Chapter on Selection and for the methods and definitions used here, see Section 1.1).

Figure 1.2 shows the percentage of total volume, and interquartile range, in the non-hospital sector in 2008 made up by medicines listed on the core and complementary WHO Model List of Essential Medicines and medicines that are permitted to be substituted for those on the core and complementary List issued in 2007. It is important to note that the IMS data from low-income countries exclude publicly reimbursed medicines, and that in middle-income countries the information from the public hospital sector is not included. A key comparison is between the public sector in high-income countries and the private sector in low-income countries. This is because these represent on the one hand national or insurance funded expenditure in public sector facilities and on the other out-of-pocket expenditure in private facilities. Middle-income countries in IMS data represent a mix of funding (see Annex 1). Having said this, there appears to be little difference between country income categories, and the situation has changed little since 2002 (see Annex 8). Median usage of medicines on the Model List ranges on average between 25% and 35% across all income categories.

FIGURE 1.2



All countries/panels listed in Annex 1 are included in the analysis.

There are a number of reasons why the use of medicines included in the WHO Model List may be so low, but these are likely to be different in the various income categories. In low-income and some middle-income countries the level will be a function of the fact that here the private sector serves to both supplement and complement the public sector. The mix of medicines stocked in the private sector will thus tend to be different to those procured by the public sector. Given the mix of funding sources in middle-income countries, however, it might have been expected that the rate of WHO Model List usage would have been higher than that seen in low-income countries. However, it is clear from the data from high-income countries that a higher income, and wider public reimbursement of medicines, does not necessarily correlate with greater or lesser use of the WHO Model List products.

### 1.2.2

### Consumption of brands and/or generics

#### Percentage of volume in the retail sector by type of brand in 2008

As discussed earlier, IMS data can be divided into two broad categories: “original brands” plus “licensed brands” and “other brands” plus “unbranded medicines” (for definitions see Section 1.1).

In 2008, the share (in volume) of other brands and unbranded was more than twice that of original and licensed brands across all income categories (see Table 1.4). The share of original and licensed brands was highest in high-income countries but similar in both middle- and low-income countries. There has been modest decline (2–3%) in the percentage of original and licensed brand usage since 2000. The higher percentage use of original and licensed brands in high-income countries no doubt reflects their higher use of on-patent products. These similarities however hide considerable variation between countries in the use of generic medicines, as shown in the next section.

**TABLE 1.4 Percentage share of original and licensed branded medicines, of different types of medicines, in the non-hospital sector by country income category in 2000 and 2008**

	High (n=31)	Upper Middle (n=12)	Lower Middle (n=18)	Low (n=12)
<b>2000</b>				
Median	38%	23%	22%	30%
Minimum	7%	6%	7%	10%
Maximum	57%	38%	32%	31%
Percentile				
25	33%	18%	14%	20%
75	46%	30%	30%	30%
	High (n=31)	Upper Middle (n=12)	Lower Middle (n=18)	Low (n=12)
<b>2008</b>				
Median	35%	20%	19%	28%
Minimum	17%	9%	6%	6%
Maximum	55%	38%	33%	31%
Percentile				
25	26%	16%	10%	17%
75	44%	23%	25%	29%

*The share of original and licensed brands was highest in high-income countries, but similar in middle- and low-income countries. There has been modest decline in use (2–3%) since 2000.*

Of the countries listed in Annex 1, the following were excluded from this analysis in both 2000 and 2008: Estonia, Kuwait, the Netherlands (high-income), Croatia, Latvia, Lebanon, Lithuania, Romania (upper-middle-income), Algeria, India, Ukraine (lower-middle-income).

### Consumption of generics in higher-income countries

In 25, mainly high-income, countries, the IMS consumption data can be broken down according to the existence of legal or commercial protection from competition (see Section 1.1 for definitions). This allows analysis of only that part of total consumption that has never been protected against competition or for which protection has expired or ceased (the “unprotected” market). Figures 1.3 and 1.4 show a breakdown of the unprotected market for

FIGURE 1.3

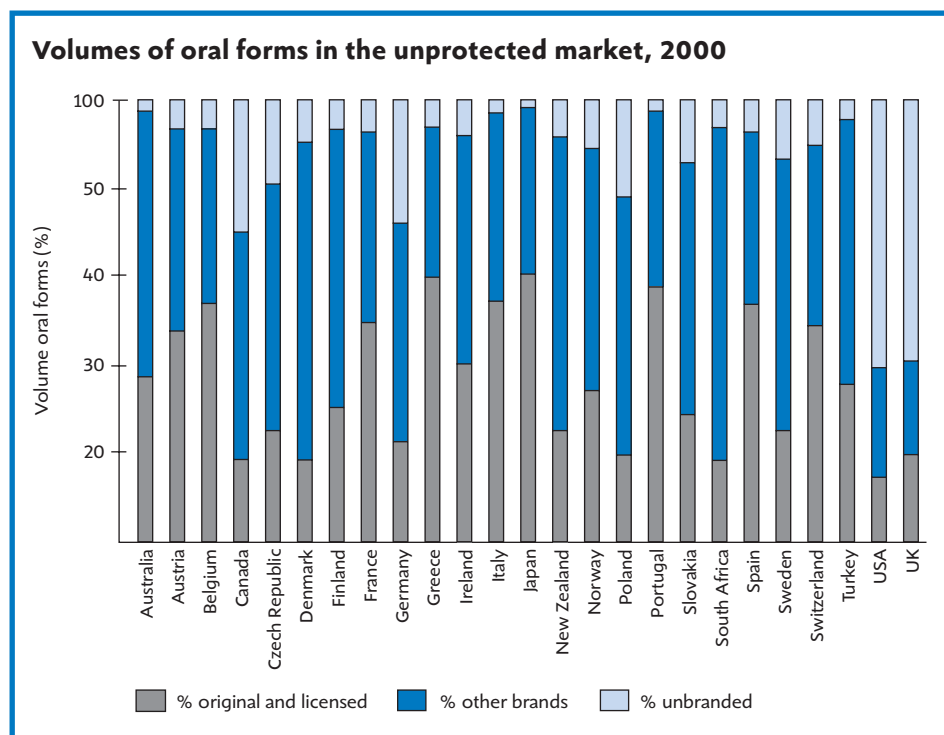
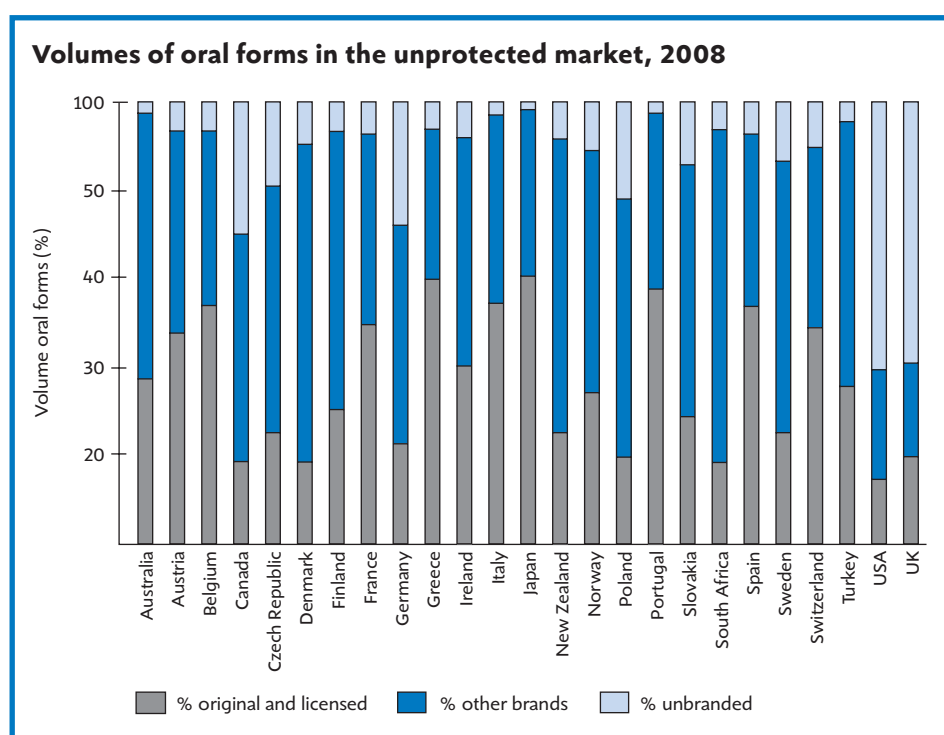


FIGURE 1.4



*Canada, Germany, the UK and USA use a substantial amount of unbranded (generic) medicines while other countries rely heavily on original or licensed branded products.*

oral forms in the non-hospital sector for all 25 high- and upper-middle-income countries for 2000 and 2008.

As noted above there is considerable variation between countries in the use of the different types of product. It is clear that the USA, the UK, Canada and Germany use a substantial amount of unbranded (generic) medicines while several other countries still rely heavily on original or licensed branded products even though their protection has expired or ceased years previously. In the higher-income countries described here, it may be that reference pricing, rebates paid by the wholesalers or pharmacists, regional or national procurement contracts or other reimbursement policies lead to little or no differential in the price of the original or licensed brand and the equivalent unbranded generic at some or all of the points within the distribution chain. It is only where this is not the case that wider use of unbranded generics would produce savings and policy needs to take these factors into account.

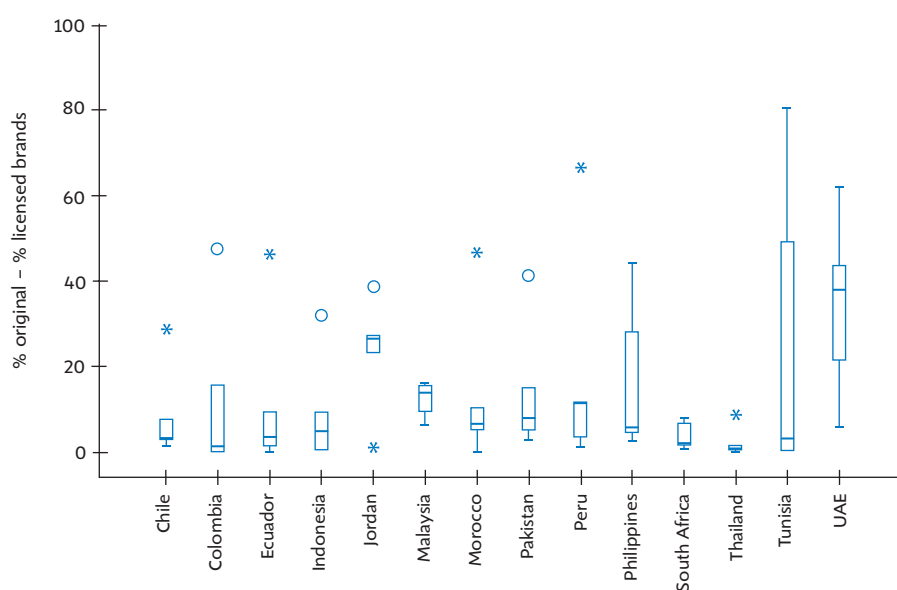
### Consumption of generics in lower-income countries in the non-hospital sector

In lower-income countries the difference in price between original and licensed brands and their branded or unbranded generic equivalents can be great. For example, in a review of the WHO/HAI pricing studies the “percentage difference in price between originator brands and lowest-priced generics (brand premium) in the private sector was over 300% in lower-middle-income countries and low-income countries, whereas in upper-middle-income countries it was substantially lower (152%), and in India it was only 6%.”<sup>(1)</sup>

As explained in Section 1.1, in lower-income countries it is not possible within the IMS data to split out the unprotected market. However it is possible to look in some detail at some widely used molecules. Figure 1.5 shows how the share of volume of original and licensed brands varies for each of five commonly used medicines from different therapeutic classes. Each of these medicines had generic equivalents according to the WHO/HAI survey. Outlier products whose market share was more than 1.5 times the Inter Quartile Range

FIGURE 1.5

### Consumption of original and licensed branded versions of five commonly used medicines<sup>a</sup> in the non-hospital sector in the year to September 2009 (as a percentage of total consumption)



<sup>a</sup> acyclovir 200 mg, atenolol 50 mg, ciprofloxacin 500 mg, omeprazole 20 mg and simvastatin 20 mg.

*Use of original and licensed brands varies both by medicine and across countries. Such variation may offer opportunities for savings if there was greater use of generics.*



(IQR) for the country are indicated by circles. Outlier products whose market share was more than three times the IQR for the country are indicated by asterisks.

Even within this small sample of products it can be seen that the use of original and licensed brands varies both by medicine and across countries. Again such variation may offer an opportunity for savings if there were greater use of generics. However, branded generics have sometimes been found to be priced at the same price as the original or licensed brands and the perception of the relative quality of branded or unbranded generics and indeed their relative pricing in each country has had a significant effect on consumption patterns.

### 1.3

### FUTURE CHALLENGES AND ISSUES

*As demand grows, unless systems and resources improve, the rate of stock-outs, already too high in both the public and private sectors in the developing world, may worsen.*

The current and projected growth in volumes seen here will challenge the health-care budgets of both individuals and governments, and perhaps also the supply chain itself. As demand grows, unless systems and resources improve, the rate of stock-outs, already too high in both the public and private sectors in the developing world, may worsen.

The analyses in this Chapter suggest some useful areas for further investigation at an individual country level that will help to address these two issues:

- Whilst the intra- and inter-country variation in the use of generic medicines is not necessarily indicative of inconsistent policy, it does suggest that a review of the different incentives and requirements for generic prescription, dispensing and substitution, and their implementation, may generate substantial savings.
- The role of the private sector supply chain should be considered. The impact of dramatically increased volumes on the reliability of supply may be better managed using the skills and resources of both sectors than either alone. Lessons from the Medicines Transparency Alliance may be relevant (16).
- The 25–35% share of consumption of medicines that are on the WHO Model List of Essential Medicines may indicate that a local review of consumption patterns of products on the national list is appropriate, if this has not been done already.

These actions, and assessment of their impact, will benefit from comprehensive information covering both the public and private sectors. In lower-income countries, particularly those in sub-Saharan Africa, the information that is available is spread across a number of different databases and sources. Efforts to link together such sources of information on price, volumes and expenditure should be encouraged.

## REFERENCES

1. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet*, 2009, 373, 9659:240–249.
2. World Health Organization Medicines web site:  
[http://www.who.int/medicines/services/essmedicines\\_def/en/index.html](http://www.who.int/medicines/services/essmedicines_def/en/index.html)
3. *International drug price indicator guide. Price sources*. Cambridge MA, Management Sciences for Health, 2011. Available at:  
<http://erc.msh.org/mainpage.cfm?file=2.1.cfm&id=5538&temptitle=Price%20sources&module=DMP&language=English>
4. Stolk P et al. No difference in between-country variability in use of newly approved orphan and non-orphan medicinal products – a pilot study. *Orphanet Journal of Rare Diseases*, 2009, 4:27. Available at:  
<http://www.ojrd.com/content/pdf/1750-1172-4-27.pdf>
5. Dickson M, Jacobzone S. *Pharmaceutical use and expenditure for cardiovascular disease and stroke: A study of 12 OECD countries*. Paris, OECD Health Working Papers, February 2003. Available at:  
[http://www.oecd.org/document/25/0,3343,en\\_2649\\_33929\\_2380441\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/25/0,3343,en_2649_33929_2380441_1_1_1_1,00.html)
6. Walley T et al. Comparison of national administrative and commercial databases to monitor expenditure and costs of statins across Europe. *European Journal of Clinical Pharmacology*, 2004, 60:503–511.
7. Campos J et al. Surveillance of outpatient antibiotic consumption in Spain according to sales data and reimbursement data. *Journal of Antimicrobial Chemotherapy*. doi:10.1093/jac/dkm248. Available at: <http://jac.oxfordjournals.org/cgi/reprint/dkm248v1>
8. WHO Collaborating Centre for Drug Statistics Methodology. *ATC/DDD Methodology*. Available at:  
[http://www.whocc.no/atc\\_ddd\\_methodology/purpose\\_of\\_the\\_atc\\_ddd\\_system/](http://www.whocc.no/atc_ddd_methodology/purpose_of_the_atc_ddd_system/)
9. European Pharmaceutical Market Research Association (EphMRA). *Anatomical Classification*. Available at:  
<http://www.ephmra.org/classification/anatomical-classification.aspx>
10. WHO Model List of Essential Medicines 15th List, March 2007. Geneva, World Health Organization. Available at:  
[http://www.who.int/medicines/publications/08\\_ENGLISH\\_indexFINAL\\_EML15.pdf](http://www.who.int/medicines/publications/08_ENGLISH_indexFINAL_EML15.pdf)
11. World Bank. *World Development Indicators database*. Available at:  
<http://data.worldbank.org/indicator/SP.POP.TOTL>
12. Abegunde DO et al. The burden and costs of chronic diseases in low-income and middle-income countries. *Lancet*, 2007, 370, 9603:1929–1938.
13. *Estimates of the impact of Type 2 diabetes on volumes and of the impact of different treatment regimens on overall survival in simulated cohorts of type 2 diabetes patients in South Africa, China and Brazil*. Report prepared for the World Medicines Situation. London, IMS Health, 2009 (see Annex 7).

14. Dagogo-Jack S. Primary prevention of type-2 diabetes in developing countries. *Journal of the National Medical Association*, 2006, 98, 3:415–419.
15. The ADVANCE Collaborative Group. Intensive blood glucose control and vascular outcomes in patients with type 2 diabetes. *New England Journal of Medicine*, 2008, 358:2560–2572.
16. Medicines Transparency Alliance web site: <http://www.medicines Transparency Alliance.org/>

## ABBREVIATIONS

ATC	Anatomical, Therapeutic, Chemical
CCPs	Certificats Complementaire de Protection, Supplementary Protection Certificates
DALY	Disability-Adjusted Life Years
DDD	Defined daily dose
EphMRA	European Pharmaceutical Market Research Association
ESAC	European Surveillance of Antimicrobial Consumption
HAI	Health Action International
IQR	Inter Quartile Range
SU	Standard Unit
WHO	World Health Organization



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# THE WORLD MEDICINES SITUATION 2011

## MEDICINE EXPENDITURES

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Per capita pharmaceutical expenditures in 2005/2006 ranged from US\$ 7.61 in low-income countries to US\$ 431.6 in high-income countries, with considerable variation between income groups in each country. Compared to 1995, the rate of increase is greater in middle- and low-income countries.
- Sixteen percent of the world's population living in high-income countries accounts for over 78% of global expenditures on medicines.
- Measured Total Pharmaceutical Expenditure (TPE) accounts for 1.41% to 1.63% of Gross Domestic Product (GDP) by income groups and regions although there is considerable variation between countries ranging from 0.2% to 3.8% of GDP.
- TPE is closely related with both Total Health Expenditures (THE), and with GDP. The proportion spent on medicines is higher in low per capita income countries. On average 24.9 % of THE is spent on medicines, with a wide range from 7.7% to 67.6%
- Since 1995 the private share of TPE has increased in all but high-income countries.
- TPE is determined by price and quantity of medicines purchased. In countries with low prices and high per capita TPE addressing the rational use of medicines is critical to control TPE and TPE growth. Additional policies on medicine prices may be required to ensure equitable access.
- Millennium Development Goal (MDG) 8-E expresses a global commitment to ensure that access to essential affordable medicines is achieved by 2015. To achieve this goal an increase in spending on medicines in low- and middle-income countries may be required. This could be achieved by an increase in health insurance coverage or increased public expenditure.

**1.1****INTRODUCTION**

How much do countries spend on pharmaceuticals? Are there many differences in expenditure patterns between countries? How are those expenditures funded? What are the components that make up pharmaceutical expenditures? Is spending on pharmaceuticals increasing?

Regrettably, due to a lack of comparable data on pharmaceutical expenditures, many of these key and frequently asked questions have – until relatively recently – remained largely unanswered. Hitherto, data on pharmaceutical spending have been limited to that generated by the pharmaceutical industry, principally to serve their own marketing purposes and in most cases these data have a limited coverage, both geographically and in terms of content. Such data have limited relevance to health system policy development and implementation, the main limitation being that the data do not reflect the purchase price of medicines, which is inevitably higher than manufacturer or wholesale prices. The availability and quality of data on levels of pharmaceutical spending are better in high-income countries, the Organisation for Economic Co-operation and Development (OECD) for instance has recently released a detailed analysis of expenditure on pharmaceuticals (1). For many low-income countries, no comprehensive retail sales data, nor detailed executed budgets on pharmaceuticals, and sometimes, reference data such as manufacturer data, nor comprehensive or continuous consumer data are available beyond what the Ministry of Health (MoH) or other interested agency can collate.

Many countries are facing large increases in their expenditures on pharmaceuticals (2), a matter that causes concern for policy-makers worldwide. In many countries, especially the low-income countries, the high proportion of medicines spending that is paid for out-of-pocket by individuals, creates a huge financial burden on patients and presents an additional problem for policy-makers. In order to develop effective policies aimed at securing universal access to essential medicines requires a comprehensive understanding of a country's current expenditures on pharmaceuticals in relation to its level of income and other expenditures. This process can be greatly enhanced by comparing levels of expenditure (in the both public and private sectors) with that of neighbours or other countries at a similar level of income (2,3)

In recent years and as a direct result of its work to support Member States in preparing National Health Accounts (NHAs) (4), WHO has promoted a methodology for generating comparable country data on health system expenditures, including that on pharmaceuticals. Estimates of total pharmaceutical expenditures (TPE) based on WHO's NHA data were first published in 2004, in the previous edition of *The World Medicines Situation* (5,6).<sup>1</sup> The present chapter updates that earlier work, and using the latest available data examines patterns and trends in pharmaceutical expenditures, both globally and by national income level. Drawing on this analysis, the concluding section (1.4) identifies key challenges and priorities for future work in this area.

**1.2****SPENDING ON PHARMACEUTICALS: PRESENT SITUATION**

Medicines represent one of the most frequently used health technology components for prevention and treatment of ill health and disease (1). They represent one of the single

<sup>1</sup> The World Medicines Situation 2004. Chapter 5 & Annex 2.  
<http://apps.who.int/medicinedocs/en/d/Js6160e/2.html#Js6160e.2.2/>.



largest components of health expenditure, accounting for more than 15.2 % of total health spending in the world in 2000 (5). Both the above-mentioned OECD analysis (1) and the 2004 *World Medicines Situation* report (5) showed that the rate of change in total pharmaceutical expenditures (TPE) has been greater than the rate of change in total health expenditures (THE) and gross domestic product (GDP) in a number of different countries worldwide. According to estimates in low- and middle-income countries the proportion of total government expenditure on medicines was on average 28.4% and 29.1%, respectively (5) in 2000.

The current situation analysis is based on data on pharmaceutical spending extracted from WHO's National Health Accounts (NHA) data files for 2006 (note that 2005 data were used when 2006 data were unavailable), with the updates at the time of writing (September 2009) (4).<sup>1</sup> NHAs provide a standard measurement framework for reporting pharmaceutical data, including that on expenditures. They break down by total expenditure into public (government) and private components, OTC and prescribed medicines, but do not distinguish between essential and non-essential medicines, or generic and branded or originator medicines. The concepts and methods underlying the presentation of statistics on pharmaceutical expenditure are described in greater detail in Box 1.1.

In the subsections that follow, data on total pharmaceutical spending (public and private) are presented for the "world", and for countries grouped by World Bank income level (high-, upper-middle, lower-middle and low-income) and by WHO region. These estimates of total pharmaceutical spending are based on available data for 161 out of 193 WHO Member States. Country-specific data are given in the Annexes in Table A1.1-Table A1.10 and Figure A1.1-Figure A1.16. In the summary tables included here, key variables are reported as means, medians and ranges (the sample size, i.e. number of countries included in the calculation is also given). Expenditures were converted from national currency units (NCUs) to US dollars (US\$) using the national exchange rate.

*In 2006, just 16% of the world's population accounted for 78.5% of global pharmaceutical expenditures.*

### 1.2.1

#### Total expenditure on pharmaceuticals

Although data on total pharmaceutical expenditures are lacking for many low-income countries, it is evident that collectively high-income countries spend a great deal more on medicines than the less wealthy countries. In 2006, high-income countries accounted for 78.5% of global pharmaceutical expenditures, while the upper middle-income, the lower middle-income and the low-income countries combined accounted for the remaining 21.5% of the total (10.2%, 10.3% and 1.0%, respectively). In other words, just 16% of the world's population in 46 countries was responsible for more than 78% of the world's total expenditures on pharmaceuticals, leaving the poorest 71% of the population distributed among 78 low-middle- and low-income countries with an 11% share of the world's medicines expenditure. Figure 1.1 reflects the extremely unequal levels of total pharmaceutical expenditure (TPE) between high-, middle- and low-income countries. The disparity is even more evident when spending is expressed in per capita terms. Per capita pharmaceutical expenditures ranged from as little as US\$ 7.61 in low-income countries to US\$ 431.6 in high-income countries, with considerable country variation within individual income groups, measured as standard deviation of per capita spending.

<sup>1</sup> See <http://www.who.int/nha/en/> and <http://www.who.int/whosis/en/index.html>

The main differences between data released in 2004 and this update are due to improved data sources. Current releases more often measure direct expenditure of pharmaceuticals instead of international and national wholesale trade as was done in 2004.

## BOX 1.1

**Indicators of pharmaceutical expenditure and their measurement****The indicators**

The indicator, total pharmaceutical expenditure or TPE, provides a measure of the total consumption of pharmaceuticals, regardless of the means of distribution, the place or condition of consumption or its type (prescription or over-the-counter). As far as possible, TPE is disaggregated into two components to reflect public (i.e. government) and private sector financing. In the absence of TPE the consumption by outpatients (OPE) was taken, which represents a partial measurement of TPE as it lacks the inpatient consumption, for which private and public financing were also identified, when possible.

Although most studies have empirically demonstrated that the acquisition of pharmaceuticals does not imply that the medication is consumed, pharmaceutical consumption is by convention measured as equivalent to purchase. Direct provision is considered as equivalent to purchase and added to recorded sales.

**Data sources**

At present, fully comprehensive systematic data collection for world pharmaceutical consumption does not exist. Continuous industry intelligence and marketing surveys monitor deliveries to pharmacies in around 120 countries, covering mainly urban areas and a fair proportion of deliveries to hospitals. However, the data that are compiled by these surveys are not generally accessible to public policy information systems. Where they are, they tend not to include the total retailing and distribution margins, and the medicines produced by local pharmacists and by hospitals themselves. On the whole, the survey data are of good quality for the branded products, but supplementary data on retail margins and production by generic producers, health-care institutions, and traditional and alternative therapies, as well as donations and external procurement, have to be collated separately.

As an alternative, WHO has promoted a methodology for extracting data on health system expenditures, including on pharmaceuticals, from National Health Accounts (NHAs). These data are a depository of all market activities and part of the non-market economy (public administration and government-related activity plus paid domestic services, excluding "do it yourself" activities and with some allowance made for home-grown produce). The higher per capita income countries have developed sophisticated commodity flow statistics, which provide reliable estimates of the consumption of medical goods (as acquired by pharmacies and health-care units). The UN National Accounts and the International Monetary Fund have developed specific expenditure by purpose classifications, which include a class for health and a subclass for pharmaceuticals. They cover, respectively, the household and governmental spending on pharmaceuticals. The UN and the IMF surveys aim at updating these spending figures annually.

WHO's first attempt at providing comprehensive estimates of total pharmaceutical expenditures (TPE), based on NHA data, was presented in the previous WMS report, published in 2004. The methodology has since been further refined and various improvements made to the NHA database,<sup>a</sup> upon which estimates of TPE presented in this chapter are based. Countries contribute data to the NHA database on a voluntary basis; currently about two thirds of the 193 WHO Member States, plus the Special Administrative Regions of China, (Hong Kong, Macao and Taiwan) participate by providing information on consumption in hospitals, and where data are available, on consumption of traditional medicines. The main strength of the NHA-based TPE estimates lies in its relative comprehensiveness; the drawbacks include a relatively low geographical coverage and a bias towards measurement of retail sales related to outpatient treatment.

**Accessed or collected TPE comprise:**

- a) Health accounts reports aim at reporting through a resource cross-classified by public and private spending.

<sup>a</sup> See <http://www.who.int/nha/country/en/>

BOX 1.1 (continued)

b) As far as possible, the figures integrate the reports of public bodies containing pharmaceutical spending, complemented notably by household out-of-pocket spending (OOPs) on pharmaceuticals, based on the observed household surveys share as well as pharmaceutical external aid (in kind + earmarked donations).

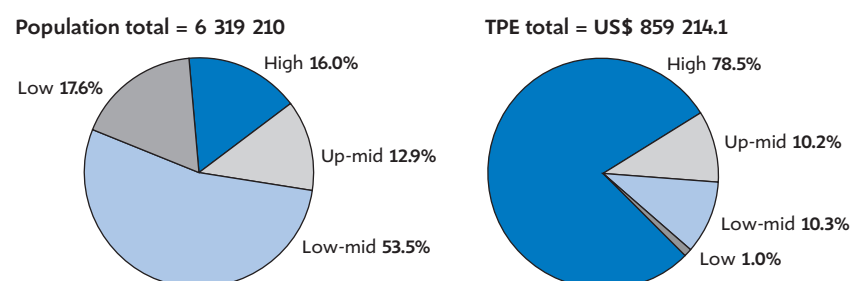
**Data caveats**

Measurement of pharmaceutical spending is likely to underestimate the level, mainly because certain components are omitted from the most frequently published reports, such as externally-funded medicines, medicines covered by private insurance, medicines produced by local pharmacists and by hospitals, traditional and alternative products and informal sales and payments. Examples of the latter include sales of unregistered pharmaceuticals or re-sold pharmaceuticals.

FIGURE 1.1

*The 17.6% of the world's population that live in low income countries accounted for only 1% of global pharmaceutical expenditure.*

**Distribution of world population and total pharmaceutical expenditure (TPE) among countries grouped by income level, 2006**

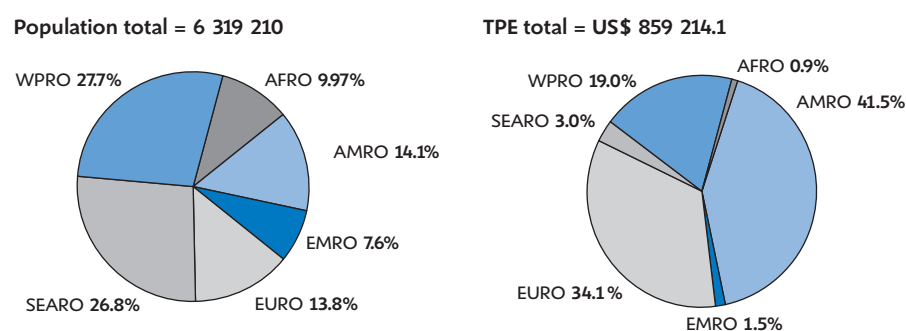


Source: WHO NHA database

Similar disparities are apparent when countries are grouped by geographical region (see Figure 1.2). At one extreme, the WHO South-East Asia Region, which is home to 26.8% of the world's population, accounts for only 3% of the world's spending on pharmaceuticals. At the other end of the scale, the region of the Americas contains 14.1% of the world's population but accounts for 41.5% of the world's pharmaceutical spending. Included within this region are Canada and the USA, two countries which between them contain 37.3% of the region's population yet account for 84.3% of the region's pharmaceutical spending.

FIGURE 1.2

**Distribution of world population and total pharmaceutical expenditure, by WHO region, 2006**



Source: WHO NHA database

## 1.2.2

*Poor countries spend a greater proportion of their Total Health Expenditure (THE) on medicines than high-income countries.*

## Pharmaceutical expenditure as a share of total health expenditure

Data on total pharmaceutical expenditures for 2006 confirm that pharmaceuticals account for an important share of all expenditure on health. This proportion varies considerably between high- and low-income countries; pharmaceutical spending as a share of total health expenditure ranges from a mean of 19.7% in the high-income countries to a mean of 30.4% in the low-income countries (Table 1.1). On average, poorer countries spend proportionally more of their health budget on medicines than the wealthier countries.

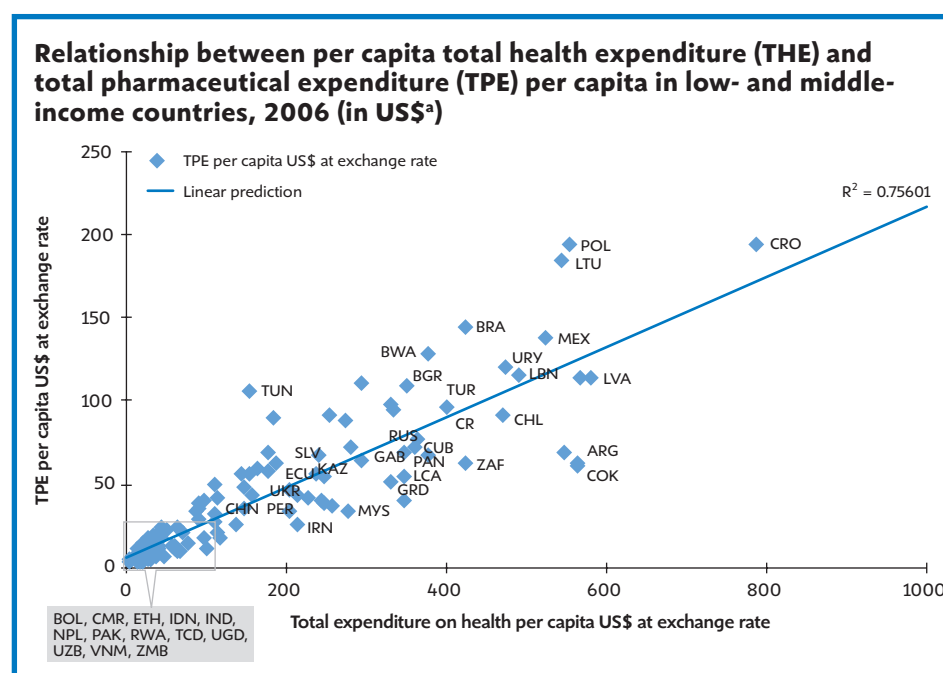
TABLE 1.1 Total pharmaceutical expenditure share of total health expenditure, 2006 (%)

Income group	N	Population (thousands)	Mean <sup>a</sup> (%)	Median (%)	Minimum (%)	Maximum (%)
High	46	1 011 957	19.7	18.2	8.7	32.4
Upper-middle	37	812 489	23.1	22.0	10.4	36.8
Lower-middle	44	3 379 873	27.6	26.6	9.8	67.6
Low	34	1 114 890	30.4	29.5	7.7	62.9
All countries	161	6 319 210	24.9	23.1	7.7	67.6

<sup>a</sup> Weighted mean by population.  
Source: WHO NHA database

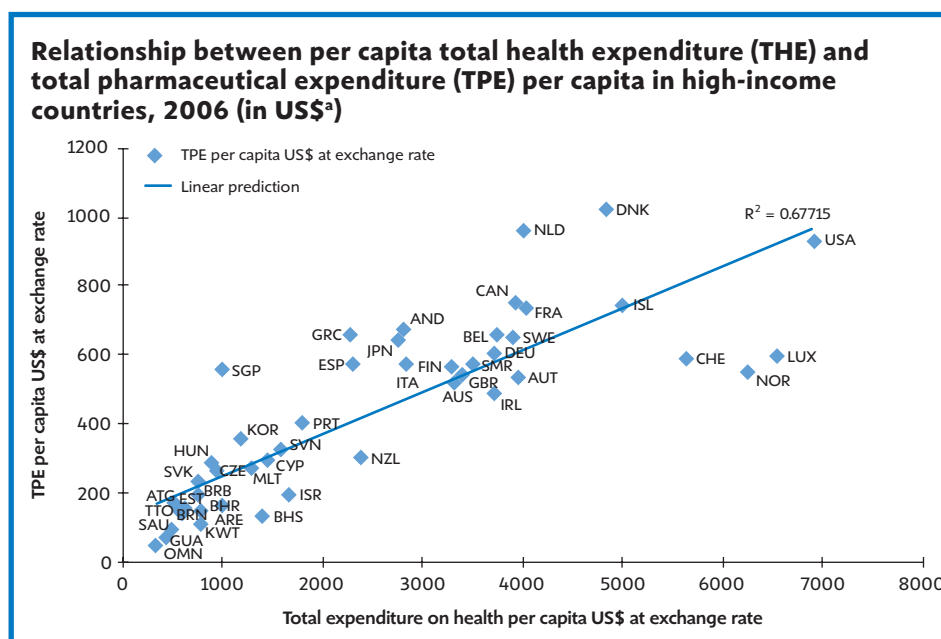
Figures 1.3 and 1.4 show the relationship between per capita TPE and THE in low- and middle-income countries, and in high-income countries, respectively. In both cases, data suggest that spending on medicines is positively correlated with total health spending ( $R^2 = 0.756$  in low- and middle-income countries and 0.6772 in high-income countries). The higher the per capita health expenditure the higher is the per capita pharmaceutical expenditure.

FIGURE 1.3



<sup>a</sup> National currency units converted to US\$ at 2006 exchange rates.  
Source: WHO NHA database

FIGURE 1.4



<sup>a</sup> National currency units converted to US\$ at 2006 exchange rates

Source: WHO NHA database

### 1.2.3

*Out-of-pocket expenditure is the major source of pharmaceutical payments in all but the high-income countries.*

### Expenditure on medicines by the public and private sectors

The figures presented in Table 1.2 show that in the high-income countries most medicines are funded by the public purse, i.e. through public health insurance or social security systems. According to estimates for 2006, public (government) expenditure represented 61.3% of the total medicines expenditures in per capita terms in this group of countries. However, the reverse is true in the low- and middle income countries, where at least two thirds of pharmaceutical expenditures are privately financed. In 2006, private expenditure on medicines as a share of total pharmaceutical expenditure in per capita terms was 61.2%, 66.5% and 76.9% in upper middle-income, lower middle-income and low-income<sup>1</sup> countries, respectively (Table 1.2). This reflects the reality that out-of-pocket expenditure is the major source of pharmaceutical payments in all but the high-income countries.

TABLE 1.2

### Composition of per capita total pharmaceutical expenditure by income group, 2006 (in US\$ at exchange rate values)

Income group	N	Total pharmaceutical expenditure				Total expenditure on health				N
		Public		Private		Total	Public	Private	Total	
		US\$	%	US\$	%	US\$	US\$	US\$	US\$	
High	42	264.4	61.3	167.2	38.7	431.6	2473.6	1597.6	4071.4	49
Upper middle	31	32.6	38.8	51.5	61.2	84.1	214.7	184.1	398.8	54
Lower middle	34	10.5	33.5	20.8	66.5	31.3	27.5	38.6	66.1	47
Low	27	1.76	23.1	5.85	76.9	7.61	19.2	3.7	22.9	41

<sup>1</sup> Growing support for pharmaceutical funding by external agencies emerged after 2006. e.g., US funding for HIV/AIDS programmes and the money provided by the Global Fund for AIDS, Tuberculosis and Malaria.



## 1.2.4

## Pharmaceutical expenditures and GDP

In 2006, world pharmaceutical spending represented 1.5% of global GDP (Table 1.3). Although total pharmaceutical expenditure (TPE) as a percentage of GDP is on average fairly constant across the income groups, ranging from 1.41% in high-income countries to 1.63% in lower middle-income countries, there is a marked variation in this indicator between countries in all income groups. The differences are largest in the two poorest groups of countries (Table 1.3). In general, the lower a country's income, the larger the share of GDP spent on pharmaceuticals.

**TABLE 1.3 Total pharmaceutical expenditure (TPE) and total health expenditure (THE) as a percentage of GDP by income group, 2006**

Income group	Total pharmaceutical expenditure						Total health expenditure	
	N	Population (thousands)	Mean (%)	Median (%)	Minimum (%)	Maximum (%)	N	Mean (%)
High	46	1 011 957	1.41	1.40	0.30	2.70	49	11.3
Upper middle	37	812 489	1.45	1.30	0.40	2.70	54	6.4
Lower middle	44	3 379 873	1.63	1.45	0.40	3.80	47	4.4
Low	34	1 114 890	1.62	1.50	0.40	3.60	41	5.3
All countries	161	6 319 210	1.52	1.40	0.30	3.80	191 <sup>a</sup>	9.8

N = number of countries

<sup>a</sup> Somalia & Zimbabwe excluded

Source: WHO NHA database

Figures 1.5 and 1.6 show the relationships between per capita GDP and total per capita pharmaceutical expenditure (TPE) in poor and rich countries, respectively. In both cases, there is a positive correlation between GDP and TPE in per capita terms, suggesting that in general the larger the per capita GDP, the larger the amount spent on pharmaceuticals. Although there is a definite relationship between GDP and pharmaceutical expenditures, there are, however, a number of outlier countries that appear to buck the general trend. Those countries that have achieved a relatively low level of medicines expenditure in relation to their income, i.e. per capita GDP, presumably as a result of specific national policies designed to control pharmaceutical expenditures, are particularly noteworthy and may serve as useful models for other countries. (See Norway case study Box 1.3.)

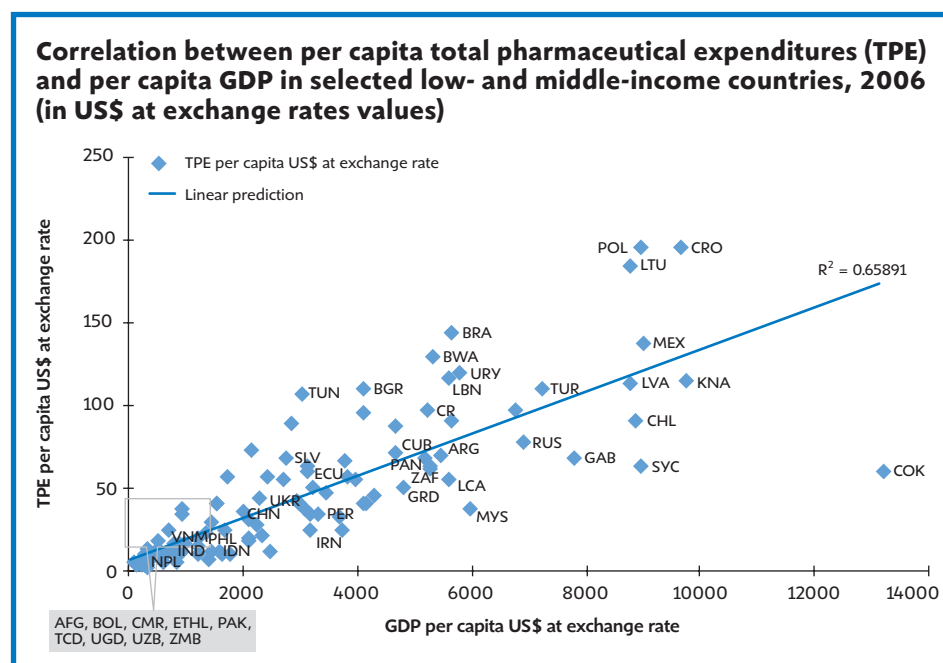
## 1.2.5

## The impact of price and quantity on pharmaceutical expenditures

*Total pharmaceutical expenditure is determined by medicine prices and volumes of medicines consumed.*

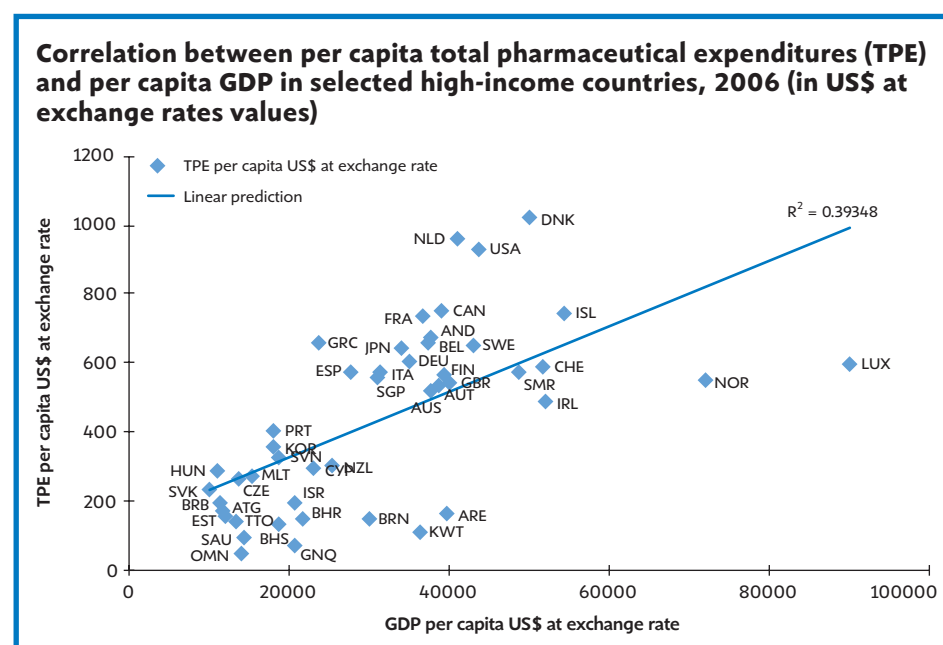
Spending on pharmaceuticals is largely governed by two variables, medicine prices and the quantity of medicine sales. In some countries it may be high prices that are driving up expenditure, whereas in others, it may be high-use patterns (i.e. high quantity). There are many factors that explain country differences in spending on pharmaceuticals, including level of health insurance coverage for prescription medicines, physician prescribing practices, consumer behaviour, and regulatory policies that apply to medicine pricing and reimbursement. Policy-makers who are concerned about the level of pharmaceutical expenditures need

FIGURE 1.5



Source: WHO NHA database

FIGURE 1.6



Source: WHO NHA database

to understand what factors are driving their expenditure. Clearly the policy response will vary according to the underlying factors that are seen as important.

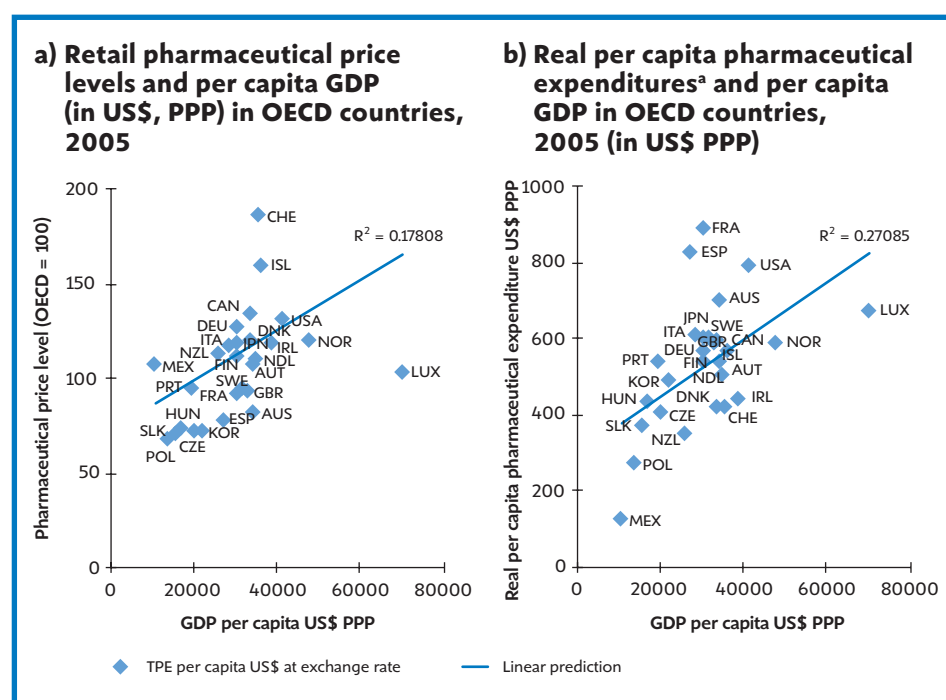
In order to illustrate the role of the two key determinants of expenditures, price and quantity, we examine variations in medicine prices and per capita expenditure in relation to per capita GDP within two distinct country groupings, the richer OECD countries and selected less wealthy countries for which Health Action International (HAI) medicine price

survey data (2004) are available. For the purposes of this analysis, the prices of the lowest price generic medicines in the private sector have been used, expressed (in accordance with standard HAI methodology as a median price ratio (MPR)).<sup>1</sup>

Figure 1.7 plots retail price levels and real per capita pharmaceutical expenditures<sup>2</sup> against per capita GDP for the OECD countries (Figures 1.7 a,b, respectively). Figure 1.8 reflects the situation in the less well resourced group of countries, and shows the relationships between medicines prices (as MPRs; Figure 1.8a), and per capita spending on pharmaceuticals (as per capita TPE; Figure 1.8b) and per capita GDP.<sup>3</sup> Four distinct groups emerge from this analysis when looking at prices, per capita pharmaceutical expenditures and GDP per capita:

- The first group of countries had low medicine prices and spend less on pharmaceuticals per capita based on their per capita income. These are countries such as Poland and Slovakia among OECD countries, and Peru among lower-middle-income countries.
- The second group of countries had high medicine prices and high medicine expenditures per capita, such as USA, Canada, Italy from OECD countries, and El Salvador in lower-middle-income countries.
- The third group of countries had low medicine prices, but spending more than would be expected based on their per capita income.
- The fourth group of countries had high medicine prices, but spending less than would be expected based on their per capita income.

FIGURE 1.7



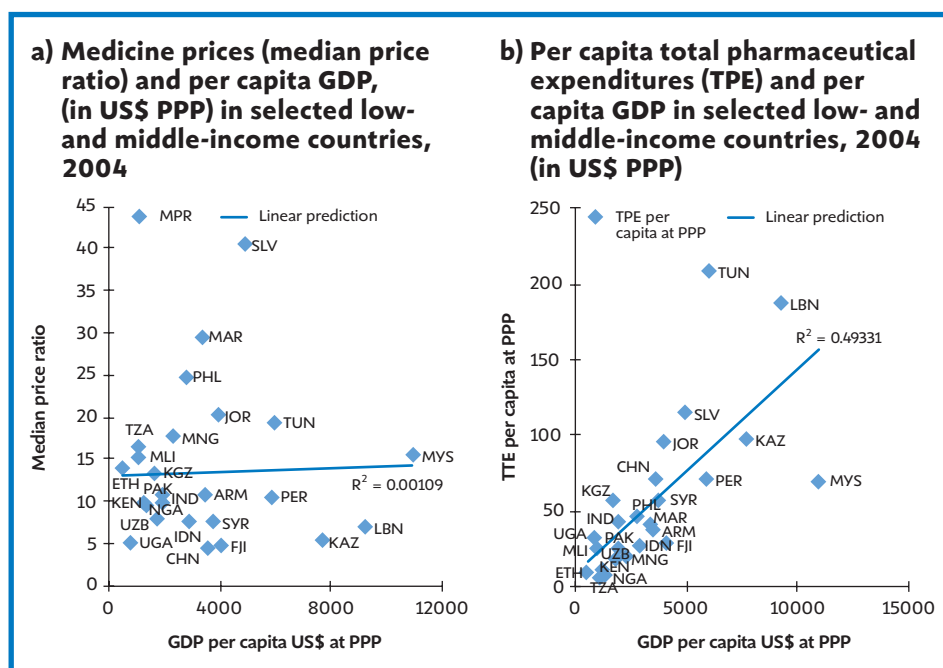
<sup>a</sup> Per capita expenditures are based on outpatient consumption.  
Source: OECD health policy studies

<sup>1</sup> This is a ratio of median national unit prices international reference prices for the same medicine unit compiled by the Management Sciences for Health (10) (see also Chapter on Prices, Availability & Affordability).

<sup>2</sup> Current expenditures deflated by purchasing power parities computed for pharmaceuticals.

<sup>3</sup> The regression lines on these charts are not intended to correlate the data. They are intended to provide an indicator line which reflects whether countries' prices on expenditures are above or below other similar countries.

FIGURE 1.8



Source: HAI data calculated by author

The following examples are noteworthy. In OECD countries, France has the highest per capita expenditure, but had retail prices that are well below the OECD average level. Switzerland had the highest retail prices for pharmaceuticals, but expenditure is below the average. China has the lowest prices for generic medicine among the countries compared; however, the total pharmaceutical expenditure per capita is substantially above the regression line in terms of countries' income level. If we consider the case of the Philippines, the picture changes, the Philippines has the highest prices for generic medicine, but per capita pharmaceutical expenditure falls substantially below the line.

*Addressing consumption factors may be more important than reducing prices in controlling Total Pharmaceutical Expenditures (TPE).*

There are some factors that can potentially contribute to cross-national medicine consumption differences. These include health insurance coverage of prescription medicines, doctor prescribing behaviour and regulatory policies applied to medicine pricing and reimbursement. The level of coverage for pharmaceuticals varies from country to country. Both France (7) and Switzerland have high levels of public funding for pharmaceuticals, while there are limits on patients' annual cost-sharing expenditures, people on low incomes are not exempted in Switzerland (8). The key message of chart 1.7a, 1.7b is that while prices are high in Switzerland (185%) and low in France (91%), TPE per capita in these countries was \$ 888 in France and only \$ 418 in Switzerland. This reflects dramatically different pattern of consumption driven by prescribing practices. The underlying factors that account for such dramatically different consumption factors may vary between individual countries. Addressing these factors may be more important to reducing or controlling TPE than focusing on medicine prices. (see Box 2 in Annex)

## BOX 1.2

**China initiates new health-care reform**

China is a lower-middle-income country with over 1.3 billion inhabitants. In 2006, China spent a total of Yuan 984.3 billion (US\$ 144.8 billion) on health, an amount equivalent to 4.67% of its GDP. Health financing in China is largely dependent on the private sector. The Government's contribution (i.e. public funding) to the total health expenditure (THE) was only 18%, with social health insurance and others contributing 33% to THE, and out-of-pocket payments the remaining 49.3%.<sup>a</sup>

There are three main insurance schemes currently operating in China, the Urban Employee Medical Insurance, the New Rural Cooperative Medical Scheme and the Unemployed Urban Residents and Children Medical Insurance. Between them these schemes provide varying levels of health insurance cover and benefits for nearly 80% of China's population. The New Rural Cooperative Medical Scheme has the greatest number of members, at 726 million (2007 estimate), followed by the Urban Employee Medical Insurance (220 million, 2008 estimate), and the Unemployed Urban Residents and Children Medical Insurance (42.9 million, 2008 estimate).<sup>b</sup>

In China, 95% of all health facilities are state-managed hospitals, in which approximately 90% of operational revenues are generated by charging fees for services. Hospital, as well as doctors', incomes are thus dependent on the profits generated from diagnostic investigations, procedures and drug sales. Hospitals and physicians can increase those profits and thus their incomes by purchasing expensive medicines and by prescribing more of these products. Driven by such economic incentives, some hospitals encourage (and physicians prefer to prescribe) expensive medicines rather than lower cost, yet equally effective, medicines. Several surveys have demonstrated that even in the most basic primary care level institutions, patients are frequently provided with unnecessary and expensive drugs.<sup>c,d</sup>

Medicines account for nearly half, or 42.7%, of China's total health expenditures, amounting to Yuan 448.6 billion (US\$ 66 billion) in 2006. Though the proportion of out-of-pocket payments on pharmaceutical has declined since 2002, it was still above 50%, except in 2006(49%).<sup>a</sup>

During the period, 1997–2007, the Chinese Government introduced a number of measures aimed at lowering medicine expenditures, including reducing the price of individual drugs, separating drug revenue and expense streams in hospitals, and separating the prescribing and dispensing functions. Despite these efforts, recent medicine pricing surveys<sup>c,d</sup> have shown that medicine prices in China remain significantly higher than international reference prices, in particular for branded products. In addition, the surveys revealed low affordability among large sectors of the population of medicines for some common ailments, especially noncommunicable chronic diseases, such as hypertension and diabetes.

In order to tackle the economic burden caused by high medicines expenditures, the Government in September 2006, formed the State Council Healthcare Reform Leading Group, comprising representatives from 14 ministries and following two years of careful research, the Government published a draft of its Healthcare Reform Plan<sup>e</sup> in October 2008. Having invited and taken into account comments from the public, on April 6 2009, the Healthcare Reform Plan<sup>f</sup> was announced by the Chinese Government. The main objectives of the new health-care policy are as follows:

- To accelerate the establishment of a basic medical security system (the target coverage: by the year of 2010, 90% of the citizens in rural and urban China will be covered by medical insurance);
- To establish a national essential medicines system, to include a list of essential medicines (medicines on the list will be reimbursed at a higher proportion by the health insurance schemes);
- To improve the health-care service provision at the grassroots, local level;



BOX 1.2 (continued)

■ To promote the gradual equalization of basic public health services to push forward public hospital reform (e.g. pilot projects will explore various ways of separating health-care services and drug sales).

To achieve these goals, the Government will increase the health budget by 850 billion Yuan (US\$ 125 billion ) including 331.8 billion Yuan (US\$ 48.8 billion ) of additional resources from the central Government between 2009–2011. China's health-care reform plan is both ambitious and comprehensive, and indicates a new determination on the part of China's leaders to make nationwide health-care provision a priority.

<sup>a</sup> *China National Health Accounts Report 2007*. Beijing, China National Health Economics Institute, 2006.

<sup>b</sup> *Health Statistic Yearbook 2008*. Beijing, Centre for Health Statistics and Information, Ministry of Health, 2008.

<sup>c</sup> Sun Q. *A survey of medicine prices, availability, affordability and availability and price components in Shandong Province, China*. Jinan, Center for Health Management and Policy, University of Shandong, 2007 ([http://www.haiweb.org/medicineprices/surveys/200411CN/survey\\_report.pdf](http://www.haiweb.org/medicineprices/surveys/200411CN/survey_report.pdf), accessed 10 April 2010).

<sup>d</sup> Ye L. *A survey of medicine prices, availability and affordability using the WHO/HAI methodology*. Shanghai, School of Public Health, Fudan University, 2006 ([http://www.haiweb.org/medicineprices/surveys/200609CNS/survey\\_report.pdf](http://www.haiweb.org/medicineprices/surveys/200609CNS/survey_report.pdf), accessed 10 April 2010).

<sup>e</sup> State Council Healthcare Reform Leadership Coordination Group. *Recommendations on deepening health system reforms* [draft for comments]. 2008. (<http://shs.ndrc.gov.cn/yq> accessed Oct 16, 2008) [in Chinese].

<sup>f</sup> Opinions of the CPC Central Committee and the State Council on Deepening the Health Care System Reform. ([http://shs.ndrc.gov.cn/yqjd/yqwj/t20090408\\_271138.htm](http://shs.ndrc.gov.cn/yqjd/yqwj/t20090408_271138.htm), accessed April 8, 2009).

## 1.3

## THE TRENDS OVER PAST 12 YEARS<sup>1</sup>

### 1.3.1

### Trends in per capita pharmaceutical expenditures

Overall, per capita spending on pharmaceuticals as reported in NHA reports has increased by approximately 50% over the period, 1995–2006 (Table 1.4). The largest increases occurred in the middle-income countries where per capita pharmaceutical expenditures in 2006 were 1.73 and 1.82 times larger than in 1995 (upper-middle- and lower-middle-income countries respectively). In contrast, per capita expenditures increased by a factor of 1.54 in the high-income countries, and 1.66 in the group of low-income countries. The gap in per capita spending between the high- and low-income countries has continued to grow; expenditure on pharmaceuticals in the poorest countries is still a fraction of that in the high-income countries (see section 1.2.1).

Table 9 and Table 10 in the Annexes provide data on TPE as a percentage of THE by country income level and WHO Region. Most countries have seen increases although the WHO AFRO and EMRO regions have seen modest decreases in these proportions.

### 1.3.2

### Total pharmaceutical expenditures as a share of GDP

Since 1995, TPE as a share of GDP has increased across all income groups. The largest growth occurred in the low-income countries, where total spending on pharmaceuticals as a share of

<sup>1</sup> To track changes in expenditures over time (and to make valid comparisons between countries) it is necessary to adjust each country's data to take account of fluctuations in inflation and currency exchange rates. This is usually done by applying a series of conversion factors to national expenditure estimates and expressing these data in units of purchasing power parity (PPPs) at constant US\$ (2). Expenditures in this section were estimated by converting TPE at NCU into per capita values, then adjusted by the GDP deflator adjusted for the reference year 2005 and then converted at PPP rate.

**TABLE 1.4 Mean per capita total pharmaceutical expenditures by income group, 1995–2006 (in constant US\$2005, expressed in PPP)**

Year	High income (N=43–46)	Upper middle income (N=32–37)	Lower middle income (N=36–44)	Low income (N=20–33)	All countries (N=135–148)
1995	275.8	87.9	39.5	12.2	122.1
1996	284.8	90.9	39.9	13.0	126.0
1997	306.0	100.2	40.7	13.3	134.4
1998	319.6	111.4	42.7	14.7	140.6
1999	341.4	112.8	43.1	15.6	149.3
2000	352.0	119.4	46.1	15.4	149.6
2001	380.6	122.0	51.1	15.4	162.9
2002	397.4	122.7	54.5	16.6	178.4
2003	400.5	130.9	64.1	20.1	179.0
2004	407.6	137.7	68.3	19.8	182.5
2005	426.5	143.8	72.1	21.4	193.4
2006	425.9	152.0	71.9	20.3	181.5

N – number of countries. Note that the number of countries reporting data varies from year to year.  
Source: WHO NHA database

GDP increased from 1.12% to 1.62% (Table 1.5). More modest increases were observed in the other income groups. Similar patterns are evident in the figures for TPE as a share of THE over the same period (see Statistical Annex; Table 1.8).

**Table 1.5 Total pharmaceutical expenditures as share of GDP by income group, 1995–2006 (%)**

Year	High income (N=43–46)	Upper middle income (N=32–37)	Lower middle income (N=36–44)	Low income (N=20–33)	All countries (N=135–148)
1995	1.19	1.19	1.31	1.12	1.22
1996	1.20	1.17	1.26	1.19	1.21
1997	1.23	1.25	1.29	1.16	1.24
1998	1.26	1.32	1.34	1.26	1.30
1999	1.31	1.34	1.33	1.41	1.33
2000	1.33	1.39	1.38	1.40	1.37
2001	1.35	1.42	1.45	1.36	1.39
2002	1.40	1.43	1.49	1.46	1.44
2003	1.45	1.46	1.65	1.60	1.53
2004	1.43	1.46	1.68	1.60	1.54
2005	1.46	1.45	1.70	1.65	1.55
2006	1.41	1.45	1.63	1.62	1.52

N – number of countries. Note that the number of countries reporting data varies from year to year.  
Source: WHO NHA database

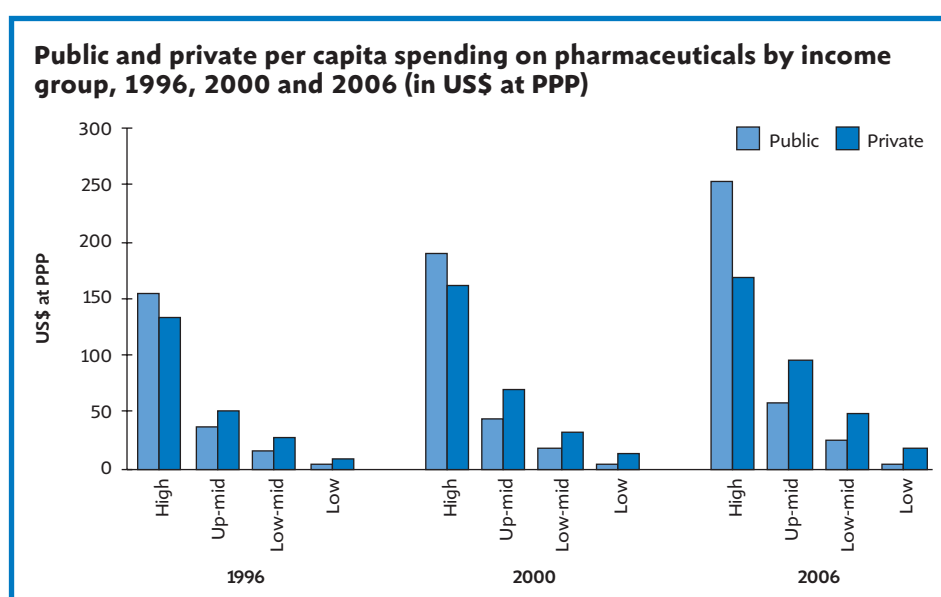
*Between 1995 and 2005, the largest increases in the proportion of GDP spent on pharmaceuticals have occurred in low-income countries.*

### 1.3.3

### Trends in public and private spending on medicines per capita

Figure 1.9 compares levels of public and private spending on medicines, in per capita terms, in 1996, 2000 and 2006 for countries grouped according to their income. Between 1996 and 2006, both public and private per capita spending on medicines steadily increased in all income groups, except in the low-income group of countries for which public spending on medicine per capita decreased in 2000 and then increased in 2006. The increase in private spending was faster than that in public spending in middle-income countries whereas the opposite is seen in high-income countries. Public funding in low-income countries remained the same, at only US\$ 5 per person, whereas it has increased quite substantially in the high-income countries, in particular since 2000.

FIGURE 1.9



Source: WHO NHA database

## 1.4

## FUTURE CHALLENGES AND PRIORITIES

### 1.4.1

### Access to essential affordable medicines

*In all but high income countries most expenditure on pharmaceuticals is from private resources.*

A substantial proportion of the population in low-income countries still does not have adequate access to the essential medicines they need to treat those diseases that are negatively impacting on their health and well-being (9) (see Chapter on Prices, Availability and Affordability). The demographic changes described in the Chapter Global Health Trends: Global burden of Diseases and Pharmaceutical Needs, particularly population ageing with increases in the prevalence of chronic diseases, mean that the problem of assured access to affordable essential medicines for poor people is likely to remain a major challenge for the foreseeable future.

Millennium Development Goal (MDG-8E) expresses a global commitment to ensure that access to essential affordable medicines is achieved by 2015 (10). Data presented in this chapter of the WMS report for 2011 demonstrate that although pharmaceutical expenditures are a sizable component of total health expenditures, the level of expenditure on medicines in the poorest countries of the world, in per capita terms, is extremely low. Moreover, in all but the high-income countries, most medicines are paid for by private sources usually as out-of-pocket payments by individuals.

In all but the high-income countries, increased public funding for pharmaceuticals is thus vital to improve access to affordable medicines and to progress towards achievement of MDG-8E. Increasing spending on pharmaceuticals brings not just direct health benefits, but is also an investment that has a positive impact on both the availability and affordability of other health-care services.

In any given country, pharmaceutical consumption is related to the structure of its health-care system and the type of health insurance available. To improve access to affordable essential medicines in countries with health insurance schemes, such schemes need to cover the cost of providing essential medicines to patients as is the case in most European countries. In countries without health insurance systems, public sector systems need to ensure that medicines are made available for all patients at either an affordable price or free of charge to prevent catastrophic medicine payments from plunging or entrenching families into poverty (11).

#### 1.4.2

#### Cost containment

Pharmaceuticals are one of the single, largest cost components of health-care systems, especially in low- and middle-income countries. They also represent one of the fastest growing components of health expenditures (see section 1.3). The implications of such rapid increases in a single component of a health-care system are profound, especially in those countries where pharmaceuticals already account for a high proportion of total health spending.

Nationally, pharmaceutical expenditures are governed by multiple variables, but in particular, by medicine price and the quantity of consumption (see section 1.2.5). Appropriate policies and controls on medicine pricing and quantity are needed, irrespective of a country's wealth, in order to keep the cost of pharmaceuticals to within sensible limits. The OECD countries provide a range of different approaches to cost containment of spending on pharmaceuticals through various pricing and reimbursement policies (1). Particularly noteworthy in this regard is Norway, which compared with other OECD countries, has managed to keep its pharmaceutical expenditures at a low level relative to its per capita GDP (and THE), partially through the application of strict price and reimbursement policies. As detailed in Box 1.3, prior to 1994, Norway operated a strong "needs-based" approach to the selection and authorization of medicines (12). Since then, it has continued to actively manage its pharmaceutical sector, controlling prices and actively promoting the rational prescribing of medicines, including through a positive reimbursement list (12).

For those countries with high pharmaceutical expenditures, the need for cost containment measures will likely become increasingly acute in the future. This will entail the adoption of appropriate policies, according to each country's situation, to keep pharmaceutical expenditures at a reasonable level and to release funds for other health interventions.

#### 1.4.3

#### Improving the monitoring of pharmaceutical spending

This chapter presents information on the global pattern of pharmaceutical expenditures based on improved methods of measurement. With this evidence, policy-makers can compare their country's level of expenditure in the public and private sectors with that of their neighbours or other countries at a similar level of development.

## BOX 1.3

**Medicine pricing policies in Norway: keeping the cost of medicines down**

The Norwegian health-care system is founded on the principles of universal access, decentralization and free choice of provider.<sup>a</sup> It is financed through taxation, together with income-related employee and employer contributions and out-of-pocket payments and co-payments. All residents are covered by the National Insurance Scheme.<sup>a</sup>

At over 80 years, life expectancy in Norway is relatively high. In 2005, Norway's per capita GDP stood at \$US 72 215, which makes Norway one of the highest income nations in the world. Interestingly, it only spends 0.7% of its GDP on medicines, compared with an-OECD country average of 1.5% of GDP. Total pharmaceutical expenditure (TPE) as a share of total health expenditures (THE) is around 9%, again considerably lower than the average in OECD countries (17%). Moreover, for the first time in Norway's recent history, and unlike the situation in many other countries worldwide, expenditures on pharmaceuticals are not growing rapidly.<sup>a</sup>

**Registration and selection of medicines**

Until 1994, Norway was unique among developed countries in having a "needs" clause in its legislation governing the registration of medicines. This clause required the Registration Board, in addition to assessing the quality, safety and efficacy of a product submitted for registration (i.e. market authorization), to also consider the "need" for the product in question. This meant that new medicines were assessed not just from a scientific or technical point of view, but also in light of health priorities and with the aim of protecting the individual from exposure to unnecessary drugs.<sup>b</sup> In addition, registration authorizations were only valid for five years, obliging suppliers to resubmit evidence and update their applications every five years. The net effect of these policies was to limit the number of products on the Norwegian market to about 2000. However, the restrictions led to a significant number of special authorizations for medicines which were not registered on the Norwegian market to permit them to be prescribed to patients in Norway. The "need clause" was abolished in 1994 when Norway joined the European Economic Area (EEA), a move which resulted in an increase in the number of registered products.

**Supporting rational use of medicines**

Both producer-independent drug information and drug utilization statistics have been used in Norway as instruments for achieving greater rational medicines use. The Department of Pharmacotherapeutics was established to promote the generation of producer-independent drug information through a range of activities, such as involving opinion-leading clinicians in discussions and provision of printed information materials. This has increased awareness among clinicians about the benefits of rational use and has likely contributed to relatively low levels of drug use in Norway.<sup>b</sup>

Norway was one of the first countries in the world to routinely publish data on drug sales (principally wholesaler sales), reflecting both general trends as well as regional differences. This policy has brought transparency into the system.<sup>b</sup> Reporting is based on the ATC classification system and Defined Daily Doses, a methodology that was developed in Norway. Greater transparency surrounding drug use and regular comments on usage trends in both professional and general-interest publications have contributed to increased awareness and accountability among prescribers, the public and health authorities. In 2004, a system for recording all prescriptions on an individual level was introduced, allowing Norway to track all outpatient medicines use.

**Pricing policies**

The Norwegian Medicines Agency (NoMA) is responsible for setting maximum pharmacy purchase prices. Pharmaceuticals can only be sold at or below the maximum price level. An international price referencing system has been used since July 2002 to set maximum prices for both new and existing pharmaceuticals. Prices are based on the average of the three lowest pharmacy purchasing prices (PPP) in Austria, Belgium, Denmark, Finland, Germany,



## BOX 1.3 (continued)

Ireland, the Netherlands, Sweden and the United Kingdom. If a product is marketed in fewer than three of the reference countries, the mean price is taken of the countries where a market price exists. Wholesalers are free to negotiate mark ups with manufacturers because the Norwegian Medicines Agency (NoMA) sets prices at the ex-wholesaler/pharmacy purchasing price (PPP) level. Mark ups for generics and over-the-counter (OTC) products are significantly higher than for branded pharmaceuticals.<sup>a</sup> Since the Norwegian Medicines Agency sets maximum prices at the ex-wholesaler/ PPP level, wholesalers are free to negotiate mark ups with manufacturers. Mark ups on generics are typically significantly higher than those on most branded, more expensive pharmaceuticals<sup>a</sup> because of the policy of setting a degressive margin, i.e. a lower mark up on the more expensive products. The mark up on over-the-counter products is not regulated and thus also tends to be high.

In January 2005, Norway introduced a new pricing model, the "Trinnprismodellen" (the "step-price model") which sets a maximum reimbursement price for those pharmaceuticals (both branded and generics) included in the scheme. For each medicine, the maximum price level is automatically reduced in a step-wise manner once the patent on the medicine expires. The size of the price cuts depends on the volume of annual sales prior to the establishment of generic competition and the length of time taken to establish competition.

In 2007, a study<sup>c</sup> was conducted in which the price of prescription pharmaceuticals in Norway was compared with that for the same medicines in nine other European countries (Austria, Belgium, Denmark, Finland, Germany, Ireland, the Netherlands, Sweden and the United Kingdom). The study covered 300 top-selling active substances. The authors of the study calculated volume-weighted average prices for each active substance at both the wholesalers' purchase price and the pharmacies' sales price, and also the relative margin for the active substance. The results showed that medicine prices were lower in Norway than in most of the nine comparison countries, in terms of prices for all active substances, both the patent-protected active substances and the active substances with generic competition. Norway also had, on average, the lowest margins, this being calculated as the difference between the wholesalers' purchase price and the pharmacies' sales price which is 22%. A comparison of the price indices for both off- and on-patent active substances revealed that Norway, together with Sweden and the United Kingdom, has the lowest medicines prices at the pharmacy level. However, at 25% Norway does have one of the highest rates of value added tax (VAT) on pharmaceuticals; the standard rate of VAT on pharmaceuticals is 5% in most of the other countries included in the comparison study.<sup>d</sup>

<sup>a</sup> *Pharmaceutical Pricing and Reimbursement Information. Pharma Profiles. Norway.* Town, Gesundheit Österreich GmbH/Geschäftsbereich ÖBIG, 2007 ([http://ppri.oebig.at/Downloads/Results/Norway\\_PPRI\\_2007.pdf](http://ppri.oebig.at/Downloads/Results/Norway_PPRI_2007.pdf), accessed 10 April 2010).

<sup>b</sup> Andrew M el. Norway's national drug policy: Its evolution and lessons for the future development dialogue. *The Journal of the Dag Hammarskjöld Foundation*, 1995, 1:25–53.

<sup>c</sup> Brekke KR, Holmås TH, Straume OR. *Are pharmaceuticals inexpensive in Norway? A comparison of prescription pharmaceuticals between Norway and nine west European countries.* Bergen, Institute for Research in Economics and Business Administration, 2008 (SNF report no. 05/08; (<http://apps.who.int/medicinedocs/documents/s16197e/s16197e.pdf>, accessed 10 April 2010).

<sup>d</sup> *Pharmaceutical pricing policy in a global market.* Paris, OECD Publishing, 2008.

There are differences in data availability among income groups and geographical regions. However, more disaggregated information on spending on pricing related factors as well as those linked to quantity determinants, such as prescription medicines as opposed to over-the-counter (OTC) medicines, by inpatients versus outpatients, and also on insurance reimbursements versus out-of-pocket payments would be needed to improve the analysis of potential interventions and the rational use of resources in the pharmaceutical field.

To further improve the quality of medicines-related information and institutional arrangements to ensure that in the future data are collected according to a standard methodology represents a significant challenge. WHO and its Member States need to continue to improve and institutionalize the process of NHA generation in order to better monitor pharmaceutical spending and also to develop a broader and a more robust evidence base (13,14,15) for policy-makers upon which to guide future spending decisions. There is also a need to integrate NHA data with other sources of information on pharmaceutical expenditures, such as that collected by ATC group, so as to provide a more complete picture of the factors that underpin trends in health expenditures, and on medicines expenditure in particular.

## REFERENCES

1. *Pharmaceutical pricing policy in a global market*. Paris, OECD Publishing, 2008.
2. Aaserud M et al. *Pharmaceutical policies: effects of reference pricing, other pricing, and purchasing policies*. Cochrane Library, 2009, Issue 1.
3. van Mosseveld C. Pharmaceutical expenditure compared across countries. *Canadian Journal of Clinical Pharmacology*, 2005, 12 (3):e269–e275.
4. World Health Organization National Health Accounts.
5. *The world medicines situation*, 2nd ed. Geneva, World Health Organization, 2004. Available at: <http://apps.who.int/medicinedocs/en/d/Js6160e/>
6. Hernandez P, Poullier J-P. Global trends in pharmaceutical spending and financing Chapter 5 pp 41–51 and the statistical annex 2: expenditure. In: *The world medicines situation*, 2nd ed. Geneva, World Health Organization, 2004. WHO/EDM/PAR/2004.5.
7. *Pharmaceutical pricing and reimbursement information France*. October 2007. Commissioned by European Commission, Health and Consumer Protection Directorate-General and Austrian Ministry of Health, Family and Youth.
8. Paris V, Docteur E. *Pharmaceutical pricing and reimbursement policies in Switzerland*. OECDHealth Working Papers, No. 27. OECD Publishing. 2007doi:10.1787/136157357151.
9. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet*, 2009, 373(9659):240–249.
10. *Millennium Development Goal 8: Delivering on the global partnership for achieving the Millennium Development Goals*. Millennium Development Goals Gap Task Force Report 2008. New York, United Nations, 2008.
11. Ke Xu. Household catastrophic health expenditure: a multicountry analysis. *Lancet*, 2003, 362 (9378):111–117.

12. *Pharmaceutical pricing and reimbursement information, Norway*. June 2007. Commissioned by the European Commission, Health and Consumer Protection Directorate-General and Austrian Ministry of Health, Family and Youth. Available at: [http://ppri.oebig.at/Downloads/Results/Norway\\_PPRI\\_2007.pdf](http://ppri.oebig.at/Downloads/Results/Norway_PPRI_2007.pdf)
13. Poullier J-P et al. Patterns of global health expenditures: results for 191 countries. Chapter 17 in: Murray CJL, Evans DB, eds. *Health systems performance assessment: debates, methods and empiricism*. Geneva, World Health Organization, 2003.
14. *A system of health accounts*. Paris, Organisation for Economic Co-operation and Development, 2000. Available at: <http://www.oecd.org/dataoecd/41/4/1841456.pdf>
15. *Guide to producing health accounts: with special applications to middle- and low-per capita income countries*. Geneva, World Health Organization/World Bank/United States Agency for International Development, 2003. Available at: [http://www.who.int/nha/docs/English\\_PG.pdf](http://www.who.int/nha/docs/English_PG.pdf)

## ABBREVIATIONS

GDP	Gross domestic product
HAI	Health Action International
MDG	Millennium Development Goal
MPR	Median price ratio
NCUs	National currency units
NHAs	National Health Accounts
NoMA	Norwegian Medicines Agency
OECD	Organisation for Economic Co-operation and Development
OTC	Over-the-counter
PPP	Pharmacy purchasing prices
THE	Total health expenditure
TPE	Total pharmaceutical expenditure
VAT	Value added tax

**ANNEX****Tables**

Table A1.1	Total pharmaceutical expenditure in absolute and per capita level by income level of country group, 2005/2006 (million US\$)
Table A1.2	Total pharmaceutical expenditure in absolute and per capita level by region of country group, 2005/2006 (million US\$)
Table A1.3	Total pharmaceutical expenditure per capita in US exchange rate by region
Table A1.4	Total pharmaceutical expenditure share of GDP by region in 2006
Table A1.5	Total pharmaceutical expenditure share of total health expenditure by region in 2006
Table A1.6	The composition of total pharmaceutical expenditures per capita at exchange rate by region, 2006 (US\$)
Table A1.7	1995–2006 Per capita TPE (US\$ at PPP) (2005 US constant) by region
Table A1.8	1995–2006 TPE share of GDP (%) by region
Table A1.9	1995–2006 TPE share of THE (%) by income group
Table A1.10	1995–2006 TPE share of THE (%) by region

**Figures**

Figure A1.1	TPE per capita and GDP per capita in 2006 in low middle income countries
Figure A1.2	TPE per capita and GDP per capita in 2006 in low income countries
Figure A1.3	TPE per capita and GDP per capita, 2006 in upper middle income countries
Figure A1.4	TPE per capita and GDP per capita, 2006 in high income countries
Figure A1.5	TPE per capita and THE per capita in 2006 in low income countries
Figure A1.6	TPE per capita and THE per capita in 2006 in low middle income countries
Figure A1.7	TPE per capita and THE per capita in 2006 in upper income countries
Figure A1.8	TPE per capita and GDP per capita in 2006 in the WHO African Region (AFRO)
Figure A1.9	TPE per capita and GDP per capita in 2006 in the WHO Region of the Americas (AMRO)
Figure A1.10	TPE per capita and GDP per capita in 2006 in the WHO Eastern Mediterranean Region (EMRO)
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Figure A1.14	Public private share of pharmaceutical expenditure 1996–2006
Figure A1.15	TPE per capita and GDP per capita, 2006 in all countries
Figure A1.16	TPE per capita and THE per capita, 2006 in all countries

**TABLE A1.1 Total pharmaceutical expenditure in absolute and per capita level by income level of country group, 2005/2006 (million US\$)**

WB Income group	N	Population (000s)	Absolute amount (million US\$)	Per capita (US\$)
High	46/48	1 011 957 (16.0%)	\$674 011(78.5%)	\$434.7
Up-mid	37/42	812 489 (12.9%)	\$87 862.8 (10.2%)	\$88
Low-mid	44/54	3 379 873 (53.5%)	\$88 745.6(10.3%)	\$34
Low	34/49	1 114 890 (17.6%)	\$8 594.7 (1.0%)	\$7.7
<b>Total</b>	<b>161/193</b>	<b>6 319 210 (100.0%)</b>	<b>\$859 214.1 (100%)</b>	<b>\$155</b>

Note: N is number of countries

**TABLE A1.2 Total pharmaceutical expenditure in absolute and per capita level by region of country group, 2005/2006 (million US\$)**

Region	N	Population (000s)	Absolute amount (million US\$)	Per capita (US\$)
AFRO	31/46	629 913 (9.97%)	\$8 101.1 (0.9%)	\$21.1
AMRO	35/35	890 361 (14.1%)	\$356 882.1(41.5%)	\$117.8
EMRO	16/21	481 711 (7.6%)	\$12580.5 (1.5%)	\$59.8
EURO	50/53	871 998 (13.8%)	\$293 187.9 (34.1%)	\$325.8
SEARO	9/11	1 696 228 (26.8%)	\$25 575.7 (3.0%)	\$16.0
WPRO	20/27	1 749 000 (27.7%)	\$162 886.8 (19.0%)	\$142.8
<b>TOTAL</b>	<b>161/193</b>	<b>6 319 211 (100.0%)</b>	<b>\$859214.1 (100.0%)</b>	<b>\$155.4</b>

Note: N is number of countries

**TABLE A1.3 Total pharmaceutical expenditure per capita in US exchange rate by region**

Region	N	Pop (000s)	Mean	Median	Min	Max
AFR	31/46	629 913	21.1	9	1.8	127.3
AMR	35/35	890 361	117.8	66.9	9.6	924
EMR	16/21	481 710	59.8	35.8	9.1	156.4
EUR	50/53	871 998	325.8	242.9	7.5	1 015
SEAR	9/11	1 696 228	16	11.1	2.2	49
WPRO	20/27	1 749 000	142.8	28.8	8.3	640
<b>Total</b>	<b>161/193</b>	<b>6 319 210</b>	<b>155.3</b>	<b>55.1</b>	<b>1.8</b>	<b>1 015</b>

**TABLE A1.4 Total pharmaceutical expenditure share of GDP in 2006 by region**

Region	N	Pop (000s)	Mean	Median	Min	Max
AFR	31/46	629 913	1.38	1.30	0.30	3.60
AMR	35/35	890 361	1.6	1.5	0.7	3.8
EMR	16/21	481 710	1.34	1.15	0.30	3.50
EUR	50/53	871 998	1.72	1.70	0.40	3.50
SEAR	9/11	1 696 228	1.17	1.30	0.40	2.00
WPRO	20/27	1 749 000	1.44	1.60	0.40	3.30
<b>TOTAL</b>	<b>161/193</b>	<b>6 319 210</b>	<b>1.52</b>	<b>1.40</b>	<b>0.30</b>	<b>3.80</b>



**TABLE A1.5 Total Pharmaceutical Expenditure share of Total Health Expenditure by region in 2006**

Region	N	Pop (000s)	Mean	Median	Min	Max
AFR	31/46	629 913	24.9	23.8	7.7	56.6
AMR	35/35	890 361	24.1	22.7	9.3	39.7
EMR	16/21	481 710	26.8	23.1	11.2	67.6
EUR	50/53	871 998	23.1	21.0	8.7	50.9
SEAR	9/11	1 696 228	31.8	28.3	10.8	56.5
WPRO	20/27	1 749 000	26.5	24.1	10.4	54.7
<b>TOTAL</b>	<b>161/193</b>	<b>6 319 210</b>	<b>24.9</b>	<b>23.1</b>	<b>7.7</b>	<b>67.6</b>

**TABLE A1.6 The composition of Total Pharmaceutical Expenditures per capita at exchange rate by region 2006 (US\$)**

Region	Public	Private	Total
AFR	6.0 (28.4%)	10.6 (50.2%)	21.1
AMR	41.9 (35.6%)	75.5 (64.1%)	117.8
EMR	25.6 (42.8%)	28.9 (48.3%)	59.8
EUR	200.7 (61.6%)	124.2 (38.1%)	325.8
SEAR	8.9 (55.6%)	7.1 (43.8%)	16
WPRO	84.1 (58.9%)	51.4 (36.0%)	142.8

**TABLE A1.7 1995–2006 Per capita TPE (US\$ at PPP) (2005 US constant)**

Year	AFR	AMR	EMR	EUR	SEAR	WPR	Total
1995	39.6	104.9	87.3	198.0	21.7	101.3	122.2
1996	36.5	110.7	82.0	205.1	24.3	103.5	126.0
1997	37.9	120.0	85.4	222.2	25.1	105.9	134.4
1998	39.9	126.2	106.4	237.4	23.1	107.5	140.6
1999	43.4	133.1	96.6	247.8	24.2	116.9	149.3
2000	34.9	136.6	88.5	256.9	24.7	117.6	149.6
2001	35.7	145.4	99.4	283.4	26.0	123.6	162.9
2002	37.6	143.0	120.2	307.8	27.9	134.5	178.4
2003	45.3	146.9	110.7	298.1	30.4	154.7	179.0
2004	35.4	152.6	122.4	319.2	32.6	160.0	182.52
2005	37.1	156.6	120.6	334.0	34.4	181.3	193.4
2006	39.9	162.6	100.4	335.1	36.4	173.5	181.5

**TABLE A1.8 1995–2006 TPE Share of GDP (%)**

Year	AFR	AMR	EMR	EUR	SEAR	WPR	Total
1995	1.24	1.29	1.13	1.25	1.11	1.08	1.22
1996	1.17	1.29	0.91	1.27	1.16	1.11	1.21
1997	1.18	1.36	0.90	1.32	1.12	1.07	1.24
1998	1.19	1.38	1.33	1.37	1.11	1.16	1.30
1999	1.41	1.44	0.94	1.40	1.12	1.17	1.33
2000	1.36	1.53	1.10	1.40	1.13	1.24	1.37
2001	1.31	1.57	1.22	1.46	1.14	1.23	1.39
2002	1.39	1.59	1.23	1.53	1.17	1.21	1.44
2003	1.35	1.59	1.25	1.73	1.19	1.38	1.53
2004	1.30	1.61	1.32	1.76	1.17	1.43	1.54
2005	1.28	1.62	1.33	1.77	1.19	1.47	1.55
2006	1.38	1.60	1.34	1.72	1.17	1.44	1.52

**TABLE A1.9 1995–2006 TPE Share of THE (%)**

Year	High-income	Up-mid-income	Low-mid-income	Low income	WHO Member states
1995	17.9	21.7	28.5	27.0	23.3
1996	17.7	21.3	26.3	27.6	22.6
1997	18.3	21.6	26.4	27.3	22.9
1998	18.7	21.6	25.7	29.4	23.2
1999	19.1	22.2	26.1	31.9	23.9
2000	19.7	22.7	25.4	31.1	24.1
2001	19.5	22.7	25.3	30.2	23.8
2002	19.6	22.2	27.0	28.2	23.6
2003	19.7	23.1	29.3	33.2	25.4
2004	19.7	23.3	29.4	32.8	25.5
2005	20.3	23.1	29.2	33.8	25.6
2006	19.7	23.1	27.6	30.4	24.9

**TABLE A1.10 1995–2006 TPE Share of THE (%)**

Year	AFR	AMR	EMR	EUR	SEAR	WPR	Total
1995	29.1	22.3	31.5	19.2	32.0	22.8	23.3
1996	27.7	22.2	22.8	19.1	32.9	22.6	22.6
1997	27.1	22.9	24.4	19.5	32.6	22.1	22.9
1998	26.5	23.1	25.3	20.0	31.5	22.5	23.2
1999	30.7	23.1	23.7	20.4	32.8	23.6	23.9
2000	29.8	23.4	25.1	20.6	32.8	23.6	24.1
2001	28.2	23.1	25.7	21.3	32.7	22.4	23.8
2002	26.1	23.3	24.0	21.2	31.7	23.7	22.6
2003	26.8	23.8	28.4	23.9	32.5	26.0	25.4
2004	25.5	24.5	26.9	23.7	33.4	27.2	25.5
2005	25.4	24.5	27.3	23.8	33.1	28.0	25.6
2006	24.9	24.1	26.8	23.1	31.8	26.5	24.9

FIGURE A1.1

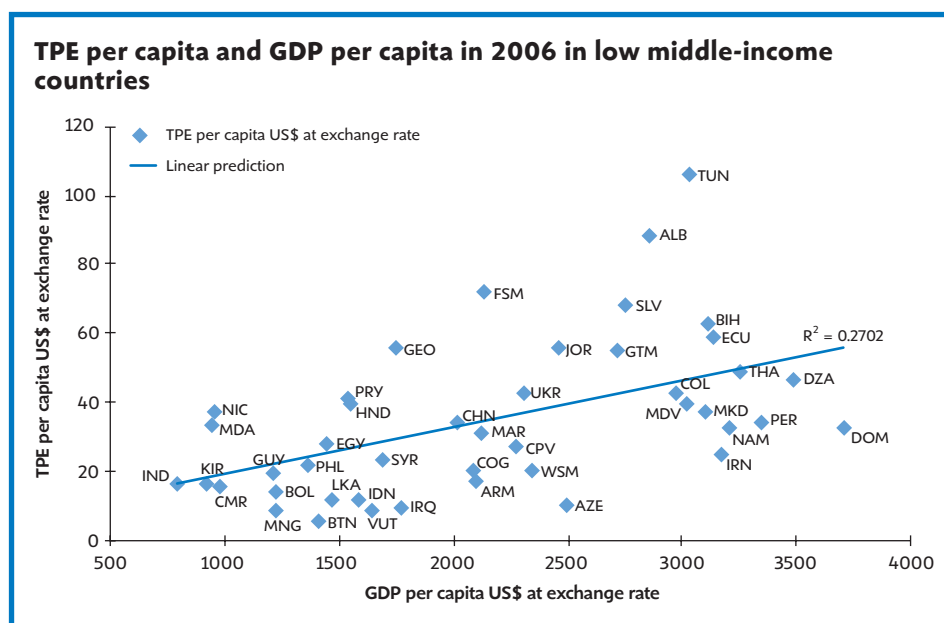


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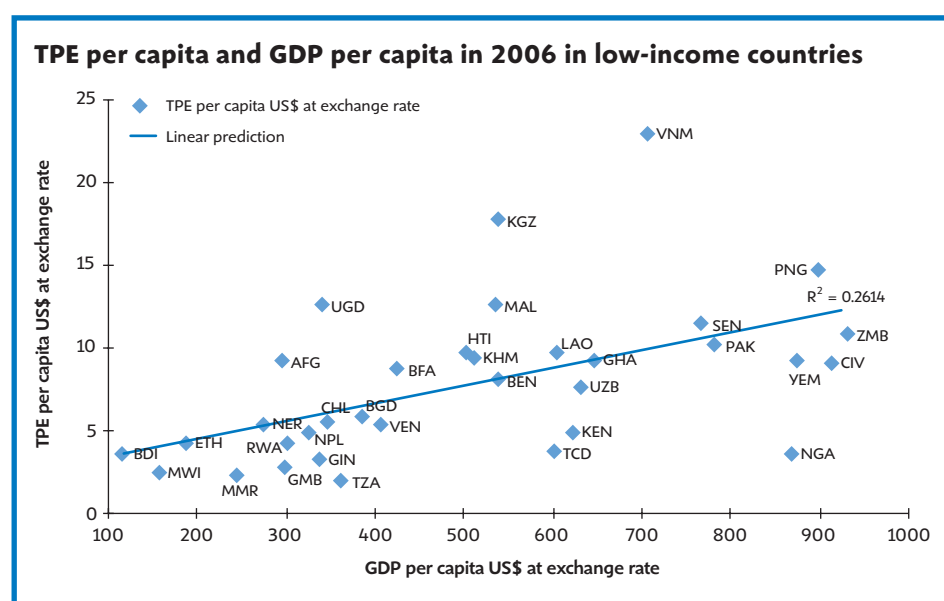


FIGURE A1.3

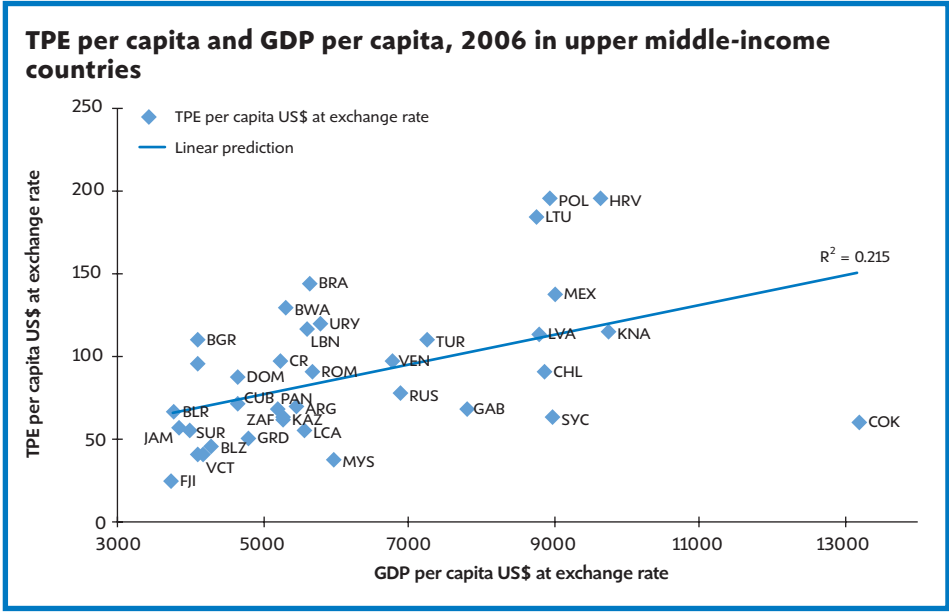


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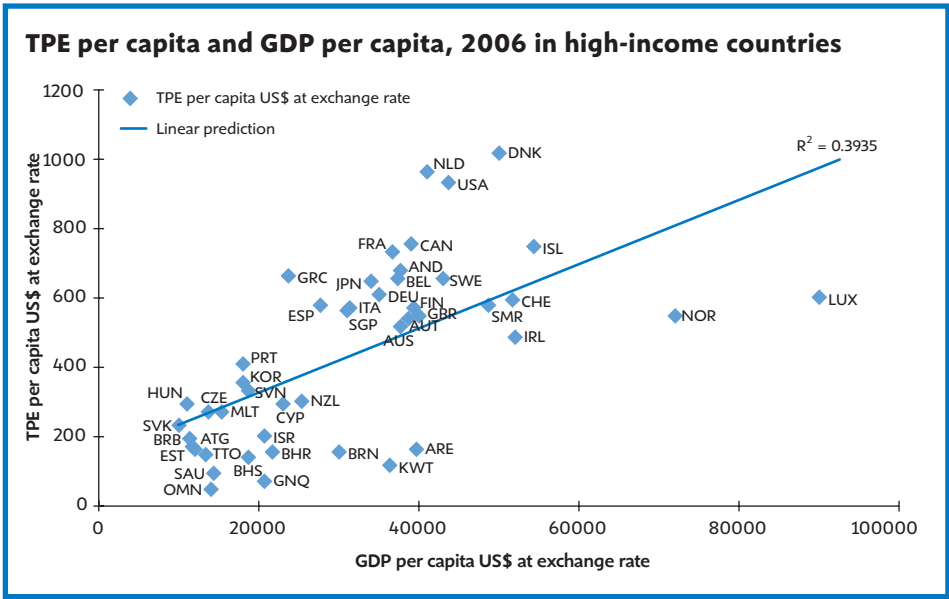


FIGURE A1.5

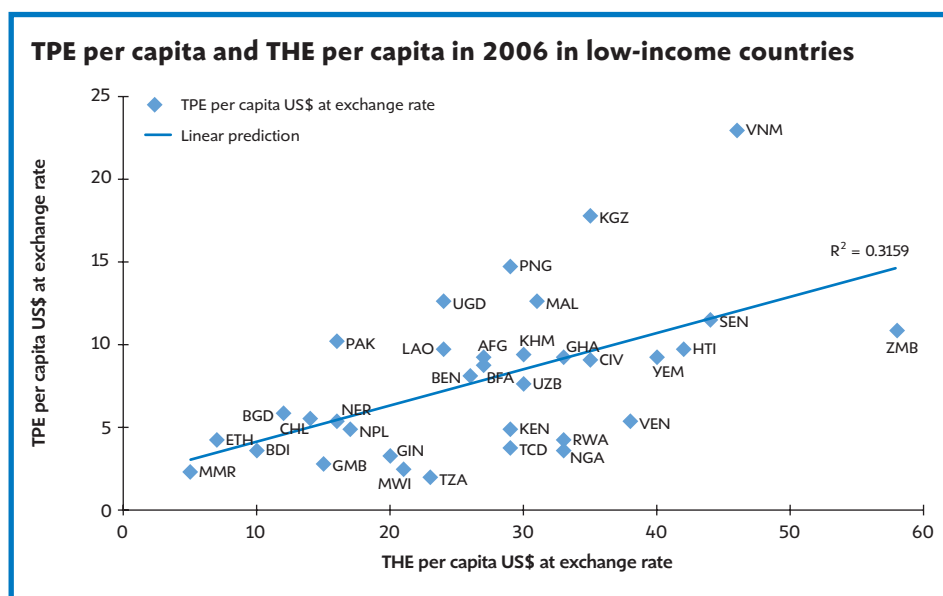


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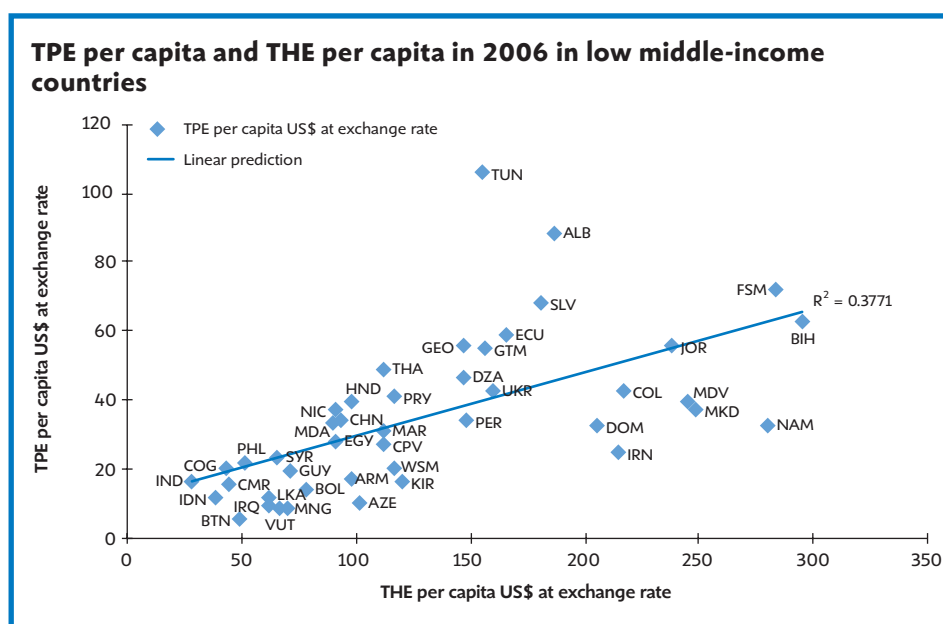




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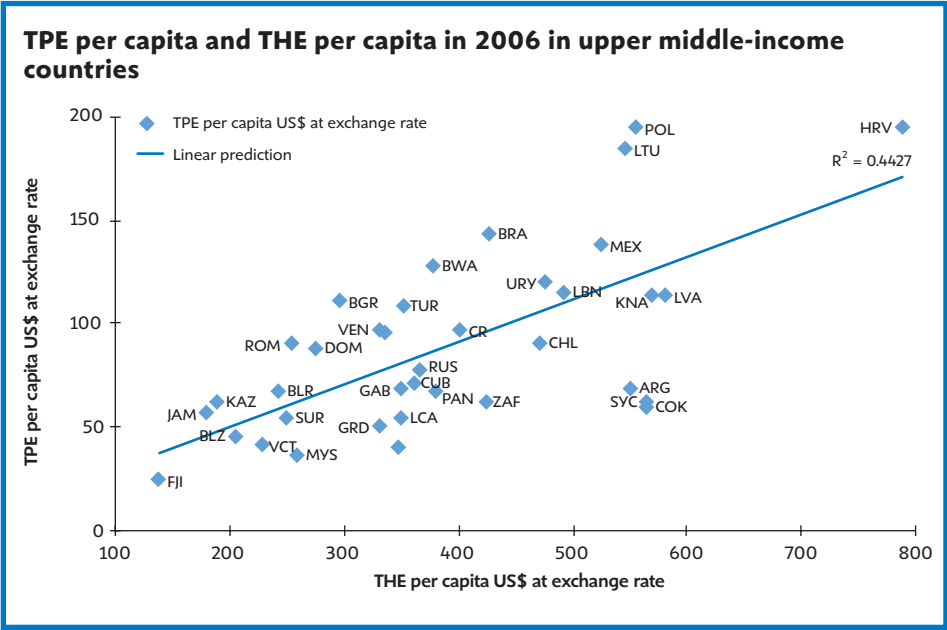


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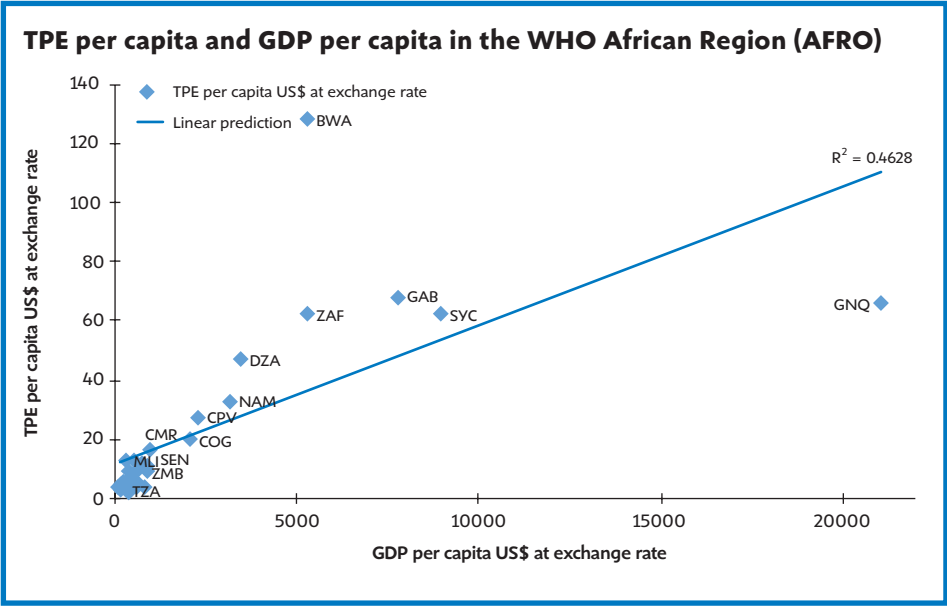


FIGURE A1.9

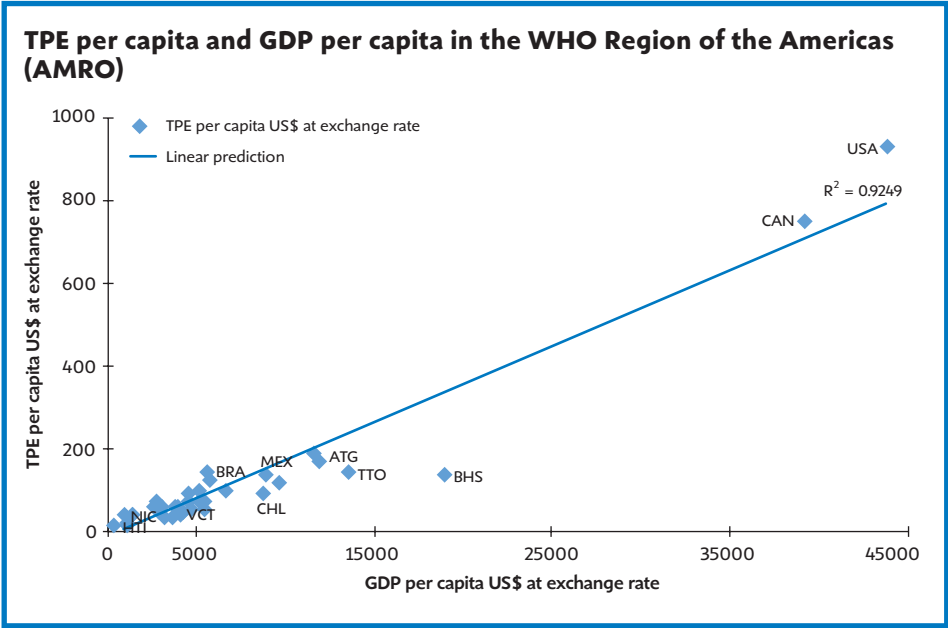


FIGURE A1.10

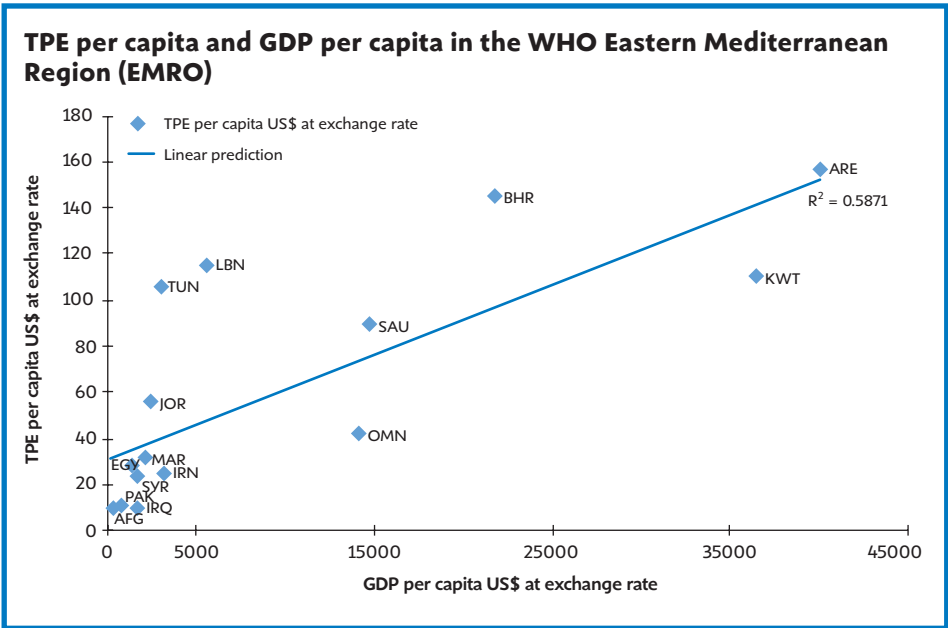


FIGURE A1.11

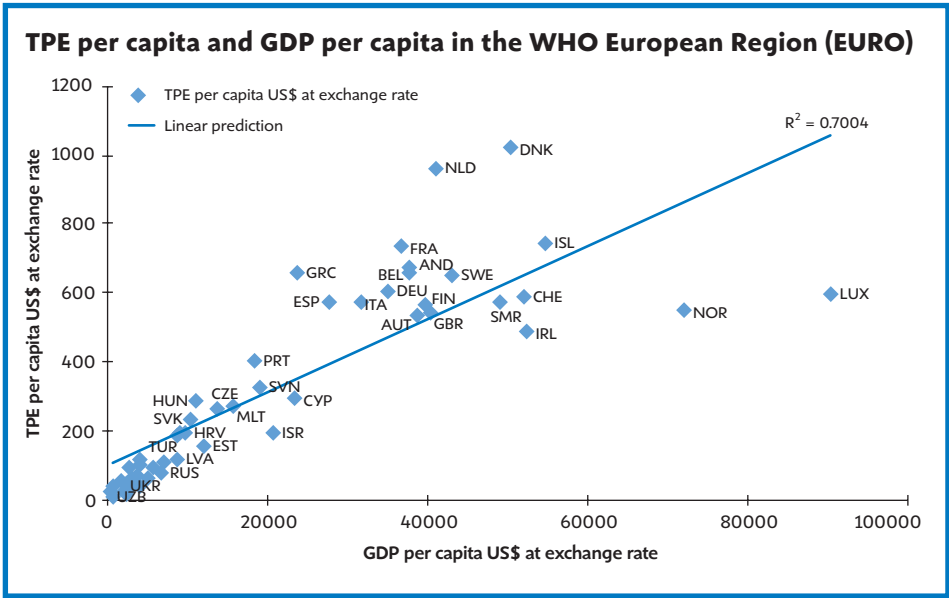


FIGURE A1.12

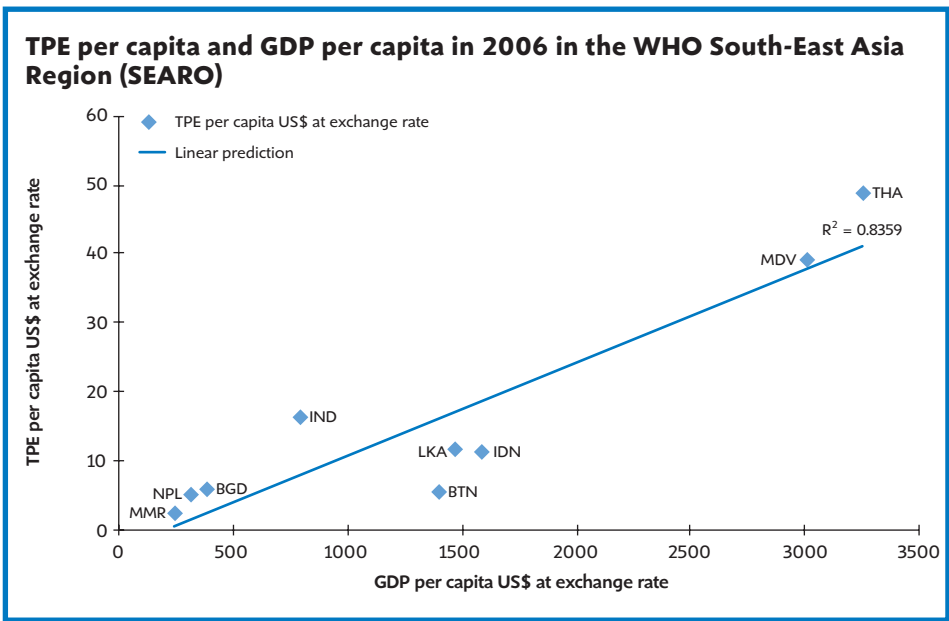


FIGURE A1.13

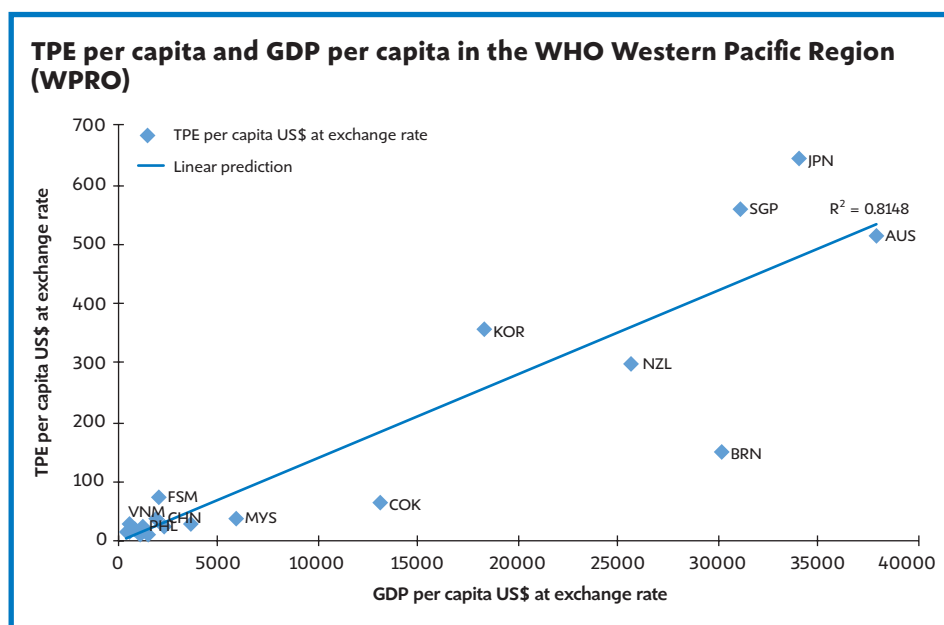


FIGURE A1.14

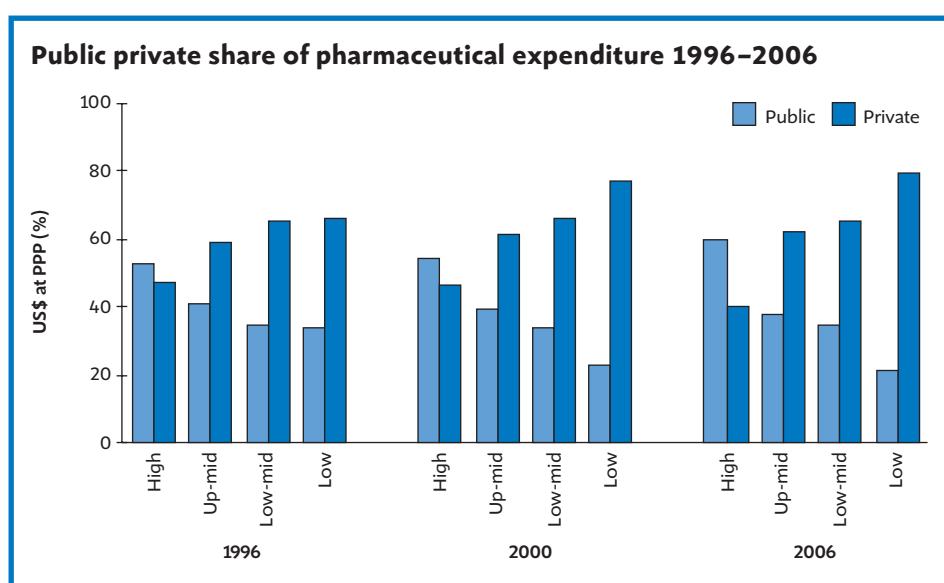


FIGURE A1.15

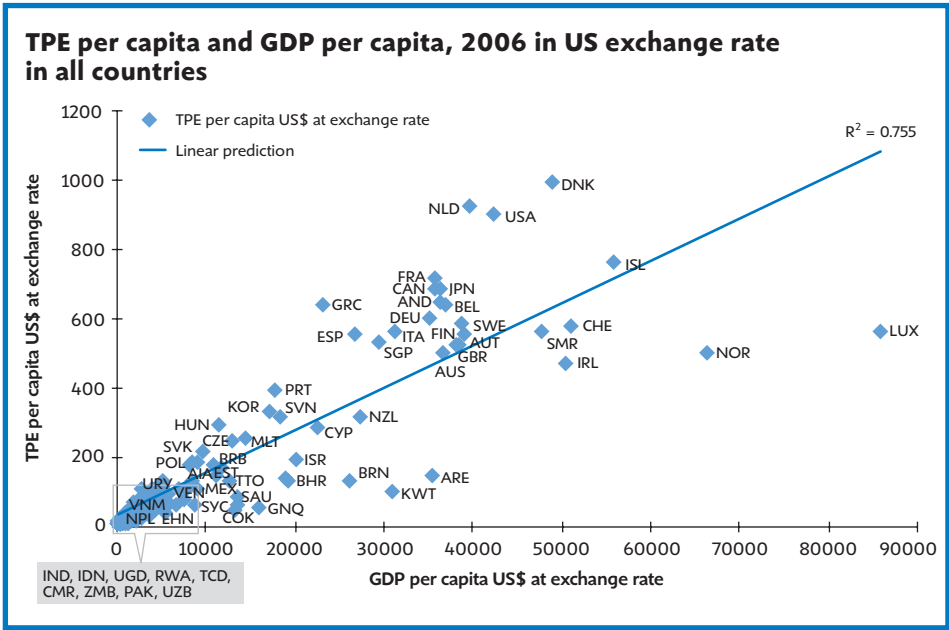
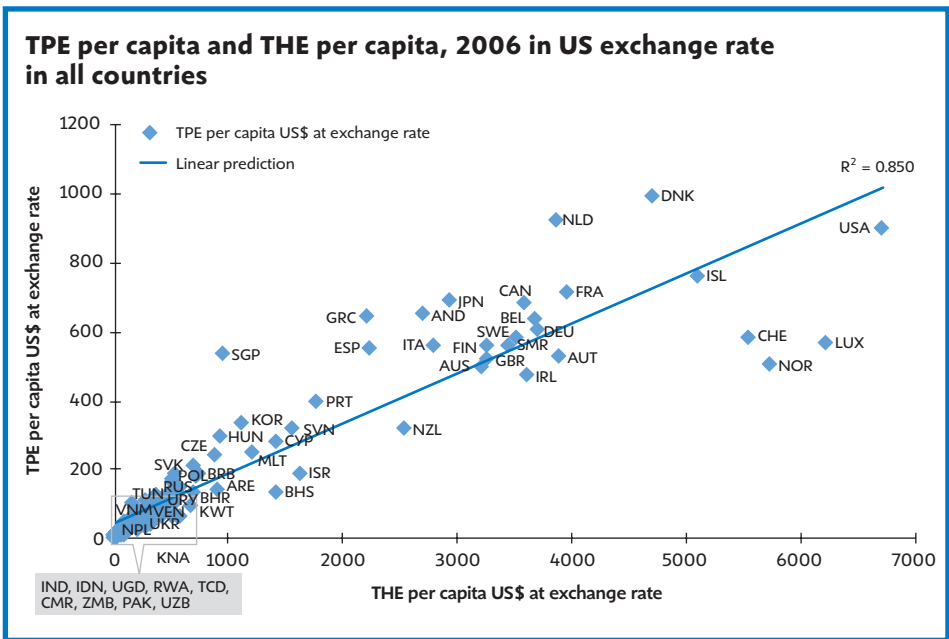


FIGURE A1.16





# THE WORLD MEDICINES SITUATION 2011

## OPTIONS FOR FINANCING AND OPTIMIZING MEDICINES IN RESOURCE-POOR COUNTRIES

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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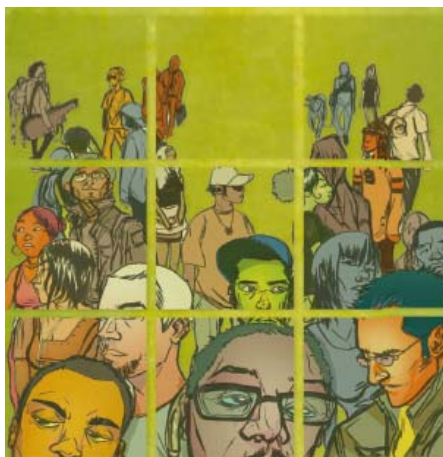
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# **Options for financing and optimizing medicines in resource-poor countries**

**Panos Kanavos, Prithwiraj Das ,  
Varatharajan Durairaj , Richard Laing  
and Dele Olawale Abegunde**

**World Health Report (2010)  
Background Paper, 34**



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## **Options for financing and optimizing medicines in resource-poor countries**

*World Health Report (2010) Background Paper, No 34*

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The authors are grateful to Priyanka Kanth-Devarakonda and Willemien Schurer for excellent research assistance. The paper has benefited significantly from comments by Guy Carrin. We are grateful for their contribution.



## **Abbreviations used**

ACAME	African Association of Central Medical Stores for Generic Essential Drugs
CDS	Community Drug Scheme
CEE	Central and Eastern Europe
CIF	Cost, Insurance, Freight
CMS	Cooperative Medical System (China)
DLO	Supplementary Pharmaceutical Provision (Russian Federation)
ECCB	Eastern Caribbean Central Bank
ECDS	Eastern Caribbean Drug Service
EFPIA	European Federation of Pharmaceutical Industry Associations
Ex-M	Ex Manufacturer's (Price)
FFOMI	Federal Fund of Obligatory Medical Insurance (Russian Federation)
FOB	Free on Board
FSU	Former Soviet Union
G	Generic
GST	General Sales Tax
IB	Innovator Brand
IT	Information Technology
IRP	International Reference Price
JFDA	Jordan Food and Drug Administration
JNDF	Jordanian National Drug Formulary
JUH	Jordan University Hospital
LPI	Local Price Inflator
LPG	Lowest Priced Generic
MDG	Millennium Development Goals
MoH	Ministry of Health
MPR	Median Price Ratio
MPS	Medicine Price Survey
MSA	Medical Savings Account
MSH	Management Sciences for Health
MSP	Maximum Selling Price
M-U	Mark-Up

NGO	Non-Governmental Organization
OB	Originator Brand
OECS	Organization of Eastern Caribbean States
OOPs	Household out-of-pocket spending
OTC	Over the Counter
PHI	Private Health Insurance
PPS	Pharmaceutical Procurement Service
RDF	Revolving Drug Fund
RMS	Royal Medical Service (Jordan)
SHI	Social Health Insurance
TAC	Technical Advisory Committee
TNMSC	Tamil Nadu Medical Services Corporation
UNICEF	United Nations (International) Children's (Emergency) Fund
US\$	United States dollar
WHO	World Health Organization
VAT	Value Added Tax

## Executive summary

Globally, there are significant inequalities in access to medicines, particularly in resource-poor countries. The available literature suggests that these inequalities are mainly due to inadequate public spending, a lack of or adequate health insurance coverage, poor availability of essential medicines, poor affordability and high household out-of-pocket expenditure. Ranked among the top two items in household health care budgets, medicines account for a significant proportion of personal or household income as much of the financing of medicines in the developing world is characterized by household out-of-pocket payments. As health insurance and savings are only available to a small proportion of developing world populations, there is a high likelihood of households entering the debt and poverty cycle. Additional financial burden on the households is imposed by price inflators and fragmented and ineffective procurement systems. Medicines in the private sector are significantly higher priced and more dominated with originator brand drugs.

Although prepayment and risk pooling could protect poor households from facing catastrophic spending in health, many resource-poor countries lack appropriate mechanisms to pool financial risks, even with rising income. However, successful models, many of them at the sub-national or sub-sector level, do exist in some countries, which could be scaled up or replicated. This paper discusses various options for resource-poor countries to enhance access to, and minimize household out-of-pocket spending, on medicines. Specific options discussed in this paper are

- Taxation
- Social health insurance
- Private health insurance
- Community financing
- Drug sales and revolving funds
- Medical savings accounts

Some positive medicine financing experiences have come from East Caribbean states, India, the Russian Federation, Sudan, and Viet Nam. On the other hand, less successful experiences are reported from Lao PDR, Nigeria, and Uganda. Mixed results have emerged from Bangladesh and Jordan. Of course, many options practiced in different countries are not strictly comparable because their objectives and targets and, therefore, their achievements are quite different. However, some options may be relevant to particular settings in resource-poor countries and lessons can be learnt from them so as to develop appropriate medicine financing strategies.

Drawing lessons from various experiences, one could argue that successful financing of medicines is contingent upon a number of factors, as outlined below:

- Political commitment
- Effective design and administrative capacity
- Clear implementation strategies
- Financial sustainability
- Rational selection and rational drug use
- Affordable prices
- Reliable medicine supply systems and low taxes

## Introduction

Target 17 of the eighth goal of the MDGs seeks to provide access to affordable essential medicines in developing countries in cooperation with pharmaceutical companies,<sup>1</sup> and is measured with indicator 46 as the proportion of population with such access on a sustainable basis.<sup>2-3</sup> The available literature suggests that they are mainly inequalities in access to medicines due to inadequate public spending, a lack of or adequate health insurance coverage, poor availability of essential drugs, poor affordability and high household out-of-pocket expenditure, partly due to significantly higher priced and more dominated with originator brand drugs in the private sector. Moreover, many resource-poor countries lack appropriate mechanisms to protect the poor and pool financial risks. This paper discusses various options for resource-poor countries to enhance access to medicines and minimize household out-of-pocket spending on medicines. Some of the suggested options are already in practice in some low-income countries while others emerged from the experience in high- and middle-income countries.

The paper has four broad sections. Section-1 discusses the challenges to medicines' financing in developing countries and highlights some of the bottlenecks in medicines availability, affordability, and the lack of good regulation and planning. The following section analyses different options for financing medicines and their merits and demerits. Section-3 brings out some examples of successful execution of the listed financing options. Section-4 provides an analytical framework for financing to attain universal coverage of medicines.

# 1 Medicine financing: Challenges in resource-poor countries

There are significant inequalities in the distribution of prescription medicines consumption and expenditure from a global perspective. Whereas high-income countries account for 80.3% of global pharmaceutical spending, upper middle-income countries, lower middle-income and low-income countries account for 9.9%, 9.3% and 0.5%, respectively.<sup>4</sup> When considering the population distribution, expenditures on medicines become even more unequal. Table-1 demonstrates this by examining expenditure on medicines by (WHO) region and income group. The high-income group has an average per capita spend of US\$ 438, whereas the low-income group has a US\$ 7 per capita. At the same time, the Southeast Asian region (SEARO) has 31.2% of the global population but only 3% of total medicines spending, while Europe and the Americas with 14.6% and 16.4% of the world's population account for 33.7% and 43.3% of total medicine spending respectively.

**Table-1**

## **Total medicine spending by region and income, 2005-06**

Country group	Countries		Population		Total expenditure		Per capita (US\$)
	Number	%	Number ('000)	%	Million US\$	%	
By WHO Region							
AFRO	19	41.3	310,156	5.7	4,466	0.5	21
AMRO	35	100.0	890,669	16.4	356,005	43.3	116
EMRO	4	20.0	26,941	0.5	1,512	0.2	97
EURO	46	86.8	793,314	14.6	277,540	33.7	340
SEARO	9	81.8	1,696,228	31.2	25,064	3.0	16
WPRO	17	63.0	1,718,390	31.6	158,216	19.2	131
BY World Bank Income Group							
High	43	89.6	983,493	18.0	660,609	80.3	438
Upper-middle	35	83.3	782,194	14.4	81,235	9.9	82
Low-middle	33	61.1	3,106,247	57.0	76,857	9.3	31
Low	19	38.8	577,565	10.6	4,123	0.5	7

**Source:** Adapted from Lu et al, 2010.<sup>4</sup>

Whereas expenditure on medicines ranges between 7% and 30% of total health care expenditure (both public and private) in developed and transition economies, it ranges between 25% and 65% of total health expenditures in the developing world.<sup>5-6</sup> Many developing countries' reported spending on medicines and human resources rank among the top two items in their health care budgets.

Surveys in Kenya suggest that almost half of respondents reported problems paying for their last illness, 66% were prevented from using health care due to costs, 71% had no ready cash for health care, 27% did not receive drugs due to lack of funds and 31% bought less drugs due to lack of funds.<sup>7-10</sup> Sources of money for health care include delaying payment (5%), payment in kind (2%),

borrowing from friends (31-45%), selling produce (6-9%), selling belongings (2-15%), savings (4%), gifts (2-3%) or by not seeking care (3-9%).

In Guinea, 25% could not access health care due to costs, 57% had no ready cash for health care, 7% did not receive drugs due to lack of funds and 15% bought less drugs due to lack of funds.<sup>10-11</sup> Sources of money for health care include getting exempted (1%), delaying payment (18%), paying in kind (2%), borrowing from friends (25%), borrowing from money lenders (2%), selling produce (20%), selling belongings (2%), savings (12%), gifts (11%) or by not seeking care (3%). Informal payments are frequently requested from care providers, and are often far greater than the official out-of-pocket (OOP) expenditures.

Similarly in Burundi, 12% could not use health care due to costs and 28% had no ready cash for health care.<sup>10</sup> Sources of money for health care include borrowing from friends (35%), selling produce (18%), selling belongings (22%), or gifts (16%). Significant shortages were also reported for pharmaceuticals.

### **1.1 Out-of-pocket spending (OOP)**

Much of the financing of medicines in the developing world is characterized by household out-of-pocket (OOP) payments.<sup>12-15</sup> As health insurance and savings are only available to a small proportion of developing world populations, there is a high likelihood of households entering the debt and poverty cycle.<sup>16-19</sup> Out-of-pocket spending is often proportional to the amount of care consumed and regressive, as usually it proportionately takes up large portions of lower income household budgets. Furthermore, there is no risk pooling or separation between risk of illness from financial risk.

In a large number of developing countries, up to 90% of the population purchase medicines on an out-of-pocket basis;<sup>13,20-21</sup> In other words, medicines account for a significant proportion of personal or household income.<sup>21-23</sup> This is in sharp contrast to most developed countries, where OOPs for prescription medicines are a small proportion of total spending on medicines, due to health insurance coverage, as Figure-1 suggests. In the UK, for instance, the effective co-payment<sup>4</sup> is 6%, whereas in France and Spain it is 3.6% and 7.8% respectively (Figure-1). In all these countries, there are extensive exemptions from co-payments, based on disease type, age and income, where applicable. Most chronic diseases are either fully covered by health insurance (if they are deemed life threatening), or subject to a (very) modest co-payment.

In the developing world, observed OOPs are higher in outpatient and chronic care. In Kenya, 69.4% of household health-related OOPs are expended on outpatient care.<sup>7-8</sup> In India, these numbers are higher, notably, 83% in rural areas and 77% in urban areas.<sup>24</sup> This is a phenomenon also observed in Pakistan,

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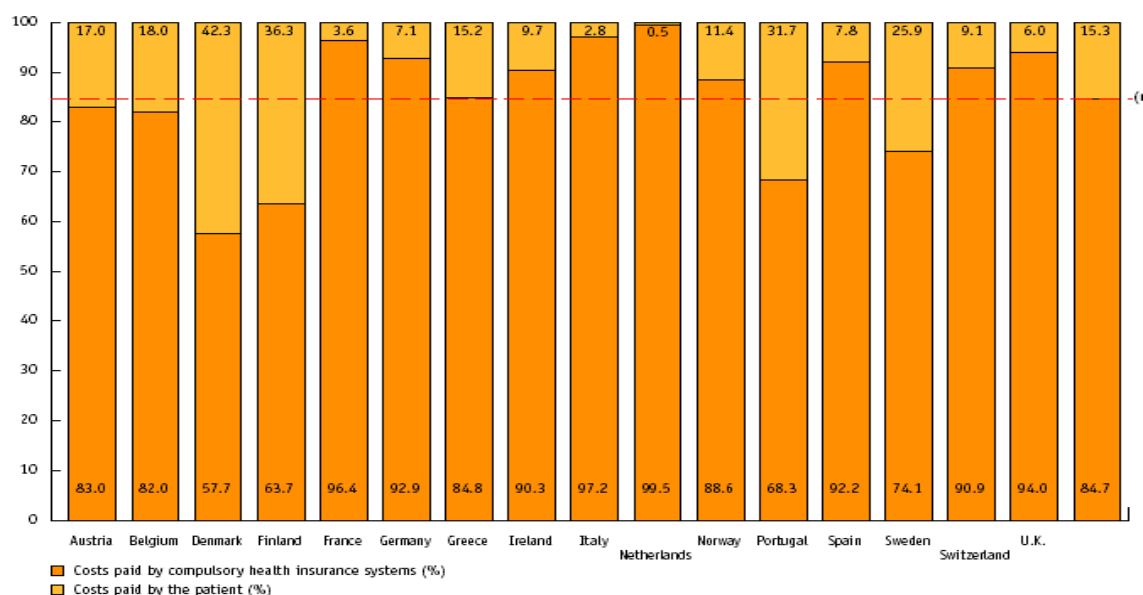
<sup>4</sup> Defined as total OOPs on prescription medicines over total expenditures on prescription medicines



where 98% of health care funding is private and means that most of the medicine requirements are covered by patients on an OOP basis.<sup>25</sup> In Ghana, 25% of drug funding is generated through the OOP expenditure of patients on medicines and other health care facilities.<sup>26</sup>

**Figure-1**

**Effective co-payment for prescription medicines in selected (European) countries with comprehensive health insurance coverage, 2006**



**Source:** Authors' compilations from EFPIA, 2008.<sup>135</sup>

Further, indirect OOPs may be required for health care goods or services which cost above a set reimbursement rate.<sup>22-23</sup> For instance, under referencing pricing<sup>5</sup> for pharmaceuticals, the cost above the reference price is borne by the patient; similarly under balance billing patients pay for the difference between the reimbursement rate and the care provider's fee.

### 1.1.1 The problem of informal payments

Informal OOPs exist in some (developing, transition as well as developed) countries in the public sector despite not being officially endorsed.<sup>27,28</sup> These may range from ex-post gifts to 'thank' staff for care (for patients with chronic ailments, these may also have the nature of ex-ante payments) to large envelope payments given to the physician before treatment to secure their services. Informal payments are often a form of corruption undermining the official system and reducing equity of access particularly for vulnerable populations. As these

<sup>5</sup> A mechanism, whereby health insurance pays (reimburses) up to a maximum for a product or a service and the patient pays the difference if the reimbursed product or service is not that of the consumer's choice.

payments are covert, much of the 'evidence' is often anecdotal. These payments exist for several reasons:

*Lack of financial resources in the public system*

Without payment, patients cannot obtain basic supplies such as the drugs or bandages required for treatment. Staff relies on payments to supplement their small or non-existent public salaries.

*Desire to exercise consumer leverage over providers*

No third party is involved in the transaction, making the provider accountable to the patient. This seems to be important in southern Europe and may explain their lack of demand for private health insurance.

*Cultural tradition*

Southern European, Central and Eastern European (CEE) and former Soviet Union (FSU) countries have a long tradition of informal payments that has persisted despite attempts in some countries to curb it.

*Lack of private services*

The private sector is not fully developed, so patients with money have fewer options to obtain services elsewhere. In Western Europe, physicians may legally work across the public–private divide, shifting patients to their private practice. Treating patients for a 'private' payment in the public sector may arise where private practice does not exist.

Information on the extent and size of informal payments is often limited because they are covert and, in some countries, illegal. Furthermore, a lack of transparency means that accessing this revenue is difficult for publicly funded systems. In transitional countries the informal payments partially replace government funding to fund materials or finance salaries, in addition to providing extra services or better quality care.<sup>27</sup> Unfortunately in some countries, it may be the only method of provider payment, allowing some form of health care provision to take place.

Although difficult to measure due to the nature of its activity, household surveys, corruption surveys and exit polling show large variations in informal payments (3% of patients in Peru to 96% in Pakistan).<sup>28</sup> Regions with greater likelihood of informal payments, particularly for inpatient care, include South-East Asia (with the exception of Thailand), South Asia, Eastern Europe and regions of South America. Often these payments are necessary to receive care, even 'free' care, and to receive higher quality care. The impact on household budgets can be significant, ranging from 5% of average monthly per capita income to far over 100%, particularly for inpatient care.

In Bulgaria, there is a complexity and range of informal payments, from illicit under-the-counter to semi-official user fees, and from unethical ex ante to

gratuitous ex post gifts.<sup>29</sup> Almost one quarter of survey respondents reported giving an informal payment for public care, primarily as gifts rather than cash. These payments were for pharmaceuticals, hospital stay, to physicians for examinations, operations (surgery and obstetrics), tests and certificates, and for nursing care. Average cash payments were 4.4% of monthly salary, but 21% of minimum monthly salary, while gifts were 1.5% and 7% respectively. Gifts are generally given after treatment, while cash is given either before or during treatment, or a combination thereof.

In Greece, OOPs accounted for approximately 40% of total health expenditure in 2004, of which 10% is considered informal. More than one-third of publicly treated patients report informal physician payments some of which are demanded by physicians for care.<sup>30,133</sup> The primary reason for payment was to receive better quality care, although 20% of patients reported being asked to pay prior to surgery and the likelihood of making informal payments related to their surgery was twice that of non-surgery payments. The average inpatient payment for care was €535, while for gratuities €280. Informal payments are also given to nursing staff, on average €37, and are higher in private than public hospitals.

In Turkey, approximately 30% of total health expenditure is through OOPs, with a quarter classified as informal payments.<sup>31</sup> Of these informal payments, 72% were cash payments and 27% in-kind payments. Overall, the majority of OOPs were directed to outpatient care; however, higher amounts per episode were directed to inpatient care for food, medicines and medical devices. The majority of public payments were for medicines and surgery services privately for medical services, reflecting competition within a private-public practice physician. Lowest income (indigent) patients insured by the state (Green Card citizens) made informal payments primarily for surgery (64%) and physician (80%) services, compared to uninsured for medicines (82%). Cultural factors were not seen as primary reasons for giving informal payments (i.e. gratitude).

### **1.1.2 Likely responses to a perennial problem**

Response to informal payments is difficult. Increasing the level of resources allocated to health care may be easier said than done during difficult economic times. Raising wages and restructuring incentives may be implemented, along with increasing accountability with strong management and introducing community involvement, particularly in smaller communities.

Converting informal payments into formalized cost-sharing arrangements requires compliance from providers, who may lose substantial income (especially if income has to be declared for tax purposes) and public support. Securing these commitments is not an easy task. Experience from low-income countries suggests that whether such initiatives can be implemented in practice depends on the ability of government to regulate providers and their willingness to set priorities or limit the services on offer.

The ability to achieve improved efficiency and quality, without jeopardizing equity, is critically dependent on several policy measures. These encompass the skills and capacity of staff, the development of appropriate incentives and exemption

systems and suitable information systems to support the accounting and auditing of such payments.<sup>32</sup> Informal payments do, however, represent an important source of revenue in countries in which prepayment systems have collapsed, and phasing them out without developing suitable alternatives would probably be altogether damaging.

### **1.1.3 Equity implications of OOPs**

Evidence from several countries (including Myanmar, Nepal, Indonesia, Pakistan, several sub-Saharan African countries, and also some European countries) indicates a willingness to pursue provision of free/ low cost medicines to respective populations.<sup>12,18,20-21,25,33-38</sup> Unfortunately, due to a lack of available resources or absence of adequate earmarked funding, frequently results are limited to poor medicines availability and accessibility, contributing to inequity and often leading to impoverishment. For members of the population still able to access and avail themselves health care services, the OOPs has lesser impact and these people are at lower risk of facing catastrophic spending.

Similar to developing countries, many transition economies face serious problems in drug financing since often federal/national budgets ignore the importance of funding essential medicines, leading to significant inequities. This is shown to be true in Georgia and Kazakhstan, and also in the Baltic countries.<sup>39</sup>

In Estonia, a recent study of income inequality in health care financing and utilization has raised significant equity concerns, likely to impact access to medicines.<sup>40</sup> Not only do 53% of average OOP household expenditure relate to medicines, but there are concerns that different socio-economic groups are impacted differently. A disaggregation of these figures by quintile – each quintile including equal number of households – reveals significant differences across different income levels: medicines account for 33% of total out-of-pocket health expenditures for the wealthiest quintile, and 84% for the poorest quintile (Figure-2). The poorest quintile is also much more likely to be affected and, in fact, impoverished because of OOPs. The availability and affordability concerns surrounding medicines in this particular country context have also been confirmed by more recent evidence.<sup>134</sup>

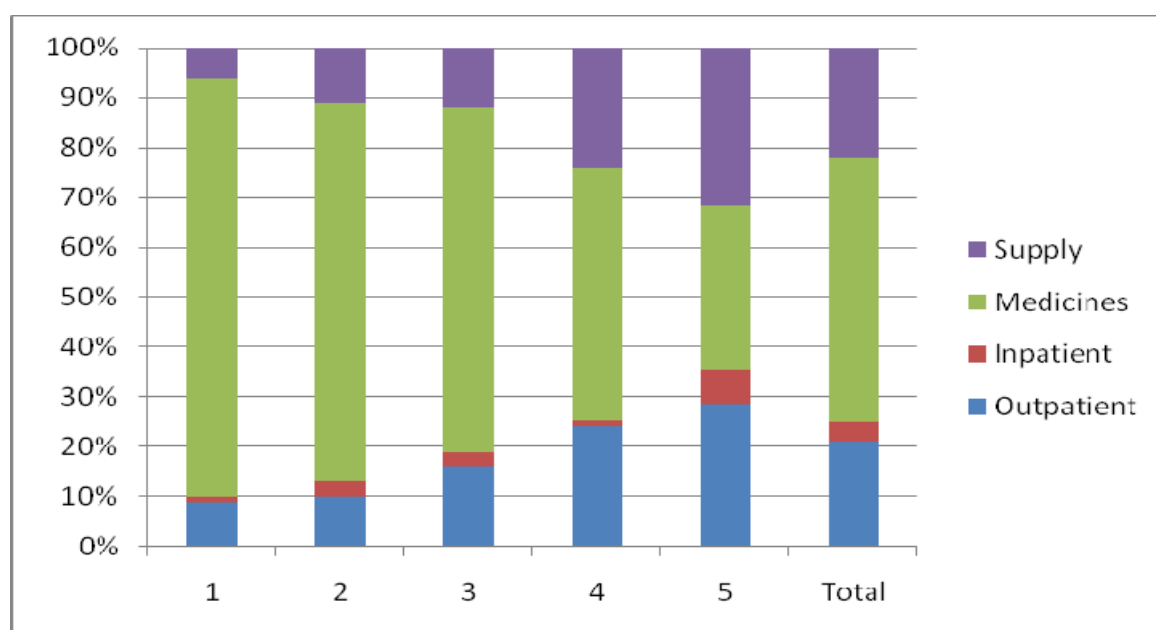
Due to the scarcity of data available on OOP spending, specifically on medicines, it is difficult to evaluate the entire problem. However, a near universal finding in all studies is that a single catastrophic health incident pushes families, usually already in debt, further down the poverty line, consequently forcing them to sell belongings and assets, or incurring non repayable loans from informal or formal sector funders.<sup>12-19</sup>

Many countries, such as India, Mexico, Indonesia and Egypt, have special provisions in place for parts of the population, chiefly civil servants, enabling them and their families to access health care and medicines at subsidised rates. Although this ensures that part of the population's needs is adequately met, it is often seen as unfair because similar provisions do not exist for other segments of the population. Further, such provisions contribute to inequity, as civil servants are not the poorest segment of society most in need of comprehensive coverage.

**Figure-2**

**Structure of out-of-pocket health spending by quintile in Estonia (2007, %)**

Health care aspect	Quintile					Total
	Poorest	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	Richest	
Medicines	84	75	69	50	33	53
Other supplies	6	11	12	24	32	22
Outpatient	9	10	16	24	29	21
Inpatient	1	3	3	1	7	4



**Source:** Võrk, 2009.<sup>40</sup>

## 1.2 Price inflators

Tariffs and VAT in many poor countries are a significant factor in determining the end-user price of drugs, driving them up sometimes by as much as 55%, thus contributing to access restrictions.<sup>20</sup> Tariffs on pharmaceuticals are regressive in their effect on consumers, harming especially the poorest and weakest. But VAT and tariffs are not the only Local Price Inflators (LPIs). Others include port charges, clearance and freight, importer's margins, central, regional and local government taxes, wholesaler and pharmacy margins – many of which are driven up by regulations and other government-imposed restrictions on competition.

## 1.3 Ineffective medicine procurement and distribution practices

Countries managing to procure medicines at prices comparable to the international reference prices (IRP) still do not always seem to be able to ensure availability, accessibility and/or affordability. Often procurement processes are inefficient, even if the models are not. For example, in most middle-eastern and

some Asian countries (e.g. Pakistan), public procurement rates seem to be reasonably low and affordable, however, this does not necessarily translate into low retail prices or high availability.<sup>25,41-47</sup> Even if procurement practices and processes work reasonably well, the absence of insurance schemes or other social security results in high OOPs, often disproportionate to personal or family income.

In countries where procurement is functional in terms of quantity of medicines procured for the medical needs of given populations, bottlenecks in the distribution system impede access to medicines. In India and China, for example, procurement is carried out by various entities, including public sector hospitals, private sector retail pharmacies and some governmental bodies.<sup>48-53</sup> The result is poor coordination in the procurement processes due to simultaneous procurement of similar drugs and, although it stimulates competition in procurement rates, it also results in widespread disparities observed in patient prices at different outlets.

Fragmentation in the procurement process for pharmaceuticals and lack of coordination capabilities often result in significant waste of resources.<sup>20</sup> Many countries continue procurement of branded drugs, rather than cheaper generics, adding to the total health expenditure incurred. A significant pitfall is the lack of available data which hinders analysis of procurement models, and in turn affects the possibility of carrying out reforms.

### **1.3.1 Distribution practices**

A well-run distribution system should maintain a constant supply of medicines, store them in good condition, minimize medicine losses due to spoilage and expiry, rationalize the storage points, use available transport efficiently, reduce theft and fraud, and provide information for forecasting medicine needs.<sup>132</sup> The evidence on how distribution channels work in developing countries is fairly fragmented both in terms of country coverage and data comprehensiveness.<sup>54-61</sup> The key points from the available evidence are summarized in Table-2. These disparities emanate from a variety of sources, including differences in importing and local production of medicines, national/regional tariffs and mark-ups, and a country's ability to regulate the medicines distribution chain. The evidence points at certain trends in terms of the variability of mark-ups and margins applied to medicines between countries, within countries, between different drugs, and in different sectors.<sup>20</sup>

Often there are differential policies on certain drugs which may include mark-up exemption (in which case, the nature of the drugs is not specified), ineffective regulation, ineffective implementation of regulation, or a complete absence of regulation where mark-ups are applied at the discretion of the major players in the distribution chain, especially wholesalers and retailers. Some countries put a ceiling on the percentage of mark-ups allowed for wholesale and retail distribution, whereas others regulate import tariffs or their national taxes such as VAT and GST. While there is some information on distribution mark-ups and taxes, the evidence from the peer review literature and other sources is very



scarce on the broad legal framework relating to pharmacy operations and geographical distribution, among others.

**Table-2**

**Key pitfalls in distribution systems for medicines in developing countries**

1. Significant gaps in the evidence, which is not comprehensive for any country.
2. Very high mark-ups reflecting inefficient markets or an absence of regulation. Wholesale and retail mark-ups are the most significant components of final price.
3. Import tariffs are not the largest component of the final price while government taxes are major contributors.
4. Absence of price regulation monitoring or/and enforcement regarding margins.
5. No meaningful information emerging about organization of the distribution sector, both wholesale and retail (e.g. whether there are restrictions in the geographic allocation of pharmacies).

**Source:** The authors from the literature.

Information is also very scarce on the distribution of retail outlets within countries, in terms of rural and urban distribution, or demographic distribution. Similarly, evidence on how the wholesale sector operates and how market coverage is ensured is not available and only mentioned in a few studies in passing. The same also applies to the quality and efficiency of distribution, where little has been found or reported on the key components of the distribution chain including quality and efficiency of storage, transport and dispensary facilities. These gaps in the data have some serious human resource implications.

### **1.3.2 Taxation and distribution of medicines in developing countries**

Tariffs and taxes are a significant factor in determining the end-user price of drugs in many developing countries and drive them up, sometimes by as much as 55%. Some countries put a ceiling on the percentage of mark-ups allowed for the wholesale and retail sectors, whereas others regulate import tariffs and others control their national taxes such as VAT and GST. There is some information on distribution mark-ups and taxes (see Table-3). Thailand is seen to have very high cumulative mark-ups that can go up to 2,000% in certain cases on the Maximum Selling Price (MSP); however, the accuracy of the data has been questioned. In comparison in the Philippines, cumulative mark-ups ranged much lower but similar problems have occurred in collecting data from primary sources for specific medicines. In China, public sector price components were collected in a drug-specific rather than general method and found that different medicines are

subjected to different taxes and exemptions, for example in Shandong<sup>53</sup> and Shanghai<sup>52</sup> provinces.

**Table-3**

**Distribution margins and taxes in some low/middle-income countries**

Country	Value (% MSP or ex-M)	Stage/Purpose	Comments
Thailand	2,000	Cumulative	Inaccurate estimation
	20-285	Public mark-up (M-U): OB 28-41%, G 20-285%	
	37-900	Private cumulative M-U	Extreme variability noted
	0-31	Wholesale M-U: G 7-31%, OB <2%	
	13-150	Pharmacy M-U: G (20-150%); OB (13-40%)	
Philippines	87-273	Cumulative M-U	Sector not specified
	3-5	National corporate taxes	
	12	VAT	
China	4	Duty tax on all imported medicines	Pharmacy medicines sans public
	17	VAT	
Pakistan	25	Cumulative M-U	Ex-factory prices (locally produced generics)
Morocco	10 - 30	Wholesale M-U: 10%; Retail M-U 30%	Regulated
	7	VAT	Regulated
	32-40	Custom charges	
Kyrgyzstan	44-63	Cumulative M-U	Sector unspecified
	15-35	Wholesale M-U: G 25-35%, OB 15-25%	
	5-25	Retail: G 15-25%, OB 5-15%	
Yemen	57	Cumulative M-U	Sector non-specified
Ghana	178-246	Cumulative M-U: public 178-246%, private 27-388%, mission 67-186%	Public sector
Nigeria	123	Cumulative M-U: 44% landing cost, 8% clearance fee, 12% inspection fee, 13% import margin; 23% each wholesale & retail margin	For imported medicines from the point of landing till dispensing
Uganda	49	FOB	
	1-35	M-U: retail (35%); wholesale (1.3%)	
	11.9	Import fee	
	1.5	Clearing fee	
	1.5	CIF	

Originator Brand (OB); Generics (G); Mark-Up (M-U); Cost, Insurance and Freight (CIF); Free on Board (FOB); Ex-Manufacturer's Price (ex-M); Maximum Selling Price (MSP).

**Source:** The authors from the literature.

In Pakistan, higher level regulation is noted in the supply chain under the Drug Act of 1976, which regulates the import, export, storage and distribution of medicines.<sup>25,62</sup> Pakistan is reported to manufacture 95% on its national pharmaceutical needs locally, considerably reducing the amount of medicines that are imported. In Morocco, the law regulates wholesale mark-ups at 10% and retail mark-ups at 30%. A VAT of 7% is reported to be applied to certain drugs (although the selection criteria for these drugs are not mentioned). For imported drugs, customs duties are also applied, with different charges for drugs originating from different geographical regions. In Kyrgyzstan, mark-ups differ for generic and originator brand drugs, with higher mark-ups for the former and wholesalers compared to retailers.<sup>63</sup> Yemen has fairly extensive data, including information on the distribution of pharmacies, and reports a public sector distribution warehouse and 225 pharmacies staffed with qualified pharmacists.<sup>43</sup>

In Ghana, the data reveals wide disparities between different sectors, different medicines in the same sector and different medicines in different sectors.<sup>26,64</sup> In Nigeria, medicines were reported to cost at least 123% of the landing cost, which is the cost of imported medicines.<sup>65-68</sup> In Uganda, data only covers the private sector with further information not available on public and mission sectors or cumulative mark-ups for generics.<sup>69</sup>

#### **1.4 Price disparities**

Public sector procurement prices are often found to be low and comparable to international reference prices (IRP). Nonetheless, in most cases low procurement prices do not translate into low patient prices, even in the public sector, and the savings or low costs are not passed on to patients, resulting in severe affordability problems.<sup>20</sup> The prices of medicines in the mission and NGO sectors, where they still have to be purchased, are usually lower than the private sector yet higher than the public sector. On the other hand, medicines in the private sector are significantly higher priced and more dominated with originator brand drugs. Originator brands are priced significantly higher than generics. It has been demonstrated that countries with effective generic policies minimize on excess medicine spending.<sup>20</sup>

There are significant price disparities between different regions of a given country. The differences could be between different provinces or states, or between areas of different economic growth (rural and urban differences). Some regional disparities arise from decentralized procurement, by which means prices are different in different geographical regions, while socio-economic differences arise from a community's power to pay a certain higher price. In India and China, prices differ across states, while in Africa differences are mostly between rural and urban areas;<sup>12</sup> for instance in Tanzania, the urban public sector has drug prices 10% higher than the rural public sector. Similar evidence emerges from other African countries, such as Uganda, Kenya, Ghana and Nigeria. Prices may also fluctuate abruptly, as in Kenya where they fluctuate within a month up to 4 times the original price.<sup>12</sup> These price variations make it extremely difficult to manage household budgets, especially for chronic diseases that necessitate continuous treatment.

Cameron et al (2009)<sup>20</sup> found that the percent difference in price between originator brands (OB) and lowest-priced generics (LPGs) in the private sector was over 300% in lower-middle income and low-income countries, 152% in upper-middle income countries and 6% in India (see also the evidence from different settings presented in Table-4). In India, median price in the private sector was less than 2 times the IRP, with the exception of few innovator brands (IB).

**Table-4**  
**Private sector patient prices**

Country	Prices	Comments
India	Median price < 2* IRP	With the exception of OBs
	MPRs: 1.74-4.38	OB
	1.3-1.69	MSGs
	1.3-1.84	LPGs
Jordan	17*IRP	OB
	11- 51* IRP	For 50% of the surveyed medicines
	10.5 * IRP	LPGs
Pakistan	3.36* IRP	OB
	2.26* IRP	LPG
Yemen	2- 129* IRP	OB
	0.26-18* IRP	LPGs
Ghana	18*IRP	OB
	2.04-7* IRP	For 50% of the LPGs surveyed.

**Note:** Originator brands (OB), Medicine Price Survey (MPS), lowest price generic (LPG), International Reference Price (IRP), Median Price Ratio (MPR).

**Source:** The authors from the literature.

In middle-eastern countries, private sector prices are noted to be among the highest. In Jordan, patient prices for originator brand products were approximately 17 times higher than the IRP, with half of the medicines priced between 11 and 51 times, and LPGs priced 10.5 times higher than international reference prices.<sup>44</sup> Originator brands are primarily found in the private sector with substantially greater costs.

In Pakistan, overall prices for originator brands were 3.36 times the IRP and the LPGs were 2.26 times the IRP.<sup>25</sup> In Yemen, where prices are noted to be extremely high for innovator brands, whereas the median price ratios (MPRs) varied from around 2 to 129 times greater than IRP.<sup>43</sup>

In Ghana's Private Retail Pharmacy sector, innovator brands were priced at more than 18 times the IRP, with half of them priced between 9.13 to 52.14 times the IRP. Generic prices were lower, with half of the LPGs ranging between 2.04 and 7.00 times the IRP. LPGs were also 65.9% more expensive in private retail pharmacies than in public sector pharmacies. The most exorbitant prices were

noted in Nigeria where private health clinics charge up to 184% more than public facilities and 193% more than private retail pharmacies. Originator brands cost between 2 and 7 times LPG equivalents. In Kenya, private sector prices were also noted to be higher, approximately 36% more than the public sector.

Mission and NGO sectors are most prominent in sub-Saharan African countries due to the extremely low resources in these countries; however, their medicine prices (where they still have to be purchased) are usually lower than the private sector but higher than the public sector. In Ghana, for instance, the mission sector has a median retail price for LPGs (across fifty medicines surveyed) of 2.75, with no brands found. Another observation of mission and NGO sectors is that branded drugs are usually avoided in the procurement process. In Tanzania, urban mission sector reported prices 32% higher than rural mission sector, similar to the 31% difference between mission and public sector observed in Kenya.

## **1.5 Regulation and governance issues**

Medicines procurement, safety, quality and efficacy are key parameters to ensure credibility of the pharmaceutical supply chain and to inspire community confidence in the value offered by essential medicines. The evidence from developing and transition countries suggests poor perception of locally produced (generic) medicines, resulting in increased consumption of originator or generic brands, and that the highest priced medicine has the largest market share, thus price becomes a proxy for quality.<sup>70</sup> In developed countries, safety and efficacy regulations are very tight, allowing the free market economy to run without endangering quality of treatment provided.

Many governments, including India, Brazil and China are rolling back on other elements of regulation, such as monitoring and oversight policies, and are increasingly relying on market competition forces which makes it harder to oversee drug policies and to monitor availability and prices.<sup>28,48,50,71-73</sup> Other countries, including the Russian Federation, have moved in slightly different direction and rely on setting up and implementing a drug benefit programme to ensure free access to medicines for all eligible patients based on the severity of their disease, and linking these policies to existing health insurance policies.<sup>74</sup>

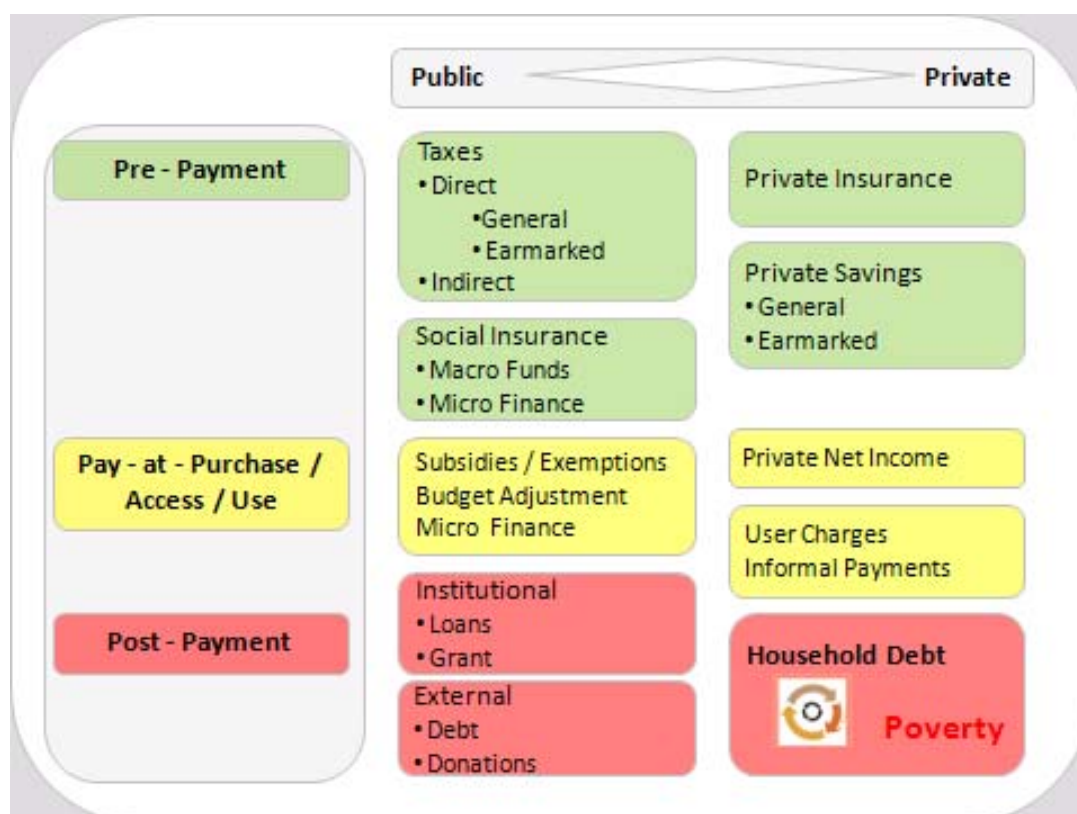
In all cases, government policy has involved the establishment of structures that regulate the behaviour of key stakeholders in the pharmaceutical supply chain, notably manufacturers, wholesalers, retailers as well as physicians, rather than leaving this open to market forces.

## 2 Options for financing medicines

This section provides an overview of resource mobilization for the financing of pharmaceutical services, focusing on specific macro- and micro-financing mechanisms. The financing models for medicines can be broadly grouped as shown in Figure-3. Combinations of the various options are often seen in practice and are in fact the rule rather than the exception. It is easier to mobilize resources at macro level as this pre-supposes the establishment of (some) coverage policy with rules and regulations applied uniformly and nationally, as opposed to potentially fragmented structures applied to sections or regions of a country which is often the case with community financing schemes.

**Figure-3**

### Financing options for medicines



**Source:** The authors.

The type of revenue-raising mechanism has often little bearing on the resources available to spend on drug benefits. Evidence from countries that fund health and medicine through taxation or social insurance does not point towards significant differences between the two methods, as far as resource mobilization is concerned.<sup>5</sup> Indeed, there seems to be a limit with regards to how much tax or social insurance contributions can be increased in order to fund services or the purchase of goods. Under social insurance, employers are key stakeholders who



normally object to premium increases,<sup>6</sup> viewing them as a cost and a consequent threat to national and international competitiveness. Under taxation, the electorate is usually resistant to further tax increases due to its invisibility in the use of the available resources. As a result, under both taxation and social insurance, similar resources can be raised for medicines. Much of the discussion surrounding taxation and social insurance relates to the utilization of the available resources and in all cases results in oversight mechanisms and regulatory practices being put in place to ensure that resources are used optimally. These mechanisms apply both on the supply- and the demand-side, and include patient cost-sharing.

This may not be the case under private health insurance or medical savings accounts (MSA), where the insurer is partly responsible for decisions on premium policy (private health insurance) or expenditures of medical savings accounts proceeds (MSA schemes). It is likely that private insurance schemes will meet an upper ceiling and a resistance to continuous increases in premiums, particularly if employers contribute a proportion of that premium, resulting in a managed care type of coverage where utilization of medicines is monitored and/or regulated through both supply- and demand-side policies similar to those in taxation and social insurance systems.

Regardless of the method of raising funds, a drug benefit coverage and whether it is universal, comprehensive with exemptions, or targeted (covering only a sub-section of the population and/or a defined list of diseases/diagnoses), has significant resource implications and analogous resource mobilization requirements. Clearly, universal drug benefits are likely to be more costly than targeted programmes where their resource implications depends on conditions covered (acute vs. chronic – the latter being associated with significantly higher costs). Evidence suggests that over 80% of total medicine costs and an equal proportion of health care costs in defined comprehensive benefits are attributable to chronic conditions.<sup>33</sup>

## **2.1 Financing medicines through taxation**

The problems with tax-funded health systems in a developing country context have been well documented,<sup>75</sup> including problems with the provision of and access to medicines, poor medicines management, poor accountability, high levels of corruption, lack of incentives, continued underfunding, and resource and expenditure misallocation. Resource-poor countries with very limited resources have weaker institutions and limited resources to finance essential services and provide financial protection. This results in limited access and poor-quality health services as well as limited financial protection against catastrophic health expenditures, particularly for the poor in rural areas. More troublesome situations find only one of the three basic financing functions (revenue collection) is fully under the control of ministries of health.

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<sup>6</sup> *To the extent that employers contribute part or a significant proportion of the actual insurance premium.*

### **2.1.1 Revenue collection**

Tax-based health systems receive their funding from general tax revenues. Thus, the quantity collected and the proportion of the total amount allocated to health is largely outside the control of the MoH. Significant donor financing of health activities outside government budgets may motivate ministries of finance to allocate domestic resources to uses other than health and medicines, thereby reducing the additionality of health funding. As the tax and revenue system is outside the control of the MoH, it has little ability to affect the equity aspects of revenue generation.

### **2.1.2 Pooling**

Given that resource collection is outside of MoH control and that the whole population is generally covered by government health services, risk and equity subsidization are determined by MoH decisions on resource allocation, purchasing and service delivery functions. Risk pooling and prepayment functions are central to the creation of cross-subsidies between high-risk and low-risk individuals (risk subsidy) as well as between rich and poor (equity subsidy).

### **2.1.3 Resource allocation and purchasing**

For a determined budget, resource allocation and purchasing are key endogenous functions of the MoH. Its resource allocation method largely determines quality, efficiency, access and equity of services. The MoH must determine, within political economy constraints, what, how and for whom to purchase. Although these functions are fundamental to attaining access, equity and efficiency in a health system, they are not solely under the MoH control.

Tax-based health systems have usually been associated with the delivery of services by public providers, although in a number of developed countries reforms have separated purchasing from provision. Problems, such as power of medical unions, misappropriation of public funds, lack of accountability and interregional distribution inequities of facilities and personnel, have all been associated with public sector delivery. These problems may result in inequitable physical access to services and medicines for the poor, particularly in rural areas. Although public sector service delivery is not an inherent characteristic of all national health services, separating financing from provision may generate appropriate incentives to improve service efficiency and equity.

## **2.2 Statutory health insurance**

Social health insurance (SHI) is quite distinct from systems where health insurance is largely voluntary and from those dominated by out-of-pocket payments. Overall, SHI contributions are compulsory, and, importantly, can pool health risks plus financial risks over time and across individuals. This pooling decreases the uncertainty linked with health and health costs such as when, what type, how long, and how costly an illness may be,<sup>76</sup> although costs of administering and re-allocating funds can be significant. Furthermore, separating

contributions from health status promotes the financing goal of equity of access based on health needs rather than ability to pay.

The range of SHI models represented by Europe, Latin America and parts of Asia highlights the significant variation across SHI schemes. In many countries, SHI schemes provide universal coverage, while in others they are selective, including the coverage of medicines. Coverage selectivity can occur because insurance or medicines coverage is not offered to all members of the population, or because beneficiaries are often permitted to opt out of the SHI system, or simply due to insufficient resources to provide universal coverage. Sometimes this is intentional, but often it is related to systemic failures. For example, in some lower income countries only a relatively small proportion of the population receives coverage (e.g. Dominican Republic, Kyrgyzstan), despite pledges and the political goal of universality as a long-term objective.

Social health insurance contributions are proportionate or slightly regressive, as contributions are based on income, usually with contribution ceilings, either as a fixed proportion of earnings or on total income paid by the employee and/or employers; this may differ between funds. Unemployed may be covered by employed contributions or by government assistance. Depending on the system in place, eligible patients may have a choice between funds and the benefits package to which they subscribe; while premium cost is known, insurance funds rarely compete on premiums to attract new clients. The insured are also aware of care costs, particularly cost-sharing for different goods or services.

### **2.3 Private health insurance and medical savings accounts**

Levels of public finance are often low in resource-poor countries, prompting interest in private forms of prepayment.<sup>77-82</sup> In recent years, the role of private health insurance and medical savings accounts (MSAs) in financing health care and medicines has emerged as a key policy issue in different parts of the world.<sup>13,34,83-85</sup>

Private insurance premiums are largely regressive, even when premiums are subsidized, as health history and risks are attached to contributions. Health care is often supplied based on ability to pay rather than evaluation of health needs, penalising the unhealthy. In practice, private insurance may have poor cost controls, experiencing inequity of access and perhaps inequity of health, in addition to administrative inefficiencies and costs (administrative costs range from 12-17% compared to 6% in SHI).<sup>86-88</sup> Some risk pooling may occur, yet often proves inadequate, and cream-skimming is inherent in the system.

The concept of MSA – in its purest form, a vehicle to allow people to save money to spend on health care – was initially developed in the United States in the 1970s. In the 1980s and 1990s the concept was translated into policy in a handful of countries, either as part of a private health insurance market (South Africa and the USA) or to complement publicly-financed health care in south-east Asia (Singapore and China). Two threads link these four initiatives: a desire to address the problem of ‘moral hazard’ in health care and a belief that individuals should take some responsibility for their health care costs.<sup>86,89</sup> It is only in the last 5 to 10

years that MSAs have begun to be discussed as an option in European health care systems. If people accumulate their own money to pay for health care (or accumulate savings based on contributions from their employer or the government), they may be more responsible in the health care consumption. Instead of 'using or losing' the money they pay in health insurance premiums, the choice they now have is to 'spend it or save it.'<sup>90</sup>

## **2.4 Community financing**

Community-based health funds have existed for centuries.<sup>91</sup> The earliest ones were largely sponsored by local religious organizations such as churches and synagogues. In the 20<sup>th</sup> century, community cooperatives, local mutual aid societies and local funeral funds have sponsored and managed local health funds. The initiation of a nationwide community-based and managed program in China, the cooperative medical system (CMS), in the late 1950s created a great deal of attention on the potential of community-based efforts to mobilize resources and provide cost-effective health care for the rural population. Other well-known successful community-based financing and provision programs include the Thai Health Card scheme and Indonesia's Dana Sehat.<sup>91</sup> Each scheme covered millions of rural people for primary care and some secondary hospital services. Other local schemes such as *Grameen* Health Program, Dhaka Community Hospital Insurance Program and SEWA have been successfully established and cover thousands of low-income households.

Community health financing is defined as a system comprising consumer payments, including user fees, pre-payments and/or other charges, for community delivered health care with proceeds retained and managed within the local health sector. This method of mobilizing resources provides additional health resources and may also be a method for communities to be active, rather than passive, participants in their health system. The generation of funds depends greatly on the balance of a combination of factors: prices and the relevant level of OOPs, willingness to pay, quality of care, improvements, local government investment and management of payments. Community financing covers a range of different methods,<sup>10-11,92-96</sup> including,

- Charging systems, such as fee for a service rendered, or fee per consultation;
- Drug sales and revolving drug funds;
- Personal insurance (pre-payment) schemes; and
- Income-generating schemes, such as community or individual labour and fundraising activities, raffles, donations, etc.

The following sections discuss the various coverage options through community financing and presents such evidence from selected countries.

### **2.4.1 Charging systems**

Raising funds by charging fees for services, consultations or medicines is very common,<sup>77,91-92,95</sup> yet such systems tend to be regressive for several reasons.

First, the sick, particularly the chronically ill, incur greater penalties compared to those enjoying good health. Second, the poor may pay more as they are statistically at greater risk for illness. Third, the poor are likely to incur even greater financial penalties if flat payment rates are in place, as usually standard in many systems, resulting in health care costs equalling a higher percentage of their annual income than the wealthy. Fourth, this regressive nature often results in potential clients excluded from the system by their inability to pay, and when exemption schemes do operate their effectiveness is not routinely monitored.

In medicines, cost sharing creates various scenarios for total prescription drug and user charge expenditures, with price sensitivity playing a key role.<sup>97</sup> When patients are not sensitive to drug prices, introducing or increasing user charges will only have minor effects on total drug expenditure, although it will increase user charge expenditure. When patients are sensitive to drug prices, introducing or increasing user charges will have a greater effect on total drug expenditure as patients will decrease their drug usage.

Examination of aggregate data found greater cost sharing (ranging from \$0.50-\$35 copayment or 0-95% co-insurance) was associated with lower total prescription drug expenditure, and varied with the user charge characteristics: charge amount, drug types and population. The price elasticity of user charges on total drug expenditure ranges from -0.29 to -0.06 (suggesting that a 10% change in user charges results in 0.6-2.9% decrease in total drug expenditure), although can be much higher (-1.07) in vulnerable communities who are financially responsible for 100% of the cost of their prescription medicines.<sup>97-98</sup>

Health insurance coverage also plays an important role in this context. Health insurance coverage can increase total drug expenditure, although this is dependant on physician prescribing patterns, overall coverage and culture.<sup>11,77,79</sup> User charges increase patients' total OOP expenditures, however, even partial insurance coverage can lower OOPs.

User charges may also affect other parts of the health care market, such as physician visits, hospital care and over the counter (OTC) drugs. The effect of physician visit user charges usually leads to decreased physician visits, while its absence is associated with higher physician visits as found in universal taxation-based health care (i.e. UK, Canada).<sup>99</sup> Hospital care user charges which encourage lower-cost drug choices have no effect on inpatient or emergency care,<sup>100</sup> while all other user charges may increase inpatient, outpatient and emergency care usage. When OTC drug user charges are used, the results are less clear; it may or may not increase prescription versus OTC drug expenditure,<sup>101</sup> and if a fixed number of prescription coverage is implemented then OTC expenditure may increase.<sup>102</sup> These results point to user charges potentially increasing overall health expenditure, as prescription drugs may be substituted by more expensive hospital care, although heavily dependent on user charge design and exemptions.

User charges, regardless of their form, have a negative impact on volume of drug consumption. Conversely, health insurance increases prescription drug usage, except in the case of limited reimbursement pharmaceutical lists.<sup>103-104</sup> The

exceptions to this relationship can be under chronic care, life-threatening conditions or other price-insensitive groups. Reference pricing and multi-tiered formularies usually have little effect on volume as patients switch drugs rather than discontinue consumption. Measurement of elasticity of demand for user charges on total drug use ranges from -0.8 to -0.02 (a 10% change in user charges results in 0.2-8.0% decrease in total drug volume).<sup>97</sup>

The effects of drug charges on health are difficult to measure as longitudinal data is scarce. Evidence suggests that user charges have a negative impact on health, decreasing drug use and increasing improper drug use (i.e. reducing dosage, missing dosage, substituting with OTC drugs). This is particularly the case in financially vulnerable groups, even when user charges are income related.<sup>105-107</sup>

The implementation of user charges appears to have an impact on both essential and non-essential drugs.<sup>9,108-109</sup> This points to the significance of patients being their own judge for which drugs to forego, something that most are obviously not qualified to do.<sup>106</sup>

User charges appear to decrease efficiency, where health care resources are best used to maximize health outcomes, by decreasing prescription drug consumption due to relatively inelastic demand while shifting costs from third party payers to patients, regardless of protection policies for the financially vulnerable. Shifting patients to less-expensive and generic drugs is only a one-off event, however, it may protect against systemic abuse of hospital care as a substitute for prescription drugs. User charges appear to have a negative equity effect on health, increase poor drug-taking behaviour and forces patients to make unqualified decisions between essential and non-essential drugs. Overall and unless appropriately targeted, user charges are a regressive form of health care financing, penalizing the poor and reducing their drug usage even when subsidized.

#### **2.4.2 Medicines sales and revolving funds**

Revolving funds seem to be successful in improving drug availability, when certain guidelines are followed.<sup>110-116</sup> They cannot, however, be expected to subsidize other areas of health care, such as training of community health workers, immunization programmes or preventive activities. In addition, high emphasis on profit would detract from the aim of making essential drugs available at low cost. Moreover, they could result in irrational medicines prescription practices.

Opponents of revolving funds highlight considerable problems with their operation. First, calculating profit margins is complicated by management problems, including inflation budgeting, rising prices, foreign-exchange transactions, devaluation, import charges and taxes. Second, many pharmacies funded by NGOs depend on skilled administrators to run them, and often find themselves de-capitalized due to the aforementioned problems which are often beyond their control. Third, there are opportunities for corruption at local level, especially when health workers' salaries are linked to drugs sales or profits

coupled with weak project or community control. Fourth, defining essential drugs and prescribing of non-essential drugs may prove problematic.

Of the above, the de-capitalization problem is very common but not without apparent solutions. One scheme in Zaire developed an innovative and successful solution: it bought cattle as soon as the programme had enough money which were sold once new drugs were needed. As long as livestock retains greater value than cash, and no calamity befalls them, this solution is an interesting method of operation.<sup>117</sup> Nevertheless, such innovative and often risky solutions are the exception rather than the rule.

In order for revolving drug funds to be operationally viable, it is important to: (a) develop and use a rational drug policy (including guidelines on how to use drugs safely and appropriately); (b) use a standard list of essential generic drugs; (c) develop standard treatment guidelines; (d) have in place good management, administration, monitoring and reporting; (e) have good control and monitoring at project and/or community level; (f) ensure staff training with adequate support and supervision; (g) ensure accurate price setting (which reflects the need to subsidize some more expensive medicines and cope with expiry of some stock and currency fluctuations), or, better still, a standard charge per consultation rather than per prescription; (h) offer a guarantee of foreign exchange if drugs are to be imported.

#### **2.4.3 Personal insurance (prepayment) schemes**

This is one of the most progressive methods to fund essential medicines, although its implementation varies quite significantly by area or country.<sup>22,118-119</sup> Personal insurance schemes have featured in many developing countries in Asia more so than in Africa.<sup>118</sup> In these schemes, services are usually paid for in advance, which may bear no relation to the service used. Costs are shared among individuals, regardless of whether they use the services or not. Overall, the healthy population subsidizes the chronically sick.

There seem to be several advantages in such schemes. First, they are more favourable towards the sick and poor as risks are shared resulting in a progressive rather than regressive system. Second, patients are not penalised when vulnerable and sick and unable to work. Third, budgeting is encouraged as premiums are usually set annually and the system can forecast income generation. Finally, annual fee payments can take into account seasonal variations in members' ability to pay, for instance, following harvest periods.

Despite the advantages, membership levels often remain low since many people may be unwilling to pay in advance for services they may not use. In addition, it is not usually possible to cover a sufficient proportion of costs by this method alone.

Numerous studies have examined why rural populations voluntarily enrol, and stayed enrolled, in different prepayment schemes.<sup>91</sup> In China and Indonesia, market surveys of health care systems, risk pooling and prepay preferences found people valued primarily: availability of close-by and affordable primary care and drugs; some protection against high financial risks such as hospital charges;



neat and clean facilities particularly outhouses or bathrooms; reasonably competent practitioners and good customer service. Various studies from Asia, Africa and Latin America found similar findings. The products valued by community members are summarized in Table-5.

**Table-5**

**How do community members value availability, quality, risk protection and cost?**

Availability of affordable services			Quality of services (competence, cleanliness & custom service)			Extent of risk protection	Costs	
Preventive	Primary care & drugs	Hospital	Preventive	Primary care & drugs	Hospital		Travel	Charges at time of use
High	High	Modest	Modest	High	High	Modest	High	High

**Source:** Hsiao, 2001.<sup>91</sup>

#### **2.4.4 Income generating schemes**

Income generating schemes have made useful contributions to health programmes, however, they cover supplementary rather than core financing needs and are often based around community labour. In Senegal, villagers developed several different income-generating projects to support their local health posts, health workers and water supply developments. These included the sale of vegetables from market gardens, and the purchase of chairs and tables for hire at weddings and funerals.<sup>120</sup> The latter involved the development of a women's fund-raising committee to control the finances and activities.

These schemes require a great degree of community participation, and in some cases have led to disharmony if some members are perceived as not doing their share of the work. While fairly successful on an ad hoc basis, this is neither a reliable method of financing, nor is it sustainable. It is, however, extremely useful when funds are required for a specific purpose, such as repairs to a health station.

#### **2.4.5 Issues concerning community based financing mechanisms**

The measurement of affordability in community financed care is difficult, as choices are made between ability to pay and willingness to pay. Local income levels and cash availabilities can impact affordability, while relying on national per capita income may be unrealistic locally, particularly when overall per capita income is difficult to measure. Affordability in community financing is most troublesome for major expensive care, but less so for minor basic care.

Health care choices and willingness of pay depend largely on the perceptions of quality of care in community financed care. For pharmaceuticals, price may be seen as a guide to quality, injections may be preferred over tablets, patients may

purchase from high status individuals rather than receive them free, and counterfeit prescriptions can be a major problem.

A community financed care system using OOPs for prescriptions runs the risk of over-prescribing drugs responding to patient demands rather than prescribing based on diagnostic needs. This may become more problematic when quality of care and provider status is measured upon catering to these demands.

#### **2.4.5.1 Cost recovery**

In practice, community financed health care has yet to provide full coverage of operating costs, although efficient management with low administrative costs can recoup substantial portions of operating costs. The proportion of cost recovery is dependant on the local market, affordability, exemptions and pricing, which results in large variability of success. The goal of full cost recovery involves trade-offs between degree of cost recovery and economic accessibility, while its pursuit means less reliance on external funding. When external funding is unreliable, care can continue to be delivered regardless of central situations.

#### **2.4.5.2 Community participation**

Community participation is often a neglected portion of community financed health care and difficult to quantitatively define, yet remains central to the success of the system. Given that proceeds from financing are retained within the community health system, greater thought should be placed on community mobilization, financing, health workers, representation and hierarchies.

### 3 Evidence on various financing options in different contexts

This section brings examples concerning the listed financing options from Bangladesh, India, Jordan, Lao Peoples Democratic Republic, Nigeria, the Russian Federation, Sudan, Uganda, Viet Nam and the east Caribbean States.

#### 3.1 Targeted outpatient drug benefit based on disease severity

The Russian Federation government introduced a targeted drug benefit plan, through implementation of the Programme of Supplementary Pharmaceutical Provision (DLO) in 2005.<sup>74</sup> The most important achievement of the DLO programme (see Box-1) was that, for the first time, it enabled free access to essential medicines by the most vulnerable and under-provided segment of the Russian population. Under the scheme patients could obtain medications sustainably without the necessity of having to make any OOP contribution, compared with *status quo ante* where all medicines were financed out-of-pocket. Prescribed drug provision increased from 87% (April, 2005) to 99.5% (January, 2006), while the share of prescriptions waiting to be filled decreasing from 11% (April, 2005) to less than 1% (January, 2006).

The vast majority of medicines (over 75%) consumed by DLO eligible individuals in the first half of 2006 were within the more expensive medicines categories, costing more than 500 roubles each (\$18); half of these medicines were very expensive costing in excess of 2,000 roubles each (\$72). Prior to DLO implementation, patients would either need to purchase these on the commercial market paying the entire cost out of pocket, obtain some pharmaceutical coverage through in-patient settings, or simply forego treatment.

On average, the number of prescriptions filled nationally increased 2.5- to 3-fold in 2005 (the inaugural year) compared with 2004. In some regions, particularly those previously underserved, the increases were even more striking including a four-fold increase in Mordovia, a five-fold increase in Amur, and more than a six-fold increase in Kaluga. The average cost per prescription nearly doubled, from 180 rubles (\$6.4) to 340 rubles (\$12), between the first quarter of 2005 and the same period in 2006. This was not due to price hikes, as prices had stabilized and even fallen by 10% across 118 medicines, but rather an indication that more expensive medicines were being prescribed more frequently.

The DLO programme was made possible because of the political commitment by the Russian government and was accompanied by the appropriate financial resources. Its long-term financial sustainability relies on continued political support, availability of resources alongside the implementation of appropriate policies to manage resource use appropriately.

At the other end of the spectrum, physicians were mainly concerned with having an excessive workload and caring for patients without necessarily having the relevant supporting infrastructure. Pharmacists were sometimes overwhelmed by caring for an increased number of patients, while at the same time experiencing listed medicine shortages. In addition, the requirement to prepare dispensing and activity reports led to a disproportionate amount of time spent on administration.

### Box-1

#### **Financing a targeted prescription drug benefit: The Programme for Supplementary Pharmaceutical Provision (DLO) of the Russian Federation**

The DLO programme initially enrolled nearly 16 million eligible citizens in the Russian Federation and included people of all ages (children, retirees and those aged between 16 and 60). Eligibility was based on either (a) disability status; “disabled” were classified those who were very ill, or chronically ill (more than 90% of all eligible groups); or (b) special social status, e.g. or war veterans. The key objective was to enable access to pharmaceutical treatments by this population at no cost to them or their families. The key actors in this DLO system included the Ministry of Health Care and Social Development, which coordinates the activities of the other stakeholders, sets the main rules for programme regulation, including those governing the budget, medications and fund flows, as well as establishing the list of reimbursable products. Other actors included the Federal Foundation of Obligatory Medical Insurance (FFOMI), holding the budget paying for pharmaceutical products, and the Federal Service of Health Care and Social Development (*Roszdraznadzor*), initially supervising implementation of the DLO programme and responsible for oversight, pricing policy and overall policy reform. Physicians, pharmacies and regional storehouses who prescribe, dispense, store and deliver pharmaceuticals to the eligible population, as well as pharmaceutical distributors at the federal level who purchase and supply pharmaceutical products were and still are key actors.

The implementation of the DLO programme required mobilization of a substantial number of resources and manpower including:

- 233,698 participating physicians
- 26,064 polyclinics, hospitals, and other institutions
- 6,000 pharmacies initially, subsequently increased to 12,813 pharmacies by the beginning of 2006
- 23 pharmaceutical distributors at federal level, selected through an initial competitive process
- 86 regional storehouses working together with federal level pharmaceutical distributors
- 61 national and 110 foreign pharmaceutical manufacturers

**Source:** Khabriev et al, 2006<sup>74</sup>

At the same time, patients expressed a number of complaints: government-led surveys suggested that 27% of all patient-related complaints related to medicines not being in-stock at a participating pharmacy and a further 27% of complaints related to (excessive) waiting times in order to see a physician and receive a prescription.

## 3.2 Revolving drug funds

There is a wealth of evidence on the operation of Revolving Drug Funds (RDFs) in Asian and African countries, with both positive and negative experiences emerging.

### 3.2.1 Viet Nam

In Vietnam, the establishment of a RDF (Box-2) resulted in the availability of essential and some non-essential medicines in participating health centres, with particular progress in remote areas.<sup>113</sup> Drug procurement and sales occur at the community level, with little central government interference but with their support. Its success appears to be associated with overall increased household wealth, increased drug consumption, local drug manufacturing and decentralization of decision making. Competition between public and private suppliers appears to have aided the replenishment mechanisms as well as encourage remote area access to drugs. These drugs are affordable and of acceptable quality, with primarily public (Vinapharm) rather than private suppliers.

#### Box-2

#### Revolving Drug Funds in Vietnam

The 1980s in Vietnam saw the popularisation of market forces in all sectors of the economy, including fee-for-service and private practice in the health care sector. The source of taxation-financed health care decreased to almost nil by 1990, adversely affecting staffing, equipment, drug availability and medical supplies, and resulted in the transfer of many surviving health care centres or personnel to private practice. External aid from UNICEF and the Nippon Foundation initialised a revolving drug fund in 1994, including a seed stock of essential drugs, basic health centre equipment, training and support, in order to revitalize community health services.

**Source:** Umenai and Narula, 1999<sup>113</sup>

Community involvement, performance and management vary widely between communities, positively impacting communities who emphasize finance. The effects of the programme on health centre staff have been largely positive due to resource supply and bonuses. In particular, households in participating communities slightly increased the use of community health centres, although limited data exists on effects on household expenditure. Appropriate drug use appears improved, with 1.9 items per prescription in participating regions versus 3.3 in others, and only 19% versus 81% as injectable medicines. Additional improvements include training, equipment purchasing, guidelines and procedures development and application, in addition to management and organization.

Several factors have contributed to the success of the RDF in Vietnam, as follows:

- The government's interest in access and cost recovery of affordable, good quality generic drugs.
- Elimination of conflicts with the national drug policy.
- Encouragement of private investment in improving the pharmaceutical sector.
- Privatization of central drug manufacturing and supply.
- Strengthening of MoH regulatory and control functions, as well as the local community decision making abilities for ordering, purchasing and selling drugs.
- Community involvement in managing and training the revolving drug fund and health services; and
- The existence of strong local health administration, with systemic interest in the supervision and management of the fund.

### **3.2.2 Lao PDR**

Contrary to the experience offered by Vietnam, Lao PDR offers a less positive experience in introducing a revolving drug fund (Box-3). Overall, the shift from higher cost private pharmacies to lower cost RDF was not perceived to be wholly successful.<sup>112</sup> The RDF was not felt to be integral to the community, RDF staff felt at odds with local prescribing culture (preferences for injections, brand name drugs, stockpiling) and villagers did not want lengthy examinations. Medicine quality was of concern, particularly at smaller private pharmacies.

#### **Box-3**

#### **Revolving Drug Funds in Lao PDR**

Pharmaceutical cost recovery programmes in Laos, initiated by MoH and UNICEF, were an experiment in health financing and pharmaceutical policy. Laos began the transition to a market economy in the mid 1980s, with RDFs implemented in the 1990s. By 1997, almost half of health centres, three-quarters of regional hospitals and almost all provincial hospitals had RDFs each unique in its operation and organization. The majority (95%) of total drug expenditure was covered by OOP, a per capita outlay of \$11 USD per year, with the remainder covered by central government. Drug supply was via government endowment to government health facilities (6%), drug sales at national hospitals (16%), RDF at health facilities and hospitals (3%) or drug sales by private pharmacies (75%). The RDF operates in conjunction with other drug supply routes: private pharmacies are the main procurement source and government endowment covers drugs in priority health programmes.

**Source:** Murakami et al, 2001

However, impact analysis of RDF implementation found significant increases in outpatient visits at health centres and hospitals. Regional hospitals and district health centres had regular supply of essential drugs (85% and 78%), and a majority of patients could fill their prescription at the hospital pharmacy (87%). On average, the cost recovery rate of health centres and hospitals was just over 100%, however, variations occurred with some not achieving full recovery. The majority of prescriptions were given based on treatment guidelines, although some concerns existed for over prescribing unnecessary antibiotics. Private pharmacy visiting hours were more liberal than RDF, and RDF staff was perceived as needing more training and supervision.

### **3.2.3 Sudan**

In the Khartoum state of Sudan, RDFs were established in 1989, and a recent survey found that RDF-supplied health facilities were more likely to have regular medicine supplies than non-RDF facilities.<sup>115</sup> More than three-quarters of exit polls of RDF users purchased their medicines there, with less than 10% unable to do so due to stocking issues. For essential items, availability was 97% compared to 87% in non-RDF facilities. Over a twenty year period, the programme has expanded from 60 centres to supplying almost the entire state, although yet to achieve rural penetration. The OOP charges for RDF medicines are approximately 2% of lowest government salary. Its success is related to substantial investments, gradual implementation with testing of financial systems and proper training, as well as business-oriented and transparent management. The fund is politically supported, contains a currency swap agreement, and is able to revise prices. The community is also committed with high supervision and a reliable supply system.

### **3.2.4 Uganda**

In Uganda, the RDF system was abolished in 2001 in response to poverty assessments and lack of evidence of quality improvement, while counter-measures of increased government financing for drugs and staff wages was implemented. Examination of this policy change found increased drug availability in public facilities, although the average annual out-of-stock days increased significantly and was greater than private non-profit facilities.<sup>108</sup> This situation resulted in patients seeking medicines privately and paying OOP. On average, 80% of public health units did not receive drugs on time, increasingly due to district bureaucracy; these issues are less of a problem at private non-profit facilities. Perceptions of public health units staffing were of lower quality than private non-profit, in addition, public staff experienced fewer allowances than previously in addition to salary delays.

### **3.2.5 Nigeria**

In Nigeria, initial implementation in 1989 of a RDF under the Bamako Initiative led to full cost recovery, with 80% used to replenish stock and the remainder for local health initiatives. Recently, OOPs and irrational drug prescribing have resulted in inequity in access and utilization. An examination of healthcare staff found initially they were motivated due to drug availability; however, current government focus



on cost recovery comes at the expense of health provision.<sup>114</sup> This is further compounded by non-payment of salaries resulting in further mark-ups passed onto the patients, in addition to poor training in financial systems resulting in local mismanagement of funds. Health workers often purchase or steal their own medicines which they sell privately to patients, resulting in available medicines expiring before purchase, as monitoring is not routine. Full course of medicines often do not occur due to lack of money, irrespective of medicine availability.

### **3.2.6 Lessons learned**

Revolving drug funds often present problems, which typically relate to

- The sources of initial capital investment
- Ensuring that prices are low but cover resupply costs
- Project supervision
- Whether they ensure safety against catastrophic spending
- Potential under-estimation of capital costs and losses through deterioration, and high operating costs
- The fact that after an initial capital investment, medicine supplies are replenished using the funds collected from the sales to the consumer

In addition to the above, adjusting for inflation, checking the quality of the medicines and likely failures to collect payments for unsubsidized medicines may constitute further shortcomings.

## **3.3 Good procurement practices**

The evidence on procurement of medicines in developing countries provides an insight into the various procurement models and is only limited by the availability of information.<sup>41,80,121-123</sup> An attempt is made to present some good procurement methods which in turn result in better availability, affordability and overall improved access to essential medicines. This section presents the evidence on the different types of procurement models and how these affect access to medicines. Different countries are seen to employ different types of procurement models. It emerges from the literature that, while many countries are moving towards improved procurement practices, access to medicines still remains of vital focus (and a significant shortcoming) in the vast majority of cases.<sup>48,124-128</sup>

Evidence on public procurement in the case of the middle-east and some Asian countries (such as Pakistan or the Indian state of Tamil Nadu) reveals that public procurement prices seem to be low and affordable, yet this does not always translate into low retail prices, even in public sector facilities where patients are having to pay for their medicines, or into high availability. The procurement models and payment options used in some countries are summarized in Table-6.

### **3.3.1 Pooled procurement through inter-country initiatives**

Even though national pharmaceutical policies have been developed in many developing countries, accessibility to essential drugs varies both within and

between countries. This variability becomes more prominent during economic crises since drug supply management is disrupted due to financial and economic factors. Inter-country cooperation in sustaining essential drug supply becomes a critical issue as this strategy can ameliorate the shortage of essential drugs in the health care facility. Such cooperation has been commonly seen in the area of pharmaceutical procurement where countries collaborate successfully in pooled procurement or group purchasing with obvious benefit due to economies of scale. A number of successful examples exist to date in different parts of the world. The schemes now in operation are (a) the African Association of Central Medical Stores for Generic Essential Drugs (ACAME); (b) the Maghreb Commission for Bulk Purchasing by the Arab States; (c) the Bulk Purchasing System of the Gulf Countries; (d) the Eastern Caribbean Drug Service (ECDS); and (e) the South Pacific Pharmaceutical Project among the Pacific Island countries. Among them, the ECDS features prominently (see Box-4).

**Table-6**

**Examples of Country Specific Procurement Models**

<b>Country</b>	<b>Procurement Model</b>	<b>Payment Options</b>
India	Decentralised/Mixed	Mixed (Pooling prevalent)
China	Decentralised/	Pooled and Tendering
Philippines	Centralised	Pooled and Competitive bidding
Pakistan	Not Available	Bulk
Jordan	Para-state	Tender
Lebanon	Centralized	Tender
Nigeria	Not available	Competitive bidding/ Tendering
Brazil	Decentralised/ Mixed	Competitive bidding

**Source:** The authors from the literature.

The OECS has performed well over time for a number of reasons, including political will, financial commitment, a centralized tender system, organizational aspects, a single stable currency and terms of payment and past performance of suppliers. These are discussed below.

*Political will and financial commitment*

Political will was an essential ingredient for success as the Prime Ministers of the OECS agreed to establish the OECS Pharmaceutical Procurement Service OECS/PPS in 1986. The countries deposited one-third of their annual pharmaceutical budget to individual country drug accounts at the Eastern Caribbean Central Bank (ECCB) in order to assure prompt payment to suppliers and to maintain a RDF. This was a concrete sign of political will and financial commitment.

#### **Box-4**

### **Pooled procurement through the Organization of Eastern Caribbean Service**

The countries comprising the Organization of Eastern Caribbean States (OECS) – formerly known as the Eastern Caribbean Drug Service (ECDS) - recognized that efficient procurement practices could improve the use of existing resources. Of the four areas of drug supply management - selection, procurement, distribution, and use - efficient procurement provides the greatest opportunity for cost-savings.

The OECS/Pharmaceutical Procurement Service (OECS/PPS) is an agency of the OECS, a formal grouping of nine Eastern Caribbean Countries - Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines - with a combined population of approximately 550,000 inhabitants. It was established under a project funded by USAID, and by 1989 was financially self-sufficient. It is a self-financing public sector monopsony that covers its operating cost from a 15% surcharge.

The core function of the OECS/PPS is the pooled procurement of pharmaceuticals and medical supplies for nine Ministries of Health (MOHs) of the OECS countries. During the 2001-02 tender cycle, the annual survey on a market basket of 20 popular medicines showed that the regional prices were 44% lower than individual country prices. The continuous annual cost-savings accrued after 16 years of the joint purchasing arrangement have reinforced it as an excellent cost-benefit model of economic and functional cooperation among OECS member countries.

The OECS/PPS operates a centralized, restricted tendering system in which all approved suppliers are pre-qualified by a vendors' registration questionnaire. Pre-qualification is necessary to assess the quality standards, technical competence and financial viability of competing suppliers. Following a solicitation bid from over 75 international suppliers, the OECS/PPS awards annual contracts, places orders directly with suppliers, and monitors delivery and supplier performance. It does not warehouse supplies, but instructs suppliers to ship consignments directly to participating countries which in turn reimburse their respective ECCB drug accounts.

Recognizing the success with pooled procurement, the OECS/PPS has rapidly expanded its product portfolio to include medical supplies, contraceptives and x-ray consumables. The OECS/PPS has now been mandated to explore the feasibility of purchasing dental and laboratory supplies. During the 2001-02 tender cycle, the Unit purchased US \$3.5 million worth of supplies for the 9 OECS member states.

Overall, the evidence shows the success of the OECS/PPS in implementing improved pharmaceutical procurement as a cost containment strategy, and outlines essential elements for successful pooled procurement for other resource-constrained countries.

**Source:** OECS, 2009<sup>129</sup>

#### *Centralized Tender (Bid)*

The OECS/PPS presented suppliers with a public sector monopsony, a purchasing cartel, so that products tendered by OECS/PPS are purchased exclusively through annual contracts. Prior to the establishment of OECS/PPS,

the OECS countries purchased drugs individually from suppliers by direct negotiation. The cost of pharmaceuticals in any country depended on the following factors: professional attitude and negotiating skills of the supplies officer, government payment track record, and source of supply. Consequently, drug prices for similar products varied widely among OECS countries.

#### *Organizational Development & Institutional Alliances*

The Eastern Caribbean Central Bank (ECCB) facilitated prompt payment of foreign exchange to suppliers at no additional cost to participating countries. The formal country-based committees of the OECS/PPS ensured participatory decision-making and commitment by MoH. The OECS/PPS Policy Board, who exercised overall responsibility for the policy directives of the Unit, was comprised by the MoH (assisted by their Permanent Secretaries), the OECS Director General, the ECCB representative and the OECS/PPS Managing Director. The tendered items were extracted from the OECS/PPS' Regional Formulary and Therapeutics Manual, which is reviewed annually by the OECS/PPS Technical Advisory Committee (TAC). The Tenders Sub-Committee reviewed bid offers and awarded contracts to successful suppliers. The pooled procurement list represents large volume and/or high-cost items for which there is a consistently high demand.

#### *Choice of Currency Foreign Exchange and Terms of Payment*

The OECS/PPS solicits bids in U.S. dollars to provide one standard monetary unit for easy price comparison. The Eastern Caribbean (E.C.) dollar is pegged to the US\$ at a rate of 2.7 and has remained stable at this rate for the last 25 years. The use of the US dollar prices through the OECS/PPS procurement system allow OECS countries to forecast drug costs in the E.C. dollar without concern about fluctuations between international currency, or between the E.C. dollar and the US dollar. The stability of the E.C. dollar and the availability of the US dollar are advantages that many developing countries, including some Caribbean countries, do not have. One of the most critical elements of OECS/PPS initial success in reducing the cost of pharmaceuticals was the ability to pay suppliers promptly in foreign exchange within 60 days of receipt of goods. In recent years, however, this reputation for prompt payment initially established by the OECS/PPS has become tarnished because of slow reimbursement of drug accounts by some member countries experiencing economic difficulties. Suppliers have responded to tardy payments by withholding shipments to both defaulting and non-defaulting countries.

#### *Past performance of suppliers*

The selection of suppliers has a profound impact on both the quality and cost of drugs. Inadequate quality assurance in the selection process may result in the purchase of drugs that are ineffective and unsafe. Hidden costs caused by late deliveries, defaulting on confirmed orders, losses due to poor packaging, short expiry date and other factors attributable to an unreliable supplier may raise the cost of a drug to several times the original contract price. Apart from the cost implications, poor supplier performance can seriously hurt the credibility of health

programs and demoralize health workers. Prior to the adjudication of contracts, the past performance of suppliers is reviewed in detail. Factors considered in evaluating supplier performance include delivery times, number of partial shipments per purchase order, expiration dates, quality of packaging and labelling, quality of attendant documentation, quality assurance of products and proficiency of the customer service department.

### **3.3.1.1 Lessons learned**

Based on the OECS experience, the key findings in pooled procurement of pharmaceuticals are the following:

- Reduction in the cost of drugs and other medical supplies;
- Improvement in quality assurance;
- Increased collaboration of pharmaceutical sectors among countries including harmonization of drug registration.

There are a number of key conditions for successful implementation of pooled procurement. They are (a) political will, (b) commitment of participating countries to the scheme, (c) formal agreement among the relevant countries, (d) well-defined regulations and procedures, (e) a permanent and independent secretariat, and (f) stage-by-stage development. Exchange rate stability, as a result of a currency-pegging policy, is also particularly helpful in this context, as is the availability of resources to dedicate to the joint procurement activities.

### **3.3.2 Efficient drug procurement in Tamil Nadu**

The Tamil Nadu Medical Services Corporation (TNMSC), an autonomous medicines procurement agency, procures and supplies medicines for the public health care system in the state of Tamil Nadu in India with the aim of making medicines accessible to the public through public health services at lower prices (see Box-5). Overall, the TNMSC model has many positive attributes: it appears to be efficient, procures medicines at prices lower than market rates and has increased availability in the public health system. The evidence from 2002 – 2008 suggests that prices of the TNMSC are lower than retail market rates.<sup>48,130</sup> There has been a downward pressure on prices over a period of five years, although 2007–2008 has seen a slight increase in prices in the case of more than 50% of drugs (see Table-7).

Overall competition, measured by the number of applicants per medicine, is relatively strong, although falling in 2007-08, with an uneven pattern in the prices of high-expenditure drugs. While consistent competition has brought down prices of groups of medicines and decreased competition, it has also increased the prices of remaining medicines (see Table-8). Competition is low in the case of high-priced speciality medicines and interestingly, one company accounts for 60% of the speciality medicines budget. Medicines procurement and utilization are in sync with the increase in demand.

With regards to quality control, all approved suppliers are accredited by the National Accreditation Board for Testing and Calibration of Laboratories and

follow strict quality control measures set by pharmacopeia, ensuring that assured quality drugs are available to the public. Evidence over the 2002–2008 period suggests there has been a continuous increase in the number of samples being tested, with satisfactory results. Interviews with those responsible for quality control in the participating laboratories established that procedures were stringent and standardized.

### **Box-5**

#### **Medicines procurement in Tamil Nadu**

Prior to 1995, drug procurement in Tamil Nadu was decentralized, with approximately 1,000 institutions procuring their own drugs. This resulted in acute drug shortages, market-driven high prices, plus drug pilferage and wastage due to improper storage and distribution. This situation gave rise to a lack of faith in public health services and low utilization of services. To overcome the problem, the TNMSC, an autonomous drug procurement agency, was established in 1995 by an executive order of the government of Tamil Nadu under the Company Securities Act, 1956. The agency adopted the European model of drug procurement, involving both procurement and logistics. The main objective of the TNMSC is to ensure the availability of quality essential drugs to public health services at cost-effective prices.

The TNMSC was established with the involvement of multiple stakeholders. The process of floating tenders was used with the aim of bringing transparency into the state drug procurement mechanism. The model implements strong quality control measures and has a robust infrastructure in the areas of information technology (IT) and warehouse distribution. The human resource component and other services have collectively affected its performance. The TNMSC also provides various services and procures surgical equipment, veterinary drugs and essential medicines for human use in the public health system.

Procurement is done within given budget constraints and combines procurement with logistics with a distinctive stakeholder ownership. Quality assurance mechanisms are built-in along with improved infrastructure to cater for IT surveillance systems for inventory management and account keeping. The infrastructure re-modelling also provides for appropriate warehouses for stocking and distribution. The reform was initiated as a response to decentralization in procurement by the Indian government, which resulted in acute shortage of drugs, market-driven high prices, and drug pilferage and wastage (due to improper storage and distribution). The challenge faced by the state at present is to ensure sustainability of implemented successful practices established in 1995. Sustainability in all procurement practices is vital to cater to growing medicine needs of the respective communities. Health and drug expenditures have increased by 80% since 2002, responding to increase in drug consumption and price variability. Sustainability also needs to address the availability and affordability matters. In Tamil Nadu, even though procurement is seemingly efficient, availability and affordability are still low, but improving.

**Source:** Chokshi et al, 2008<sup>48</sup>

**Table-7****Prices of high-expenditure medicines over time**

<b>Name of drug</b>	<b>Unit</b>	<b>2002–03</b>	<b>2003–05</b>	<b>2005–06</b>	<b>2006–07</b>	<b>2007–08</b>
Salbutamol	10x10	5.73	5.22	5.18	4.85	4.45
Amylodipine	10x10	7.56	6.3	5.05	4.7	5.1
Theophylline	10x10	10.03	9.04	8.29	8.09	8.9
Multivitamin	10x10	14.4	16	15.39	13.4	14.54
Metronidazole	10x10	12.7	13	13.47	14.29	14.72
Ibuprofen	10x10	12.6	12.49	12.42	11.95	14.25
Enalapril	10x10	6.4	5.95	5.13	5.04	6.15
Diclofenac	10x10	7.19	6.86	5.85	5.55	7.6
Atenolol	14x10	14.68	12	11.9	11.44	10.72
Calcium lactate	10x10	5.59	5.4	5.59	5.56	6.3
Glybenclamide	10x10	5.19	4.54	4.23	3.77	3.9
Isosorbide	10x10	3.96	3.82	3.69	3.58	6.6
Metformin	10x10	15.9	14.46	13.1	12.36	12.16
Ranitidine	10x10	22.34	22.05	18.25	21.61	18.19
Co-trimoxazole	10x10	27.28	24.88	25.3	30.42	32.23
Amoxycillin	10x10	75.45	61.68	54.48	52.85	93.96
Aluminium hydroxide	10x10	6.25	6.2	6.15	6.3	5.85
Ferrous sulphate with folic acid	10x10	5.98	6.74	6.54	8.4	8.73
Chlorpheniramine	10x10	2.4	2.59	2.7	2.59	2.6
Vit. B complex tab NFI prophylactic	10x10	5.99	5.7	4.77	4.22	4.85
Paracetamol	10x10	11.24	12.4	13.42	13.41	12.69

**Source:** Chokshi et al, 2008<sup>48</sup>

### 3.3.2.1 Lessons learned

Overall, the Tamil Nadu procurement model has been able to:

- Procure drugs at prices that are lower than market prices
- Trigger some competition, although further work is needed
- Increase efficiency, whilst taking advantage of IT, safeguarding transparency and flexibility
- Ensure adequate quality of the drugs procured by implementing a tight quality control policy

Factors contributing to its success are the use of IT, the transparency created by the tendering process and state government policies, outsourcing of activities, and flexible and focused human resource policies. The stringent quality control policy of the TNMSC ensures drugs distributed from PHS are of standard quality while political commitment and enactment of legislation contribute to its sustainability.



**Table-8****Number of drugs drawing one or more applicants**

<b>No. of applicants</b>	<b>Number of drugs</b>				
	<b>2002–03</b>	<b>2003–04</b>	<b>2005–06</b>	<b>2006–07</b>	<b>2007–08</b>
16 and above	28	34	28	17	9
15	5	4	4	0	0
14	4	6	6	3	4
13	6	5	6	4	3
12	6	6	10	6	1
11	2	13	11	6	2
10	16	10	7	6	8
9	16	9	7	9	5
8	11	14	6	9	10
7	17	15	15	19	16
6	18	6	27	17	26
5	18	19	20	21	20
4	29	30	21	32	28
3	24	33	30	38	42
2	32	26	33	33	42
1	25	29	39	51	36
<b>Total no. of drugs</b>	<b>257</b>	<b>259</b>	<b>270</b>	<b>271</b>	<b>252</b>

**Source:** Chokshi et al, 2008.<sup>48</sup>

Other states or countries intending to replicate the TNMSC model should take note of the fact that the efficiency of the TNMSC can be attributed to various factors: political commitment, legislation, as well as the plus points of the model itself, notably efficiency and procurement at low cost. Replication of the model requires following the steps and processes used in Tamil Nadu, which may not be universally applicable. It would be useful for interested parties to seek information on the suppliers, both accepted and rejected, and to learn the reasons for rejection. Further, they should access information on quality testing laboratories from the TNMSC.

### **3.3.3 Partial health insurance with a vibrant local pharmaceutical industry**

In Jordan approximately 32% of the national population have no insurance coverage and a significant proportion of total health expenditures, nearly 33%, are related to medicines (see Box-6). A procurement system is in place for purchasing medicines in the public sector.<sup>44</sup> Medicines expenditures in 2003 was almost \$300 million; approximately 80% of all spending on medicines is paid for by OOPs. The Jordanian pharmaceutical market is made up of imported (75%) and locally manufactured medicines (25%). Most of the locally-produced medicines are generics, usually sold under a commercial name (branded generics). About 5% of local production is manufactured under license through an

agreement with the originator brand manufacturer with some local labelling and packaging undertaken using products supplied in bulk from the originator company.

### **Box-6**

#### **Access, availability and affordability of medicines in Jordan**

The total expenditure on medicines in Jordan was one-third of total (public and private) health care expenditure. According to MoH data, government medicine expenditure as a proportion of total medicine expenditure is relatively small, ranging from 19% in 1996 to 17% in 2003. Over 80% of the cost of medicines purchased publicly is funded through OOPs, despite 68% of the population having some sort of health insurance coverage (although 32% have no coverage).

In the public sector, the procurement agency purchases medicines at prices comparable to the IRP which indicates a high level of purchasing efficiency, although, a number of high priced originator brands are also being purchased. Public sector patient prices for generic medicines are similar to procurement prices, indicating very low mark-ups in the public sector distribution chain. However, median availability of generic medicines in the public sector was only 28%, indicating many patients purchase medicines in the private sector.

In the private sector, the median availability of originator brands and generic medicines was 60% and 80%, respectively. Generic medicines in private pharmacies were priced about 10 times higher than in the public sector, and 10 times higher than IRP. When originator brand medicines are dispensed in private pharmacies, patients pay about twice the price of generics.

Based on a recent WHO-HAI pricing survey, examining treatment of common conditions using standard regimens, the lowest paid government worker would need 2.1 days to treat arthritis with diclofenac and 4.6 days to treat an ulcer with ranitidine when purchasing LPGs from private pharmacies. If originator brands are dispensed, costs escalate to between 4.6 and 8.6 days' wages respectively. Some treatments were clearly unaffordable particularly for chronic conditions; for instance, ulcer treatment with originator omeprazole would cost 19.9 days' wages. Affordability is much better for medicines purchased in the public sector, particularly for generic medicines, but availability is poor.

**Source:** Bader, 2007<sup>44</sup>

Several different medicine brands are listed by private health insurers for reimbursement. Private health insurance funds generally require doctors to prescribe LPGs in a given bio-equivalent category. However, the present drug law does not allow for generic substitution or other changes to the prescription unless the prescribing doctor has formally agreed in writing. This applies where the patient is insured (68% of population).

The Jordanian pharmaceutical industry (comprising 18 companies) is dynamic, profitable and export-oriented with exports to markets in over 60 countries, including the Middle East, South Africa, Europe and North America. In 2003 production for the local industry totalled JD141.6 million (about US\$ 200 million), of which JD103 million or US\$ 145 million (73%) was exported. The remaining JD38.6 million (US\$ 54.4 million) was for local consumption, and of this JD9.9 million or US\$ 13.9 million (25.6%) was spent on government tenders. The industry represents a capital investment in excess of US\$400 million, and has generated over 4,000 jobs.

A national medicines policy has been in place since 2002 with the establishment of the Joint Procurement Administration in 2006, while the Jordan National Drug Formulary (JNDF) was reviewed and published in August 2006. For the public system, medicines are acquired through tenders issued by the generic (or scientific) name of medicines. These tenders are conducted through one of three sources: the MoH, the Royal Medical Services (RMS) and the Jordan University Hospital (JUH).

The sale of medicines is regulated by the Pharmacy and Drug Law as enforced by the Jordan Food and Drug Administration (JFDA). Prices in Jordan are regulated, and registration of a product includes price setting. Registration fees differ between originator brands and generics, and between imported and locally produced medicines, while generics and locally produced enjoy lower registration fees.

Evidence suggests that procurement of medicines in the public sector is relatively efficient as procurement prices are close to IRP.<sup>44</sup> Generic medicines are generally sold to patients at similar prices to the procurement price benefiting patients (see Table-9). For some medicines the government purchases originator brands when lower-priced generics are available, pointing to a lack of efficiency.

**Table-9**

**Jordan: Median MPR for medicines found in both the public and private sectors**

<b>Type and number of medicines in both sectors</b>	<b>Median MPR Public Sector Procurement Prices</b>	<b>Median MPR Public Sector Patient Prices</b>	<b>Median MRP Private Sector Patient Prices</b>
Originator brand (n=1)	6.53	5.95	9.30
Lowest price generics (LPGs)	0.66 (n=9)	0.85 (n=16)	9.49 (n=16)

**Source:** Adapted from Bader, 2007<sup>44</sup>

Median availability of generic medicines in the public sector was poor; half of medicines were found in only 5.1% to 61.1% of surveyed public facilities. As a result, many patients have to purchase medicines from the private sector. Median

availability in the private sector was higher than the public sector but did not reach the ideal of 100%. Private sector patient prices were on average 17 and 11 times higher than IRP for originator brands and LPGs respectively. The overall originator brand premium in the private sector was 222%, showing patients are paying substantially more to purchase originator products compared to LPGs. Patients are paying substantially more (about 10 times more) for generics in the private sector than in the public sector. Given the low availability of generics in the public sector, this is a cause for concern.

For the standard treatment of common conditions, the lowest paid government worker would need to spend less than 1 day's wages to purchase generic medicines in the public sector, while in the private sector up to 8.6 days' wages are needed to purchase LPGs and up to 21.6 days' wages to purchase originator brands. In the private sector, treatment of some chronic conditions is unaffordable even when LPGs are used.

### **3.3.3.1 Lessons learned**

The overall experience from Jordan raises questions of both availability and affordability similar to those in other developing countries, with significant variation in prices offered by the public and private sectors. Although generics are procured very close to the IRP, availability in public sector is relatively poor:

- Despite two thirds of the population having health insurance coverage, about 80% of total pharmaceutical expenditure is still paid for OOP.
- Jordan has a vibrant local pharmaceutical industry catering primarily for the private sector and export market
- Public procurement mechanisms are reported to be relatively efficient, but availability – particularly of generics – ranges from average to very poor in public, yet significantly better, in private sector outlets, although with much higher prices.
- Some of treatments, particularly for chronic illnesses, are not affordable to significant parts of the population.

### **3.3.4 Maintaining equity and improving access through pre-payment schemes**

The *Gonoshasthya Kendra* health centre in Bangladesh uses a differential contribution structure, which is means tested to ensure those who cannot afford OOP for the services have access to their services and medicines (Box-7).<sup>131</sup> Approximately 25% of those eligible enrolled in the scheme, however, membership renewals were quite low. Overall, the scheme recovered approximately 50% of its cost, through fees for service and the insurance scheme (about 25% from each).

## Box-7

### **Gonoshasthya Kendra in Bangladesh**

*Gonoshasthya Kendra*, funded by Oxfam, highlights how equity and revenue raising capacity could be safeguarded, in what was considered an innovative scheme. A system of prepayments was initiated where members were divided into classes, as follows:

- First, the destitute, families with no male earner, or families with a disabled earner: these paid a registration fee of 5 taka per year and 1 taka per visit;
- Second, families who could not afford, from any source, two meals a day; these paid 10 taka per annum and 3 taka per visit;
- Third, families who could afford two meals a day throughout the year, but had no surplus; they paid 25 taka per annum, plus 6 taka per visit; and
- Fourth, wealthy landowners paid 30 taka per annum, plus 5 taka per visit, plus half the cost of their medicine.

Under the provisions of the scheme, non-members could still have access to the services by paying 10 taka per visit plus total costs of drugs or treatment. There were also different charges for a long list of services such as medical investigations.

**Source:** Mehreen, 2008<sup>131</sup>

Overall, individual prepayment schemes in the context of developing countries are viable under certain provisions. First, a good understanding of community dynamics and community coherence as some members subsidize others with seemingly few benefits for themselves. In order to achieve consensus, significant preparatory work may need to be done in the community before such a programme can be contemplated. Second, membership should ideally be as broad as possible. And third, premiums must be affordable and ideally on a sliding scale.

### **3.4 An evaluation of the existing medicine financing mechanisms**

The criteria for evaluating financing mechanisms include, chiefly, equity, access, efficiency, appropriateness of care, financial sustainability and political feasibility.

*Equity* addresses the question of who benefits and who pays for services and that its application means that care is provided according to need and is financed according to ability to pay. In the context of medicine policy, equity implies universal access to medicines according to need, regardless of income level.

*Access* encompasses availability, accessibility and affordability of medicines and the extent to which these three are improved.

*Appropriateness of care or rational medicine use* relates to the question of whether the financing mechanism creates incentives for overuse, underuse or misuse of medicines. Free access to medicines could lead to high demand and

potential overuse; similarly, provider-induced demand could also lead to high demand and potential problems in use, particularly if revenue from medicine sales is used for staff salaries.

*Efficiency* addresses the question of whether the financing mechanism encourages the maximum output or health outcome from available resources.

*Financial sustainability* takes into account whether a reasonable level of funding will be maintained over time, as both the amount of revenue generated and the availability of funding over time are very important.

*Political feasibility* debates the additional requirements both from a systemic as well as an administrative perspective for introducing a drug benefit and making the funding mechanism(s) operational. For instance, managing a viable revolving drug fund is many times more demanding than managing a system in which drugs are free. Insurance schemes require a multiplicity of new structures and arrangements. By contrast, government financing (general taxation) systems are usually well established, but can be less efficient, and donor administrative requirements are usually well defined and do not place additional requirements on existing structures.

Table-10 presents and compares each of the financing mechanisms discussed in Section-3 by benchmarking them against these evaluation criteria. Clearly, of course, it is not possible to have a clear winner that satisfies all criteria at the same time and it is important to highlight the fact that important tradeoffs need to be considered in this context. For instance, meeting the objective of equity fully, in terms of universality, is likely to create problems of cost and financial sustainability. Although these tradeoffs need to be considered very seriously at policy level, it is also important to understand that policy mechanisms exist to fine-tune choices improve performance across criteria. For instance, improving availability does not necessarily improve affordability unless an appropriate cost-sharing structure is introduced.

The ten financing mechanisms outlined in Table 10 are not mutually exclusive, and they can co-exist possibly to cover different needs of different population groups within a developing country context. Regardless of the mechanism of finance, several issues emerge that policy makers in a developing country context need to take into account.

Table-10 also includes Global Partnerships, which are a new form of assistance available to developing countries. Despite being a relatively recent phenomenon, they seem to have amassed significant support among donor agencies, whether bilateral or multilateral.<sup>133</sup> There are arguments favouring GHPs over bilateral or multilateral aid, which include, (a) their flexibility, (b) the potential for scale economies, (c) the multiple country links, and (d) their independence.

#### **3.4.1 Cost of a medicines benefit**

Significant differences exist across countries in the mix of pharmaceutical products consumed. These differences may well reflect variations in underlying

disease prevalence, national prescribing guidelines, or other factors, including culture, procurement practices, product launch, the mix of brands versus generics, etc. As a result, the cost of a medicines benefit depends on the type of medicines consumed and the prescribing rates for these medicines.

Negotiating and monitoring the prices of medicines that are included in a drug benefit is very important as prices are a key cost driver for drug benefit managers. Prices and price levels of medicines in different countries are a function of many parameters. Key among them are (a) whether the medicines in question are brands (in-patent or off-patent) or generics; (b) the extent to which regulation affects the prices of medicines; (c) the extent to which there is a reimbursement authority that negotiates prices of medicines; (d) the age of product on the market; (e) the number of manufacturers for a specific product on the market; (f) the stakeholder effects on the prices of medicines and (g) the size of the market.

Relevant cost drivers for a drug benefit include the prevalence of different conditions, the extent to which a drug benefit is comprehensive or targeted (selective), the prices at which drugs are procured and the consumption volume that is likely to emerge. Within each of these areas important decisions need to be made; key among them are how prices and price levels are determined, the procurement policy and whether it applies to a number of outpatient drugs (and which ones), the remuneration of stakeholders, the type of medicines included in the drug benefit and the criteria for their inclusion, prescribing policy and cost-sharing policy.

The authorities that are empowered with the establishment of a drug benefit are also empowered to monitor the way it works, its sustainability as well as have oversight on and regulate the behaviour of different stakeholders, including providers. Beyond deciding what drugs to include in a formulary, local decision makers also need to steer the way the drug benefit works with a view to keeping within budget and ensuring it covers the needs of the population it is supposed to cover.

### **3.4.2 The role of local industry and imports**

Countries where the generic drug industry is still under-developed have the option of importing drugs at much lower prices from other countries with growing/large generic drug industries such as Pakistan, India and China. It has also been noted in some of the middle-eastern countries that importation of generics from Asian industries is an efficient method of cost containment due to fewer import tariffs resulting in cheaper patient prices. This necessitates heightened generic policies to be implemented in all countries.



## **4 Conclusions**

The available literature suggests that there is significant inequity in access to medicines in many resource-poor countries, propagated by inadequate public spending, a lack of or adequate health insurance coverage, poor availability of essential drugs, poor affordability and high OOP expenditure. International evidence suggests that high OOP payments for health care are positively related to catastrophic payments and can often lead to impoverishment. This in turn indicates that poverty can be prevented by reducing the burden of catastrophic payments, whose primary determinant is OOP payments.

### **4.1 Options for financing medicines**

Although prepayment and risk pooling could protect poor households from facing catastrophic spending in health, many resource-poor countries lack appropriate mechanisms to pool financial risks, even with rising income. However, successful models, many of them at the sub-national or sub-sector level, do exist in these countries, which could be scaled up or replicated. This paper has discussed a few of them. Some positive medicine financing experiences have come from Eastern Caribbean states, Tamil Nadu in India, the Russian Federation, Sudan, and Viet Nam. The tax-based DLO programme in the Russian Federation enabled free access to essential medicines by the most vulnerable and under-provided segment. The community-based revolving drug funds in Vietnam resulted in the availability of essential and some non-essential medicines, particularly in remote areas; it also succeeded in a Sudanese province. The pooled procurement methods in the Eastern Caribbean States and the Tamil Nadu state of India using two different approaches enhanced efficient, sustainable and affordable access to essential medicines. The evidence from these experiences also suggests that constant reform may be needed to ensure the continuity and sustainability of these policy mechanisms.

On the other hand, less successful experiences are reported from Lao PDR, Nigeria, and Uganda. A community-based revolving drug approach similar to the one in Viet Nam was proved to be less successful in Lao PDR, Nigeria and Uganda. Despite their known advantages, revolving drug funds also present a number of disadvantages, related to the sources of initial capital investment, project supervision, whether they ensure safety against catastrophic spending, potential under-estimation of capital costs and losses through deterioration, potentially high operating costs, and the fact that after an initial capital investment, medicine supplies are replenished using the funds collected from the sales to the consumer.

Mixed results have emerged from Bangladesh and Jordan. Of course, all these are not comparable because their objectives and targets and, therefore, their achievements are quite different.

### **4.2 Enabling factors to successfully finance medicines**

Drawing lessons from various experiences, one could argue that successful financing of medicines is contingent upon a number of factors, as outlined below.

#### **4.2.1 Political commitment**

Political commitment to improve access to medicines, particularly for the disadvantaged and vulnerable population groups, is a pre-requisite. Governments are better placed to shoulder the responsibility of protecting the health of the disadvantaged members of society. Successful models presented in this paper have all enjoyed the maximum political and therefore, the government support.

#### **4.2.2 Effective design and administrative capacity**

This is needed for extending medicine coverage in a steady and continuous manner respecting the goal of universal coverage. It is important to have a good medicine financing strategy well-founded on the strong technical and administrative structure, in government as well as in academia. For instance, technical experts will need to examine the financing context, income distribution, the tax base, the share of the poor in the population, the household distribution of employment status, and the government's ability to collect taxes and/or contributions. Technical expertise is also needed to design the financial model, the services delivery model and the administrative as well as operational structure. Important decisions need to be made about the type of financing mechanisms, the service delivery modalities and other key elements of health care financing, which are, in most cases, country-specific.

#### **4.2.3 Clear implementation strategies**

This is very important and in most cases a gradual and integrated approach is recommended. Experiences from the Russian Federation, Ghana, the Philippines as well as countries in transition in Eastern Europe are very interesting in this respect. All citizens, irrespective of their health, income or social status, need to be included in medicine financing schemes - tax, insurance or community based. Similarly, earmarked tax revenues could be used to develop and implement appropriate demand and supply side incentives and promote equity.

#### **4.2.4 Financial sustainability**

Once a medicine financing strategy has been designed and launched, a critical challenge to be faced in most cases is its financial sustainability over time. A strong primary care base and an efficient referral system for extended care would be very desirable features of a medicine financing system. However, conflicting interests among stakeholders involved in the resource allocation process are frequently an impediment. It may be the case that the available financial resources are not sufficient to cover a comprehensive medicine package, in which case, the strategy would be to initiate a targeted benefit, focusing on a set of conditions. Finally, the extent to which rich patients contribute part of the relevant medicine costs can also be a predictor of long-term financial sustainability, on the understanding that those who have limited ability to pay are either exempted or are able to access medicines on a preferential basis.

#### **4.2.5 Rational selection and rational drug use**

While advanced methods of treatment for major infectious diseases and related conditions tend to become ever more complex and costly, many highly effective medicines are or can be made available at very low cost. It is therefore feasible for affordable treatments to be procured in a straightforward manner if one chooses well. Rational selection of medicines includes defining which medicines are most needed, identifying the most cost-effective treatments for particular conditions while taking full account of quality and safety aspects as well as ensuring that medicines are used correctly and effectively. Appropriate prescribing by physicians and other health professionals and use by patients can be pursued by introducing evidence-based treatment guidelines and protocols. Based on these and on actual needs a national formulary or essential medicines list can be prepared. In-service programmes and availability of unbiased information are also needed to update the skills and knowledge of clinicians and other health care professionals (pharmacists, nurses) in effective drug use. The encouragement of rational drug use by patients carries equal weight in this process.

#### **4.2.6 Affordable prices**

Affordability of medicines by individual patients in developing countries is critically important and influences access to care and treatment. Medicine prices in developing countries are often higher than those in developed countries and, more often than not, they have to be met entirely by sick patients. Reducing the burden of high prices implies that a proportion of the cost is covered and/or that good choices are made in drug selection and procurement, so that prices are brought to the lowest attainable level. That could be ensured by promoting competition among different generic versions as well as negotiation of prices. Availability of good quality and cheaper generics would also contribute towards that goal. The realization of the fact that prices of medicines comprise mark-ups for (wholesale and retail) distribution, which are quite often arbitrarily set and vary substantially even within countries, could also lead to their rationalization.

#### **4.2.7 Reliable medicine supply systems and low taxes**

Medicine supply systems must serve to ensure continuous availability of essential medicines and medical supplies of good quality. Supply needs to be well planned and dependable in order to ensure availability, minimize shortages and stock-outs, and keep costs under control. Meeting increasing medicine demand and expectations requires cost-effective ways of financing and managing medicine supplies. It is not uncommon to have a confluence and co-involvement of public, private and NGO sectors in national medicine supply and distribution systems. National legislation and regulations should be in place for monitoring both imported and locally produced medicines that are available in the local market. Control is also needed over who prescribes and who dispenses and how is the quality of medicine supplies assured. Finally, tariffs and sales taxes (e.g. value added tax) on medicines should be kept at a minimum or removed as these are taxes on health and deter access.

The next world health report will be on health financing and will argue for universal coverage by extending health care services and financial risk protection to the vast majority of the global population, rich and poor.<sup>134</sup> This paper highlighted financing issues (and some successes in dealing with them) concerning medicines, one of the key inputs of health care service provision and a crucial determinant of the household out-of-pocket spending.

**Table-10**

**Options for financing medicines in developing countries**

<b>Financing mechanism</b>	<b>Equity</b>	<b>Efficiency</b>	<b>Access (Availability &amp; affordability)</b>	<b>Financial sustainability</b>	<b>Appropriateness of care</b>	<b>Political feasibility</b>
<b>General Taxation</b>	Can be equitable  Depends on who pays taxes, who receives services and how progressive the tax system is	Offers little incentive for improvement(s)	Can increase access depending on budget allocation(s) & good management and type of coverage & cost-sharing arrangements	Depends on economic growth, the business cycle and government revenues	Requires good drug selection, management & control; prescription monitoring and follow up; active involvement in managing the drug benefit	May require new structures  Requires political willingness to advocate in favour of weaker socio-economic groups
<b>Social Health Insurance (SHI)</b>	Should be equitable (based on social solidarity)	Could be efficient if management is good, including provider relationships and contracts  Strong incentive for efficiency if care is "managed"	Can increase equity if drug benefit is part of insurance package and cost-sharing arrangements take into account ability to pay	Sustainable if there exist good management & collection mechanisms, and adequate premiums  Having a large share of the population in paid employment is beneficial and contributes to sustainability	Requires good drug selection, management & control; prescription monitoring and follow up; active involvement in managing the drug benefit  Can lead to inappropriate use depending on patient-provider relationship	Requires new administrative structures and the setting up of a Health Insurance Fund; contracts with providers  Insurance Fund often dependent on the government structures rather than being independent

<b>Private Health Insurance (PHI)</b>	In principle inequitable, because of the ability to pay principle and cream-skimming; although this is partly dependent on membership	Offers some incentive based on good management and provider contracts	Should be equitable if membership is conferred; significant affordability questions remain for those who cannot afford membership	Sustainability depends on good management, adequate revenues from premia and sufficient number of members; incentive to cream-skin	Same as in Social Health Insurance	Requires new administrative structures  Requires contracts with providers and a contracting culture  May attract criticism if it is the only option available
<b>Medical Savings Accounts (MSA)</b>	In principle equitable for all socio-economic groups, so long as there is catastrophic coverage if proceeds of MSA are exhausted	Strong incentive from MSA holder to select most suitable provider; avoids moral hazard, but requires good information, which is not always feasible	Access increases as pool of resources becomes available through MSA; affordability is guaranteed if catastrophic cover also exists	MSAs are financially sustainable, so long as individuals contribute to it regularly  May not work in non-monetised, rural settings	Can lead to inappropriate use depending on patient-provider relationship and high cost for MSA holder	Requires operational framework for MSAs, which needs to be enforced  additional coverage provided by the state in case MSA proceeds are exhausted
<b>Revolving Drug Funds (RDFs)</b>	Can increase depending on supply management improvements	Success depends on supply management improvements	In principle can increase, only if exemptions or sliding fees are in place for the poor	Can increase, but requires good management and a reliable drug supply	Can encourage over-prescribing if revenue is used to fund staff salaries  Fees may discourage overuse or lead to underuse	If run by central government, they require some support and management structures  Politically feasible
<b>Community Drug Schemes (CDS)</b>	Can increase because local control and	Success depends on supply	In principle can increase, only if exemptions or	Can increase, but requires good management and	Can encourage over-prescribing if revenue is	Requires a framework enabling local authorities or communities to operate

	targeting support equity	management improvements	sliding fees are in place for the poor	a reliable drug supply	used to fund staff salaries  Fees may discourage overuse or lead to underuse	these  Requires local management capacity
<b>Private Drug Purchases (OOPs)</b>	Inequitable – the poor cannot afford essential drugs	Increases – there is a strong financial incentive for that	Primarily benefits higher income citizens – problem with affordability	It is sustainable, but is meant for a segment of the population that can afford drugs	Is problematic – affordability problems may lead to inadequate dosing	No additional requirements
<b>Community Financing</b>	Can increase, depending on provisions and local control	Success depends on supply management improvements	In principle can increase, only if exemptions or sliding fees are in place for the poor	Can increase, but requires good management and a reliable drug supply	Can encourage over-prescribing if revenue is used to fund staff salaries  Fees may discourage overuse or lead to underuse	Requires a framework that enables local authorities or communities to operate these  Requires local management capacity
<b>Global Health Partnerships</b>	Increases; Meant to target the poor	In principle, increases	Increases – this is a targeted tool	Relies on continuous pledging and flow of funds from the global community & manufacturers	Good targeting – usually by disease; may not be sustainable for the totality of medical conditions	GHP can operate within existing systems – no additional structures required
<b>Other Donor Financing</b>	In principle increases; transfers from richer countries	No incentive for improvement	In principle increases	Relies on continuous funds flow from rich countries – not always sustainable	Usually yes, so long as there is appropriate targeting of drugs and conditions	Politically feasible - No additional structures required, but needs good reporting

**Source:** The authors and adapted and enhanced from MSH, 1997.<sup>132</sup>



## Reference

1. United Nations. *MDG Gap Task Force Report 2008: Delivering on the Global Partnership for Achieving the Millennium Development Goals*. New York: United Nations, 2008.
2. HAI. *New UN report: Millennium development goal 8.E - Essential medicines: the high price of health*. Amsterdam: Health Action International, 2008.
3. HAI. *Medicine price, availability, affordability and price components*. Geneva: Health Action International, 2008.
4. Lu Y, Hernandez P, Abegunde D, Tan Torres T. Medicine Expenditures. Chapter 16, in *World Medicine Situación Report*, 2010.
5. OECD. *Pharmaceutical Pricing Policies in a Global Market*, Paris: Organization for Economic Co-operation and Development (OECD), 2008.
6. UNESCAP. *Financial and human resources for health. Statistical Yearbook for Asia and the Pacific*. New York: United Nations, 2007.
7. Wamai RG. *Reforming health systems: the role of NGOs in Decentralization – lessons from Kenya and Ethiopia*. Boston, USA: Harvard School of Public Health, 2008.
8. Mubangizi P. Kenya medicine price monitor: July-August 2007. Geneva: Health Action International (HAI), 2007.
9. Mwabu G, Mwanzia J, Liambila W. User charges in government health facilities in Kenya: effect on attendance and revenue. *Health Policy and Planning* 1995;**10(2)**:164-70.
10. McPake B, Hanson K, Mills A. Community financing of health care in Africa: an evaluation of the Bamako initiative. *Social Science and Medicine* 1993;**36(11)**:1383-95.
11. Chabot J, Boal M, Da Silva A. National community health insurance at village level: the case from Guinea Bissau. *Health Policy Plan*. 1991;**6(1)**:46-54.
12. Leive A, Xu K. Coping with out-of-pocket health payments: empirical evidence from 15 African countries. *Bull World Health Organ* 2008; **86 (11)**: 849-856.
13. O'Donnell O, van Doorslaer E, Rannan-Eliya RP, Somanathan A, Adhikari SR, Akkazieva B, et al. Who pays for health care in Asia? *Journal of Health Economics* 2008; **27(2)**: 460-75.
14. Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic health spending. *Health Affairs (Millwood)* 2007; **26(4)**: 972-83.
15. Wagstaff A, van Doorslaer E. Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993-1998. *Health Econ* 2003;**12(11)**: 921-34.
16. Banerjee AV, Duflo E. The Economic Lives of the Poor. *Journal of Economic Perspectives* 2007;**21(1)**:141-167.
17. McIntyre D, Thiede M, Dahlgren G, Whitehead M. What are the economic consequences for households of illness and of paying for health care in low- and middle-income country contexts? *Social Science and Medicine* 2006; **62(4)**: 858-65.

18. Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Rahman MH. Poverty and access to health care in developing countries. *Ann N Y Acad Sci* 2008;**1136**:161-71.
19. Russell S. Ability to pay for health care: concepts and evidence. *Health Policy and Planning* 1996; **11(3)**: 219-37.
20. Cameron A, Ewen M, Ross-Degnan D, Ball D, Laing R. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet* 2009; **373(9659)**: 240-9.
21. WHO. *WHO medicines strategy - Countries at the core - 2004 - 2007*. Geneva: World Health Organization 2004.
22. Xu K, Klavus J, Aguilar-Rivera AM, Carrin G, Zeramardini R, Murray CJL. Summary measures of the distribution of household financial contributions to health. In: Murray CJL, Evans DB, editors. *Health Systems Performance Assessment: Debates, Methods and Empiricism*. Geneva: World Health Organization, 2003.
23. Xu K, Klavus J, Evans DB, Hanvoravongchai P, Zeramardini R, Murray CJL. The impact of vertical and horizontal inequality on the fairness in financial contribution index. In: Murray CJL, Evans DB, editors. *Health Systems Performance Assessment: Debates, Methods and Empiricism*. Geneva: World Health Organization, 2003.
24. Garg CC, Karan AK. Reducing out-of-pocket expenditures to reduce poverty: a disaggregated analysis at rural-urban and state level in India. *Health Policy and Planning* 2009; **24(2)**: 116-28.
25. Kiani A, Qadeer A, Tissocki K, Mirza Z, Mustafa T. *Prices, availability and affordability of medicines in Pakistan*. Geneva: Health Action International (HAI), 2006.
26. Andrews E. *Medicine prices in Ghana: A comparative study of public, private and mission sector medicine prices*. Geneva: Health Action International (HAI), 2004.
27. Ensor T. Informal payments for health care in transition economies. *Social Science and Medicine* 2004; **58(2)**: 237-46.
28. Lewis M. Informal payments and the financing of health care in developing and transition countries. *Health Affairs* (Millwood) 2007; **26(4)**: 984-97.
29. Balabanova D, McKee M. Understanding informal payments for health care: the example of Bulgaria. *Health Policy* 2002; **62(3)**: 243-73.
30. Liapopoulos L, Siskou O, Kaitelidou D, Theodorou M, Katostaras T. Informal payments in public hospitals in Greece. *Health Policy* 2008; **87(1)**: 72-81.
31. Tatar M, Ozgen H, Sahin B, Belli P, Berman P. Informal payments in the health sector: a case study from Turkey. *Health Affairs* (Millwood) 2007; **26(4)**: 1029-39.
32. Mills AE, Spencer EM. Organization ethics or compliance: which will articulate values for the United States' healthcare system? *HEC Forum* 2001; **13(4)**: 329-43.
33. Mendis S, Fukino K, Cameron A, Laing R, Filipe A, Jr., Khatib O, et al. The availability and affordability of selected essential medicines for chronic

- diseases in six low- and middle-income countries. *Bulletin of the World Health Organization* 2007; **85(4)**: 279-88.
34. Sekhri N, Savedoff W. Private health insurance: implications for developing countries. *Bulletin of the World Health Organization* 2005; **83(2)**: 127-34.
  35. van de Ven WP, Beck K, Buchner F, Chernichovsky D, Gardiol L, Holly A, et al. Risk adjustment and risk selection on the sickness fund insurance market in five European countries. *Health Policy* 2003;65(1):75-98.
  36. Whitehead M, Dahlgren G, Evans T. Equity and health sector reforms: can low-income countries escape the medical poverty trap? *Lancet* 2001;358(9284):833-6.
  37. Hotchkiss DR, Rous JJ, Karmacharya K, Sangraula P. Household health expenditures in Nepal: implications for health care financing reform. *Health Policy and Planning* 1998; **13(4)**: 371-83.
  38. Reich MR. The politics of health sector reform in developing countries: three cases of pharmaceutical policy. *Health Policy* 1995; **32(1-3)**: 47-77.
  39. Skarbinski J, Walker HK, Baker LC, Kobaladze A, Kirtava Z, Raffin TA. The burden of out-of-pocket payments for health care in Tbilisi, Republic of Georgia. *Journal of American Medical Association* 2002; **287(8)**: 1043-9.
  40. Võrk A, Saluse J, Habicht J. Income-related inequality in health care financing and utilization in Estonia 2000-2007. Health Financing Technical Paper: WHO Regional Office for Europe, 2009.
  41. Goodman C, Kachur SP, Abdulla S, Bloland P, Mills A. Drug shop regulation and malaria treatment in Tanzania--why do shops break the rules, and does it matter? *Health Policy and Planning* 2007; **22(6)**: 393-403.
  42. Sooksriwong C-o, Yoongthong W. *Thailand - Medicine prices, availability, affordability & price components*. Geneva: Health Action International (HAI), 2006.
  43. Al-Qubati YA, Ahmed A-KS. *Medicine prices in Yemen: A survey report on medicine: availability, prices and affordability*. Geneva: Health Action International (HAI), 2007.
  44. Bader R. *Medicine prices, availability and affordability in Jordan: Report of a survey conducted in 2004 in Amman, Irbid, Zarqa and Karak using the WHO/HAI price measurement methodology*. Geneva: Health Action International (HAI), 2007.
  45. Batangan DB, Echavez. C, Santiago AA, Cruz ACdl. The prices people have to pay for medicines in the Philippines. Geneva: Health Action International (HAI), 2006.
  46. Benammar R, Agoumi A, Amamou A, Hachlaf A, Belhaj K, et al. Enquête sur les Prix des Médicaments: Maroc. Geneva: Health Action International (HAI), 2004.
  47. Godwin SK, Varatharajan D. Drug price differentials across different retail market settings: an analysis of retail prices of 12 commonly used drugs. *Health Administrator* 2007; **19(1)**: 41-47.
  48. Chokshi M, Weeasuriya K, Nicod E, Kanavos P. Tamil Nadu Public Drug Procurement Model. *Bulletin of the World Health Organization*, 2009, under review.

49. Kotwani A, Ewen M, Dey D, Iyer S, Lakshmi PK, Patel A, et al. Prices & availability of common medicines at six sites in India using a standard methodology. *Indian Journal of Medical Research* 2007;**125(5)**: 645-54.
50. Selvaraj S. *How effective is India's drug price control regime?* Boston, USA: Harvard School of Public Health, 2007.
51. Duggal R. Poverty & health: criticality of public financing. *Indian Journal of Medical Research* 2007;**126(4)**:309-17.
52. Lu YE. *A survey of medicine prices, availability and affordability in Shanghai, China using the WHO/HAI methodology: Research report*. Geneva: Health Action International (HAI), 2006.
53. Qiang S. *A survey of medicine prices, availability, affordability and price components in Shandong province, China*. Geneva: Health Action International (HAI), 2005.
54. WHO. *WHO Medicines*. Geneva: World Health Organization 2009.
55. WHO. *Essential Drugs and Medicines Policy*. Manila: World Health Organization, Western Pacific Region, 2008.
56. WHO. *Technical discussion on medicine prices and access to medicines in the eastern Mediterranean region*. Geneva: World Health Organization, Regional committee for the eastern Mediterranean region - Fifty-fourth session, 2007.
57. WHO. *Guidelines for drug donations: Interagency guidelines - 2<sup>nd</sup> edition*. Geneva: World Health Organization 1999.
58. WHO. *Counterfeit drugs: guidelines for the development of measures to combat counterfeit drugs*. Geneva: World Health Organization 1999.
59. WHO. *National drug regulatory legislation: guiding principles for small drug regulatory authorities*. WHO Technical Report Series Annex. Geneva: World Health Organization 1999.
60. WHO. *Health reform and drug financing*. Geneva: World Health Organization. Health Economics and Drugs EDM Series, 1998.
61. WHO. *Financing drugs in south-east Asia*. Geneva: World Health Organization, Health economics and drugs DAP series, 1997.
62. Government of Pakistan. *DRUG Act. 1976*. Islamabad: Ministry of Health. <http://www.dcomoh.gov.pk/regulations/drugact1976.php> (Accessed on 26<sup>th</sup> February 2010).
63. Karymbaeva S. *Medicine prices, availability, affordability and price components in Kyrgyzstan: Report of a survey undertaken February to May 2005*. Geneva: Health Action International (HAI), 2005.
64. Ansah EK, Narh-Bana S, Asiamah S, Dzordzordzi V, Biantey K, Dickson K, et al. Effect of removing direct payment for health care on utilisation and health outcomes in Ghanaian children: a randomised controlled trial. *PLoS Med* 2009;**6(1)**.
65. Onwujekwe O, Dike N, Chukwuka C, Uzochukwu B, Onyedum C, Onoka C, et al. Examining catastrophic costs and benefit incidence of subsidized antiretroviral treatment (ART) programme in south-east Nigeria. *Health Policy* 2008.

66. Onwujekwe O, Ojukwu J, Shu E, Uzochukwu B. Inequities in valuation of benefits, choice of drugs, and mode of payment for malaria treatment services provided by community health workers in Nigeria. *American Journal of Tropical Medicine and Hygiene* 2007; **77(1)**: 16-21.
67. Auton M, Adegoke C. *Medicine prices in Nigeria: Prices people pay for medicines*. Geneva: Health Action International (HAI), 2005.
68. Uzochukwu BS, Onwujekwe OE, Akpala CO. Effect of the Bamako-Initiative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. *Health Policy and Planning* 2002; **17(4)**: 378-83.
69. Mubangizi P, Martin OO. *Uganda medicine price monitor: Oct-Dec 2006*. Geneva: Health Action International (HAI), 2007.
70. Mouala C, Abeye J, Somse P, Maritoux J, Goumba A. Prescribing and dispensing generic drugs in the Mambere-Kadei health district of the Central African Republic. *Med Trop (Mars)* 2008; **68(2)**: 149-54.
71. Bertoldi AD, de Barros AJ, Wagner A, Ross-Degnan D, Hallal PC. Medicine access and utilization in a population covered by primary health care in Brazil. *Health Policy* 2009; **89(3)**: 295-302.
72. Weiyan C. China's village doctors take great strides. *Bulletin of the World Health Organization* 2008; **86(12)**: 914-5.
73. Tang S, Meng Q, Chen L, Bekedam H, Evans T, Whitehead M. Tackling the challenges to health equity in China. *Lancet* 2008; **372(9648)**: 1493-501.
74. Khabriev RU, Kanavos PG, Telnova EA, Gildeeva GN. Improving access to medicines in the Russian Federation: The programme for supplementary pharmaceutical provision. *Eurohealth*, 12(4), 2006.
75. Wagstaff A, Claeson M. *The Millennium Development Goals for Health: Rising to the Challenges*. Washington, DC: World Bank, 2004.
76. Barr N. *Economics of the Welfare State*. 4th ed: Oxford University Press, 2004.
77. Carrin G, Waelkens MP, Criel B. Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. *Trop Med Int Health* 2005; **10(8)**: 799-811.
78. Grant K, Grant R. Health insurance and the poor in low income countries. *World Hosp Health Serv* 2003; **39(1)**: 19-22.
79. Carrin G. Social health insurance in developing countries: A continuing challenge. *International Social Security Review* 2002; **55**: 57-69.
80. Dumoulin J, Kaddar M, Velasquez G. *Guide to drug financing mechanisms*. Geneva: World Health Organisation, 1998.
81. Abel-Smith B. Health insurance in developing countries: lessons from experience. *Health Policy Plan* 1992; **7(3)**: 215-26.
82. Abel-Smith B, Dua A. Community-financing in developing countries: the potential for the health sector. *Health Policy Plan* 1988; **3(2)**: 95-108.
83. Pauly MV, Zweifel P, Scheffler RM, Preker AS, Bassett M. Private Health Insurance In Developing Countries. *Health Aff* 2006; **25(2)**: 369-379.

84. Santoso B, Shein K, Suryawati S. *Financing drugs in South-East Asia*. New Delhi: WHO South East Asian Regional Office, Health Economics and Drugs DAP Series No. 8, 1998:72.
85. Varatharajan D, Muralikannan M, Gopalan SS, Jayalakshmi C, Sr. Agnes Clare CSST, Shivalingiah M, Sarma PS. *Lessons learned from a community-based medisave experiment among rural women in the Indian state of Karnataka*. Geneva: World Health Organization, Department of Health Systems Financing, Discussion Paper No. 6, 2009.
86. Thomson S, Mossialos E. Medical savings accounts: can they improve health system performance in Europe? *Euro Observer* 2008;**10(4)**:1-4.
87. Thomson S, Mossialos E. Regulating private health insurance in the European Union: the implications of single market legislation and competition policy. *Journal of European Integration* 2007; **29(1)**: 89-107.
88. Mossialos E, Thomson S (Ed.) *Voluntary health insurance in the European Union*. Copenhagen: World Health Organization, 2004.
89. Hsiao WC. Behind the ideology and theory: what is the empirical evidence for medical savings accounts? *J Health Polit Policy Law* 2001;**26(4)**:733-7.
90. Hoffman C, Tolbert J. *Health Savings Accounts and High Deductible Health Plans: Are They An Option for Low-Income Families?* Kaiser Commission on Medicaid and the Uninsured, Kaiser Family Foundation (KFF), 2006.
91. Hsiao WC. *Unmet Health Needs of Two Billion: Is Community Financing a Solution?* In: Preker AS, editor. *Health, Nutrition and Population (HNP) Discussion Paper*. Washington, DC: The International Bank for Reconstruction and Development / The World Bank, 2001:50.
92. Gertler P, Levine DI, Moretti E. Do microfinance programs help families insure consumption against illness? *Health Econ* 2009;**18(3)**:257-73.
93. Jacobs B, Bigdeli M, Pelt MV, P I, C S, B C. Bridging community-based health insurance and social protection for health care - a step in the direction of universal coverage? *Tropical Medicine and International Health* 2008;**13(2)**:140-43.
94. McCord MJ. Health care microinsurance - case studies from Uganda, Tanzania, India and Cambodia. *Small Enterprise Development* 2001;**12**:25-38.
95. Dror DM, Jacquier C. Micro-insurance: Extending Health Insurance to the Excluded. *International Social Security Review* 1999; **52**: 71-97.
96. Sauerborn R, Adams A, Hien M. Household strategies to cope with the economic costs of illness. *Soc Sci Med* 1996; **43(3)**: 291-301.
97. Gemmill MC, Thomson S, Mossialos E. What impact do prescription drug charges have on efficiency and equity? Evidence from high-income countries. *International Journal of Equity in Health* 2008;**7**:12.
98. Gemmill-Toyama M, Costa-Font J, Kanavos P. *Does Cost Sharing Affect the Quality of Pharmaceutical Care for the Elderly?* London: London School of Economics and Political Science, LSE Health, Health Econometrics and Data Group (HEDG) Working Paper 09/04, 2009.

99. Li X, Guh D, Lacaille D, Esdaile J, Anis AH. The impact of cost sharing of prescription drug expenditures on health care utilization by the elderly: own- and cross-price elasticities. *Health Policy* 2007; **82(3)**: 340-7.
100. Motheral B, Fairman KA. Effect of a three-tier prescription copay on pharmaceutical and other medical utilization. *Med Care* 2001; **39(12)**: 1293-304.
101. Stuart B, Grana J. Are prescribed and over-the-counter medicines economic substitutes? A study of the effects of health insurance on medicine choices by the elderly. *Med Care* 1995; **33(5)**: 487-501.
102. Cox ER, Jernigan C, Coons SJ, Draugalis JL. Medicare beneficiaries' management of capped prescription benefits. *Med Care* 2001; **39(3)**: 296-301.
103. O'Brien B. The effect of patient charges on the utilization of prescription medicines. *Journal of Health Economics* 1989; **8(1)**: 109-32.
104. Ryan M, Birch S. Charging for health care: evidence on the utilization of NHS prescribed drugs. *Social Science and Medicine* 1991; **33(6)**: 681-7.
105. Landsman PB, Yu W, Liu X, Teutsch SM, Berger ML. Impact of 3-tier pharmacy benefit design and increased consumer cost-sharing on drug utilization. *Am J Manag Care* 2005; **11(10)**: 621-8.
106. Tamblyn R, Laprise R, Hanley JA, Abrahamowicz M, Scott S, Mayo N, et al. Adverse events associated with prescription drug cost-sharing among poor and elderly persons. *JAMA* 2001; **285(4)**: 421-9.
107. Poirier S LJ, Page V, Lacour A. The effect of a \$2 co-payment on prescription refill rates of Quebec elderly and its relationship to socio-economic status. *Canadian Pharmaceutical Journal* 1991; **131(1)**: 30-34.
108. Nabyonga-Orem J, Karamagi H, Atuyambe L, Bagenda F, Okuonzi SA, Walker O. Maintaining quality of health services after abolition of user fees: a Uganda case study. *BMC Health Serv Res* 2008; **8**: 102.
109. Kanji N. Charging for drugs in Africa: UNICEF'S 'Bamako Initiative'. *Health Policy and Planning* 1989; **4(2)**: 110-120.
110. Ali GKM. How to establish a successful revolving drug fund: the experience of Khartoum state in the Sudan. *Bulletin of the World Health Organization* 2009; **87**: 139-142.
111. Witter S. Achieving sustainability, quality and access: lessons from the world's largest revolving drug fund in Khartoum. *East Mediterr Health J* 2007; **13(6)**: 1476-85.
112. Murakami H, Phommasack B, Oula R, Sinxomphou S. Revolving drug funds at front-line health facilities in Vientiane, Lao PDR. *Health Policy Plan* 2001; **16(1)**: 98-106.
113. Umenai T, Narula IS. Revolving drug funds: a step towards health security. *Bulletin of the World Health Organization* 1999; **77(2)**: 167-71.
114. Uzochukwu B, Onwujekwe O. Healthcare reform involving the introduction of user fees and drug revolving funds: influence on health workers' behaviour in southeast Nigeria. *Health Policy* 2005; **75(1)**: 1-8.

115. Ali GKM. How to establish a successful revolving drug fund: the experience of Khartoum state in the Sudan. *Bulletin of the World Health Organization* 2009;87:139-142.
116. Uzochukwu BSC, Onwujekwe OE, Akpala CO. Effect of the Bamako-Initiative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. *Health Policy Plan* 2002; 17:378-383.
117. Nickson P. Community-Determined Health Development in Zaire. In: Rohde J, Chatterjee M, Morley D, editors. *Reaching Health For All*. Delhi: Oxford University Press, 1993: 44-61.
118. Yang BM. *Achieving social insurance: what one can learn from the Asian experiences*. Boston, USA: Harvard School of Public Health, 2007.
119. Hardeman W, Van Damme W, Van Pelt M, Por I, Kimvan H, Meessen B. Access to health care for all? User fees plus a Health Equity Fund in Sotnikum, Cambodia. *Health Policy Plan* 2004;**19(1)**:22-32.
120. Diskett P, Nickson P. *Financing Primary Health Care: An NGO Perspective*. Development in Practice, Taylor & Francis, Ltd. on behalf of Oxfam GB 1991:43-51.
121. Ford N, Wilson D, Costa Chaves G, Lotrowska M, Kijtiwatchakul K. Sustaining access to antiretroviral therapy in the less-developed world: lessons from Brazil and Thailand. *Aids* 2007; **21 Suppl 4**: S21-9.
122. Milovanovic DR, Pavlovic R, Folic M, Jankovic SM. Public drug procurement: the lessons from a drug tender in a teaching hospital of a transition country. *Eur J Clin Pharmacol* 2004; **60(3)**: 149-53.
123. Hartog R. Essential and non-essential drugs marketed by the 20 largest European pharmaceutical companies in developing countries. *Social Science and Medicine* 1993; **37(7)**: 897-904.
124. Beran D, Ariane M, JS Y. Access to medicines versus access to treatment: the case of type 1 diabetes *Bulletin of the World Health Organization* 2008; **86(8)**: 648-49.
125. Burapadaja S, Kawasaki N, Charumanee S, Ogata F. Effects of essential medicines on cardiovascular products available for the market in Thailand. *Health Policy* 2007; **84(1)**: 67-74.
126. Attaran A. How do patents and economic policies affect access to essential medicines in developing countries? *Health Affairs (Millwood)* 2004; **23(3)**: 155-66.
127. Boulet P, Garrison C, Hoen Et. *Drug Patents Under the Spotlight, Sharing practical knowledge about pharmaceutical patents*. In: Hakoköngäs L, editor. Geneva: WHO, Médecins Sans Frontières, Campaign for Access to Essential Medicines, 2003:40.
128. Donahue JM, McGuire MB. The political economy of responsibility in health and illness. *Social Science and Medicine* 1995; **40(1)**: 47-53.
129. OECS. Organization for Eastern Caribbean States, 2009. <http://oecs.org> (Accessed on 26<sup>th</sup> February 2010).
130. Senthil Arasi D. *Managing drug delivery to PHCs: An appraisal of Tamil Nadu Model*. Thiruvananthapuram: Sree Chitra Tirunal Institute for Medical



Sciences and Technology, Achutha Menon Centre for Health Sciences Studies, MPH Dissertation, 2004.

131. Mehreen AA. Getting health to rural communities in Bangladesh. *Bulletin of the World Health Organization* 2008; **86(2)**:85-6.
132. Management Sciences for Health (MSH). *Managing Drug Supply: The selection, procurement, distribution and use of pharmaceuticals*, MSH and WHO, 1997 Kumarian Press.
133. Ngoasong MZ. The emergence of global health partnerships as facilitators of access to medication in Africa: a narrative policy analysis. *Social Science and Medicine* 2009; **68(5)**: 949-56.
134. Evans DB, Etienne C. Health systems financing and the path to universal coverage. *Bulletin of the World Health Organization* 2010; **88(6)**: 402 (Editorial).



# THE WORLD MEDICINES SITUATION 2011

## MEDICINES PRICES, AVAILABILITY AND AFFORDABILITY

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Medicine availability and prices in both public and private sectors are key indicators of access to treatment. Surveys of medicine prices and availability, conducted using a standard methodology, have shown that poor medicine availability, particularly in the public sector, is a key barrier to access to medicines. Public sector availability of generic medicines is less than 60% across WHO regions, ranging from 32% in the Eastern Mediterranean Region to 58% in the European Region. Private sector availability of generic medicines is higher than in the public sector in all regions. However, availability is still less than 60% in the Western Pacific, South-East Asia and Africa Regions. In countries where patients pay for medicines in the public sector, average prices of generic medicines range from 1.9 to 3.5 times international reference prices (IRPs) in the Eastern Mediterranean and Western Pacific Regions, respectively. While public sector availability of originator brand medicines is low, when these medicines were sold to patients their average costs ranged from 5.3 times IRPs in the Eastern Mediterranean Region to 20.5 times IRPs in the European Region.
- Due to low availability of medicines in the public sector, patients are often forced to purchase medicines in the private sector. In this sector, patient prices for lowest-priced generic products ranged from 2.6 times IRPs in South-East Asia to 9.5 times IRPs in the Americas. For originator brand products, private sector prices were at least 10 times higher than international reference prices in all WHO regions. When originator brands are prescribed and dispensed for products that are also available in generic form, patients are paying four times more, on average, to purchase the brand.
- High medicine prices increase the cost of treatment. For example, treatment of an adult respiratory infection with a 7-day course of treatment with ciprofloxacin would cost the lowest-paid government worker over a day's wage in most countries. Costs escalate when originator brands are used: the same treatment would cost the lowest-paid unskilled government worker over 10 days' wages in the majority of the countries studied; in Armenia and Kenya, over a month's salary would be needed to purchase this treatment. Additional problems of affordability face people living with chronic diseases due to the lifelong nature of treatment and the frequent need for combination therapy.
- Countries should intensify efforts to measure and regularly monitor medicine prices and availability, and adopt policy measures to address the issues identified. A range of policy options are available to address issues of high prices and low availability of medicines. Low public sector availability can be addressed through improved procurement efficiency, and adequate, equitable and sustainable financing. Medicine prices can be reduced by eliminating duties and taxes on medicines and promoting the use of quality-assured generic medicines. Mark-ups can also be regulated to avoid excessive add-on costs in the supply chain. The most appropriate actions to follow depend on a country's individual survey results and their underlying determinants, as well as local factors including existing pharmaceutical policies and market situations.

**1.1****INTRODUCTION**

High medicines prices, low affordability and poor availability are key impediments to access to treatment in many low- and middle-income countries (1-9). Certainly, in those countries where the majority of the population still buys its medicines through out-of-pocket payments, the high cost of medicines (relative to the household budget) means that an illness in the family exposes that family to the risk of catastrophic expenditure. Too often the choice is made to go without.

Inequity in medicines access is widely perceived as symptomatic of weaknesses in the health-care system and represents a failure on the part of national governments to fulfil their obligations towards their citizens in terms of their right to health (see also chapter on *Access to medicines as part of the right to health*). Ensuring equitable access to quality pharmaceuticals is thus a key development challenge and an essential component of health system strengthening and primary health care reform programmes throughout the world. The Millennium Development Goals (MDGs) acknowledge the critical importance of improving access to medicines in setting MDG target 8E, which is:

“in cooperation with pharmaceutical companies, to provide access to affordable essential drugs in developing countries”.

Improved access is also a prerequisite to the achievement of several other MDGs, namely MDG 4 (reducing child mortality), MDG 5 (improving maternal health) and MDG 6 (combating HIV/AIDS, malaria and other diseases).

This chapter provides an overview of data on the availability of medicines and on medicine prices and their affordability, three measures which serve as key indicators of access to treatment (2). Comparisons between the public and private sectors are made, with a particular focus on the situation in low- and middle-income countries. The chapter also briefly reviews a range of policy options and other interventions for improving medicines availability and affordability, highlighting some successes in countries that have recently taken steps to address these issues.

Much of the data reported in this chapter are derived from surveys of medicine prices and availability conducted using a methodology developed through a collaborative project between WHO and the nongovernmental organization (NGO), Health Action International (see Box 1.1). The WHO/HAI survey methodology was originally developed to address the lack of comparability (10) between the results of earlier attempts to measure medicines prices in low-income and middle-income countries (11-14). Despite certain inevitable limitations, the WHO/HAI methodology has evolved over time to become an internationally-accepted standard way of collecting reliable evidence on medicine prices and availability (4,15).

**1.2****PRESENT SITUATION**

The situation analysis presented here is based on the results of a total of 53 surveys conducted between 2001 and 2008. Table 1.1 provides a breakdown of the number of countries that have carried out pricing surveys according to WHO/HAI methodology by WHO region.

**BOX 1.1**
**WHO/HAI standard methodology for measuring medicine prices, availability, affordability and price components**

The WHO/HAI methodology for measuring medicine prices relies on data that are collected through visits to medicines outlets in the public sector, the private sector and any other sectors that serve as important medicine dispensing points (e.g. NGOs, mission hospitals). For each medicine included in the survey (a standard “basket” of 50 medicines is recommended), information on the final price of both the originator brand and the lowest-priced generic equivalent found at each medicine outlet is sought. Data on government procurement prices are also collected, as are data on add-on costs (i.e. the incremental charges that added to medicines as they proceed through the supply and distribution chain). Data collection is conducted by trained data collectors, following which data are double-entered into a pre-programmed Excel workbook that performs a standardized analysis of the data.

For each medicine, the **availability** is calculated as the percentage (%) of medicine outlets in which the medicine was found on the day of data collection. Price results are reported as **median prices** in the local currency and also as **median price ratios** (MPRs). The median price ratio compares local prices with a set of international reference prices (IRPs) reported by the US-based Management Sciences for Health (MSH), and is an expression of how much greater (or lower) the median local medicine price is than the international reference price. A MPR of 2, for example, means that the local medicine price is twice the international reference price. The MSH international prices represent the median prices of multi-sourced medicines offered to low- and middle-income countries by different suppliers. Generally speaking, individual country data are not adjusted for differences in the MSH reference price year used, exchange rate fluctuations, national inflation rates, variations in purchasing power parities, levels of development and a number of other factors.<sup>a</sup>

Medicine prices are also compared with the daily wage of the lowest-paid unskilled government worker in order to derive a measure of treatment **affordability**. Affordability is calculated as the number of days’ wages required to purchase selected courses of treatment for common acute and chronic conditions. Comparisons are possible across sectors, product types (e.g. originator brand versus generic) and regions within a country. Finally, data on medicines prices are broken down into **components** to show the cumulative mark-up applied to the base price of a medicine (e.g. manufacturer’s selling price), as well as the relative contribution of various add-on costs to the final medicine price.

A more detailed description of the WHO/HAI methodology, as well as country-specific data and reports, can be obtained from the HAI web site: (<http://www.haiweb.org/medicineprices/>).

<sup>a</sup> *Measuring medicine prices, availability, affordability and price components*, 2nd ed. Geneva, World Health Organization and Amsterdam, Health Action International, 2008. Available at: <http://www.haiweb.org/medicineprices/manual/documents.html>

**TABLE 1.1 Distribution of completed surveys of medicine prices and availability conducted according to the WHO/HAI survey methodology, by WHO region, 2001–2008**

WHO region	Number of participating countries	Number of completed surveys <sup>a</sup>
Africa	11	11
The Americas	6	6
South-East Asia	4	10
Europe	6	6
Eastern Mediterranean	11	14
Western Pacific	5	6

<sup>a</sup> Note that three countries, China (Western Pacific), India (South-East Asia) and the Sudan (Eastern Mediterranean) conducted multiple state or regional surveys.

Source: Data provided by HAI, 2009 (see also <http://www.haiweb.org/medicineprices/>).

## 1.2.1

## Medicine availability

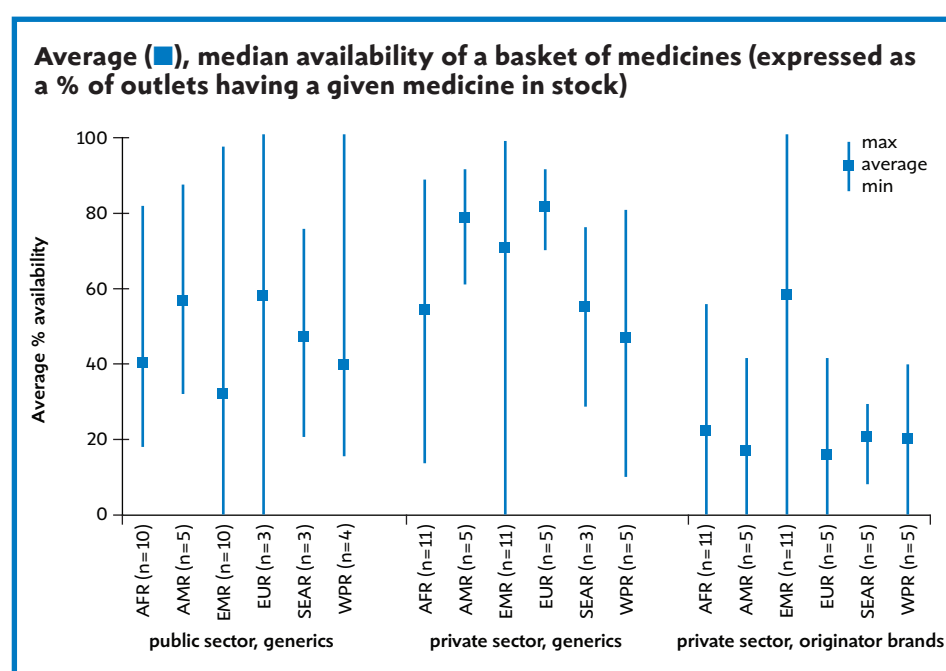
## Public sector

Figure 1.1 shows the average (and minimum and maximum) median availability<sup>1</sup> of a basket of medicines in countries for which data have recently been collected using the WHO/HAI survey methodology, grouped by WHO region. Individual country data are provided in the Statistical Annex (see Annex 2a & 2b). The figure reveals that in all regions, public sector availability of generic medicines is, on average, less than 60%, ranging from 32% in the Eastern Mediterranean to 58% in Europe.<sup>2</sup> However, a large variation is observed across the individual countries of all regions; the largest differences between lowest and highest median availability are seen in the Eastern Mediterranean (where availability ranges from 0% to almost 100%) and Europe, and the smallest in the Americas and South-East Asia (Figure 1.1).

The availability of originator brands in the public sector is low, with most governments favouring the purchase and distribution of lower-priced generic equivalents. Countries with the highest public sector availability of originator brand products are Kuwait (12.0%), the Islamic Republic of Iran (13.3%), United Arab Emirates (16.7%) and Ukraine (50.0%).<sup>3</sup>

FIGURE 1.1

*Availability of generic medicines in public sector is less than 60%. Availability of originator brands in the private sector is lower than generic medicines.*



n = number of countries. Where multiple state or provincial surveys have been conducted (China, India, Sudan), results from individual surveys have been averaged without weighting.

Source: Based on results of surveys of medicine prices and availability conducted using the WHO/HAI standard methodology and collated by HAI (<http://www.haiweb.org/medicineprices/>).

<sup>1</sup> Surveys conducted since 2008 measure mean availability, as opposed to median availability. However, for the purposes of this report, mean availability data has been recalculated to median availability so as to be consistent with surveys conducted prior to 2008.

<sup>2</sup> The sample of countries from Europe consists of the following former Soviet republics: Armenia, Kazakhstan, Kyrgyzstan, Tajikistan, Ukraine and Uzbekistan.

<sup>3</sup> In Ukraine, 11 originator brand products were excluded from the survey as they are not marketed in the country, giving a relatively high median availability of the remaining 13 originator brand products that were purposefully included.

### Private sector

Private sector availability of generic medicines is higher than that in the public sector in all regions (Figure 1.1). Nevertheless, median availability is still less than 60% in Africa, South-East Asia and the Western Pacific. Large differences in availability across individual countries within the same region are again observed; the difference between the lowest and highest availability is as much as 98% and 74% in the countries of the Eastern Mediterranean and Africa, respectively. Elsewhere, particularly in Europe and the Americas, the range in availability is much smaller, 21% and 27%, respectively. This may be due, at least in part, to the smaller number of participating countries in these regions (only six in each region). Availability of originator brands in the private sector was consistently lower than that of generics in all regions. Availability of these products is less than 25% in all regions, with the exception of the Eastern Mediterranean where average private sector availability of originator brands is notably higher (58%) but with a wide range across individual countries (median availability ranges from 0% in the Sudan and Syrian Arab Republic to 100% in the United Arab Emirates).

## 1.2.2

### Medicine prices

#### Public sector

In many countries, medicines are provided free to all patients in the public sector. Where this is the case, price data are not reported. In countries where medicines are only provided free to some groups of patients (e.g. children, the elderly), data on the price paid by those who are required to pay for their medicines are collected. In such cases, the price is the full price paid, even if patients themselves only pay part of this price.

As indicated in Box 1.1, in WHO/HAI methodology medicine prices are reported as median price ratios or MPRs, which express median local prices in relation to a set of MSH IRPs (as the denominator) (16). Figure 1.2 charts average private sector median MPRs for both originator brand and generic medicines, by WHO region. Median MPR data for individual countries, for both the public and private sectors, are listed in the Statistical Annex (Annex 2a & 2b).

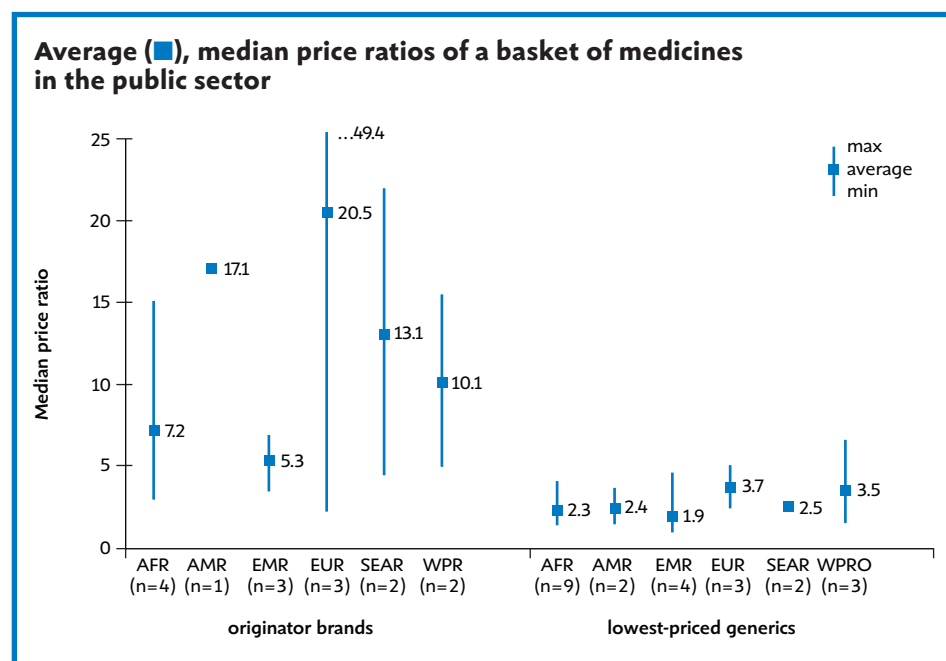
In the present sample of 23 countries in which patients are required to purchase medicines in the public sector, prices paid for the lowest-priced generic medicines, on average, range from 1.9 times the international reference price (IRP) in the Eastern Mediterranean to 3.7 times the IRP in Europe. In some individual countries, local prices for generics exceed the international reference prices by a factor of four and above: examples include, Ukraine (MPR, 4.0), Sudan (MPR, 4.4), Kazakhstan (MPR, 4.8) and the Philippines (MPR, 6.4). In the Ukraine, Kazakhstan and the Philippines, high procurement prices (3.5, 3.0 and 5.1 times the IRPs, respectively) are largely responsible for the high patient prices in the public sector. Conversely in Sudan, mark-ups in the public sector supply chain (patient prices are 2.4 times higher than government procurement prices) are driving up the prices of medicines for public sector patients.

Although the availability of originator brands in the public sector is generally low, when such products are sold to patients, prices tend to be very high. As indicated in Figure 1.2, average prices range from 5.3 times the IRP in the Eastern Mediterranean to 20.5 times the IRP in Europe. The highest price difference was found in Tajikistan, where median prices were 49.4 times the IRP; however, in this particular case, the median price calculation is based on just four branded products, all of which also recorded low availability (20–50%).

*Public sector prices paid for the lowest-priced generic medicines, range from 1.9 times to 3.7 times the international reference price (IRP) and from 5.3 times to 20.5 times for originator brands.*



FIGURE 1.2



n=number of countries. Where multiple state or provincial surveys have been conducted, results from individual surveys have been averaged without weighting.

Baskets of medicines included in the analysis differ between countries. Data have not been adjusted for differences in the reference price year used, exchange rate fluctuations, national inflation rates, variations in purchasing power parities and levels of development, among other factors.

Source: Based on results of surveys of medicine prices and availability conducted using the WHO/HAI standard methodology and collated by HAI (<http://www.haiweb.org/medicineprices/>).

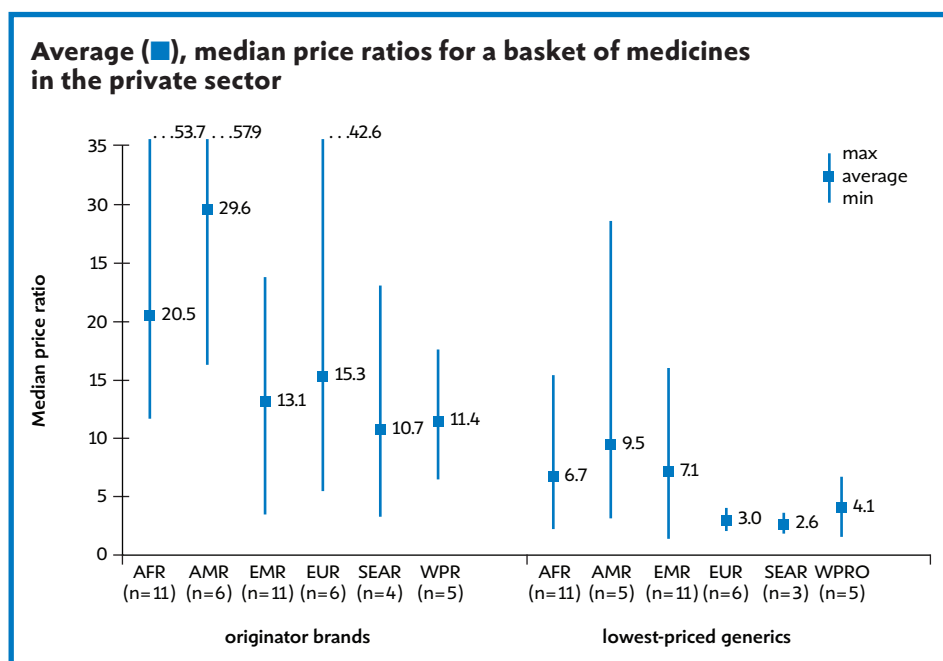
### Private sector

Low availability of medicines in the public sector means that many patients are forced to purchase medicines from the private sector, often at prices they can ill afford. Comparison of Figures 1.2 and 1.3 reveals that, broadly speaking, medicine prices – especially that of generics – are higher in the private sector. In the case of generic products, two distinct patterns emerge across the WHO regions. Among the 43 countries surveyed, moderately high MPRs are observed in Europe (average MPR, 3.0), South-East Asia (average MPR, 2.6) and the Western Pacific (average MPR, 4.1), with only small variations across the individual countries in each region (Figure 1.3). However, while variation across countries in a given region may be small, variation across individual medicines within a country can be substantial. For example, in Mongolia, the price of individual generic medicines ranged from 0.75 to 120.13 times the IRP. The three remaining regions, Africa, the Eastern Mediterranean and the Americas, have in common not just substantially higher MPRs for generic medicines (average MPRs of 6.7, 7.1 and 9.5, respectively) but also much larger price variations between individual countries (Figure 1.3). In the Eastern Mediterranean, MPRs vary from 1.32 in the Islamic Republic of Iran to 1.7 in Kuwait; in Africa, from 2.2 in Ethiopia to 15.1 in Chad, and in the Americas, from 4.5 in Bolivia (Plurinational State of) to 28.3 in El Salvador (Figure 1.3).

*Private sector prices of originator brand medicines were at least 10 times higher than the corresponding international reference prices, and were as much as 20 and 30 times higher in Africa.*

Price differentials for originator brands are much higher than lowest-priced generic equivalent products even for off-patent medicines. In all WHO regions, prices of originator brand medicines were, on average, at least 10 times higher than the corresponding international reference prices, and were as much as 20 and 30 times higher in Africa and the Americas, respectively. Countries with the highest private sector differentials between local and IRPs for originator brand medicines include Bolivia (MPR, 30.3), Tajikistan (MPR, 42.6), Sao Tome and Principe (MPR, 53.7) and El Salvador (MPR, 57.9). Although the baseline IRP

FIGURE 1.3



n=number of countries. Where multiple state or provincial surveys have been conducted, results from individual surveys have been averaged without weighting.

Baskets of medicines used in the analysis differ between countries. Data have not been adjusted for differences in the reference price year used, exchange rate fluctuations, national inflation rates, variations in purchasing power parities and levels of development, among other factors.

Source: based on results of surveys of medicine prices and availability conducted using WHO/HAI standard methodology and collated by HAI (see <http://www.haiweb.org/medicineprices/>).

used to calculate these MPRs is often the procurement price for the generic product, this fact alone does not account for the high prices of originator brands widely observed in the private sector.

In most countries, high medicine prices are a consequence of high prices charged by manufacturers and/or high add-ons in the supply chain, such as wholesale and retail margins and government-imposed duties and taxes. Both of these factors, acting either singly or in combination, can substantially increase the final price of medicines to patients in both the public and private sectors. In the limited number of low- and middle-income countries for which data are available, private sector wholesale mark-ups range from 2% to 380%, whereas retail mark-ups range from 10% to 552% (4). In countries where value added tax (VAT) is applied to medicines, the amount charged varies between 4% and 25% (17,18). In addition to the various mark-ups and taxes, publicity and marketing costs incurred by manufacturers for promoting medicines are often also passed on to the consumer, and can thus represent a significant component of the final price (19).

From the available WHO/HAI survey data, it has been possible to calculate difference in price between selected originator brand products and their lowest-price generic equivalents, the so-called “brand premium”. Table 1.2 shows the results of this analysis, averaged across each WHO region. Individual country data are reported in the Statistical Annex (see Table Annex 2c & 2d). It is apparent that when originator brand medicines that are also available in generic form are prescribed and dispensed, patients are paying as much as four times more, on average, for the branded version. For many patients, price differentials of this magnitude could represent the difference between being able to have the medicine and going without. In individual countries, brand premiums ranged from as low as 1.1 in Kuwait to 13.2 in China; however, it should be noted that the low brand premium in Kuwait was not the result

**TABLE 1.2 Average, minimum and maximum brand premiums (difference in price between originator brand products and their lowest-priced generic equivalents), in the private sector, by WHO region**

WHO region	Number of countries	Average brand premium	Range (minimum–maximum)
Africa	10	3.9	2.1–5.7
The Americas	5	4.1	1.7–6.5
South-East Asia	3	4.8	1.2–9.4
Europe	6	5.3	2.4–13.2
Eastern Mediterranean	11	2.8	1.1–7.0
Western Pacific	4	5.5	2.5–13.2
All countries	39	4.1	1.1–13.2

Where multiple state or provincial surveys have been conducted, results from individual surveys have been averaged without weighting.

Baskets of medicines included in the analysis differ between countries. Data have not been adjusted for differences in the reference price year used, exchange rate fluctuations, national inflation rates, variations in purchasing power parities and levels of development, among other factors.

Source: Based on results of surveys of medicine prices and availability using the WHO/HAI standard methodology and collated by HAI (see <http://www.haiweb.org/medicineprices/>).

of low originator brand prices but of high generic prices (MPR, 15.7 for generics; MPR, 17.9 for originator brands).

### 1.2.3

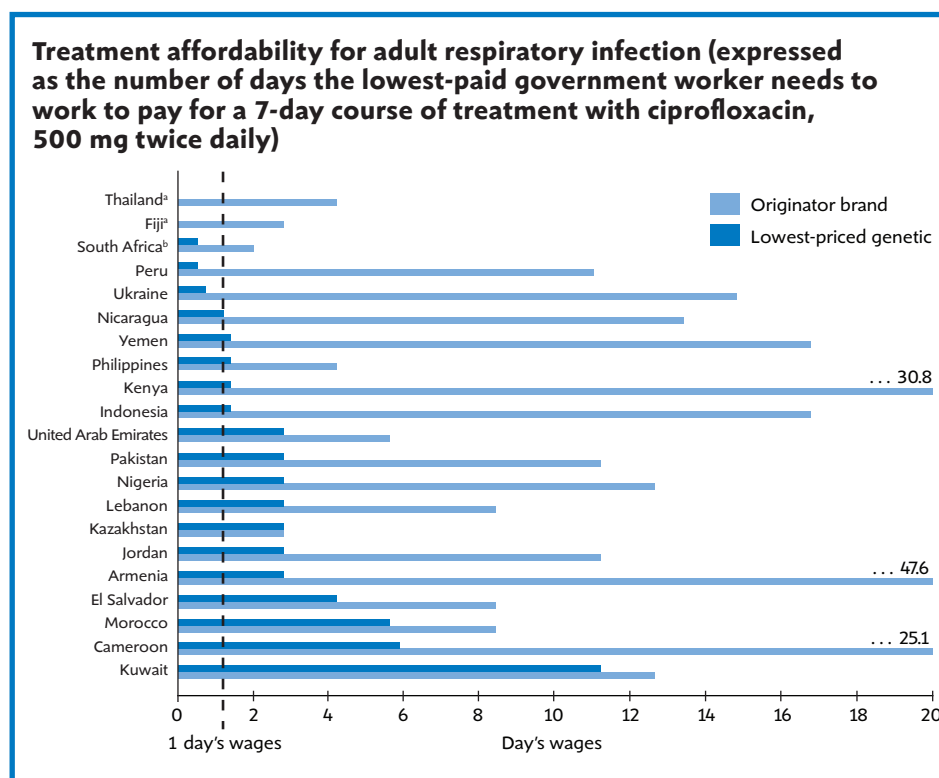
### Affordability of purchasing treatment in the private sector

Figure 1.4 reflects the very large differences in the affordability of both originator brand products and lowest-priced generics that currently exist in many countries. The figure shows the number of days the lowest-paid government worker needs to work in order to be able to pay for a standard course of treatment for an adult respiratory infection (a 7-day course of ciprofloxacin, 500 mg capsule or tablet, twice daily) in the 20 countries for which such data were available for both product types, originator brand and lowest-price generic. A course of treatment that costs the equivalent of one day's salary of the lowest-paid government worker is generally considered affordable; treatments that cost more than this are classed as unaffordable. It should be noted that large sections of the populations in low- and middle-income countries earn less than the lowest-paid government worker, and as such, the true degree of unaffordability is likely to be underestimated using this indicator.

Figure 1.4 reveals that even when lower-priced generic medicines are available, treatment is beyond the reach of many people in low- and middle-income countries; treatment of respiratory infection with generic ciprofloxacin costs over a day's wage in nearly all countries except Thailand (< 0.1 day's wage), Fiji (< 0.1 day's wage), South Africa (0.5 day's wage), Peru (0.5 day's wage) and the Ukraine (0.7 day's wage). Treatment with generics costs over 2 days' wages in over half of the countries studied. The position is far worse when originator brands are considered; treatment with the originator brand product would cost the lowest-paid government worker over 10 days' wages in over half of the countries studied; in Armenia and Kenya, the equivalent of over a month's salary would be needed to purchase this treatment. Nowhere did treatment with a branded product cost less than 2 days' wages (Figure 1.4). On this basis, treatment can be described as "consistently unaffordable" not only for the lowest-paid government worker, but also for the many people earning less than this.

*Treatment of pneumonia with lower priced generic is beyond the reach of many people in low- and middle-income countries.*

FIGURE 1.4



<sup>a</sup> Affordability is calculated as 0.1 day's wages.

<sup>b</sup> Results of a sub-national survey conducted in Gauteng Province.

Source: Based on results of surveys of medicine prices and availability conducted using the WHO/HAI standard methodology and collated by HAI (<http://www.haiweb.org/medicineprices/>).

The problem of medicine unaffordability is further illustrated in Box 1.2 which describes the results of a recent survey of antimalarial use in Uganda. Despite strong commitment to introduce the newer, more effective artemisinin-based antimalarials into the mainstream health-care system, the lack of availability of these first-line antimalarials in the public sector (where they are free), is driving patients to the private sector where up to 11 days of average household income is needed to purchase treatment for a five-year-old child.

*People with chronic diseases requiring lifelong treatment have greater problems of affordability.*

People living with chronic diseases face additional problems of affordability due to the lifelong nature of treatment required. Spending a day's wages as a one-time expenditure to treat an acute condition may be within reach for some, but if this sum is deducted from each monthly salary on a regular basis, the financial impact of ill health is clearly going to be much greater. Whereas traditional financial coping mechanisms, such as borrowing or selling household goods, can be used to fund a one-time payment to treat an acute illness, chronic disease treatment is far less amenable to such strategies. Moreover, chronic diseases often require treatment with combination therapy; this can increase costs considerably and further reduce affordability.

Affordability for chronic combination treatment of hypertensive diabetics who require both oral hypoglycaemics (e.g. metformin) and angiotensin-converting enzyme (ACE) inhibitors for high blood pressure (e.g. captopril) is shown in Figure 1.6. Even for the oral hypoglycaemic alone, a 1-month supply of the lowest-priced treatment regimen using generics costs over a day's wages in the majority of countries for which data are available. In the United Republic of Tanzania, for example, this treatment would cost the lowest-paid unskilled government worker the equivalent of over 5 days' wages. The combined therapy, the oral hypoglycaemics and ACE-inhibitor, would cost the lowest-paid government worker over 2 days' wages in all countries except Fiji and the Islamic Republic of Iran, and as much as 15 days' wages in Ghana.

## BOX 1.2

**Access to effective antimalarial medicines in Uganda**

Malaria is a significant health problem in Africa, particularly in Uganda where malaria accounts for up to 50% of the country's morbidity and mortality. Recent years have witnessed a surge in both national and international interest in reducing the malaria burden and thus willingness and ability to tackle this disease is currently at an unprecedented level. New funding, tools and leadership have emerged, and an effective class of new medicines, artemisinin combination therapies (ACTs), has been developed to replace failing medicines. Since 2004, there has been a strong commitment in many countries to make these artemisinin-based products more widely available in the public sector.

The cost of the new ACTs is significantly greater than that of the older classes of drugs such as chloroquine and the previously recommended first-line treatment, sulphadoxine+pyrimethamine. In Uganda, ACTs are purchased for the public sector largely through international funds such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and are provided free of charge to patients. Despite such efforts, availability problems mean that ACTs remain unaffordable and inaccessible to a large part of the population, many of whom live below the poverty line and predominantly in rural areas. Many Ugandans are still having to seek treatment for malaria through the private sector, and are funding their treatment through out-of-pocket payments.

In 2007, the Ministry of Health Uganda and Medicines for Malaria Venture (MMV) carried out a market survey that measured availability, affordability and price of all antimalarial medicines, using techniques based on the WHO/HAI methodology. The purpose of the study was to contribute to the evidence base used by national and international policy-makers interested in expanding access to effective, affordable, high-quality ACTs in malaria-endemic countries, such as Uganda. More specifically, the study was intended to inform the design of international financing mechanisms to subsidize the manufacturers' price of ACTs, and in so doing, reduce local patient prices.<sup>a</sup> The study found that:

- Although the existing supply chain is relatively successful in delivering antimalarials, even down to local levels, it continues to provide mainly cheap, ineffective antimalarials.
- The recommended artemisinin-based treatment is being provided for free in public/mission facilities, but availability is a frequent problem; in some districts, only 50% of public health facilities were found to have regular supplies of ACTs, and many were vulnerable to stock-outs between deliveries.
- In some districts, only 16% of outlets that provide medicines were offering public sector care; in others, as many as 45% of the outlets selling medicines were not legally permitted to do so (many of these outlets could, however, easily be (re)licensed to sell medicines).
- In some districts, as few as 4% of private sector outlets stocked ACTs.
- ACTs typically cost up to 30–60 times more than the older, ineffective medicines (see Figure).
- Antimalarials are unaffordable for a significant proportion of the population; only 50% of patients were able to purchase a full course of even the lower-priced (ineffective) antimalarials, and the price of even the cheapest antimalarial found on the market (chloroquine) put it beyond the means of those on the very lowest incomes.

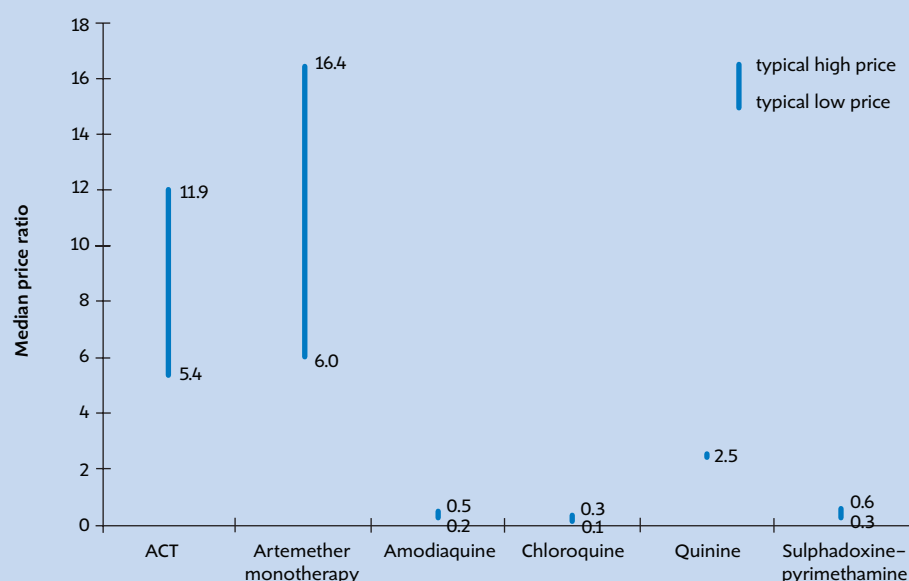
A typical family would have to choose between meeting its basic needs (e.g. for food and education) and purchasing medicines for the treatment of malaria; 11 days' average household income would be needed to purchase a single course of ACT for a five-year-old child.

The study concluded that in order to increase access for all of the population, different interventions are needed for the public and private sectors.<sup>a</sup>

<sup>a</sup> *Understanding the antimalarials market: Uganda 2007. An overview of the supply side. A study by Medicines for Malaria Venture, in collaboration with Ministry of Health Uganda, HEPS and WHO.* Geneva, Medicines for Malaria Venture, 2008. Available at: [http://www.mmv.org/sites/default/files/uploads/docs/publications/Understanding\\_antimalarials\\_market.pdf](http://www.mmv.org/sites/default/files/uploads/docs/publications/Understanding_antimalarials_market.pdf)

BOX 1.2 (continued)

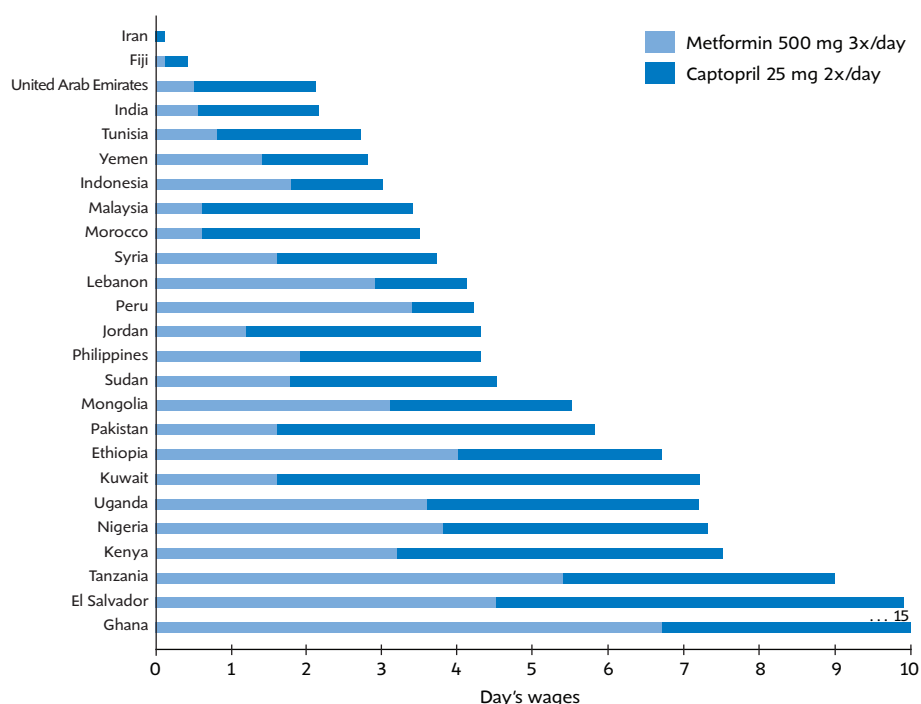
**FIGURE 1.5**  
**Minimum and maximum price ratio<sup>b</sup> of a course of antimalarial treatment (adult) in private for-profit and not-for-profit sectors in Uganda**



<sup>b</sup> The price ranges depicted represent 25th and 75th percentile values found across five categories of private/not-for-profit outlets in nine districts.

FIGURE 1.6

**Treatment affordability for diabetes with concomitant hypertension (expressed as the number of days the lowest-paid government worker needs to pay for a 1-month supply of generic medicines from the private sector for this condition)**



Where multiple state or provincial surveys have been conducted (i.e. India, Sudan), results from individual surveys have been averaged without weighting.

Source: Based on results of surveys of medicine prices and availability conducted using the WHO/HAI standard methodology and collated by HAI (<http://www.haiweb.org/medicineprices/>).

## 1.3

**POLICY OPTIONS FOR IMPROVING MEDICINE AVAILABILITY AND AFFORDABILITY**

In many low- and middle-income countries, medicine prices are high (Figures 1.2 and 1.3), treatments are unaffordable (Figures 1.4 and 1.5) and availability is unreliable (Figure 1.1). At best the situation could be described as worrying, as low availability of medicines is likely to lead to poor disease control. Where out-of-pocket expenditure on medicines is high, the combination of high prices and low availability of medicines is a cause for serious concern, leading as it does to indebtedness or people having to go without the treatment they need. A patient in the Philippines described the reality of her illness in a recent interview, *“I cannot accept that I have diabetes... I am scared of losing all properties just because of diabetes. I know that it is expensive to have a disease like this.”* (20)

Before embarking on policy reforms to improve access, national policy-makers need to have a clear understanding of the factors that are contributing to high prices and poor availability; this will help ensure that their response is tailored to the national context. Table 1.3 lists a number of possible policy options and specific actions that are open to governments for reducing prices and improving availability. The most appropriate response will likely be multi-faceted and will vary depending on the sector, whether the medicine is imported or locally manufactured and whether it is a single-source originator brand product or a multi-source generic product, as well as other country-specific factors. Broadly speaking, most of the policies listed are aimed at securing a better price from the manufacturer or intermediary (e.g. through price negotiation, external and internal reference pricing) on the one hand, while keeping patient prices as close to the manufacturers’ prices as possible (through cost containment measures, such as regulating mark-ups) on the other. However, no matter how cheap medicines are in the private sector, the fact remains that the poorest sections of the population in low- and middle- countries will still not be able to afford them. For this reason, governments must also seek to implement strategies that make medicines more widely available in the public sector at little or no charge.

*Improving availability of medicines through the public sector at little or no cost to the patient is of paramount importance to ensure access to treatment for the most vulnerable.*

Although increasingly countries are putting in place health insurance systems, only a small minority of people in low- and middle-income countries are covered by such schemes (3). The proportion of people with a health insurance benefit that covers medicines is even smaller. Increasing the availability and uptake of health insurance schemes with an outpatient medicines benefit is therefore a key priority for many governments. In the meantime, however, and while such systems evolve over time, improving availability of medicines through the public sector at little or no cost is of paramount importance to ensure access to treatment for the most vulnerable.

Recent surveys confirm the existence of large price premiums for originator brands and for branded generics (see section 1.2.2). Policies which increase the availability and use of low-priced generic equivalents would mean that many more medicines and treatments could be brought within the reach of those on lower incomes. Such policies could include:

- reducing regulatory barriers to the market entry of generic equivalents (e.g. early-working,<sup>1</sup> fast-tracking applications, reducing the application fee);
- strengthening quality assurance of all products on the market;

<sup>1</sup> The term, “early-working” refers to the use of an invention without the patentee’s authorization for the purpose of obtaining approval of a generic product before the patent expiration date. This procedure may permit the marketing of a generic version promptly after the patent expires (Ref. 21).



TABLE 1.3

**Policy options to improve medicine affordability and availability**

Component of medicine policy	Specific actions to influence price, availability and/or affordability
Selection of essential medicines	<ul style="list-style-type: none"> <li>■ Formulation/updating of essential medicines lists and institutional formularies</li> <li>■ Development and use of Standard Treatment Guidelines</li> <li>■ Development of a therapeutic substitution policy</li> </ul>
Procurement/ purchasing	<ul style="list-style-type: none"> <li>■ Limit to an essential medicines list by international nonproprietary name</li> <li>■ Base quantities on reliable estimates of actual need</li> <li>■ Base on formal written procedures and explicit, predetermined criteria to award contracts (i.e. ensure transparency of the process)</li> <li>■ Plan properly and monitor performance (results should be made publicly available)</li> <li>■ Base on competitive procurement from prequalified suppliers</li> <li>■ Pool procurements at the national level</li> <li>■ Use pharmacoeconomics or external reference pricing (international price comparisons) as a guideline for setting prices of new medicines (single-source)</li> <li>■ For high-priced products, apply pressure for differential prices and consider use of TRIPS<sup>a</sup> flexibilities for medicines under patent</li> </ul>
Distribution system	<ul style="list-style-type: none"> <li>■ Maximize efficiency and transparency</li> <li>■ Control mark-ups with regressive margins and with effective enforcement</li> </ul>
Generic competition	<ul style="list-style-type: none"> <li>■ Establish an effective quality assurance capacity</li> <li>■ Reduce regulatory barriers to market entry of generic equivalents (e.g. early-working, fast-tracking applications, reduce the application fee)</li> <li>■ Permit and promote generic substitution</li> </ul>
Prescribing and dispensing	<ul style="list-style-type: none"> <li>■ Introduce incentives to prescribe and dispense generic medicines</li> <li>■ Improve health professional and public confidence in generics</li> <li>■ Provide unbiased consumer medicine information</li> <li>■ Strictly regulate promotion of products by pharmaceutical companies according to WHO's Ethical Criteria for Medicinal Drug Promotion and ban direct-to-consumer advertising of prescription medicines</li> <li>■ Separate prescribing and dispensing functions; develop and monitor good prescribing and good dispensing practices</li> <li>■ Empower patients through the publishing of prices and availability</li> <li>■ Establish regular monitoring of prices and availability</li> </ul>
Financing	<ul style="list-style-type: none"> <li>■ Encourage pooled and prepaid financing of medicines (e.g. through employment-based or social insurance schemes)</li> <li>■ Support community-based insurance initiatives that focus on improving access to essential medicines</li> <li>■ Establish a social health insurance system covering the whole population</li> <li>■ Ensure that social health insurance benefits are comprehensive, using limited formularies based on cost-effective therapeutic guidelines, and that patients are not required to seek reimbursements</li> <li>■ Abolish taxes and duties on essential medicines</li> <li>■ Introduce minimal or no patient co-payments in the public sector or health insurance systems</li> </ul>

<sup>a</sup> TRIPS =Trade-related aspects of intellectual property rights

- permitting and promoting generic substitution;
- providing incentives for the prescribing and dispensing of low-priced generics;
- improving health professional and public confidence in generics.

Since there are often several contributing causes of high prices and poor availability, a single policy response is unlikely to be sufficient. In order to effect real change and maximize impact, a comprehensive package of policy reforms, fully implemented and rigorously enforced, is usually needed. Monitoring the impact of policy reforms is vital, especially as all policies can have unintended effects. For example, mechanisms that set prices too low can discourage the production and stocking of a product, whereas setting maximum wholesale and retail mark-ups can provide the necessary incentive for supply chain agents to carry those higher-priced products that will yield them a greater return.

The results of the pricing surveys summarized in this chapter suggest that there are ample opportunities to increase availability, lower prices and improve affordability of medicines in all regions and at all levels of economic development. As described in Box 1.3, several countries have already used the results of their surveys to effect positive policy change.

Despite some clear successes, many countries are still failing to implement the policy and programme changes needed to improve access to affordable medicines. Although the challenges faced differ from country to country, a common problem is a lack of technical capacity to link price data to local policy processes (and so determine the causes of high prices and unexplained price variations) and to identify and prepare suitable lines of response. A related issue is the paucity of published evidence on the effectiveness of different policies in low- and middle-income country contexts. In addition, the lack of political commitment, for example, due to conflicting industrial or trade policies, can act as a barrier to the adoption of strategies aimed at reducing medicine prices and improving availability in both public and private sectors.

To address some of the challenges described above, the WHO/HAI Project on Medicine Prices and Availability has initiated a set of activities to strengthen policy guidance on issues relating to medicine prices, availability and affordability, with a specific focus on the needs of low- and middle-income countries. These include a series of in-depth reviews on policies and other interventions to manage medicine prices, increase availability and make medicines more affordable. The results of the reviews will be used to develop a user-friendly series of policy briefs that describe various policies/interventions, their advantages and their disadvantages, and also offer practical guidance on their design, implementation and enforcement. The first set of policy reviews will be available in 2011.

## 1.4

### FUTURE CHALLENGES AND PRIORITIES

Ensuring access to essential medicines for all citizens who need them is a state responsibility enshrined in international human rights. It is surprising, therefore, that so few countries have developed comprehensive medicine pricing policies as part of their overall national medicine policy. This represents a critical first step towards tackling the problem of poor access.

Developing medicine pricing policies will always be a challenging task because it brings together the often disparate interests of public health and commerce. While governments, often at the centre of this tension, may wish to strike a balance between the numerous stakeholders engaged in the 'business' of manufacturing and supplying medicines, primacy must be given to public health. People should not have to go without treatments to protect the

## BOX 1.3

**From evidence to action: improving access to medicines**

A number of countries have used the results of recent surveys of medicine prices and availability to inform and guide policy action to improve access to medicines. Examples include:

*China:* The Chinese Government intends to limit the price of branded generics to not much higher than unbranded generics, simplify the public sector medicine supply system, establish a national pooled tendering procurement system and abolish mark-ups in the public sector.

*India:* The Government has recently established retail outlets that only sell unbranded quality generics at no more than 50% of the prevailing maximum retail price.

*Lebanon:* Following the 2004 survey, the Lebanese Government undertook a review of procurement and patient prices, comparing these with prices in Jordan and Saudi Arabia. This resulted in the lowering of prices for a large number of medicines. The Government also implemented regressive margins for importers, wholesalers and retailers and improved transparency by publishing patient prices on a web site and in the Lebanon National Drug Index. The Government also increased the budget for purchasing cancer, HIV and other specialized medicines.

*Tajikistan:* Following a 2005 survey, the Government abolished the 20% VAT on medicines.

*United Arab Emirates:* Following the 2006 survey and subsequent price review, the price of many originator brands and generics were substantially reduced. Margins for chronic disease medicines have also been reduced, resulting in a further 10% reduction in patient prices. To improve the availability of generics in the private sector, the regulatory authority has implemented a priority track for generic product applications where there are less than six generic equivalents on the market. In addition, pharmaceutical companies have been informed that they risk penalties (in the form of cancelled registrations) if they fail to market registered products.

*Yemen:* Following their 2006 survey, the Government of Yemen re-introduced price-setting, limited wholesaler "bonusing" of free stock to 10% and reduced medicine prices (in some cases by up to 50%). Additional measures currently under consideration include reducing costs in the supply chain from 55% to 43%, abolishing taxes on essential medicines (currently subject to 5% customs duty and 5% general tax) and enforcing the ban on illegal middlemen in the supply chain.

vested interest of local pharmaceutical manufacturers or indeed to balance the competing values inherent in international trade.

Inevitably, poor medicine availability in the public sector forces people to purchase medicines from the private sector. Relying on the private sector to fill the void is not the answer, as clearly many treatments, especially those for chronic diseases, are not affordable when purchased from private pharmacies. Instead, governments must ensure the medicines budget is sufficient to meet public health needs. Typically, governments of low-income countries are spending an average of US\$ 3 per capita per year on medicines (see Chapter on Medicine Expenditure), which is clearly inadequate. In addition, government procurement, financing and supply chain management must be of a standard such that essential medicines are available from public health outlets when needed by patients, and that low procurement prices are passed on to patients, preferably with no additional costs.

Of course any national medicine policy has to meet the challenge of comprehensive implementation and stringent enforcement. Without these complementary components, the good intention of regulation may be diluted and fail to achieve its goal.

Access to reliable information on medicine prices and availability in a country is essential for identifying the root causes of poor access and for selecting the right policy interventions from the range of possible options that might be considered. Once policy and/or programme changes have formulated and implemented, routine monitoring of both prices and availability is critical to assess their impact and to ensure that the desired outcomes are being achieved. While possession of data alone will not improve the availability and affordability of medicines, it is a crucial component of any informed policy response.

The landscape of pharmaceuticals is changing fast. New initiatives favour the broader de-linking of the research and development costs of new medicines from the patient price (e.g. through use of patent pools<sup>1</sup>); subsidizing the procurement price; and encouraging research and development into neglected diseases. This gives reason to hope that access to innovative medicines of proven therapeutic value may be on the horizon for many people who otherwise would have little chance of benefiting from them in their lifetime. Such initiatives, however well-intentioned, must be carefully monitored to ensure that the benefits of innovation are optimized and that patients are the ultimate beneficiaries.

In the shorter term, one of today's most immediate challenges is the growing market in higher-priced branded generic (off-patent) medicines relative to their unbranded equivalents. Gains made in lowering the prices of essential medicines – which have expanded access to treatments – will be threatened if there is a shift towards the procurement and use of higher-priced branded generic products in both the public and private sectors. Of equal concern is the promulgation of the myth that expensive medicines are necessarily better than their lower-priced equivalents. This myth needs to be overcome by assuring product quality, government purchasing by the generic name, (lowest-priced) generic substitution and most importantly, by conducting public education campaigns that build confidence in the use of lower-priced products of assured quality.

Despite the gains made in recent years, in terms of the number of people accessing treatment through specific disease programmes, for diseases such as HIV/AIDS, the fact remains that 30 years after the Alma-Ata Declaration and the launch of the health-for-all movement, patients are still not getting all the essential medicines they need. Without concerted efforts to address high prices, unaffordable treatments and unreliable availability, this situation will continue to threaten the health and well-being of people worldwide.

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<sup>1</sup> In July 2008, the UNITAID board decided in principle to establish an international AIDS medicines patent pool to deal with both access and innovation issues related to the medicines patents. A patent pool would enable others, such as generic industries, to make use of the patents to develop, produce and sell AIDS medicines in developing countries at low cost in exchange for the payment of a royalty to the pool to remunerate the patent holders (ref.21).

## REFERENCES

1. *Equitable access to essential medicines: A framework for collective action*. Geneva, World Health Organization, 2004.
2. *Delivering on the Global Partnership for Achieving the Millennium Development Goals. MDG Gap Task Force Report 2008*. New York, United Nations, 2008.
3. *Strengthening the Global Partnership for Development in a time of crisis. MDG Gap Task Force Report 2009*. New York, United Nations, 2009.
4. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: A secondary analysis. *Lancet*, 2009, 373:240–249.
5. Kotwani A. Availability, price and affordability of asthma medicines in five Indian states. *International Journal of Tuberculosis and Lung Disease*, 2009, 13(5):574–579.
6. Kotwani A et al. Insights for policy-makers from a medicine price survey in Rajasthan. *Indian Journal of Medical Research*, 2009, 129:451–454.
7. *Medicine prices, availability, affordability and price components. A synthesis report of medicine price surveys undertaken in selected countries of the WHO Eastern Mediterranean Region*. Cairo, World Health Organization Regional Office for the Eastern Mediterranean, 2008.
8. Mendis S et al. The availability and affordability of selected essential medicines for chronic diseases in six low- and middle-income countries. *Bulletin of the World Health Organization*, 2007, 85:279–287.
9. Babar ZUD et al. Evaluating drug prices, availability, affordability, and price components: Implications for access to drugs in Malaysia. *PLoS Medicine*, 2007, 4(3):e82.
10. Andersson F. Methodological aspects of international drug price comparisons. *Pharmacoeconomics*, 1993, 4:247–256.
11. Bala K, Lanza O, Kaur SL. Retail drug prices: the law of the jungle. *HAI News*, 1998, 100:2–4, 13–16.
12. Sagoo K, Bala K. HIV/AIDS: Improving access to essential drugs. *HAI News*, December 1999/January 2000, 110:1–3. Available at: <http://www.haiweb.org/pubs/hainews/Dec1999.html>
13. Bala K, Sagoo K. Patents and prices. *HAI News*, 2000, 112:1–11. Available at: <http://www.haiweb.org/pubs/hainews/Patents%20and%20Prices.html>
14. Myhr K. *Comparing prices of essential drugs between four countries in East Africa and with international prices*. Geneva, Médecins Sans Frontières, 2000.
15. *Measuring medicine prices, availability, affordability and price components*, 2nd ed. Geneva, World Health Organization and Health Action International, 2008. Available at: <http://apps.who.int/medicinedocs/documents/s14868e/s14868e.pdf>
16. *International drug price indicator guide*. Cambridge, MA, Management Sciences for Health, 2007. Available at: <http://erc.msh.org/mainpage.cfm?file=1.0.htm&module=DM&language=English>. Global medicine prices web site: <http://www.haiweb.org/medicineprices>
17. *Pharmaceutical pricing policies in a global market*. Paris, Organisation for Economic Co-operation and Development, 2008. Available at: <http://www.centad.org/seminar/2.%20Price%20regulation/OECD%20Pharma%20pricing%20policies.pdf>

18. *Public health, innovation and intellectual property rights. Report of the Commission on Intellectual Property Rights, Innovation and Public Health*. Geneva, World Health Organization, 2006. Available at: <http://www.who.int/intellectualproperty/documents/thereport/CIPHRReport23032006.pdf>
19. Correa C. *Integrating public health concerns into patent legislation in developing countries*, 2nd ed. Geneva, World Health Organization, 2002. Available at: <http://apps.who.int/medicinedocs/en/d/Jh2963e/#Jh2963e>
20. Higuchi M. *Costs, availability and affordability of diabetes care in the Philippines*. Tokyo, Foundation for Advanced Studies on International Development, 2009. Available at: [http://www.fasid.or.jp/chosa/jyosei/list\\_pdf/19-1-e.pdf](http://www.fasid.or.jp/chosa/jyosei/list_pdf/19-1-e.pdf)
21. *The Medicines Patent Pool initiative*. Geneva, UNITAID and World Health Organization, 2009. Available at: [http://www.unitaid.eu/images/projects/PATENT\\_POOL\\_ENGLISH\\_15\\_may\\_REVISED.pdf](http://www.unitaid.eu/images/projects/PATENT_POOL_ENGLISH_15_may_REVISED.pdf)

## ABBREVIATIONS

ACE	Angiotensin-converting enzyme
ACTs	Artemisinin combination therapies
HAI	Health Action International
IRPs	International reference prices
MDG	Millennium Development Goal
MPR	Median price ratio
VAT	Value added tax

## ANNEXES

## Annex 1. Surveys included in the secondary analysis

Country (survey date)	WHO region	World Bank Income Group (2008/09)
Armenia (11/2001) <sup>a,b,c</sup>	European	lower-middle
Bolivia (11/2008)	Americas	lower-middle
Brazil, Rio de Janeiro State (10/2001) <sup>a,b,d</sup>	Americas	upper-middle
Cameroon (07/2005)	Africa	lower-middle
Chad (05/2004)	Africa	low
China, Shandong Province (10/2004)	Western Pacific	lower-middle
China, Shanghai (09/2004)	Western Pacific	lower-middle
Colombia (10/2008)	Americas	lower-middle
El Salvador (11/2006)	Americas	lower-middle
Ethiopia (09/2004)	Africa	low
Fiji (09/2004) <sup>b</sup>	Western Pacific	upper-middle
Ghana (10/2004)	Africa	lower-middle
India, Chennai State (01/2004)	South-East Asia	lower-middle
India, Haryana State (10/2004)	South-East Asia	lower-middle
India, Karnataka State (11/2004)	South-East Asia	lower-middle
India, Maharashtra State, 12 districts (10/2004)	South-East Asia	lower-middle
India, Maharashtra State, 4 regions (01/2005)	South-East Asia	lower-middle
India, Rajasthan State (06/2003)	South-East Asia	lower-middle
India, West Bengal State (12/2004)	South-East Asia	lower-middle
Indonesia (08/2004)	South-East Asia	lower-middle
Iran (12/2007)	Eastern Mediterranean	lower-middle
Jordan (05/2004)	Eastern Mediterranean	lower-middle
Kazakhstan (11/2004)	European	upper-middle
Kenya (11/2004)	Africa	low
Kuwait (06/2004)	Eastern Mediterranean	high
Kyrgyzstan (02/2005) <sup>b</sup>	European	low
Lebanon (02/2004)	Eastern Mediterranean	upper-middle
Malaysia (10/2004)	Western Pacific	upper-middle
Mali (03/2004)	Africa	low
Mongolia (11/2004)	Western Pacific	lower-middle
Morocco (04/2004)	Eastern Mediterranean	lower-middle
Nicaragua (11/2008)	Americas	lower-middle
Nigeria (09/2006)	Africa	low
Pakistan (07/2004)	Eastern Mediterranean	low
Peru (09/2005)	Americas	lower-middle
Philippines (02/2005)	Western Pacific	lower-middle
São Tomé and Príncipe (06/2008)	Africa	low
South Africa, Gauteng province (11/2004) <sup>b,d</sup>	Africa	upper-middle
Sri Lanka (09/2001) <sup>a,b,c,d</sup>	South-East Asia	lower-middle
Sudan, Gadarif State (02/2006)	Eastern Mediterranean	lower-middle
Sudan, North Kordofan State (02/2006)	Eastern Mediterranean	lower-middle
Sudan, Khartoum State (06/2005)	Eastern Mediterranean	lower-middle
Sudan, Northern State (02/2006)	Eastern Mediterranean	lower-middle
Syrian Arab Republic (12/2003) <sup>b</sup>	Eastern Mediterranean	lower-middle



Country (survey date)	WHO region	World Bank Income Group (2008/09)
Tajikistan (02/2005) <sup>c</sup>	European	low
Thailand (10/2006)	South-East Asia	lower-middle
Tunisia (03/2004)	Eastern Mediterranean	lower-middle
Uganda (04/2004)	Africa	low
Ukraine (09/2007)	European	lower-middle
United Arab Emirates (12/2006)	Eastern Mediterranean	high
United Republic of Tanzania (09/2004)	Africa	low
Uzbekistan (12/2004) <sup>b</sup>	European	low
Yemen (07/2006)	Eastern Mediterranean	low

<sup>a</sup> Pilot studies. Availability data were excluded since they were not assessed using the current WHO/HAI methodology.

<sup>b</sup> Did not survey public sector medicine outlets.

<sup>c</sup> Did not survey public sector procurement prices.

<sup>d</sup> Private sector data on lowest-priced generic medicines excluded since they were not surveyed using the current WHO/HAI methodology.

## Annex 2. Median availability and median price ratio, all surveys

### a. Public sector, originator brands

WHO REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
AMRO	Bolivia	0.0	0.0	0.0	17.14	17.14	17.14	17.14	17.14
AFRO	Cameroon	0.0	0.0	0.0					
AFRO	Chad	0.0	0.0	0.0					
WPRO	China-Shandong Province	0.0	0.0	15.0	4.09	1.71	7.28	0.98	23.63
WPRO	China-Shanghai	13.3	0.0	40.0	5.64	2.58	10.85	1.28	69.45
AMRO	Colombia <sup>a</sup>	3.3	0.0	3.3	Medicines provided free of charge to insured patients				
AMRO	El Salvador	0.0	0.0	1.9	Medicines provided free of charge in the public sector				
AFRO	Ethiopia	0.0	0.0	0.0					
AFRO	Ghana	0.0	0.0	0.0	14.91	11.13	40.93	7.35	66.94
SEARO	India	0.0	0.0	0.0					
SEARO	India-Haryana	0.0	0.0	0.0					
SEARO	India-Karnataka	0.0	0.0	0.0					
SEARO	India-Maharashtra 12 districts	0.0	0.0	0.0					
SEARO	India-Maharashtra 4 regions	0.0	0.0	0.0					
SEARO	India-Rajasthan	0.0	0.0	0.0					
SEARO	India-West Bengal	0.0	0.0	0.0					
SEARO	Indonesia	6.7	0.0	13.3	21.80	13.98	36.47	6.15	51.13
EMRO	Iran	13.3	7.5	25.8	6.67	6.66	6.67	6.66	6.67
EMRO	Jordan	0.0	0.0	0.0	5.95	5.95	5.95	5.95	5.95
EURO	Kazakhstan	0.0	0.0	0.0	2.16	1.87	2.45	1.57	2.75
AFRO	Kenya	0.0	0.0	1.9	3.61	3.61	3.61	3.61	3.61
EMRO	Kuwait	12.0	2.0	38.0	Medicines provided free of charge in the public sector				
EMRO	Lebanon	0.0	0.0	0.0					
WPRO	Malaysia	0.0	0.0	47.5	Medicines provided free of charge in the public sector				
AFRO	Mali	0.0	0.0	0.0					
WPRO	Mongolia	0.0	0.0	0.0					
EMRO	Morocco	0.0	0.0	23.8	Medicines provided free of charge in the public sector				
AMRO	Nicaragua	0.0	0.0	0.0					

WHO REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
AFRO	Nigeria	0.0	0.0	7.1	7.35	6.04	11.40	2.57	21.48
EMRO	Pakistan	0.0	0.0	0.0					
AMRO	Peru	0.0	0.0	0.0					
WPRO	Philippines	7.7	3.8	18.3	15.31	8.14	32.43	3.11	79.89
AFRO	São Tomé and Príncipe	0.0	0.0	0.0	2.90	2.90	2.90	2.90	2.90
EMRO	Sudan-Gadarif State	0.0	0.0	0.0					
EMRO	Sudan-Khartoum State	0.0	0.0	0.0	3.41	3.41	3.41	3.41	3.41
EMRO	Sudan-North Kordofan State	0.0	0.0	0.0					
EMRO	Sudan-Northern State	0.0	0.0	0.0					
EURO	Tajikistan	0.0	0.0	0.0	49.44	32.12	64.96	4.27	87.39
SEARO	Thailand	10.0	2.5	20.0	4.36	2.03	9.86	1.20	15.82
EMRO	Tunisia	0.0	0.0	8.3	Medicines provided free of charge in the public sector				
AFRO	Uganda	0.0	0.0	0.0					
EURO	Ukraine	50.0	33.3	83.3	9.90	6.58	76.14	1.55	111.68
EMRO	United Arab Emirates	16.7	5.6	22.2	Medicines provided free of charge in the public sector				
AFRO	United Republic of Tanzania	0.0	0.0	0.0					
EMRO	Yemen	0.0	0.0	0.0					

## b. Public sector, lowest-priced generics

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
AMRO	Bolivia	31.9	21.7	31.9	3.46	1.84	6.36	0.30	17.55
AFRO	Cameroon	58.3	4.2	77.8	2.16	1.65	2.45	0.06	5.90
AFRO	Chad	31.3	1.0	77.1	3.88	2.63	4.98	1.29	13.16
WPRO	China-Shandong Province	5.0	0.0	20.0	0.93	0.69	2.88	0.23	21.28
WPRO	China-Shanghai	33.3	0.0	66.7	2.03	1.20	4.19	0.34	28.94
AMRO	Colombia <sup>a</sup>	86.7	54.2	96.7	Medicines provided free of charge to insured patients				
AMRO	El Salvador	53.8	3.8	87.5	Medicines provided free of charge in the public sector				
AFRO	Ethiopia	52.9	13.2	80.9	1.33	0.90	1.89	0.19	2.57
AFRO	Ghana	17.9	3.6	46.4	2.43	1.35	5.11	0.88	23.17
SEARO	India-Chennai	50.0	0.0	100	Medicines provided free of charge in the public sector				
SEARO	India-Haryana	8.3	0.0	27.5	Medicines provided free of charge in the public sector				
SEARO	India-Karnataka	14.6	4.2	61.5	Medicines provided free of charge in the public sector				
SEARO	India-Maharashtra 12 districts	15.0	0.0	46.7	Medicines provided free of charge in the public sector				
SEARO	India-Maharashtra 4 regions	15.8	0.0	38.2	Medicines provided free of charge in the public sector				
SEARO	India-Rajasthan	40.0	8.8	100	Medicines provided free of charge in the public sector				
SEARO	India-West Bengal	0.0	0.0	16.3	Medicines provided free of charge in the public sector				
SEARO	Indonesia	46.7	6.7	73.3	2.54	1.73	5.77	0.70	45.85
EMRO	Iran	96.7	90.0	100	1.32	0.94	2.03	0.01	4.89
EMRO	Jordan	27.8	5.6	61.1	0.85	0.57	1.18	0.24	2.64
EURO	Kazakhstan	0.0	0.0	50.0	4.84	2.87	6.36	1.19	22.69
AFRO	Kenya	37.7	5.7	83.0	1.99	1.29	3.33	0.26	13.18
EMRO	Kuwait	12.0	0.0	80.0	Medicines provided free of charge in the public sector				
EMRO	Lebanon	0.0	0.0	10.0	Medicines provided free of charge in the public sector				
WPRO	Malaysia	25.0	0.0	85.0	Medicines provided free of charge in the public sector				
AFRO	Mali	81.0	33.3	90.5	1.83	1.58	2.08	0.99	13.33
WPRO	Mongolia	100	75.0	100	2.60	1.94	4.72	0.79	55.06
EMRO	Morocco	0.0	0.0	72.5	Medicines provided free of charge in the public sector				
AMRO	Nicaragua	50.0	10.0	81.7	Medicines provided free of charge in the public sector				
AFRO	Nigeria	26.2	7.1	45.2	3.50	2.56	6.50	1.92	18.34
EMRO	Pakistan	3.3	0.0	33.3	Medicines provided free of charge in the public sector				

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
AMRO	Peru	61.5	3.8	86.1	1.40	0.84	3.40	0.11	25.12
WPRO	Philippines	15.4	1.0	33.7	6.40	3.25	10.59	1.52	19.49
AFRO	São Tomé and Príncipe	56.3	33.6	78.9	2.36	1.60	3.23	0.09	14.15
EMRO	Sudan-Gadarif State	40.0	0.0	55.0	3.44	2.41	6.51	0.42	20.13
EMRO	Sudan-Khartoum State	50.0	30.0	95.0	4.78	2.27	7.20	0.89	42.24
EMRO	Sudan-North Kordofan State	64.3	21.4	92.9	4.37	3.13	8.83	1.07	24.15
EMRO	Sudan-Northern State	52.6	15.8	73.7	5.11	2.78	8.25	1.04	19.62
EURO	Tajikistan	75.0	40.0	90.0	2.36	1.45	3.42	0.22	33.50
SEARO	Thailand	75.0	27.5	95.0	2.55	1.45	3.32	0.49	6.79
EMRO	Tunisia	64.3	2.4	95.2	Medicines provided free of charge in the public sector				
AFRO	Uganda	20.0	0.0	65.0	Medicines provided free of charge in the public sector				
EURO	Ukraine	100	66.7	100	3.98	1.95	6.33	0.63	20.72
EMRO	United Arab Emirates	61.1	22.2	94.4	Medicines provided free of charge in the public sector				
AFRO	United Republic of Tanzania	23.4	8.6	54.7	1.33	0.93	2.83	0.29	8.17
EMRO	Yemen	5.0	0.0	12.5	1.09	0.86	1.49	0.64	2.33

### c. Private sector, originator brands

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
EURO	Armenia <sup>b</sup>				10.40	5.45	23.60	2.20	95.54
AMRO	Bolivia	0.0	0.0	0.0	30.26	11.91	51.62	5.19	67.35
AMRO	Brazil-Rio de Janeiro State <sup>b</sup>				16.23	11.74	44.98	2.50	81.34
AFRO	Cameroon	52.5	0.0	81.3	16.24	6.80	42.46	1.13	412.92
AFRO	Chad	45.5	11.4	79.5	21.93	11.88	41.50	3.32	113.06
WPRO	China-Shandong Province	0.0	0.0	20.0	7.14	2.35	10.94	0.94	47.16
WPRO	China-Shanghai	10.0	0.0	60.0	8.76	2.75	19.53	1.28	68.42
AMRO	Colombia	40.7	19.5	53.4	17.88	8.76	59.97	0.43	218.32
AMRO	El Salvador	21.2	0.0	41.3	57.92	25.42	105.27	2.94	201.81
AFRO	Ethiopia	0.0	0.0	14.0	11.55	8.60	23.36	2.39	50.02
WPRO	Fiji	23.6	2.8	75.0	9.21	4.67	19.10	1.27	79.01
AFRO	Ghana	3.6	0.0	21.4	15.65	9.34	60.39	2.82	157.03
SEARO	India-Chennai	0.0	0.0	89.4	2.74	1.22	4.50	0.46	12.90
SEARO	India-Haryana	0.0	0.0	35.0	3.55	1.41	6.66	0.44	12.77
SEARO	India-Karnataka	7.5	0.0	54.4	3.84	1.75	7.75	0.51	13.90
SEARO	India-Maharashtra 12 districts	6.7	0.0	58.3	2.78	1.75	5.05	0.46	13.22
SEARO	India-Maharashtra 4 regions	2.1	0.0	41.7	3.77	1.69	5.80	0.49	13.24
SEARO	India-Rajasthan	0.0	0.0	82.5	2.81	1.68	5.26	0.20	13.25
SEARO	India-West Bengal	40.0	2.1	85.7	2.86	1.27	6.59	0.46	17.13
SEARO	Indonesia	25.9	8.6	48.3	22.78	10.75	54.10	1.40	101.96
EMRO	Iran	30.0	12.5	53.3	6.66	4.86	6.67	3.07	6.67
EMRO	Jordan	60.0	55.0	75.0	17.05	10.69	50.70	1.30	159.95
EURO	Kazakhstan	40.0	0.0	77.5	8.58	5.02	26.93	1.37	143.32
AFRO	Kenya	36.2	6.9	58.6	17.75	10.01	57.49	1.07	140.07
EMRO	Kuwait	84.0	28.0	92.0	17.45	9.00	29.34	3.71	110.22
EURO	Kyrgyzstan	0.0	0.0	10.8	5.42	5.08	29.95	1.82	99.11
EMRO	Lebanon	95.0	62.5	97.5	12.87	8.87	28.48	1.48	104.06
WPRO	Malaysia	39.1	2.3	66.4	16.35	4.34	30.91	0.99	111.63
AFRO	Mali	55.0	5.0	65.0	18.14	6.65	29.99	3.49	106.35

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
WPRO	Mongolia	0.0	0.0	0.0	6.40	6.40	6.40	6.40	6.40
EMRO	Morocco	92.5	47.5	100	12.15	8.59	21.65	1.43	215.70
AMRO	Nicaragua	9.7	0.0	30.6	27.52	20.03	64.35	1.72	168.95
AFRO	Nigeria	18.2	2.3	40.9	14.55	6.61	21.11	2.33	50.53
EMRO	Pakistan	54.2	14.6	83.3	3.36	2.20	5.88	0.72	26.20
AMRO	Peru	14.6	6.3	29.9	27.79	14.88	76.14	1.77	180.89
WPRO	Philippines	33.3	15.7	60.8	17.28	10.06	41.55	3.33	184.09
AFRO	São Tomé and Príncipe	0.0	0.0	19.4	53.67	21.81	98.30	2.10	266.70
AFRO	South Africa, Gauteng province	36.7	23.3	59.2	23.49	4.79	70.41	1.09	183.47
SEARO	Sri Lanka <sup>b</sup>				5.13	3.55	6.27	1.46	12.82
EMRO	Sudan-Gadarif State	0.0	0.0	5.0	7.15	5.44	8.85	3.73	10.56
EMRO	Sudan-Khartoum State	0.0	0.0	35.0	18.20	11.08	45.98	3.41	85.43
EMRO	Sudan-North Kordofan State	0.0	0.0	6.7	10.57	7.02	13.28	3.46	15.98
EMRO	Sudan-Northern State	0.0	0.0	5.9	9.95	6.71	15.07	3.56	58.90
EMRO	Syria	0.0	0.0	93.9	9.60	3.94	14.89	2.58	23.71
EURO	Tajikistan	0.0	0.0	5.0	42.58	29.18	55.79	4.94	79.45
SEARO	Thailand	28.6	4.8	71.4	11.60	5.37	23.90	1.48	72.64
EMRO	Tunisia	76.8	3.0	99.4	11.89	4.78	20.91	0.86	43.92
AFRO	Uganda	0.0	0.0	15.0	13.58	7.47	25.64	1.68	118.02
EURO	Ukraine	40.7	25.9	63.0	13.85	5.31	42.78	1.47	101.73
EMRO	United Arab Emirates	100	100	100	23.52	10.62	44.00	1.81	121.90
AFRO	United Republic of Tanzania	0.0	0.0	2.1	18.79	15.45	56.88	12.12	94.98
EURO	Uzbekistan	0.0	0.0	12.5	10.78	2.11	39.80	1.07	127.80
EMRO	Yemen	50.0	17.5	90.0	18.11	7.44	35.60	1.95	129.40



## d. Private sector, lowest-priced generics

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
EURO	Armenia <sup>b</sup>				3.42	2.05	5.77	0.48	37.33
AMRO	Bolivia	86.7	60.0	95.8	4.54	2.88	12.32	0.38	52.39
AMRO	Brazil-Rio de Janeiro State <sup>b,c</sup>								
AFRO	Cameroon	52.5	13.8	70.0	13.56	4.51	24.28	0.58	144.23
AFRO	Chad	13.6	0.0	34.1	15.12	14.03	15.96	4.08	26.33
WPRO	China-Shandong Province	5.0	0.0	22.5	0.51	0.29	1.11	0.15	4.13
WPRO	China-Shanghai	15.0	5.0	55.0	1.77	1.27	4.45	0.62	28.94
AMRO	Colombia	87.9	49.6	94.9	3.06	1.50	6.34	0.23	24.61
AMRO	El Salvador	69.2	41.3	89.4	28.33	14.80	52.41	1.56	166.68
AFRO	Ethiopia	88.0	62.0	100	2.15	1.57	3.20	0.29	7.44
WPRO	Fiji	75.0	5.6	93.1	2.73	1.86	3.33	0.31	9.22
AFRO	Ghana	44.6	23.2	66.1	3.83	1.83	6.64	0.39	33.65
SEARO	India	93.8	71.3	99.4	1.54	0.90	3.63	0.06	11.85
SEARO	India-Haryana	61.7	32.5	87.5	1.74	1.11	3.21	0.10	6.30
SEARO	India-Karnataka	68.8	34.4	82.5	1.68	1.22	4.79	0.11	11.03
SEARO	India-Maharashtra 12 districts	74.2	32.9	88.3	1.60	1.24	3.53	0.10	8.98
SEARO	India-Maharashtra 4 regions	57.3	35.9	75.0	1.79	1.25	4.25	0.11	9.46
SEARO	India-Rajasthan	95.0	62.5	100	1.83	1.06	3.56	0.09	10.31
SEARO	India-West Bengal	77.1	42.9	92.1	2.17	1.18	5.29	0.11	9.62
SEARO	Indonesia	62.1	25.9	82.8	2.78	1.92	8.06	0.81	49.43
EMRO	Iran	96.7	93.3	100	1.32	0.95	2.03	0.01	4.89
EMRO	Jordan	80.0	60.0	90.0	10.50	5.67	18.42	0.85	70.14
EURO	Kazakhstan	70.0	17.5	87.5	3.73	1.71	4.61	0.35	72.04
AFRO	Kenya	72.4	51.7	84.5	3.33	1.78	5.08	0.43	20.42
EMRO	Kuwait	0.0	0.0	50.0	15.72	14.05	47.37	4.84	100.05
EURO	Kyrgyzstan	80.0	43.3	94.2	2.56	1.63	4.29	0.48	31.70
EMRO	Lebanon	83.8	21.9	97.5	6.10	4.74	14.87	0.70	44.08
WPRO	Malaysia	43.8	10.2	71.9	6.57	3.02	9.69	1.33	39.27
AFRO	Mali	70.0	40.0	90.0	5.38	3.61	9.96	1.77	34.92
WPRO	Mongolia	80.0	32.0	96.0	4.17	2.54	7.63	0.75	120.13

REGION	Survey	Median Availability	25 %ile Availability	75 %ile Availability	Median MPR	25 % MPR	75 % MPR	Minimum MPR	Maximum MPR
EMRO	Morocco	52.5	0.0	98.8	11.07	5.65	17.09	2.11	82.76
AMRO	Nicaragua	87.1	56.5	93.5	5.73	3.26	9.99	0.69	21.30
AFRO	Nigeria	36.4	13.6	70.5	4.32	3.11	6.73	1.89	42.96
EMRO	Pakistan	31.3	6.3	50.0	2.26	1.15	3.60	0.20	7.02
AMRO	Peru	60.9	10.9	89.3	5.61	2.76	10.69	0.42	40.55
WPRO	Philippines	26.5	4.4	46.6	5.64	3.78	15.17	2.32	26.10
AFRO	São Tomé and Príncipe	22.2	11.1	33.3	13.76	7.31	24.12	0.09	107.51
AFRO	South Africa, Gauteng province <sup>c</sup>	71.7	20.0	86.7	6.52	3.21	13.86	1.58	87.16
SEARO	Sri Lanka <sup>b,c</sup>								
EMRO	Sudan-Gadarif State	55.0	30.0	75.0	4.66	2.81	10.17	0.47	95.11
EMRO	Sudan-Khartoum State	90.0	80.0	100	5.31	3.02	10.43	0.39	93.78
EMRO	Sudan-North Kordofan State	86.7	60.0	100	4.35	2.77	9.45	0.14	99.64
EMRO	Sudan-Northern State	76.5	64.7	88.2	4.57	2.96	9.58	0.40	86.05
EMRO	Syria	98.2	96.5	98.2	2.51	1.56	3.36	0.13	6.47
EURO	Tajikistan	85.0	46.3	95.0	2.29	1.47	3.63	0.25	37.79
SEARO	Thailand	28.6	0.0	92.9	3.31	2.34	5.46	1.15	7.35
EMRO	Tunisia	95.1	0.6	99.4	6.82	2.20	12.02	0.71	31.75
AFRO	Uganda	80.0	50.0	90.0	2.63	1.64	3.43	0.28	16.09
EURO	Ukraine	90.7	74.1	97.2	3.74	2.40	5.32	0.54	12.36
EMRO	United Arab Emirates	73.9	17.4	91.3	13.75	8.24	20.46	1.19	84.47
AFRO	United Republic of Tanzania	47.9	21.9	73.4	2.67	1.84	4.59	0.37	19.00
EURO	Uzbekistan	82.5	57.5	95.0	1.97	1.14	3.59	0.64	66.55
EMRO	Yemen	90.0	70.0	97.5	3.50	1.87	7.45	0.26	18.08

<sup>a</sup> Restricted to reimbursed medicines available through public sector outlets

<sup>b</sup> Pilot studies. Availability data were excluded since they were not assessed using the current WHO/HAI methodology.

<sup>c</sup> Private sector data on lowest-priced generic medicines excluded since they were not surveyed using the current WHO/HAI methodology.

Source: *Surveys of medicine prices and availability using WHO/HAI standard methodology*. Available from <http://www.haiweb.org/medicineprices/>.

**Annex 3. Ratio of median originator brand price to median lowest-priced generic price for medicines found as both product types, private sector, all surveys**

WHO Region	Survey	No. of medicines found as both product types	Median MPR, originator brands (OB)	Median MPR, lowest-priced generics (LPG)	Ratio Brand: LPG
EURO	Armenia	10	10.40	3.15	3.3
AMRO	Bolivia	4	30.26	13.23	2.3
AFRO	Cameroon	15	32.57	15.46	2.1
AFRO	Chad	5	35.83	14.93	2.4
WPRO	China-Shandong Province	4	6.97	0.29	24.0
WPRO	China-Shanghai	7	9.87	4.29	2.3
AMRO	Colombia	40	19.61	3.03	6.5
AMRO	El Salvador	26	57.92	34.21	1.7
AFRO	Ethiopia	12	11.55	2.04	5.7
WPRO	Fiji	19	9.92	2.86	3.5
AFRO	Ghana	19	15.00	3.88	3.9
SEARO	India-Chennai	15	3.31	2.37	1.4
SEARO	India-Haryana	11	3.55	2.13	1.7
SEARO	India-Karnataka	17	3.84	4.31	0.9
SEARO	India-Maharashtra 12 districts	18	2.78	2.31	1.2
SEARO	India-Maharashtra 4 regions	17	3.77	3.39	1.1
SEARO	India-Rajasthan	16	2.81	2.28	1.2
SEARO	India-West Bengal	21	3.41	3.41	1.0
SEARO	Indonesia	21	25.89	2.75	9.4
EMRO	Iran	3	6.66	0.95	7.0
EMRO	Jordan	24	18.77	9.37	2.0
EURO	Kazakhstan	13	8.51	3.59	2.4
AFRO	Kenya	33	17.93	3.52	5.1
EMRO	Kuwait	11	17.94	15.72	1.1
EURO	Kyrgyzstan	5	5.42	1.51	3.6
EMRO	Lebanon	22	12.87	5.72	2.3
WPRO	Malaysia	28	16.35	6.57	2.5
AFRO	Mali	24	13.38	4.95	2.7
EMRO	Morocco	18	16.25	11.07	1.5
AMRO	Nicaragua	21	27.52	5.82	4.7
AFRO	Nigeria	17	14.63	4.88	3.0
EMRO	Pakistan	20	3.51	2.39	1.5
AMRO	Peru	28	27.79	5.36	5.2
WPRO	Philippines	22	17.64	6.28	2.8
AFRO	São Tomé and Príncipe	17	65.53	13.34	4.9
EMRO	Sudan-Gadarif State	2	7.15	3.07	2.3
EMRO	Sudan-Khartoum State	16	18.20	5.14	3.5
EMRO	Sudan-North Kordofan State	3	10.57	4.26	2.5
EMRO	Sudan-Northern State	7	9.95	4.20	2.4
EMRO	Syria	10	9.60	3.36	2.9
EURO	Tajikistan	4	42.58	3.22	13.2
SEARO	Thailand	15	13.97	3.60	3.9
EMRO	Tunisia	11	12.76	6.99	1.8
AFRO	Uganda	11	13.58	2.61	5.2

WHO Region	Survey	No. of medicines found as both product types	Median MPR, originator brands (OB)	Median MPR, lowest-priced generics (LPG)	Ratio Brand: LPG
EURO	Ukraine	12	13.85	4.20	3.3
EMRO	United Arab Emirates	18	34.87	12.87	2.7
AFRO	United Republic of Tanzania	3	18.79	4.70	4.0
EURO	Uzbekistan	13	10.78	1.76	6.1
EMRO	Yemen	24	19.29	3.96	4.9

Source: Surveys of medicine prices and availability using WHO/HAI standard methodology.  
Available from <http://www.haiweb.org/medicineprices/>



# THE WORLD MEDICINES SITUATION 2011

## ACCESS TO CARE AND MEDICINES, BURDEN OF HEALTH CARE EXPENDITURES, AND RISK PROTECTION: RESULTS FROM THE WORLD HEALTH SURVEY

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## **The World Medicines Situation 2011**

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# Access to care and medicines, burden of health care expenditures, and risk protection: Results from the World Health Survey

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## ABSTRACT

**Objectives:** We assessed the contribution of health insurance and a functioning public sector to access to care and medicines and household economic burden.

**Methods:** We used descriptive and logistic regression analyses on 2002/3 World Health Survey data in 70 countries.

**Results:** Across countries, 286,803 households and 276,362 respondents contributed data. More than 90% of households had access to acute care. However, less than half of respondents with a chronic condition reported access. In 51 low and middle income countries (LMIC), health care expenditures accounted for 13–32% of total 4-week household expenditures. One in four poor households in low income countries incurred potentially catastrophic health care expenses and more than 40% used savings, borrowed money, or sold assets to pay for care. Between 41% and 56% of households in LMIC spent 100% of health care expenditures on medicines. Health insurance and a functioning public sector were both associated with better access to care and lower risk of economic burden.

**Conclusion:** To improve access, policy makers should improve public sector provision of care, increase health insurance coverage, and expand medicines benefit policies in health insurance systems.

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## 1. Introduction

Each year, an estimated 44 million households suffer severe financial hardship and 25 million are pushed into poverty because they need to use and pay for health care [1]. When households cannot pay for care from their income, they use savings, borrow money, sell assets, cut food expenditures, or take children out of school, thereby further restricting their short and long-term survival; or they forego needed care because they cannot afford to

pay for it, resulting in worse health, less productivity and income, and increased poverty [2].

Protection from the risk of relatively large health care expenditures should improve access to and decrease the financial burden of care. Subsidizing health care costs by insurance schemes (in any form, including national social health insurance systems, mutual benefit societies, and commercial private insurance) is crucial for overcoming financial barriers to care and protecting households from high expenditure burden [3]. To the extent that people use it, a functioning public sector that provides quality care and medicines at low or no cost also protects from risk [2] and may diminish the need for insurance coverage, especially for the poor.

The objectives of this study are to (1) describe access to health care and medicines across countries and (2) assess the relationships among household access to care,

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economic burden, and risk protection as indicated by insurance coverage and perceptions of public sector care delivery.

## 2. Materials and methods

### 2.1. Data source and study measures

We used data from the World Health Survey (WHS) [4,5] conducted by the WHO in 2002 and 2003 in 70 countries. Country samples were drawn from nationally representative sample frames to estimate general population parameters.

We analyzed information on household member demographics, health care needs, health insurance status, household assets, expenditures (by category), and sources used to pay for health care. For each household, the WHS identified one adult respondent. For adult respondents and the children they reported on, we analyzed overall health status; access to health care (including medicines) for acute and chronic conditions; reasons why care or medicines were not received; and respondents' ratings of care they received in outpatient public facilities. Country-level descriptive data on which the present analyses are based, data on additional indicators of adult respondents' and child health status, and detailed descriptions of the construction of the indicators are available elsewhere [6].

We constructed indicators of need for care, access to care and medicines, burden of health care expenditures, and household risk protection status.

#### 2.1.1. Need for health care

We defined households as needing care if (1) in the past 12 months, the respondent or a child needed care for a condition that usually requires treatment with medicines (high fever, diarrhoea, cough; arthritis, asthma, heart disease, bodily injury); (2) the respondent reported at least one chronic illness (arthritis, angina, asthma, depression, schizophrenia, diabetes); (3) the respondent reported moderate, bad, or very bad health or moderate, severe, or extreme limitations in daily activities; or (4) anyone in the household was in an institution, needed care all the time, or could not be without help for more than 1 h due to his/her health.

#### 2.1.2. Access to care and medicines

We defined households with access to care as those in which (1) the responding adult or a child who needed care for a condition that usually requires treatment with medicines reported receiving care; (2) the responding adult with at least one chronic illness was treated or reported taking medicines for his/her conditions in the past 2 weeks; (3) the responding adult or a child who needed care for a condition that usually requires treatment with medicines received all or most medicines needed.

#### 2.1.3. Financial burden of health care expenditures

We report total household expenditures; expenditures for health care, and for medicines overall and as percentages of total expenditures; and the proportion of

households for which medicines costs constitute all health care spending.

We constructed two indicators of financial burden: (1) Incurring high (potentially catastrophic) health care spending in the past 4 weeks, defined as health care expenditures of 40% or more of expenditures after accounting for food expenditure needs, [3,7] and (2) using savings, borrowing money, or selling assets to pay for health care (modified from methods reported by Leive and Xu [8]).

#### 2.1.4. Risk protection

Based on the reported number of household members covered by mandatory or voluntary health insurance, we identified households with none, some, or all members insured.

For each country, we created proxy measures of perceptions about public sector care based on ratings by households that reported receiving outpatient care in public facilities in the past year. By design, only a fraction of households (median across countries 18%) answered questions about perceptions of public sector outpatient care. We defined perceived adequacy of public sector functioning as the proportion of households receiving care that reported adequate skills, equipment, and medicines, and perceived positive experience of outpatient public sector care as the proportion of households that rated their treatment experience as very good or good. We assigned these country-level ratings of public sector adequacy and positive experience to all households in a given country. We then stratified countries into those whose ratings were in the upper 40% of countries (above 88% for adequacy of public sector functioning and above 70% for having a positive experience of public sector care) and those whose ratings were in the lower 60%. We entered these categorized ratings into regression models as country-level variables.

### 2.2. Analyses

The WHS employs a complex survey design with weights, stratification, and clustering in most countries. Our descriptive within-country analyses adjust for the survey design where possible. We report results for all households and for those that fell into the bottom two income quintiles based on reported permanent assets [9].

We used multi-country household-level logistic regression models (without country-level survey sampling weights) to explore the relationships between access to care, burden of expenditures, and household risk protection. Estimates are adjusted for household characteristics (household size greater or equal to 6 members [1/0]; having a member age 60 years and older [1/0] or a child under 5 years [1/0]; highest education of any household member as none or less than primary school [1/0]; household in lowest two quintiles of household poverty [1/0]; total household expenditures [continuous, Purchasing Power Parity-adjusted international dollars, 2002–2004]; urban location [1/0]) and respondent characteristics (female gender [1/0], age greater or equal to 60 years [1/0], married [1/0], education as either no formal schooling or less than primary school [1/0], health status reported as moderate, bad, or very bad [1/0], and difficulty with work or house-

**Table 1**

Median percent of households (number of countries) across countries in 2003 World Bank income category reporting need for and access to care and medicines, high burden of expenditures, risk protection, and ratings of public sector care, overall and for poor households<sup>a</sup>.

Country income category	Total population				Poor population			
	Low	Lower middle	Upper middle	High	Low	Lower middle	Upper middle	High
Need for health care								
Respondent or child needing care in past 12 months	36.3 (21)	29.7 (16)	14.6 (10)	18.3 (3)	37.8 (22)	28.9 (16)	11.9 (10)	11.9 (3)
Respondent needing chronic care	34.9 (22)	36.0 (17)	42.3 (10)	44.4 (20)	35.2 (22)	38.1 (17)	52.0 (10)	49.9 (18)
Respondent reporting low health status	41.8 (22)	45.9 (17)	50.3 (10)	29.5 (20)	43.1 (22)	52.2 (17)	62.4 (10)	39.7 (17)
Household needing high level care	16.2 (22)	15.4 (17)	19.4 (10)	19.9 (20)	14.6 (22)	14.2 (17)	18.4 (10)	20.7 (18)
Access to health care								
Care last time needed	93.9 (22)	97.4 (17)	99.2 (10)	98.4 (20)	92.6 (22)	95.6 (17)	99.7 (10)	98.4 (18)
Adult chronic care	31.9 (22)	37.5 (18)	47.6 (10)	50.6 (20)	26.7 (22)	31.3 (17)	44.8 (10)	49.0 (18)
All or most medicines	75.6 (22)	79.3 (17)	82.2 (10)	84.9 (3)	71.8 (22)	75.5 (17)	80.4 (10)	80.7 (3)
Financial burden								
Potentially catastrophic health care expenditures	22.1 (18)	16.4 (15)	9.0 (9)	5.1 (3)	25.1 (116)	21.8 (14)	8.0 (10)	6.4 (3)
Using savings, selling assets, or borrowing money	44.1 (21)	29.8 (16)	18.6 (9)	13.4 (3)	42.8 (20)	29.8 (16)	17.2 (9)	15.7 (3)
Risk protection								
Insurance coverage – no household members	96.9 (22)	71.6 (18)	14.6 (10)	0.9 (3)	99.1 (22)	89.5 (17)	22.6 (10)	1.5 (3)
Insurance coverage – at least one, not all members	2.4 (22)	12.8 (18)	8.7 (10)	3.3 (3)	0.6 (22)	4.5 (17)	5.7 (10)	2.4 (3)
Insurance coverage – all household members	0.7 (22)	11.6 (18)	59.5 (10)	95.8 (3)	0.2 (22)	5.4 (17)	50.9 (10)	95.1 (3)
Rating of public sector								
Public sector outpatient functioning adequate	83.0 (22)	88.9 (17)	95.3 (9)	96.2 (3)	83.5 (22)	88.9 (17)	95.9 (9)	96.8 (3)
Positive public sector outpatient experience	57.1 (22)	64.4 (17)	74.0 (9)	81.0 (20)	55.5 (22)	65.8 (17)	74.7 (9)	82.5 (18)

<sup>a</sup> Median percentages are calculated across countries in each 2003 World Bank income category in which at least 70% of households contributed data. For each value, the number of countries contributing data is noted in parenthesis. Poor households are those in the lowest two income quintiles as determined by self-reported permanent assets.

hold activities being moderate, severe, or extreme [1/0]). We selected these household and respondent characteristics to include in models on conceptual grounds and did not apply variable elimination strategies.

The study was exempt from human subjects review by the Human Studies Committee of the Department of Population Medicine.

### 3. Results

Across 70 countries (22 low, 18 lower middle, 10 upper middle, and 20 high income, according to 2003 World Bank criteria), [10] 286,803 households and 276,362 adult respondents contributed data. Of those, 100,440 adult respondents lived in 97,578 poor households. Among high income countries, most indicators are available only for a small subset of countries (Slovenia, Spain, and the United Arab Emirates).

#### 3.1. Need for and access to care, burden of expenditures, and risk protection

Tables listing household demographic, adult respondent, and child health characteristics for each country that

completed the relevant modules of the WHS are available elsewhere [6]. Table 1 summarizes the key outcome indicators by World Bank country income category, for both entire country populations and for the subset of households in the lowest two income quintiles in each country.

Many households reported health care need. Compared to higher income countries, more respondents in low income countries (median 36%) reported needing care in the past 12 months for a medicines-treatable condition for themselves or a child in the household (ranging from 8% in Georgia to 64% in Zambia); fewer (median 35%) households in low income countries reported needing care for chronic conditions. More than 40% of the respondents in low and middle income countries reported low health status; across countries, between 15% and 20% of households reported having a member institutionalized or in need of constant support at home due to health reasons.

Access to care was high in all countries, both overall and for poor households: Between 93% and 100% of households reported receiving care when it was needed within the past 12 months for conditions that usually require medicines. However, access to care for chronic conditions was lower, with 27% of respondents in poor households in low income countries and 51% in high income countries reporting treat-

**Table 2**Household health care and medicines expenditures in 2002 US\$, overall and for poor households<sup>a</sup>.

Country income category	Total population				Poor population			
	Low	Lower middle	Upper middle	High	Low	Lower middle	Upper middle	High
4-week total household expenditures	64 [49,83] (20)	114 [89,142] (15)	238 [195,345] (9)	686 [678,956] (3)	43 [35,57] (20)	71 [59,88] (14)	165 [129,270] (10)	526 [515,651] (3)
4-week health care expenditures among households with non-zero health care expenditures	7 [4,10] (22)	11 [7,21] (18)	18 [15,22] (10)	69 [52,71] (3)	5 [3,8] (22)	7 [6,14] (17)	17 [4,20] (10)	55 [40,56] (3)
Percent health care expenditures of total expenditures among households with non-zero health care expenditures	31.8 [18,37] (22)	21.7 [18,25] (18)	12.9 [9,17] (10)	10.8 [6,13] (3)	42.0 [26,61] (22)	32.1 [29,34] (17)	16.4 [11,22] (10)	11.2 [6,16] (3)
4-week medicines expenditures among households with non-zero medicines expenditures	4 [2,5] (15)	9 [7,16] (10)	16 [14,17] (9)	25 [25,25] (1)	4 [2,6] (15)	7 [6,11] (11)	11 [11,16] (10)	15 [15,15] (1)
Percent medicines expenditures of total expenditures among households with non-zero medicines expenditures	7.5 [4,8] (22)	7.9 [6,8] (17)	5.1 [3,7] (10)	3.3 [3,4] (3)	9.4 [5,10] (22)	9.5 [7,12] (17)	6.8 [4,9] (10)	3.5 [3,5] (3)
Percent households with 100% health care expenditures on medicines among households with non-zero health care expenditures	40.8 [33,54] (22)	46.4 [34,60] (16)	56.1 [46,59] (10)	51.2 [37,52] (3)	47.8 [34,55] (22)	50.8 [40,68] (16)	60.9 [50,68] (10)	58.3 [44,59] (3)

<sup>a</sup> Values displayed are medians [25th and 75th percentiles] and (number of countries) in each 2003 World Bank country income category in which at least 70% of households contributed data. Poor households are those in the lowest two income quintiles as determined by self-reported permanent assets.

ment for all chronic conditions. Between 72% and 85% of respondents said that they received all or most medicines for medicines-treatable conditions in the past 12 months for themselves or for a child in their household.

Household health care expenditures tended to be lower in lower income countries and in poor households; among households with non-zero health care expenditures, median health expenditures ranged from 2002 US \$5 among poor households in low income countries to US \$69 in the three high income countries for which data were available (Table 2). Households with non-zero health care expenditures allocated between 42% (among poor households in low income countries) and 11% (in high income countries) of overall expenditures to health care and a substantial portion of these health care expenses were for medicines. Between 41% of households in low income countries and 61% of poor households in high-middle income countries devoted all of their health care spending to medicines.

Financial burden was higher in lower income countries and in poorer households, with more than one in five households incurring potentially catastrophic health care expenditures in the past 4 weeks. Similarly, overall and among the poor, more than 40% of households in low income countries used savings, borrowed money, or sold assets to pay for health care expenditures during the past 12 months.

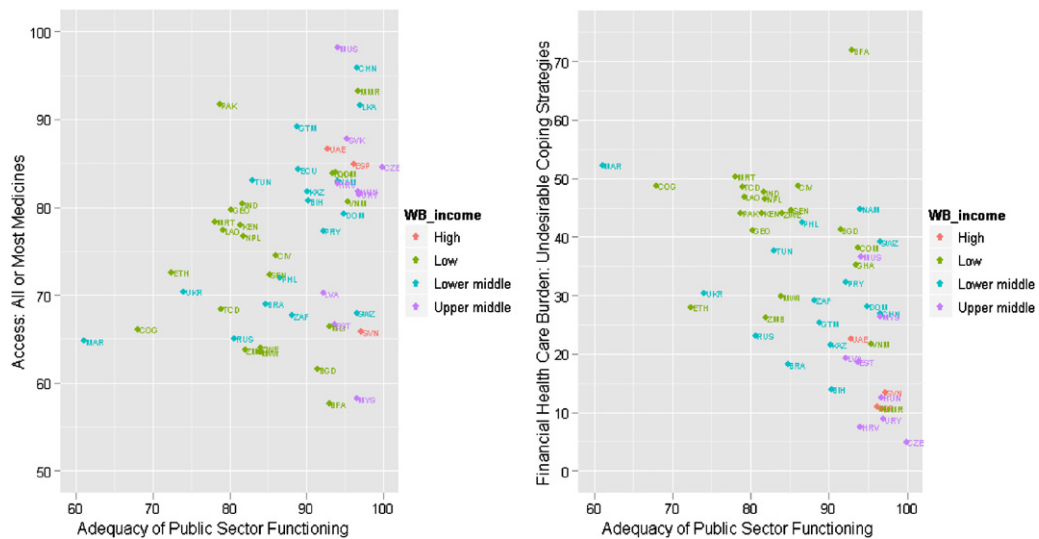
Better-off households had much higher rates of insurance coverage: overall and among the poor, almost 100% of households in the few high income countries with data reported at least some members having insurance coverage, while only 2% of households in low income countries reported some health insurance. Households in higher

income countries also tended to rate public sector functioning and positive experience higher than households in lower income countries.

### 3.2. Relationships of access to care and burden of expenditures with risk protection

We hypothesized that a functioning public sector is related to better health care access and lower burden of expenditures. Fig. 1 suggests that in countries where those who used outpatient care rated provider skill, equipment, and medicines as adequate, a higher proportion of households received all needed medicines (although access to medicines varied widely across countries with high public sector functioning); a lower proportion of households used savings, borrowed, or sold assets to pay for health care. Similar patterns were observed for other access and burden measures and public sector functioning (data available upon request).

We assessed the effect of risk protection through health insurance in multi-variable household-level models across 51 countries that had sufficient data to construct access, burden, and insurance indicators. Generally, households in which members were insured were more likely to have access to care and less likely to be burdened by health care expenditures than households without insurance (Table 3). Perceptions about the adequacy of public sector functioning and positive public sector experience moderated the effect of insurance on access and burden. However, even when the public sector was perceived as adequate, having all household members insured significantly improved the odds of having access to care when last needed (odds ratio 1.54; 95% confidence interval [1.30, 1.83]) and to adult



**Fig. 1.** Access to medicines and burden of health care expenditures by country public sector health sector functioning. *Note:* Based on 2002/2003 WHO World Health Survey data. WB.income = Country World Bank income category; for country abbreviations see reference [6].

chronic care (1.38 [1.31, 1.44]); insurance also decreased the odds of potentially catastrophic health care expenses (0.84 [0.81, 0.88]) and of having to use savings, borrow money, or sell assets to pay for care (0.66 [0.64, 0.68]) (Table 3). The effect of health insurance on medicines access is less clear – a functioning public sector attenuates the positive effect of insurance on medicines access. Regardless of health insurance status, households reported better access to care and medicines and lower expenditure burden in environments where public sector functioning is rated better (Table 3, Fig. 2).

Several household and respondent characteristics were related to access and risk protection. For example, controlling for insurance status and public sector characteristics, adults in households with six or more members were less likely to access care and medicines (0.95 [0.91,

0.99]) and were more likely to pay for care through savings, selling assets, or borrowing money (1.22 [1.19, 1.25]). Similarly, households where the highest education level was less than primary school were less likely than those with higher education levels to access needed care (0.79 [0.70, 0.88]), more likely to have potentially catastrophic health care expenses (1.18 [1.13, 1.22]) and more likely to use undesirable coping strategies (1.11 [1.07, 1.14]). Descriptive statistics and parameter estimates for all variables in the models are available upon request.

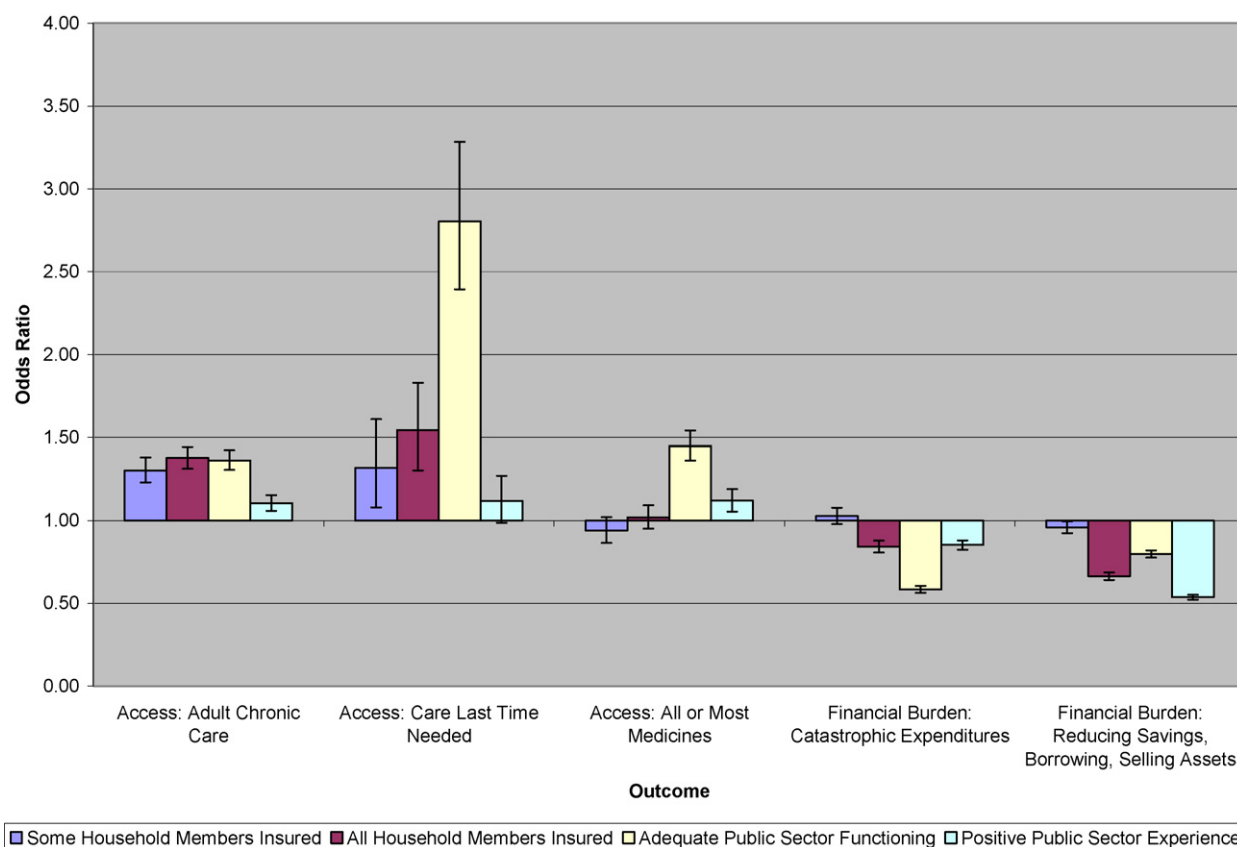
#### 4. Discussion

The results of our analyses of WHS data from 2002 to 2003 indicate that protecting households from high burden of health care costs is associated with better access

**Table 3**  
Risk protection status as a predictor of access to care and burden of care expenditures<sup>a</sup>.

Outcome	Insurance coverage		Public sector functioning adequate	Positive public sector experience
	At least one member insured (vs. none)	All members insured (vs. none)		
Access – care last time needed	1.45 (1.23, 1.70)	2.06 (1.79, 2.36)	–	–
Access – adult chronic care	1.43 (1.36, 1.51)	1.63 (1.57, 1.70)	–	–
Access – all or most medicines	1.11 (1.03, 1.20)	1.27 (1.20, 1.35)	–	–
Burden – potentially catastrophic spending	0.92 (0.88, 0.95)	0.69 (0.67, 0.72)	–	–
Burden – paying with savings, selling assets, borrowing	0.77 (0.74, 0.79)	0.51 (0.49, 0.52)	–	–
Access – care last time needed	1.32 (1.08, 1.61)	1.54 (1.30, 1.83)	2.80 (2.39, 3.28)	1.12 (0.99, 1.27)
Access – adult chronic care	1.30 (1.23, 1.38)	1.38 (1.31, 1.44)	1.36 (1.31, 1.42)	1.10 (1.06, 1.15)
Access – all or most medicines	0.94 (0.86, 1.02)	1.02 (0.95, 1.09)	1.45 (1.36, 1.54)	1.12 (1.05, 1.19)
Burden – potentially catastrophic spending	1.03 (0.98, 1.08)	0.84 (0.81, 0.88)	0.58 (0.56, 0.61)	0.85 (0.82, 0.88)
Burden – paying with savings, selling assets, borrowing	0.96 (0.92, 1.00)	0.66 (0.64, 0.69)	0.80 (0.78, 0.82)	0.54 (0.52, 0.55)

<sup>a</sup> All models control for household size; having a member age 60 years and older or a child under 5 years; highest education of any household member; household poverty; total household expenditures; urban location; respondent gender, age, marital status, education, and health status.



**Fig. 2.** Access to care and medicines, burden of health care expenditure, and risk protection. *Note:* Based on results from multivariate model of 2002/2003 WHO World Health Survey data, including 50 countries and controlling for household size; having a member age 60 years and older or a child under 5 years; highest education of any household member; household poverty; total household expenditures; urban location; respondent gender, age, marital status, education, and health status.

to acute and chronic care for adults and children, less risk of potentially catastrophic health care spending, and less use of coping strategies that further deplete household long-term resources. Our results are less clear with respect to medicines access. Specifically, when all household members are insured, access to acute and chronic care is better and economic burden is lower, even when households rate the functioning of the public sector highly; however, access to medicines is not necessarily improved. Health insurance programs are intended to protect households from burdensome health expenditures by covering all of part of the costs of care. Effects of health insurance coverage on access to care and medicines depend on the type and extent of benefits provided by each program, and the amount of out-of-pocket copayments members incur for services [11]. Unfortunately, this information is not part of the WHS. In many developing countries, health insurance programs do not provide medicines benefits [12] or do so with substantial copayments [13]. Without a broad medicines benefit, insurance coverage may not improve overall access to medicines. In fact, if insurance covers inpatient care and outpatient physician services but not the costs of the medicines prescribed during consultations, insurance coverage may lead to worse access to medicines and to higher financial burden because house-

holds need to pay for prescribed medicines out-of-pocket [14].

While the roles of the public and private sectors in health care delivery in LMIC continue to be debated [15], studies suggest that inaccessibility of public services, poor availability of medicines and equipment, and perceptions of lower quality diagnosis and treatment prompt the high use of more expensive private sector care in LMIC. [15] In particular, households in developing countries purchase most medicines in the private sector, [16] arguably because perceived [17,18] or actual availability and quality of medicines in the public sector are low, [19] fees are high, and waiting causes additional opportunity costs. Our results indicate that positive overall perceptions of public health care service delivery in a country are associated with better access to acute and chronic care for adults and children, better access to medicines, less risk of potentially catastrophic health care spending, and less likely use of negative financial coping strategies.

The present study adds to existing knowledge by shedding light on the relationships between access to care, financial burden of health care costs, and risk protection for households at different levels of poverty in more than 50 countries. Different from previous research, [3,13] the study benefits from the availability of comparable data



on both access to care and household expenditures that allowed construction of key indicators on access and burden across a large number of low and middle income countries.

Nevertheless, the available data pose several limitations. We lack data on the indirect costs of seeking care and medicines, including lost income due to ill health, travel, waiting at health care facilities, or providing care to family members [20]. Our estimates of household health care expenditures are therefore lower than the true costs of health care.

The WHS collected data on health status, health care need, and health care and medicines access for one adult household respondent and the youngest child in the household. We do not have information on health care need and access for all household members and may thus misclassify households with respect to need and access.

Our proxy measures of a functioning public sector are weak. Ideally, we would like external measures of how well the public sector functions, as indicated by the quality of care and medicines provided, how easily and reliably people can access public facilities, how well they are treated, and how much they have to pay for services. In the absence of such indicators, we used as proxy measures of functioning the perceptions of a fraction of respondents in households who used and rated the public sector outpatient care they received in the past year. Although they may misclassify the true status of public sector functioning in many countries, the strength of the overall relationships between these ratings with access and expenditures provides some face validity of these proxy measures.

Due to the nature of large household surveys, the data are cross-sectional and do not allow us to assess the cumulative effects of illness, access to care, and health care spending over time. Understanding the dynamic effects between these and other factors (for example, loss of income due to illness) is particularly important as chronic illness prevalence increases globally.

Lastly, key expenditure data are missing for almost all high income countries and results are thus not representative for this group.

These limitations notwithstanding, the results from the present analyses in more than 50 countries argue for increased attention to protecting households from the economic risks of ill health. If high quality care and medicines were conveniently available at affordable cost for those who can pay, and at no cost for the poor in either public facilities or private facilities contracted by government [15], poor households would experience less out-of-pocket cost burden [19] from medicines.

Our results also provide further evidence for the urgent need to expand health insurance coverage, so that all households can have access to needed care without risking financial hardship. In 2005, WHO member states endorsed universal coverage as a goal of health care financing and a framework exists to support countries in their development and implementation of necessary revenue collection, risk pooling, and purchasing mechanisms [21]. Based on the importance of medicines in treating acute and chronic illnesses, and because of their contribution to

high out-of-pocket health care expenditures, coverage of essential medicines should be an early, key consideration as countries move from user fees to pooled pre-payment mechanisms. Establishing universal coverage of essential medicines is complex. Even in countries with established health insurance systems that cover inpatient care, patients pay out-of-pocket for most medicines [13,22]. The need to pay for outpatient medicines continues to put even insured patients at risk of high financial burden and leads to avoidable high health system costs through overuse of covered hospital care [22].

A preliminary framework exists to guide the expansion of medicines coverage policies in insurance systems in low and middle income countries [23]. Largely based on approaches in developed countries, [11] it suggests combining educational, managerial, financial, and contractual (“active purchasing”) policy approaches to incentivize providers and members in health insurance systems to achieve cost-effective use of medicines. However, little information exists on the effects of specific pharmaceutical benefit policy approaches in low and middle income countries. Countries implementing or expanding health insurance systems need to monitor medicines utilization and evaluate the effects of specific medicines coverage policies on access, use, and affordability of medicines.

## 5. Conclusions

To improve access to care and medicines and decrease economic burden of health care expenditures on households, policy makers should improve affordable provision of quality care, increase health insurance coverage, and expand medicines benefit policies in health insurance systems.

## Role of the funding source

The World Health Organization (WHO), Geneva, developed and collected the data for the WHS and provided country and survey module level data files to the study team and WHO staff provided answers to requests for clarification. WHO was not involved in the design of the study, analysis, and interpretation of the data.

## Disclosure statement

The corresponding author had full access to all data analyzed in the study. All authors confirm that they have no conflicts of interest.

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## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.healthpol.2010.08.004](https://doi.org/10.1016/j.healthpol.2010.08.004).

## References

- [1] Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic spending. *Health Affairs* 2007;4:972–83, doi:10.1377/hlthaff.26.4.972.
- [2] Russell S. Illuminating cases: understanding the economic burden of illness through case study household research. *Health Policy and Planning* 2005;20:277–89, doi:10.1093/heapol/czi035.
- [3] Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. *Lancet* 2003;362:111–7.
- [4] Üstün TB, Chatterji S, Mechbal A, Murray CJL, WHS Collaborating Groups. The World Health Surveys. In: Murray CJL, Evans DB, editors. *Health systems performance assessment: debates, methods, and empiricism*. Geneva: World Health Organization; 2003. p. 797–808.
- [5] World Health Organization. World Health Survey. Geneva: World Health Organization; 2003. <http://www.who.int/healthinfo/survey/en/index.html>; [accessed on 1/2010].
- [6] Electronic data tables by country. URL: [www.whoccpp.org](http://www.whoccpp.org); [accessed on 8/25/2010].
- [7] Xu K. Distribution of health payments and catastrophic expenditures: methodology. Discussion paper EIP/HSF/DP.05.2. Geneva: World Health Organization; 2005.
- [8] Leive A, Xu K. Coping with out-of-pocket health payments: evidence from 15 African countries. *Bulletin of the World Health Organization* 2008;86:849–56.
- [9] Ferguson BD, Tandon A, Gakidou E, Murray CJL. Estimating permanent income using indicator variables. Discussion paper. Evidence and Information Policy Cluster. Geneva: World Health Organization; 2003.
- [10] World Bank country income classification for 2003. <http://siteresources.worldbank.org/INTRGEP2004/Resources/classification.pdf>; [accessed on 1/2010].
- [11] Lu CY, Ross-Degnan D, Soumerai SB, Pearson SA. Interventions designed to improve the quality and efficiency of medication use in managed care: a critical review of the literature—2001–2007. *BMC Health Services Research* 2008;8:75, doi:10.1186/1472-6963-8-75.
- [12] Yip W, Hsiao W. Non-evidence-based policy: how effective is China's new cooperative medical scheme in reducing medical impoverishment? *Social Science and Medicine* 2009;68:201–9, doi:10.1016/j.socscimed.2008.09.066.
- [13] Van Doorslaer E, O'Donnell O, Rannan-Elyia R, Somanathan A, Adhikari SR, Garg CC, et al. Catastrophic payments for health care in Asia. *Health Economics* 2007;16:1159–84, doi:10.1002/hec.1209.
- [14] Wagstaff A, Lindelow M. Can insurance increase financial risk? The curious case of health insurance in China. *Journal of Health Economics* 2008;27:990–1005, doi:10.1016/j.jhealeco.2008.02.002.
- [15] Palmer N, Mills A, Wade H, Gilson L, Schneider H. A new face for private providers in developing countries: what implications for public health? *Bulletin of the World Health Organization* 2002;80:292–7.
- [16] Bennett S, Quick JD, Velásquez G. Public-private roles in the pharmaceutical sector: implications for equitable access and rational drug use. *World Health Organization. Health Economics and Drugs Series* 1997;(5):1–115.
- [17] Uganda Ministry of Health. Access to and use of medicines by households in Uganda. Survey conducted in 2008. <http://apps.who.int/medicinedocs/documents/s16374e/s16374e.pdf>; [accessed on 7/12/2010].
- [18] Patel A, Gauld R, Norris P, Rades T. This body does not want free medicines" South African consumers' perceptions of drug quality. *Health Policy and Planning* 2009;1–9, doi:10.1093/heapol/czp039.
- [19] Cameron A, Ewen M, Ross-Degnan D, Ball D, Laing R. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet* 2009;373:240–9, doi:10.1016/S0140-6736(08)61762-6.
- [20] McIntyre D, Thiede M, Dahlgren G, Whitehead M. What are economic consequences for households of illness and of paying for health care in low- and middle-income country contexts. *Social Science & Medicine* 2006;62:858–65.
- [21] Carrin G, Mathauer I, Xu K, Evans DB. Universal coverage of health services: tailoring its implementation. *Bulletin of the World Health Organization* 2008;86:857–63, doi:10.2471/BLT.07.049387.
- [22] Wagner AK, Valera M, Graves AJ, Laviña S, Ross-Degnan D. Costs of hospital care for hypertension in an insured population without an outpatient medicines benefit: an observational study in the Philippines. *BMC Health Services Research* 2008;8:161, doi:10.1186/1472-6963-8-161.
- [23] Wagner AK, Ross-Degnan D. The potential for insurance systems to increase access to and appropriate use of medicines in Asia-Pacific countries. In: Eggleston K, editor. *Prescribing cultures and pharmaceutical policy in the Asia-Pacific*. Stanford, CA: The Walter H. Shorenstein Asia-Pacific Research Center Press; 2009. p. 313–35.



# THE WORLD MEDICINES SITUATION 2011

## PHARMACOVIGILANCE AND SAFETY OF MEDICINES

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**World Health  
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**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Pharmacovigilance (PV) aims to improve patient safety through the detection, assessment, understanding and prevention of adverse effects and other drug related problems
- PV, as a discipline, has seen tremendous growth over the past decade, but in response to different needs and priorities worldwide. While 'high-burden diseases' have been the focus in some settings, elsewhere this growth has been driven by a demand for transparency and access to information.
- Recent years have seen a trend towards Good Pharmacovigilance Practice (GPP), particularly in industrialized countries to assure standards and innovations in the collection, management, analysis and use of medicine safety information – with patient safety as the ultimate objective.
- Many resource-limited countries will require additional support (technical and financial) to build PV capacity to effective levels.
- Despite 40 years of PV, patients worldwide continue to be affected by preventable harm from medicines. It is important to analyse and learn from these events.
- For PV to be effective there is a need for timely and responsible communication of the available evidence, involving all stakeholders.
- Many new PV initiatives are being undertaken. But it is important that these efforts are not duplicated and that scarce resources are used wisely.

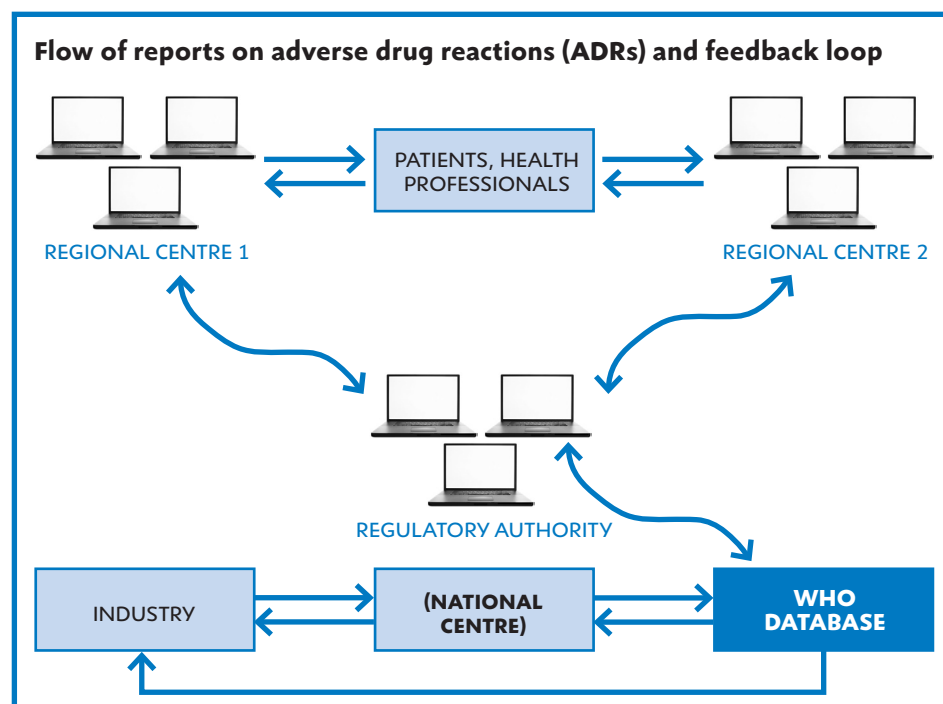
## 1.1

## BACKGROUND/INTRODUCTION

Pharmacovigilance (PV) is defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effects and all other problems related to medicines (1). It is relevant for anyone whose life is touched in any way by medicines. The thalidomide disaster, detected in 1961, initiated the first systematic international efforts to address medicine safety issues at the global level. The Sixteenth World Health Assembly (1963) adopted a resolution (WHA 16.36) that reaffirmed the need for early action in regard to rapid dissemination of information on adverse reactions due to medicines and subsequently led to the creation of the WHO Pilot Research Project for International Drug Monitoring in 1968. The purpose of this was to develop a system, applicable internationally, for detecting previously unknown or poorly understood adverse effects of medicines. The pilot project has later developed into the WHO Programme for International Drug Monitoring. Under this Programme, systems have been developed in Member States for the collection of individual case safety reports (ICSRs) and their evaluation. Health professionals on observing adverse events report these to a regional or national PV centre. The national PV centre (which is usually a part of or closely linked to the national drug regulatory authority (NDRA)) forwards the reports to a central database that is managed and maintained by the WHO Collaborating Centre for International Drug Monitoring, the Uppsala Monitoring Centre (UMC) in Sweden. Figure 1.1 describes this flow of reports on adverse drug reactions (ADRs) from countries to the UMC). In December 2010, there were 136 countries participating in the Programme. The work of the UMC, with policy directives from WHO, serves the important function of contributing to the work of the NDRA's and other relevant stakeholders, by improving the knowledge of safety profiles of medicines.

This chapter traces the growth of PV over the past 40 years. It highlights gaps in PV at national and international levels, identifies trends and the most urgent PV priorities in defined settings, and sets out the broad elements of a PV strategy designed to promote quality health care and assure patient safety.

FIGURE 1.1



## 1.2 CURRENT SITUATION

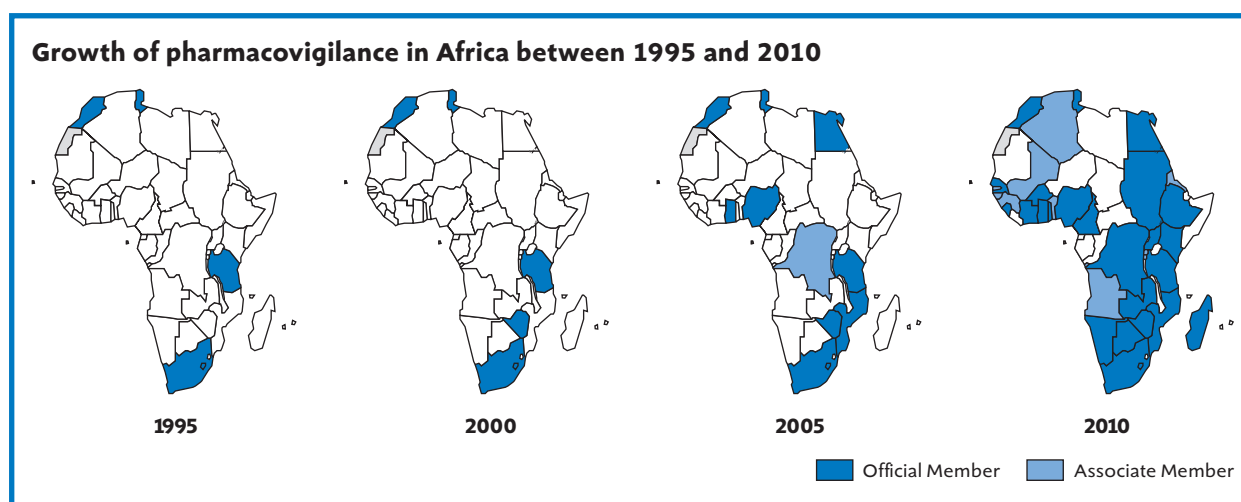
PV has seen tremendous growth over the past 10 years. In Africa, for example, the number of countries with 'good' PV capacity increased from 5 in 2000 to 23 by the end of 2010 (Figure 1.2a, countries in blue). However, the global increase in capacity for PV (Figure 1.2b) has developed for different reasons, to meet different needs, in different parts of the world. While resource constraints and disease demographics, particularly the focus on HIV/AIDS, malaria and tuberculosis, have influenced the growth of PV in developing countries, demand for greater transparency, accountability and access to information has driven PV in the developed world.

### Global overview

*The actual number of individuals experiencing an adverse reaction is difficult to determine because of low and irregular reporting.*

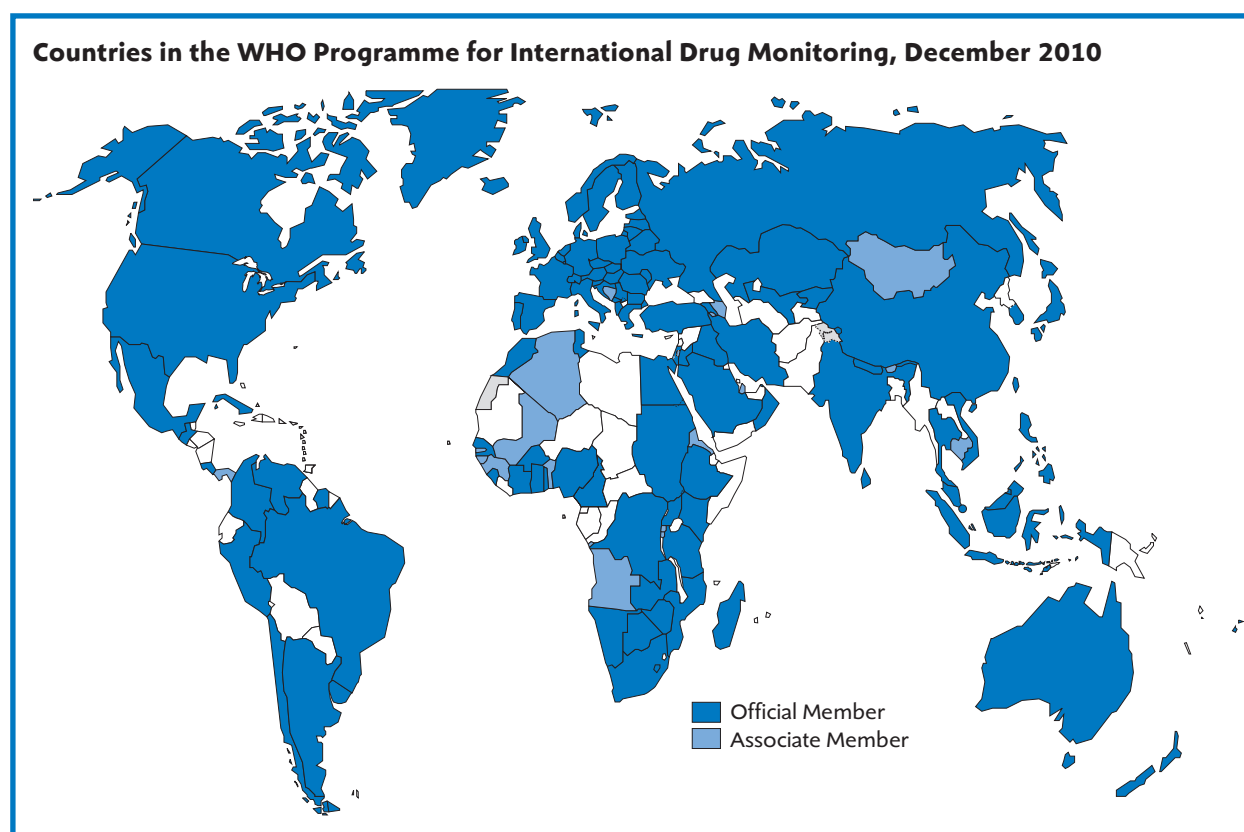
In both developing and developed countries, national PV systems rely heavily on spontaneous reporting systems in which ADRs are reported to an authority by health professionals, manufacturers or directly by patients. Spontaneous reporting systems are the easiest to establish and the cheapest to run and have proven their value in identifying products that need to be recalled from the market (2) and in the early identification of problems (such as the risk of rhabdomyolysis with the statins) that may lead to warnings that something may be amiss (hypothesis generation) (3). However, because of low and irregular reporting, it is difficult to determine the actual number of individuals experiencing an adverse reaction to the medicine. As a result of this uncertainty and lack of information on the number of patients exposed to the medicine in question, it is not possible to estimate rates and frequencies of ADRs through spontaneous reporting. Methods of greater scientific rigour are needed to establish quantitative aspects of medicine safety, to identify specific risk factors and high-risk groups, and to provide valid clinical characteristics of problems associated with specific medicines, both in resource-limited and in well-funded settings.

FIGURE 1.2a



Source: WHO Collaborating Centre for International Drug Monitoring (UMC) (4).

FIGURE 1.2b

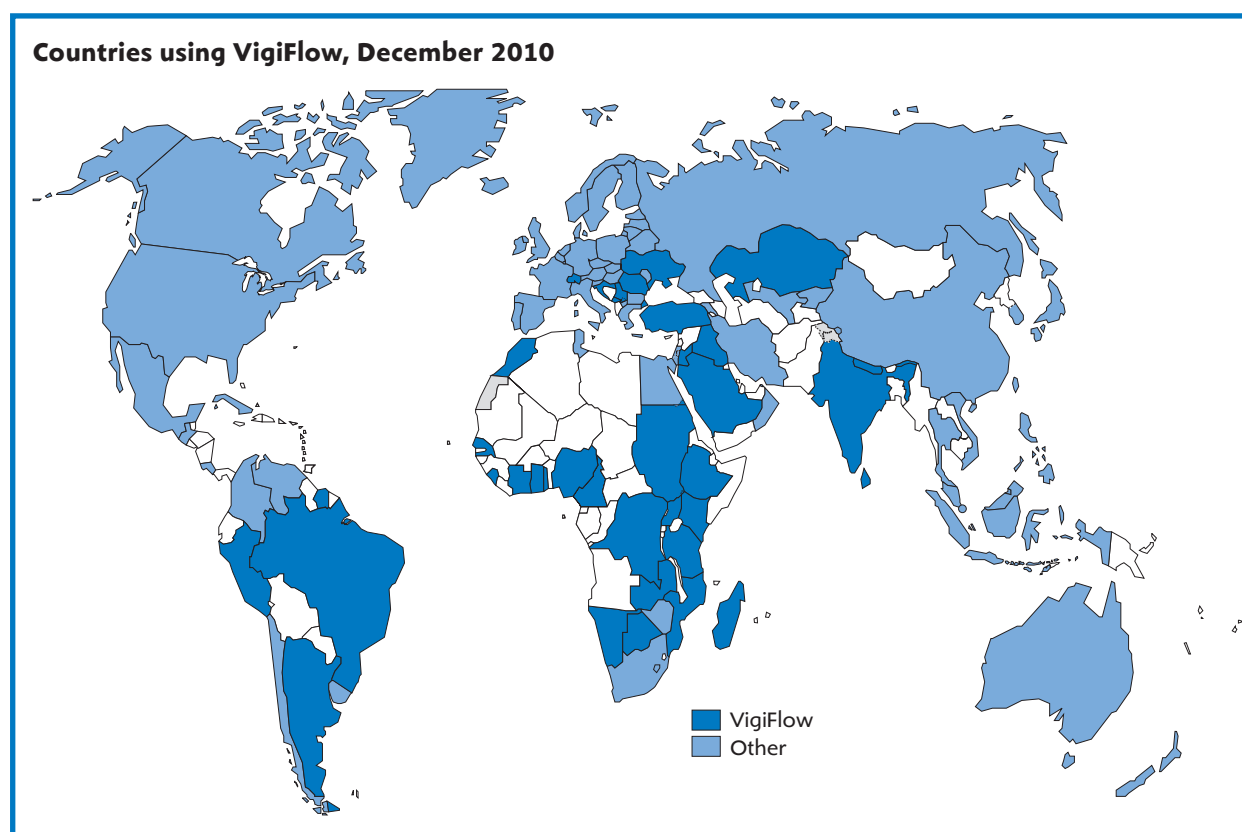


### Norms and standards for pharmacovigilance

Systems are in place to develop and promote the use of global norms and standards (5). While harmonized definitions and terminologies for PV exist (6), additional work is needed to define a broader framework for gathering comparable data, as well as data management systems that facilitate data sharing and usage – not only by clinicians but by *all* stakeholders in PV.

The International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) (7) is a joint initiative involving both regulators and research-based industry representatives of the European Union (EU), Japan and the USA. This harmonization initiative was established in 1990 to help ICH countries move towards the development of a single, seamless market for pharmaceuticals in their region. ICH has developed over 50 harmonized guidelines to assess and ensure the safety, quality and efficacy of medicines. With current trends in global trade and an open market for pharmaceuticals, the ICH standards are becoming global standards that non-ICH countries are also obliged to comply with. A typical example is seen in the development of the WHO ICSR database over the past decade. According to the ICH standards, ICSR databases have to be 'E2B compatible' (i.e. in a compatible format for the electronic transfer of data). As a result, non-ICH countries are requested to 'upgrade' to these standards in order to be fully compatible with the WHO database. In view of this, and to support countries that do not have a data management system of their own, the UMC has developed a data management tool, *VigiFlow™*, which allows a seamless online submission of ICSRs that include all E2B fields. The tool also allows national centres to manage their data locally, thereby obviating the need for additional software for national database management. At the end of 2010

FIGURE 1.3



VigiFlow was being used by 41 countries worldwide (see Figure 1.3). These developments, together with the emphasis on global cooperation, underscore the important role of an inter-governmental organization such as WHO in safeguarding the interest of resource-limited countries in disseminating information and in providing input beyond the ICH regions.

### Highlights of pharmacovigilance in the developed world

*Developed countries have more established data processing networks, management systems, databases, and regulatory oversights for systematic follow up of product safety.*

In Europe, the most significant PV development has been the introduction of EudraVigilance, a data processing network and management system for reporting and evaluating suspected ADRs during the development of and following the marketing authorization of medicinal products in the European Economic Area (EEA) (8). This includes a European PV database and is expected to support European regional PV and regulatory needs. In addition, the European Union recently initiated the European Network of Centres for Pharmacoeconomics and Pharmacovigilance (ENCePP) (9) intended to further strengthen the post-authorization monitoring of medicinal products in Europe by facilitating the conduct of multi-centre *independent post-authorization safety studies* and studies focusing on lack of efficacy.

Several developed countries already maintain patient record databases and provide services that are suitable for outcome research. Examples are the General Practice Research Database (GPRD) (10) and the Prescription Event Monitoring (PEM) (11) scheme in the United Kingdom, and the Medicaid databases in the USA (12). An additional development has been the inclusion of patients as reporting partners in the PV networks in Australia, Canada, the USA, and in some countries in Europe (e.g. Denmark, the Netherlands, Sweden and the United Kingdom).



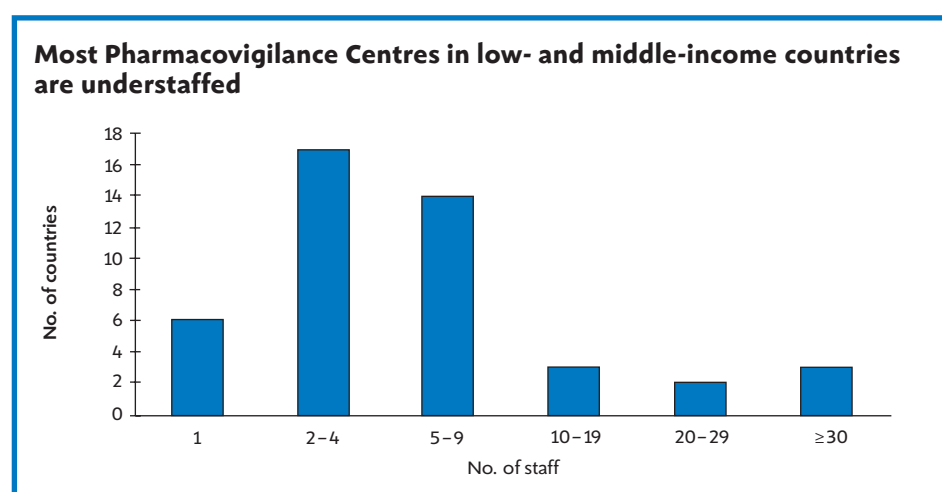
In developed countries, regulatory systems exist for regular and systematic follow-up of product safety. Product sponsors are required to submit Periodic Safety Update Reports to the relevant NDRA (13). In November 2004, the ICH published a new guideline, E2E: Pharmacovigilance Planning. This is intended to provide guidance for planning PV activities, especially in preparation for the early post-marketing period of a new drug. The guideline has been adapted for use in Europe and the USA, and pharmaceutical manufacturers in these countries are now required to provide Risk Management Plans (RMPs) for new medicines in connection with the submission of an application for marketing authorization. The pharmaceutical industry is also encouraged to engage in active PV methods and epidemiological studies, to complement spontaneous reporting. The use of pregnancy registries has increased in recent years as an active method of detecting outcomes of pregnancies in women who have been inadvertently or deliberately exposed to pharmaceuticals during pregnancy. This has been encouraged by the NDRAs as part of the post-authorization monitoring of medicines (14).

### Pharmacovigilance in the developing world

A recent assessment of PV in 55 low- and middle-income countries highlighted important characteristics and gaps in these settings (15). In general, most of the PV centres in developing countries were established after 1990, and most centres are severely understaffed (Figure 1.4) and under-resourced. Recently the PV agenda in these settings has become very much donor-driven, with most efforts going into setting up PV programmes for medicines used in public health programmes, typically for malaria and HIV (Figure 1.5). However, most centres are also involved in other activities such as medicines information, promoting patient safety and rational use of medicines, and in providing information on poisons. Spontaneous reporting is the rule, but there is now interest in the introduction of active surveillance of cohorts of patients in specific disease programmes, as with Cohort Event Monitoring (CEM) (16). Two such programmes supported by WHO are already under way for artemisinin combination therapies (ACTs) in Nigeria (see Box 1.1) and the United Republic of Tanzania (17). Some countries have also established pregnancy exposure registries and sentinel sites that serve to monitor special populations (HIV/AIDS patients, children). The WHO Special Programme for Research and Training in Tropical Diseases (TDR) has

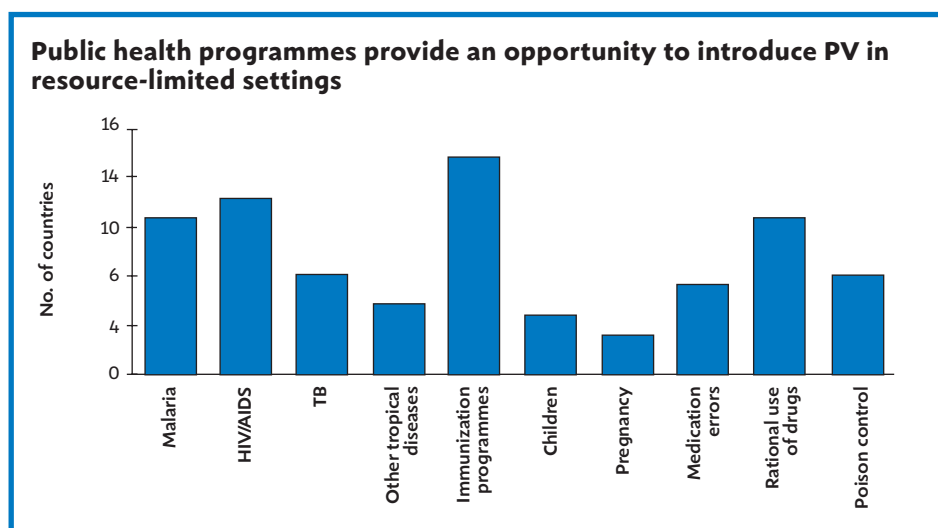
*Growth of PV in low- and middle-income countries has been influenced by a disease focus on HIV/AIDS, malaria, tuberculosis and health programmes on children and mothers.*

FIGURE 1.4



Source: An analysis of pharmacovigilance activities in 55 low- and middle-income countries, Olsson et al, *Drug Safety*, 2010; 33(8): 689–703 (15). (With permission from Adis, a Wolters Kluwer business (©) Adis Data Information BV [2010]. All rights reserved.)

FIGURE 1.5



Source: An analysis of pharmacovigilance activities in 55 low- and middle-income countries, Olsson et al, *Drug Safety*, 2010; 33(8): 689–703 (15). (With permission from Adis, a Wolters Kluwer business (©) Adis Data Information BV [2010]. All rights reserved.)

developed a protocol for setting up registries to monitor the outcomes of pregnancies following early exposure to treatment with pharmaceuticals (e.g. for malaria or HIV/AIDS) in resource-limited settings (18). WHO (TDR and the Department of Making Pregnancy Safer) is assessing the feasibility of setting up pregnancy registries in Africa. However, a major difficulty in these settings is the lack of background data on pregnancy outcomes in a normal or unexposed population. In Zambia, a key resource for this is the Zambian Electronic Perinatal Record System (ZEPRS), a population-based pregnancy registry recording 45 000 deliveries a year at the University Teaching Hospital in Lusaka (19). This system aims to provide basic data on birth weights, birth measurements and general aspects of pregnancy outcomes via electronic records. By including the pregnant population in Zambia, the effects on pregnancy outcomes of ‘external’ influences, including medicines, can be compared against the background occurrence of those effects in the Zambian population. Most of these initiatives are new and their usefulness and impact on PV locally and globally are yet to be ascertained.

## BOX 1.1

### Active surveillance of patients on antimalarial medicines in Nigeria

- The Cohort Event Monitoring Programme (CEM) in Nigeria was set up to monitor patients on artemether-lumefantrine (AL) and artesunate-amodiaquine (AA).
- When completed, CEM will help characterize rates, risk factors and frequencies of adverse events in these patients, and help determine whether medicines are being prescribed rationally.
- A cohort of 2936 (out of 3010 patients treated with either AA or AL) has been followed up so far. A larger cohort (about 10 000 patients) is needed for higher statistical power.
- There is general enthusiasm for this type of surveillance among health professionals, although it is considered as being resource-intensive and with the risk of ‘loss to follow-up’ of treated patients.

Source: Report of the 32nd Annual Meeting of Representatives of National Centres participating in the WHO Programme for International Drug Monitoring, Rabat, Morocco, 2009.

## 1.3

## TRENDS OVER THE PAST 5–10 YEARS

## Drug withdrawals and lessons learnt

*Current issues of concern in drug withdrawals include adequacy of PV methods, capability of the regulatory systems, collection and use of evidence, communication of decisions, transparency and information sharing.*

Recent market withdrawals of medicines with high market penetration (e.g. cerivastatin (20) and rofecoxib (21)), uncertainty about the safety of antidepressants in children and adolescents (22), and the confusion over reports of cardiac events associated with rosiglitazone (23) have intensified questioning about safety issues, both within professional circles and in civil society. Key issues of concern include: the adequacy of current PV methods and the appropriateness of current regulatory systems; the role of regulators, industry and academia in collecting evidence; use of evidence in decision-making; communication of decisions; and, above all, the need for transparency and information sharing. Some regulators have responded to these debates by setting up systems of greater transparency. Providing early public communication of any ongoing safety reviews (24) is one such response. The pharmaceutical industry is required by stringent regulatory agencies to provide full details of risk management plans prior to product approval, with clear PV plans that identify risk, characterize and/or quantify risks and delineate risk minimization activities for the product (25). But these efforts have so far been restricted to the developed world. Nothing has yet been done to adapt these measures in order to ensure patient safety in the developing world. This is a serious gap that needs to be addressed.

## Pharmacovigilance for high-burden diseases

*Fast-track approvals and rapid scale-up of access to new medicines for which little post-marketing experience exists have added to the vulnerability of developing countries in dealing with medicine-related adverse events.*

In the developing world, malaria, HIV/AIDS, tuberculosis and immunization programmes have received a lot of attention as part of the initiatives to achieve the Millennium Development Goals. The Prequalification of Medicines Programme (PQ) (26) and the availability of assured quality generic medicines have dramatically reduced the cost of treatment for these diseases in resource-limited countries. However, these efforts have fallen short in not including plans for any PV component or measures for strengthening regulatory systems. Fast-track approvals and rapid scale-up of access to new medicines with little post-marketing experience have added to the vulnerability of these countries and their inadequacies in dealing with medicine-related emergencies (as with amodiaquine-artesunate combination preparations) (27,28,29,30).

Between 2003 and 2008, access to antiretroviral medicines (ARVs) in low- and middle-income countries rose ten-fold (31). In caring for HIV patients, short- and long-term toxicity data have a critical role in informing treatment choices and decisions around when to substitute or switch drug regimens. Yet very little information is available on ADRs in these settings. The majority of known data on ADRs are derived from cohort studies or clinical trials conducted in North America, Europe and Australia, and based on innovator drug products. It is vital to gather data on ADRs in resource-limited settings, since different populations with different co-morbidities are being treated compared to those in resource-rich countries. These data are essential to inform policy and country or regional treatment guidelines, to provide better information for patient management (32). In recent years there have been more concerted efforts by WHO and other stakeholders to address some of these gaps. In some countries in sub-Saharan Africa, for example, efforts are under way to introduce the principles of active surveillance for the prospective follow-up of patients on HIV treatment, to better characterize the toxicity profile of ARVs in this population (33). Efforts to address the PV needs in the treatment of specific diseases have provided an opportunity to introduce PV systems into PV-naïve countries (34) in this region. As a result, the number of countries in sub-Saharan Africa with functional PV centres has increased substantially

in recent years, from under 10 in 2000 to well over 20 countries by 2010 (Figures 1.2a and 1.2b).

In addition, the components of a Risk Management Plan are being implemented, for at least some products, through PQ. Meanwhile, global health initiatives such as the Global Fund to Fight AIDS Tuberculosis and Malaria (GFATM), the Bill and Melinda Gates Foundation (BMGF) and UNITAID (the International Drug Purchase Facility) are also expressing interest in supporting projects to monitor the safety of medicines that are being brought to the countries through these initiatives. However, these projects will again be limited in their objectives and will not necessarily contribute to building long-term PV systems unless there is a conscious decision to cooperate and align with country needs (35,36).

### Bringing in other stakeholders

*Patients and consumers need to be involved in PV networks.*

One of the reasons why pharmacovigilance systems are not fully functional and effective is that many stakeholder groups do not participate sufficiently in the reporting of ADRs. In most countries, only health professionals are currently encouraged to report ADRs. Yet it has been demonstrated repeatedly that health professionals only forward a small minority of all reports (37,38). Increasingly, therefore, more attention is being given to the collection, recording and analysis of ADRs reported by other stakeholders, including patients and consumer organizations.

Worldwide, some efforts are being made – for example, in Australia, Canada, Denmark, the Netherlands, the Philippines, Sweden, the United Kingdom and the USA – to include consumer organizations in the national PV network. Early results of these efforts indicate that new dimensions of drug-related problems can be identified and described sooner by patients themselves (39,40).

However, if consumer reporting is to be optimized, methodology and best practice must be internationally agreed upon and promoted, so that consumer reporting is harmonized and comparative analysis made possible. Supported by the EU, WHO and the UMC are engaged in a project that aims to strengthen consumer reporting of ADRs through review of existing consumer reporting methods, identification of optimal methods, and training in best practice in consumer reporting of medication-related problems (41).

### Pharmacovigilance and patient safety

The ultimate aim of PV is to improve patient safety. While knowledge of appropriate and safe use of medicines has grown over the years, there remains a considerable gap between knowledge and action. A deeper understanding is needed of factors causing preventable ADRs, to develop methods to mitigate or avoid them, and to evaluate the effectiveness of drug safety efforts aimed at improving patient safety. This involves working with all stakeholders, including the World Alliance for Patient Safety which was established in response to World Health Assembly Resolution 55.18 (42). The UMC has been collaborating with the Alliance on its work related to reporting and learning systems for patient safety (43).

Studies of adverse events in developed countries have consistently shown that safety issues related to the use of medicines are one of the leading causes of preventable harm to patients. But in recent years these issues are being debated also in the developing world (44). A joint project involving WHO and the Moroccan National Pharmacovigilance Centre investigated the possibility of an extended role for PV centres, to capture information on adverse events related to medication errors. A retrospective analysis of ICSRs in the Moroccan database

identified the groups of medications 'most involved' in preventable adverse events (see Table 1.1). The medication errors associated with these preventable adverse events occurred most often at the prescribing and administration stages (45). Capturing comprehensive data (what, how and why) as a source of learning is the basis for identifying areas of change, recommendations and sustainable solutions for minimizing the recurrence of the incident (46). The pilot project is thus an important first step aimed at deepening our understanding of systemic failures responsible for the adverse events relating to drug prescribing, dispensing and administration.

**TABLE 1.1 Medication classes most involved in preventable adverse drug events in Morocco**

Medication class	Percentage
Antibacterials for systemic use	20.6
Analgesics	12.8
Psycholeptics	11.8
Anti-inflammatory and anti-rheumatic products	11.2
Propulsives	5.9

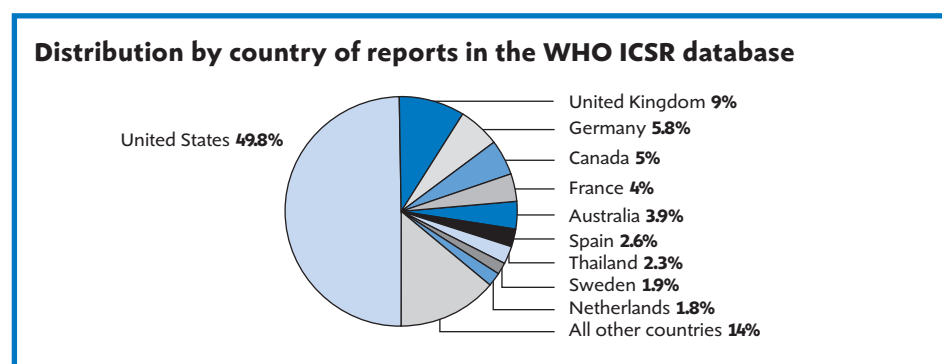
Source: Detecting medication errors in pharmacovigilance database: capacities and limits. Alj L et al., 2007, *International Journal of Risk and Safety in Medicine* (45). (With permission from IOS Press, Amsterdam).

### The WHO global ICSR database

The WHO global ICSR database is situated in the UMC in Sweden. As of December 2010, it contained 5.8 million ICSRs from the 104 full participating members of the WHO Programme for International Drug Monitoring (see Figure 1.6 for distribution of reports by country).

The data are sent by the national PV centres and are regarded as their property, held in trust by WHO. In many cases, the reports submitted to the UMC describe no more than suspicions which have arisen from observation of an unexpected or unwanted event. In most cases, it cannot be established whether a pharmaceutical product or ingredient is the cause of an event. The reports, which are submitted to national PV centres, come from both regulatory and voluntary sources. Some national centres accept reports from medical practitioners only; others accept reports from a wider spectrum of health professionals; and some centres include reports received from pharmaceutical companies and directly from patients in the information submitted to the Collaborating Centre (see Figure 1.1). The volume of reports for a particular pharmaceutical product may be influenced by the extent of use of

**FIGURE 1.6**



Source: UMC, December 2010.

the product, publicity and the nature of the reactions, as well as other factors which may vary over time, from product to product and country to country. Moreover, no information is provided on the number of patients exposed to a particular product. Data can be misinterpreted by those not familiar with these limitations; therefore only national centres have access to the WHO database. However, other stakeholders with a legitimate interest in PV data can request a search of the database.

### Signal detection

The primary function of PV is to provide early warnings ('Signals') of hitherto unknown ADRs. The sources of these Signals include spontaneous reporting systems, prescription event monitoring, case controlled surveillance, record linkages, clinical trials databases and registries. Recent additions to these sources include large comprehensive population databases, such as electronic health-care records, health insurance systems and IMS Health, the world's largest aggregator of prescription data.

Since 1998, an advanced signalling process that uses Bayesian logic (Bayesian Confidence Propagation Neural Network, BCPNN) has been an important development in the data mining of the large amount of information in the WHO ICSR database. The BCPNN and other statistical methods have a high 'early' predictive value and can greatly enhance the traditional signal detection procedures. The methods are useful in detecting both specific drug-adverse reaction signals for individual drugs and in examining complex dependencies in the data set (e.g. one event caused by the interaction of several drugs). However, the usefulness of these methods relies on the amount and quality of the data available (47,48). These methods, therefore, must always be complemented by a clinical review process.

### Substantiation of evidence

Spontaneous reporting systems and ICSRs were the mainstay of PV in the early 1960s, in view of the need for early detection of serious and unexpected effects of new drugs at the time. But it is important to consider that spontaneous reporting has been designed as a system for 'hypothesis' generation. Further study, using other methods, are needed to test the hypothesis (49). Additionally, from an epidemiological aspect, ICSRs are sometimes considered insufficient to prove a relationship between a drug and an adverse event. Drawbacks include reporter bias, drug use factors and the lack of quantification of numerator and denominator. Other data sources besides ICSRs are needed to provide the missing information. In many ICH countries, large health-care databases have been used to perform observational studies. Today in developed countries there is a move towards proactive risk management throughout the lifecycle of a medicine, including substantiation of evidence in terms of quantification of harm, relative risk assessment to yield evidence for appropriate treatment strategies, and identification of risk factors.

*In developed countries, there is a move towards proactive risk management throughout the lifecycle of medicines.*

### Post-authorization safety studies (PASS)

In the current European regulatory system, substantiation of evidence is mainly the responsibility of the holder of the marketing authorization. At the time of approval, proposals for post-authorization safety studies (PASS) to further assess safety concerns should be submitted to regulatory authorities. However, evaluation of the first cohort of RMPs indicated that information in approximately two out of five study proposals for PASS was too limited, precluding an adequate scientific assessment (50).



## Non-sponsor studies

Several initiatives such as the ENCePP and the Sentinel Initiative of the US Food and Drug Administration (FDA) indicate a shift towards sponsor-independent studies.

## Population databases, registries, international cohorts and data linkages

Biopharmaceuticals, i.e. products where the active substance is produced by or extracted from a biological source, represent a growing part of the therapeutic arsenal. In recent years the EU has approved a number of 'biosimilars' (e.g. somatotropin, epoetin). The primary safety concern with products of this type is immunogenicity (51). Existing large population-based databases, often based on general practitioners and community pharmacy data, include limited data on biopharmaceuticals as these medicines are often used in specialized (hospital) settings or directly delivered to the patient (52). Much better cooperation between all stakeholders is therefore needed to fully understand and address the PV challenges posed by biosimilars (53).

Quality PV data can also be obtained from sources such as disease and exposure registries (see previous section: PV in the developing world). Good examples of pregnancy registers exist in the Nordic countries (54), and there are some well-established registries in the field of rheumatoid arthritis (55). However, potential problems with registries include the willingness of patients and health professionals to participate, and the expense and time involved in setting up a registry.

There is also a move to integrate databases of 'treatments versus events' across countries (e.g. the Data Collection on Adverse Events of Anti-HIV Drugs (DAD) study and the International Epidemiological Databases to Evaluate AIDS (IeDEA) databases), case control assessment, drug utilization data, electronic health records, and spontaneous reporting for the substantiation of PV evidence. But as these synergies evolve, new barriers such as privacy issues, medical ethics, governance and data access will inevitably emerge.

## Using pharmacovigilance information

### Regulatory and policy aspects

Once a safety issue has been identified and validated it must be communicated to the NDRAs for appropriate action. In developed countries, data collected in PV systems are most commonly used for drug regulatory activities such as updating the product information or suspending or withdrawing a product from the market. But this is not the case in many developing countries (Table 1.2), presumably because the information received is considered inadequate to trigger or support regulatory decisions. A majority of these countries share PV information with public health programmes, drug information centres and health professionals/Drug and Therapeutics Committees (DTCs). Pharmacovigilance information is less commonly used as a background when elaborating Essential Medicines Lists, therapeutic guidelines or in providing information to the public.

### Patient care and case management

Health professionals need much more support and information than is available in Summaries of Product Characteristics (SPCs) in order to prevent, diagnose and manage the relatively rare ADRs. The information needs to be up-to-date, well-collated, analysed, and validated and presented in a system that is easy to navigate and process. The Cochrane Collaboration



**TABLE 1.2 Number of countries carrying out regulatory actions in 2007 on the basis of pharmacovigilance activities in own country**

Action taken	No. of countries taking action	No. of times action taken		
		once or twice	three or more times	not stated
Safety warnings	24	13	9	2
Changes of product information	21	8	7	6
Suspension/withdrawal of drug product licence	20	7	7	6
None of the above	15			

Source: An analysis of pharmacovigilance activities in 55 low- and middle-income countries, Olsson S et al., *Drug Safety*, 2010, *Drug Safety*, 2010, 33(8):689–703 (15). (With permission from Adis, a Wolters Kluwer business (©) Adis Data Information BV [2010]. All rights reserved.)

assembles proven clinical trial information on specified areas, but it is not comprehensive, excluding other information such as ICSRs. The National Institute for Health and Clinical Excellence (NICE), UK, and others also provide therapeutic guidance, taking into account efficacy, safety and cost. While these and many other databases are good resources, it is not easy for a busy health professional to readily access all of them when required. The Health on the Net Foundation ([www.hon.ch](http://www.hon.ch)) does provide a useful model for what could be the way forward in giving access to a variety of web sites that meet established standards. The Foundation's web site provides easy access to scientific information (such as MEDLINE) as well as information from meetings and discussion groups. But these web sites would probably be more useful if they included practical advice and answers to frequently asked questions. Overall, it is clear that drug safety issues are rarely put into context alongside issues such as effectiveness (or cost). Although some studies have done so, these require time-consuming searches to access them, via MEDLINE or Google.

### Communication in pharmacovigilance

Effective communication is essential in any PV endeavour. Effective communication helps overcome scares related to rumours and half-truths (56), especially in public health programmes, and provides redress and reassurance against poorly communicated scientific facts (57). The Erice Declaration of 1997 (58) and Erice Manifesto of 2006 (59), developed by experts in collaboration with the UMC and other partners, provide guiding principles for effective communication between and among various stakeholders, including 'pharmacovigilantes', regulators, health professionals, academia, the scientific community and the general public. Because PV is a continuous risk-benefit assessment, and because perception of risk will be very different across the different stakeholders, the communication of risk-benefit assessment is a huge challenge that involves presenting understandable, coherent information in a responsible way. The controversies around the withdrawal of rofecoxib (60) and reports of psychosis with SSRIs (61) highlight the current need for effective, timely and transparent sharing of medicine safety information. Regulators and manufacturers have access to raw data in order to perform risk-benefit assessments (62). However, NGOs do not have similar access. The lack of availability of information in pre-marketing dossiers and the existence of unpublished studies have led to distrust among health professionals and consumers, both towards industry and regulators (56,57). In aiming for a more 'informed' global partnership, WHO operates the Information Exchange system (63) for bridging the

information gap between the developed and the developing world. WHO and its Member States will need to work together, and with all the relevant stakeholders, to develop optimum standards and strategies for communicating medicine safety issues.

#### 1.4

#### FUTURE CHALLENGES AND ISSUES

*The role of an international organization such as WHO is essential to coordinate and promote best practices in PV.*

Although PV originated in the 1960s and is now firmly established in industrialized countries, it is still a new concept in many low- and middle-income countries. Current interest from global health initiatives (such as GFATM, USAID and BMGF), particularly in public health programmes, are providing opportunities to introduce the basic principles of PV in resource-limited settings. However, these must be appropriately aligned to country needs and capacities if they are to have a long-term impact. For example, before a pharmaceutical industry can be expected to meet its PV obligations, there needs to be a well organized and competent regulatory system in place. Future challenges will include guarding against the creation of parallel systems that duplicate efforts, and of structures that add to the burden of already fragile health systems and waste precious resources or, worse, are so diverse that they make meaningful collation impossible. In this environment the presence of an international organization such as WHO is essential to coordinate and promote best practices in PV.

There is sufficient evidence to suggest that patients and consumers are important partners for PV. There is a need to make information more accessible and available to the public even while protecting the confidentiality of the individual patient. The scope of PV needs to be expanded and the link between PV and patient safety needs to be a lot more tangible – underscoring the fact that current efforts in drug safety monitoring have the ultimate objective of protecting patients from avoidable harm from medicines.

Although traditionally PV centres have focused on ‘capturing’ events related to the intrinsic nature of a medicine, centres are now increasingly capturing all kinds of drug-related problems including: unexpected lack of efficacy; quality defects; drug abuse; medication errors; interactions with traditional and herbal medicines; and poisoning events that are not necessarily related to the intrinsic nature of the medicines. A comprehensive PV strategy for a country will be one that ensures reasonable economies of scope, that is, one that helps build a system that can serve the PV needs of multiple health conditions, a system that can meet a country’s specific needs. It must identify and elaborate feasible systems, governance, infrastructures, human resources, training and capacity building, sustainable methodologies and innovations. A key component of this should be the dissemination of medicines safety information to policy-makers and regulators and knowledge sharing through accessible, quality informatics and learning tools.

## REFERENCES

1. *The importance of pharmacovigilance. Safety monitoring of medicinal products*. Geneva, World Health Organization, 2002. Available at: <http://apps.who.int/medicinedocs/pdf/s4893e/s4893e.pdf> (accessed 18 May 2011).
2. Clarke A, Deeks JJ, Shakir SA. An assessment of the publicly disseminated evidence of safety used in decisions to withdraw medicinal products from the UK and US markets. *Drug Safety*, 2006, 29(2):175–81.
3. Härmark L, van Grootheest AC. Pharmacovigilance: methods, recent developments and future perspectives. *European Journal of Clinical Pharmacology*, 2008, 64(8):743–52.
4. WHO Programme Members: Countries participating in the WHO Programme for International Drug Monitoring, with year of joining. The Uppsala Monitoring Centre. Available at: <http://www.who-umc.org> (accessed 18 May 2011).
5. WHO Medicines publications and documentation database. Available at: <http://apps.who.int/medicinedocs/en/q/> (accessed 18 May 2011).
6. Web site of Medical Dictionary for Regulatory Activities Maintenance and Support Services Organization (MedDRA MSSO) <http://www.meddramsso.com> (accessed 18 May 2011).
7. Web site of the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) <http://www.ich.org> (accessed 18 May 2011).
8. Web site of EudraVigilance. <http://eudravigilance.ema.europa.eu> (accessed 18 May 2011).
9. Web site of the European Network for Centres of Pharmacoepidemiology and Pharmacovigilance (ENCEPP). <http://www.encepp.eu/> (accessed 18 May 2011).
10. Gelfand JM, Margolis DJ, Dattani H. The UK General Practice Research Database. In: Strom BL (Ed). *Pharmacoepidemiology*, 4th ed. Chichester, John Wiley & Sons, 2005: 337–346.
11. Shakir SAW. Prescription-Event Monitoring. In: Strom BL (Ed). *Pharmacoepidemiology*, 4th ed. Chichester, John Wiley & Sons, 2005: 203–216.
12. Henessy S et al. Medicaid Databases. In: Strom BL (Ed). *Pharmacoepidemiology*, 4th ed. Chichester, John Wiley & Sons, 2005: 281–294.
13. *Volume 9a of the rules governing medicinal products in the European Union - guidelines for pharmacovigilance of medicinal products for human use*. Brussels, European Commission, 2008. Available at: [http://ec.europa.eu/health/documents/eudralex/vol-9/index\\_en.htm](http://ec.europa.eu/health/documents/eudralex/vol-9/index_en.htm) (accessed 18 May 2011).
14. *Guidance for industry: establishing pregnancy exposure registries*. Rockville, Food and Drug Administration, 2002. Available at: <http://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM071639.pdf> (accessed 18 May 2011).
15. Olsson S et al. An analysis of pharmacovigilance activities in 55 low and middle income countries. *Drug Safety*, 2010, 33(8):689–703.
16. *A practical handbook on the pharmacovigilance of antimalarial medicines*. Geneva, World Health Organization, 2008. Available at: <http://apps.who.int/medicinedocs/documents/s16881e/s16881e.pdf> (accessed 18 May 2011).

17. Pal SN et al. Cohort event monitoring: A WHO strategy to complement spontaneous reporting systems (abstract). *Drug Safety*, 2010, 33:939.
18. *Pharmacovigilance guidance for countries participating in AMFm Phase I*. WHO-MMV joint consultation on active pharmacovigilance monitoring with a special focus on AMFm. Geneva, World Health Organization, 2009. Available at: <http://apps.who.int/medicinedocs/documents/s18427en/s18427en.pdf> (accessed 18 May 2011).
19. *Assessment of the safety of artemisinin compounds in pregnancy. Report of two joint informal consultations convened in 2006*. Geneva, World Health Organization on behalf of the Special Programme for Research & Training in Tropical Diseases, 2007. Available at: [apps.who.int/tdr/publications/tdr-research-publications/artemisinin-compounds-pregnancy/pdf/artemisinin-compounds-pregnancy.pdf](http://apps.who.int/tdr/publications/tdr-research-publications/artemisinin-compounds-pregnancy/pdf/artemisinin-compounds-pregnancy.pdf) (accessed 18 May 2011).
20. *Voluntary withdrawal of cerivastatin - reports of rhabdomyolysis*. Geneva, World Health Organization, 2001. Available at: <http://www.who.int/medicines/publications/drugalerts/DrugAlert102.pdf> (accessed 18 May 2011).
21. *WHO Pharmaceuticals Newsletter*, 2004, No. 5:7-8 Available at: [http://www.who.int/medicines/publications/newsletter/en/news2004\\_5.pdf](http://www.who.int/medicines/publications/newsletter/en/news2004_5.pdf) (accessed 18 May 2011).
22. *WHO Pharmaceuticals Newsletter*, 2004, No. 4:4. [http://www.who.int/medicines/publications/newsletter/en/news2004\\_4.pdf](http://www.who.int/medicines/publications/newsletter/en/news2004_4.pdf) (accessed 18 May 2011).
23. *WHO Pharmaceuticals Newsletter*, 2008, No. 1:3-4. <http://www.who.int/medicines/publications/newsletter/2008news1.pdf> (accessed 18 May 2011).
24. *Early communications about ongoing safety reviews*. The US Food and Drug Administration. Available at: <http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/DrugSafetyInformationforHeathcareProfessionals/ucm070256.htm> (accessed 18 May 2011).
25. *ICH Harmonised Tripartite Guideline: pharmacovigilance planning (E2E)*. International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use, 2004. Available at: <http://www.ich.org/products/guidelines/efficacy/efficacy-single/article/pharmacovigilance-planning.html> (accessed 18 May 2011).
26. *Prequalification of Medicines Programme* web site. World Health Organization. Available at: <http://apps.who.int/prequal/> (accessed 18 May 2011).
27. *The new anti malaria drug policy for Ghana*. World Health Organization. Available at: <http://www.who.int/countries/gha/news/2006/anti.malaria.drug.policy/en/> (accessed 18 May 2011).
28. Doodoo A, Appiah-Danquah D. Withdrawal of artesunate-amodiaquine brands: questions over regulation. *Daily Graphic*, Ghana, 21 December 2005:7.
29. Yeboah EK. Stop sale - Ministry orders withdrawal of two brands of new malarial drugs. *Daily Graphic*, Ghana, 17 December 2005:1.
30. Hatsu IE, Asiamah F. New malaria drug backfires. *Public Agenda*, Ghana, 16 December 2005.
31. *Towards universal access: Scaling up priority HIV/AIDS interventions in the health sector - Progress Report 2009*. Geneva, World Health Organization, UNAIDS and UNICEF, 2009. Available at: [http://www.who.int/hiv/pub/tuapr\\_2009\\_en.pdf](http://www.who.int/hiv/pub/tuapr_2009_en.pdf) (accessed 18 May 2011).

32. ARV drugs adverse events, case definition, grading, laboratory diagnosis and treatment monitoring. WHO/Forum for Collaborative HIV Research joint meeting background report. Forum for Collaborative HIV Research, 2008. Available at: [http://www.hivforum.org/storage/hivforum/documents/ARVDrugs/background\\_doc.pdf](http://www.hivforum.org/storage/hivforum/documents/ARVDrugs/background_doc.pdf) (accessed 18 May 2011).
33. *A practical handbook on the pharmacovigilance of antiretroviral medicines*. Geneva, World Health Organization, 2009. Available at: <http://apps.who.int/medicinedocs/documents/s16882e/s16882e.pdf> (accessed 18 May 2011).
34. *The safety of medicines in public health programmes: pharmacovigilance an essential tool*. Geneva, World Health Organization, 2006. Available at: [http://www.who.int/medicines/areas/quality\\_safety/safety\\_efficacy/Pharmacovigilance\\_B.pdf](http://www.who.int/medicines/areas/quality_safety/safety_efficacy/Pharmacovigilance_B.pdf) (accessed 18 May 2011).
35. Who runs global health? Editorial. *Lancet*, 2009, 373:2083.
36. Samb B et al. An assessment of interactions between global health initiatives and country health systems. *Lancet*, 2009, 373: 2137–2169.
37. Williams D, Freely J. Underreporting of adverse drug reactions: attitudes of Irish doctors. *Irish Journal of Medical Science*, 1999, 168(4):257–61.
38. Hazell L, Shakir SA. Under-reporting of adverse drug reactions: a systematic review. *Drug Safety*, 2006, 29:385–396.
39. Medawar C, Herxheimer A. A comparison of adverse drug reactions from professionals and users relating to risk of dependence and suicidal behaviour with paroxetine. Patients reporting new signals. *International Journal of Risk & Safety in Medicine*, 2003, 15:5–19.
40. Egberts TC et al. Can adverse reactions be detected earlier? A comparison of reports by patients and professionals. *British Medical Journal*, 1996, 313: 530–531.
41. Web site of the Monitoring Medicines project. <http://www.monitoringmedicines.org> (accessed 18 May 2011).
42. Resolution WHA55.18. Quality of care: patient safety. Geneva, World Health Organization, 2002. Available at: [http://apps.who.int/gb/archive/pdf\\_files/WHA55/ewha5518.pdf](http://apps.who.int/gb/archive/pdf_files/WHA55/ewha5518.pdf) (accessed 18 May 2011).
43. *WHO draft guidelines for adverse event reporting and learning systems. From information to action*. Geneva, World Health Organization, 2005. Available at: [http://www.who.int/patientsafety/events/05/Reporting\\_Guidelines.pdf](http://www.who.int/patientsafety/events/05/Reporting_Guidelines.pdf) (accessed 18 May 2011).
44. Benkirane R et al. Prevalence and preventability of adverse drug events in a teaching hospital: a cross-sectional study. *Eastern Mediterranean Health Journal*, 2009, 15(5):1145–1155.
45. Alj L et al. Detecting medication errors in pharmacovigilance database: capacities and limits. *International Journal of Risk & Safety in Medicine*, 2007, 19:187–194.
46. *Canadian root cause analysis framework – A tool for identifying and addressing the root causes of critical incidents in healthcare*. Edmonton, Alberta, Canadian Patient Safety Institute, 2006. Available at: <http://www.patientsafetyinstitute.ca/English/toolsResources/healthcareProfessionals/Documents/March%202006%20RCA%20Workbook.pdf> (accessed 18 May 2011).

47. Lindquist M et al. A retrospective evaluation of a data mining approach to aid finding new adverse reaction signals in the WHO International Database. *Drug Safety*, 2000, 23(6):533–542.
48. Bate A et al. A data mining approach for signal detection and analysis. *Drug Safety*, 2002, 25(6):393–397.
49. Harrison-Woolrych M. Who will fund hypothesis testing studies? *British Medical Journal*, 2006, 332(7542):666–667.
50. Giezen TJ et al. Evaluation of post-authorization safety studies in the first cohort of EU risk management plans at time of regulatory approval. *Drug Safety*, 2009; 32(12):1175–1187.
51. Casadevall N et al. Pure red-cell aplasia and antierythropoietin antibodies in patients treated with recombinant erythropoietin. *New England Journal of Medicine*, 2002, 346(7):469–475.
52. Giezen TJ, Mantel-Teeuwisse AK, Leufkens HG. Pharmacovigilance of Biopharmaceuticals. Challenges Remain. *Drug Safety*, 2009; 32(10):811–817.
53. Rågo L. Biosimilar medicines and safety: new challenges for pharmacovigilance. *International Journal of Risk & Safety in Medicine*, 2009, 21:5–11.
54. Gissler M, Louhiala P, Hemminki E. Nordic medical birth registers in epidemiological research. *European Journal of Epidemiology*, 1997, 13(2):169–75.
55. Kremer JM, Gibofsky A, Greenberg JD. The role of drug and disease registries in rheumatic disease epidemiology. *Current Opinion in Rheumatology*, 2008, 20(2):123–130.
56. Time to act to avoid drug-safety scares. Editorial. *Lancet*, 1997, 350(9084):1041.
57. Dodoo A et al. When rumours derail a mass deworming exercise. *Lancet*, 2007, 370(9586):465–466.
58. *Effective communications in pharmacovigilance - the ERICE report*. Uppsala, the Uppsala Monitoring Centre, 1998.
59. The Erice Manifesto: for global reform of the safety of medicines in patient care. *Drug Safety*, 2007, 30(3):187–90.
60. Krumholz HM et al. What have we learnt from Vioxx? *British Medical Journal*, 2007, 334:120–123.
61. Kauffman JM. Selective Serotonin Reuptake Inhibitor (SSRI) drugs: more risks than benefits? *Journal of American Physicians and Surgeons*, 2009, 14(1). Available at: <http://www.jpands.org/jpands1401.htm> (accessed 18 May 2011).
62. *Benefit-risk balance for marketed drugs: evaluating safety signals. Report of CIOMS Working Group IV*. Geneva, Council for International Organizations of Medical Sciences, 1998. Available at: <http://www.cioms.ch/publications/g4-benefit-risk.pdf> (accessed 18 May 2011).
63. WHO Drug Alerts. Available at: <http://www.who.int/medicines/publications/drugalerts/en/index.html> (accessed 18 May 2011).



**ABBREVIATIONS**

AA	Artesunate-amodiaquine
ACT	Artemisinin combination therapies
ADR	Adverse drug reaction
AL	Artemether-lumefantrine
ARVs	Antiretroviral medicines
BCPNN	Bayesian Confidence Propagation Neural Network
CEM	Cohort Event Monitoring
CIOMS	Council for Organizations of Medical Sciences
DAD	Data Collection on Adverse Events of Anti-HIV Drugs
DTC	Drug and Therapeutics Committee
EEA	European Economic Area
ENCePP	European Network of Centres for Pharmacoepidemiology and Pharmacovigilance
EU	European Union
FDA	US Food and Drug Administration
GPP	Good Pharmacovigilance Practice
GPRD	General Practice Research Database
ICH	International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use
ICSR	Individual case safety report
NDRA	National Drug Regulatory Authority
NICE	National Institute for Health and Clinical Excellence
PASS	Post-authorization safety studies
PEM	Prescription event monitoring
PQ	Prequalification of Medicines Programme
PV	Pharmacovigilance
RMP	Risk Management Plan
SPC	Summary of Product Characteristics
SSRI	Selective serotonin reuptake inhibitor
TDR	WHO Special Programme for Research and Training in Tropical Diseases
UMC	Uppsala Monitoring Centre
UNITAID	International Drug Purchase Facility
ZEPRS	Zambian Electronic Perinatal Record System







# THE WORLD MEDICINES SITUATION 2011

## SELECTION OF ESSENTIAL MEDICINES

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Essential medicines are those that satisfy the priority health-care needs of the population. Essential medicines lists (EMLs) support the systematic delivery of medicines in the health-care system.
- The selection process of the WHO Model List of Essential Medicines has evolved since 1977 from expert evaluation to evidence-based selection that includes: systematic review of evidence of efficacy and safety; consideration of public health needs, availability and costs; and a transparent process.
- The Model List and its supporting documents serve as a valuable resource for advocacy, selection, purchasing and supply at the country level.
- In 2007, at least 134 countries had a national EML and the majority had been updated in the previous five years.
- The Model List has been expanded to include the WHO Model List of Essential Medicines List for Children (EMLc), to address the priority health-care needs of children.
- In the future, countries will face challenges in selecting high-cost medicines for oncology, orphan diseases and other conditions.

## 1.1

## BACKGROUND

*Essential Medicines  
Lists have been one  
of the cornerstones of  
ensuring consistent  
medicine supply and  
management*

Since 2002, essential medicines have been defined as “those that satisfy the priority health-care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford. The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations; exactly which medicines are regarded as essential remains a national responsibility.” (1) This definition has evolved from the first definition in 1977, which was adopted in the Alma-Ata Declaration of 1978 (2). The key change has been in the process of selection from an expert-based approach to one that is evidence-based.

An essential medicines list (EML) is a limited number of carefully selected medicines. For many decades, such lists have been published as formularies and institutional lists of medicines that are made available to health facilities and health workers. These may not be called EMLs but they serve the same function. EMLs have been one of the cornerstones of public health delivery and the basis for efforts to ensure consistent medicine supply and management. The EML is an important strategy in improving access to and use of medicines, especially for the vulnerable segment of a population. Furthermore, an EML can be used as an advocacy tool to help countries spend their limited resources on the medicines that are most needed and offer the best value for money.

**The development of the WHO Model List.** Since 1977, WHO has produced a Model List of Essential Medicines which is revised every two years by the WHO Expert Committee on the Selection and Use of Essential Medicines. The aim of the Committee is to provide countries with a model list and a model process for drawing up their national list. Expert Committee members have particular expertise in clinical pharmacology, pharmacy, public health and evidence-based medicine.

The evolution of the WHO Model List and its relevance to countries has been reviewed at different points in time by Howard and Laing in 1991, and by Laing et al. in 2003 (3,4). From 1999 onwards, the selection process for medicines in the Model List evolved from expert evaluation to an evidence-based approach (5-8). Annex 1 summarizes the changes in the selection process.

The Model List consists of a core list and a complementary list. The core list includes the medicines needed for a basic health-care system, listing the most efficacious, safe and cost-effective medicines for priority diseases and conditions. The complementary list presents essential medicines for priority diseases which are effective and safe, but for which specialized health-care facilities or experience may be needed.

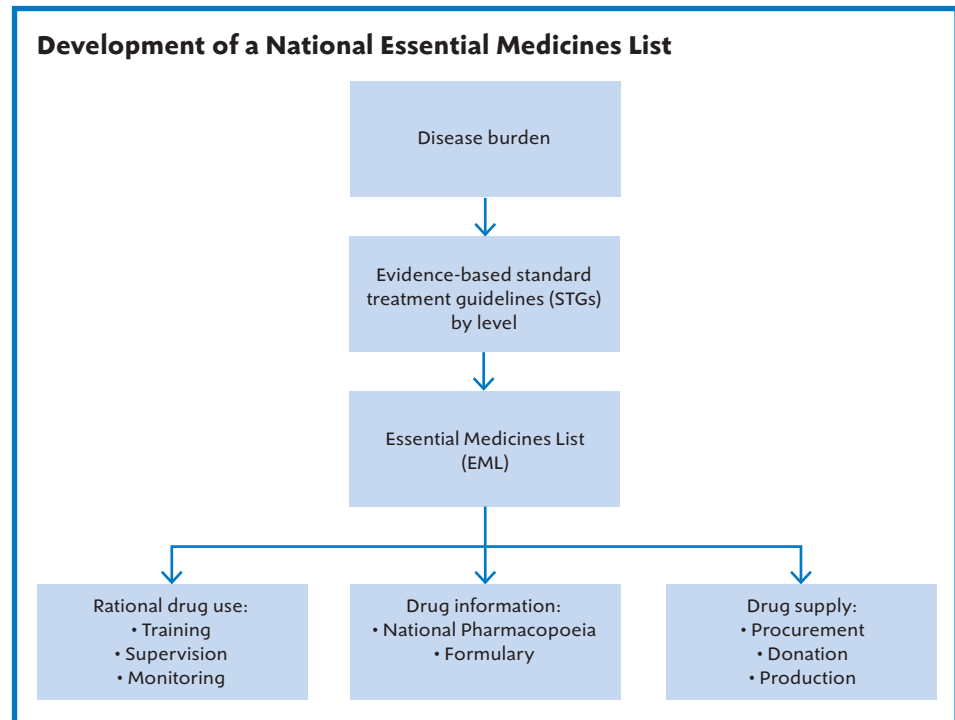
One of the ways in which the Model List provides flexibility for countries creating their own EML is the use of the square box symbol. The square box indicates that a listed medicine should be seen as a representative example from a group of clinically equivalent medicines (within a pharmacological class). The medicine listed on the Model List is intended to be the product for which there is the most clinical evidence within the group, but national lists countries could select for other medicines from the class depending on local availability and/or costs.

**The use of standard treatment guidelines (STGs) in developing a national EML.**

Figure 1.1 shows how the medicines for an EML should ideally be selected. The first step is to identify the most common health problems in a country. Evidence-based standard treatment

FIGURE 1.1

*The process of selecting the essential medicines and developing the national EML should always be consistent and coincide with the development of STGs.*



guidelines (STGs) should be systematically developed to assist prescribers in deciding on appropriate treatments for specific clinical problems. STGs will indicate the first treatment of choice. STGs also usually include diagnostic criteria for starting treatment or for choosing an alternative therapy. Medicines that are recommended in the national STGs should also then be listed in the country EML. This process ensures that the EML is consistent with the STGs. In practice, however, both in WHO and at country level it can be difficult to ensure that the development of guidelines and definition of EMLs coincide. The flow chart above demonstrates the ideal approach that can be worked towards.

The Model List and its supporting documentation serve as a valuable resource for advocacy, purchasing and supply at the country level. A locally adapted EML based on STGs can help countries spend their limited resources on the medicines that are the most needed and affordable. WHO surveys in 2007 showed that 86% of countries have been developing and updating their national EML (9).

## 1.2

## CURRENT SITUATION

### 1.2.1

### The WHO Model List

The process for developing and updating the WHO Model List has evolved over time, with emphasis now on the evidence that supports the assessment of comparative effectiveness, safety and cost (Annex 1).

**From expert decision to evidence-based selection.** Over the first 20 years of the WHO Model List, the selection of medicines was determined by the experience of the members of the Expert Committee. There was no systematic search and reporting of evidence to support the selection. In the current selection process, applications for additions, deletions or changes to medicines can be submitted by various groups, including WHO departments, pharmaceutical companies and patient advocacy groups (10). In addition, the application procedure has been revised to require: documentation supporting the public health relevance; refer-

*Evidence-based selection is supported by documentation on public health relevance, standard treatment guidelines, evidence of efficacy and safety, and regulatory status of the medicines.*

*Transparency in selecting medicines is ensured by making documentation publicly available and through efforts to prevent undue influence on Expert Committee members who are required to disclose their ties and interests.*

ence to the Standard Treatment Guidelines; a summary of comparative efficacy and safety in different clinical settings; and information about the regulatory status. Summaries of the evidence of efficacy may include tables evaluating the methodological strengths and weaknesses of the supporting studies. The existence of pharmacopoeial standards, such as the British Pharmacopoeia, International Pharmacopoeia and United States Pharmacopeia, is also documented. Since 2002, details about the international availability of medicines should also be provided in the application.

**From cost comparison to cost-effectiveness.** The 1977 selection criteria put the emphasis on the need to select low-priced medicines. Today the main criterion for deciding if a medicine is essential is *effectiveness*. Therefore, the high cost of an effective medicine is not a reason for excluding it. The WHO application procedure requires that information on “comparative cost and cost-effectiveness” are presented “as a range of cost per routine outcome (e.g. cost per case, cost per cure, cost per month of treatment, cost per case prevented, cost per clinical event prevented, or, if possible and relevant, cost per quality-adjusted life year gained”. The cost of a treatment course can be considered. For example, a shorter course using a more expensive medicine may be cost-effective. Cost can also be a factor when selecting medicines within a therapeutic class to identify the best value for money, recognizing that other products are equal in efficacy.

**Transparency of information and evaluation has also improved.** Before 2001 the recommendations and underlying evidence for the selection of essential medicines were only briefly summarized in the reports of the Expert Committee, which were sometimes published a year or more after the meeting. In an effort to ensure greater transparency in the selection process, the Expert Committee suggested that the process of receiving the applications, the reviewing of the information and the recommendation from these reviews be carefully documented and posted on a web site. Members of the Expert Committee now provide written reviews of the application materials, and the applications, reviews and all supporting documentation are made publicly available. Timelines are also published to define when applications should be submitted and reviewed. All materials are placed on the WHO web site, including comments on submissions. These revisions were approved by the WHO Executive Board in December 2001. Meanwhile, efforts are made to prevent undue influence being placed on Expert Committee members. For example, reviews are published without author attribution, and apart from an initial open to the public session, all decisions are made in closed sessions. A draft of the revised list and the meeting report are posted on the WHO web site soon after the meeting ends.

**Conflict of interest** is an issue that WHO addresses seriously. Conflict of interest means that the expert or his/her partner (“partner” includes a spouse or other person with whom the expert has a similar close personal relationship), or the administrative unit with which the expert has an employment relationship, has a financial or other interest that could unduly influence the expert’s position with respect to the subject matter being considered (11).

WHO requires complete and accurate disclosures of financial ties and other competing interests. This is done by obliging all experts and advisers to complete a specific, detailed and structured declaration of interest form that allows the organization to obtain as much information as possible about the nature and extent of the competing interests. If WHO judges the conflict of interest to be significant, the expert or advisor may be recused from all or part of the committee meeting.



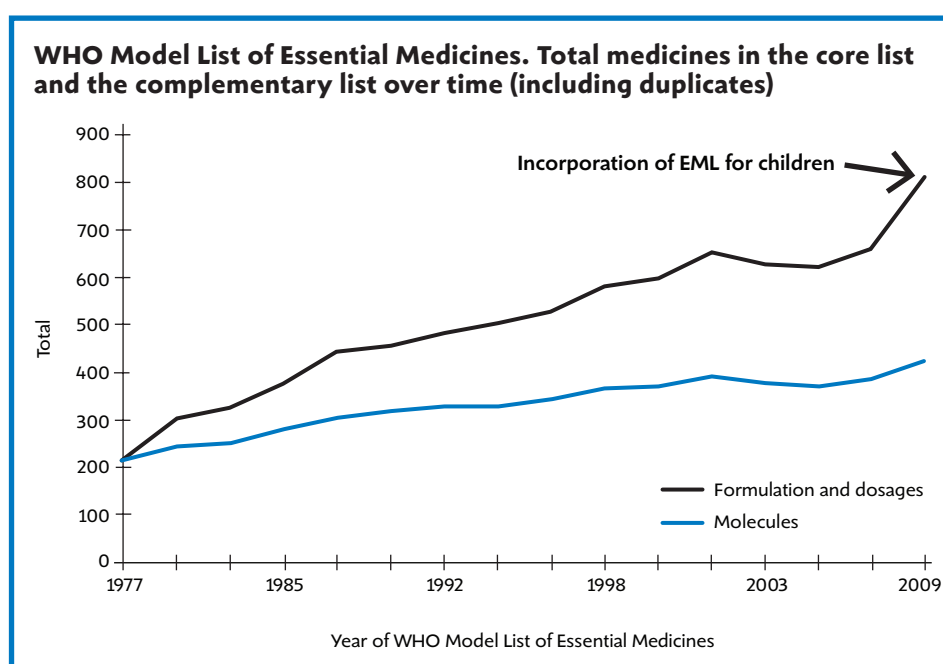
**Fixed-dose combination (FDC) medicines**, according to the current selection criteria, may be selected only when the combination products have proven to have advantage in therapeutic effect, safety and adherence and in decreasing the emergence of drug resistance. For example, FDCs are encouraged for the treatment of malaria, tuberculosis and HIV-related disease.

## 1.2.2

### Expansion of the WHO Model List and the inclusion of children's medicines

Since the development of the WHO Model List in 1977, the list has been revised every two years and the number of selected medicines has grown (Figure 1.2).

FIGURE 1.2



The first WHO Model List contained 216 molecules including duplicates<sup>1</sup> and 204 molecules excluding duplicate listings. The most recent version (2011) of the WHO Model List contains 445 medicines and 358 molecules excluding duplicates (12).

The most significant addition to the WHO Model List has been the Essential Medicines List for Children (EMLc). In May 2007, the World Health Assembly adopted resolution WHA 60.20 Better Medicines for Children, setting goals and calling for action by Member States and WHO to address the global need for children's medicines (13). Medicines used by adults are not suitable for children and need special adjustments in the dosage, formulation and delivery. However, the lack of clinical trials in children hinders the evidence-based selection of essential medicines for children (14).

Almost eight million children under five years old die each year, mainly in developing countries, due to priority diseases and conditions such as malaria, pneumonia, tuberculosis, HIV-related diseases, and diarrhoea. Many of these deaths could be prevented by ensuring the availability of essential medicines appropriate for children's needs (15,16).

*In developing countries millions of child deaths due to priority diseases and conditions could be prevented by ensuring the availability of appropriate essential medicines.*

<sup>1</sup> Duplicates are defined as molecules that are listed for different indications and are therefore listed multiple times in different sections of the WHO Model List.

Children may suffer disproportionately or from different diseases than adults. Children differ from adults when it comes to ingestion, absorption, metabolism and excretion of a medicine. Even between age groups in children there is a significant difference in the above parameters depending on the age, weight and physical condition of the child. Furthermore, the formulation of some medicines can be problematic. For example, tablets are not easy for children to swallow and there may be choking. Although medicines in liquid formulations may solve this problem, they have the disadvantage of lower stability, a shorter shelf-life and, in some cases, require refrigeration. In addition, their volume makes transport and storage difficult and their price is sometimes prohibitive (17,18).

In 2006, WHO and UNICEF held a joint meeting to consult with experts about ways to address the lack of essential medicines for children (14). One of the meeting's key recommendations was to update the WHO Model List with the addition of essential medicines specifically for children. A subcommittee of the Expert Committee on the Selection and Use of Essential Medicines was established to oversee a comprehensive update of the Model List. The first meeting in July 2007 established the first EMLc which was approved by the Expert Committee in October 2007 (19,20). At the second meeting, in September 2008, the subcommittee prepared the draft of the second version of the EMLc and there was a separate meeting on dosage forms of medicines for children (21,22). In March 2009 this second list was approved by the Expert Committee.

The EMLc was integrated into the WHO Model List for adults, although a separate list is also maintained. New symbols were introduced to indicate the following: [c] medicines with a restricted indication for use in children; [c] when specialist care was needed in treatment of children with the medicine; and [a] any age-restriction. Two new sections were added: medicines for the treatment of ear, nose and throat conditions in children and specific medicines for neonatal care.

### 1.2.3

#### National lists of essential medicines

In 2007, a WHO survey of 156 countries showed that 86% of responding countries have a national EML, including all low-income countries and most middle-income countries (Table 1.1) (9). The number of medicines included in the national EML varies, with a global median of 397.

The lists are commonly used in public sector procurement across all countries and in high-income countries for public insurance reimbursement. However, only a small fraction of countries use the EML in reimbursement for private insurance. Most of the 130 responding countries (89%) report having a committee for the selection of medicines for the national EML.

It is important that the EML is regularly updated to ensure that it is relevant to the health needs of the population, adapted to changes in therapeutic modalities, concordant with local treatment guidelines, and aligned with the logistics and budget of the health system. The survey showed that 69% of responding countries had updated their list within the previous five years. Eighty one percent of low-income countries had revised the EML within the past five years.

The concept of essential medicines provides the parameters as to which medicines should be included in the country list. These should be the medicines to treat the major diseases and conditions that affect the population and those that the health system can afford. The number of medicines on a country list can be very different from the number of medicines approved to be sold in the market. Figure 1.3 shows the median number of medicines in the

TABLE 1.1

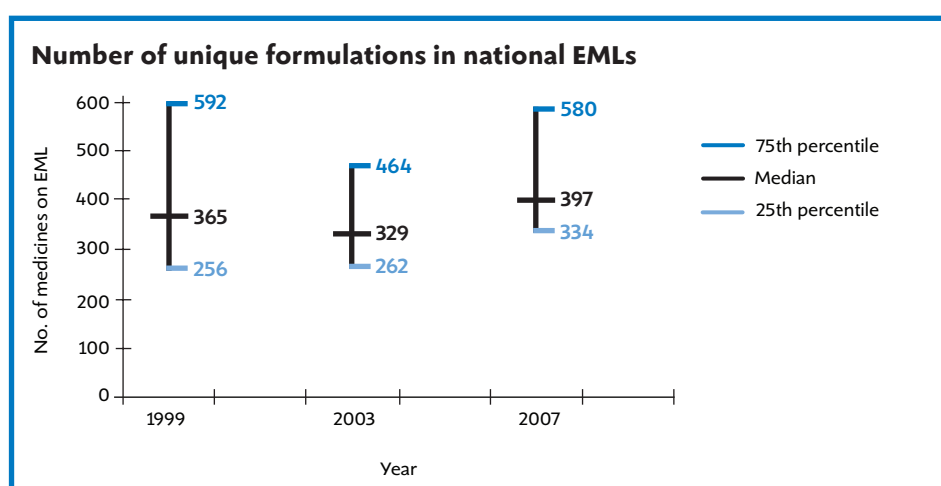
**Details of national essential medicines lists by country income level**

	Country income level <sup>a</sup>							
	Low (48)		Middle (73)		High (35)		Global (156)	
	yes/resp. countries	% yes	yes/resp. countries	% yes	yes/resp. countries	% yes	yes/resp. countries	% yes
Existence of national EML	48/48	100%	63/73	86%	23/34	68%	134/155	86%
Update of EML within last 5 years <sup>b</sup>	39/48	81%	54/73	74%	14/34	41%	107/155	69%
Use of EML in different sectors								
Public sector procurement	44/46	96%	59/65	91%	22/22 <sup>c</sup>	100%	125/133	94%
Public insurance reimbursement <sup>c</sup>	14/40	35%	20/50 <sup>c</sup>	40%	13/18 <sup>c</sup>	72%	47/108 <sup>c</sup>	44%
Private insurance reimbursement <sup>c</sup>	4/35	11%	6/49 <sup>c</sup>	12%	2/8 <sup>c</sup>	25%	12/92 <sup>c</sup>	13%
Committee for EML medicines selection	38/44	86%	59/67	88%	19/19 <sup>c</sup>	100%	116/130	89%
	Median [25th, 75th percentile]		Median [25th, 75th percentile]		Median [25th, 75th percentile]		Median [25th, 75th percentile]	
Number of medicines in EML	355		441		1706		397	
	[272, 384]		[350, 601]		[1143, 3272]		[334, 580]	
	n=34		n=52		n=8 <sup>c</sup>		n=94 <sup>c</sup>	

<sup>a</sup> World Bank list<sup>b</sup> Since many countries with a national EML did not provide dates and very few provided dates beyond the previous 5 years, it was assumed that those countries not providing dates had not updated their EML in the last 5 years<sup>c</sup> More than 30% of countries did not provide an answer to this question

national EMLs of countries surveyed in 1999, 2003 and 2007. It shows that the majority of countries now have at least 300 unique formulations in their list. Over the years, variation between countries in the total number of medicines on the EML has decreased.

FIGURE 1.3



Number of countries responding (1999=106; 2003=86; 2007=94)

## 1.2.4

**Impact of the Model Essential Medicines List: a study of 12 countries**

A comparative analysis was undertaken of recent national EMLs from 12 countries and the WHO Model List 2005.<sup>1</sup> The aim of this analysis was to describe in which way national EMLs differ from the WHO Model List, both quantitatively (e.g. number of molecules and number of dosage forms and formulations) and qualitatively (e.g. differences in the selection of specific molecules) (Annex 2).

In the comparative analysis, 7 of the 12 selected national EMLs contained a greater number of medicines than the 312 that were included in the WHO Model List of 2005. The ratio of dosage forms ranged from 1.2 to 2.1 compared to 1.7 in the WHO Model List (Table 1.2).

**TABLE 1.2 Comparison of national EMLs with WHO Model List 2005**

*The difference in number of medicines is due to considerations such as the national disease burden, local availability and pricing and differing cultural norms and selection processes, specifically addition and deletion.*

	Total number of medicines on national EML (excluding duplicates)	Total number dosage forms on national EML	Ratio dosage forms to medicines
Tanzania (2007)	319	504	1.6
Congo (2006)	264	435	1.7
South Africa (2006)	413	707	1.7
Brazil (2006)	359	597	1.7
Djibouti (2007)	218	281	1.3
Egypt (2006)	385	579	1.5
Yemen (2007)	309	397	1.3
Latvia (2007)	313	661	2.1
Moldova (2006)	447	821	1.8
Bhutan (2007)	299	366	1.2
Sri Lanka (2006)	335	415	1.2
Philippines (2007)	248	523	2.1
<b>WHO Model List (2005)</b>	<b>312</b>	<b>620</b>	<b>1.7</b>

Countries were purposively chosen based on the following criteria: the list must be from the year 2006 or 2007 and the WHO Regions (AFRO, AMRO, EMRO, EURO, WPRO and SEARO) must be represented, each with a minimum of two countries. All the lists are compared with the 14th WHO Model EML (2005).

As expected there were differences between the medicines selected for the national EMLs and those on the WHO Model EML. Medicines which appear on the Model List may not be included in national EMLs and vice versa (Annexes 2 and 3). There are several reasons for these differences, including the in-built flexibility of the square box listed medicines on the Model List, and considerations such as the national disease burden, local availability and pricing, and differing cultural norms. In addition, the process of selection can vary by country.

One specific reason for the difference could be that some medicines have been deleted from the WHO Model List due to lack of efficacy, but have not yet been removed from national EMLs. For example, cromoglicic acid appeared on five of the selected national EMLs. This product was added to the WHO Model List in 1979 but removed in 2005 due to lack of

<sup>1</sup> van den Ham R. Selection of Essential Medicines. Background paper. Utrecht, 2009.  
<http://www.pharmaceuticalpolicy.nl/Publications/Reports/Selection%20of%20Essential%20Medicines%20-%20Background%20paper%20Final%202.0.pdf>

evidence of efficacy. In March 2009, the Expert Committee considered an application for its reinstatement, but this was rejected because its superior efficacy and safety compared to placebo were not sufficiently demonstrated in the studies reviewed.

Another reason for discrepancies between the WHO Model List and country EMLs is that country lists may contain medicines that are widely used and/or included in local STGs, but for which there has been no application to the Model List. Omeprazole is an example of a medicine that was widely used in countries before it appeared on the WHO Model List. In 2005, omeprazole appeared on nine of the selected country EMLs but was not included in the WHO Model List until 2009 (15). This is a limitation in the current process of the WHO Model List, which depends on the initiation of applications by individuals or groups. As a result, some medicines may not be included in the WHO Model List unless an application is submitted. The WHO Department of Essential Medicines and Pharmaceutical Policies is now taking a more proactive approach through regular systematic review of the different sections of the list. Countries should also regularly review both their STGs and national EMLs.

The local burden of disease can also account for differences between the Model List and national EMLs. Meanwhile, in some countries the selection of specific products for the national EML may depend on the national cultural and legal acceptability. A recent example of this is the combination of mifepristone and misoprostol for medical abortion which was listed in the 2005 WHO Model List with the additional qualification “Where permitted under national law and where culturally acceptable”.

## 1.4

### 1.4.1

*Important factors in promoting access to essential medicines for children include defining appropriate dosage forms and formulations, the feasibility of manufacture, and identifying clinical research gaps on safety and efficacy.*

## FUTURE CHALLENGES AND ISSUES

### Essential Medicines for Children

The creation of the EMLc represents a critical first step towards achieving UN Millennium Development Goals Four (MDG4: Reduce child mortality) and Six (MDG6: Combat HIV/AIDS, malaria and other diseases). However, much remains to be done to ensure that children have access to essential medicines. For example, at its initial meeting in 2007 the Sub-Committee on Essential Medicines for Children noted the need for: determining suitable criteria for dosage forms for children; reviewing the feasibility of manufacturing appropriate formulations for priority medicines; and identifying the clinical research gaps regarding the safety and efficacy of essential medicines for children (23).

In May 2007, at the World Health Assembly a resolution (60.20) was passed on “Better Medicines for Children.” This resolution laid out expectations for what countries and what WHO should do to improve the medicines situation for children.

In 2008, WHO and UNICEF launched “Better Medicines for Children”, a five-year joint campaign aimed at improving access to essential medicines for children by addressing the following strategic objectives:

- (1) promote research on essential medicines for children by reviewing evidence for priority treatments for some diseases in children, developing a Model Formulary for children's medicines, and developing standards and capacity for the conduct of clinical trials in children in resource-poor settings;
- (2) encourage the development of appropriate dosage forms for children;
- (3) promote the inclusion of essential medicines for children in national EMLs, STGs and procurement schemes;

- (4) work with regulatory authorities to expedite regulatory assessment of essential medicines for children, and develop mechanisms to monitor and manage their prices; and (5) promote improved use of medicines for children by scaling up interventions known to be effective in increasing the appropriateness of medicine use.

#### 1.4.2

*Countries should include in their EMLs essential medicines for reproductive health such as contraceptives, medicines for the prevention and treatment of STIs and HIV-related infections, and medicines to ensure healthy pregnancy and delivery.*

#### Essential Medicines for Reproductive Health

Problems in reproductive health, such as unwanted pregnancy, HIV infection, sexually transmitted infections (STIs) and pregnancy-related illness and death account for a substantial portion of the disease burden among adolescents and adults in developing countries. Ensuring access to contraceptives, medicines for the prevention and treatment of STIs and HIV-related infections, and medicines to ensure healthy pregnancy and delivery is important to improve reproductive and thus public health.

A 2003 analysis by WHO showed that the majority of the countries did not specifically mention reproductive health issues in their national health policy and did not include important new essential medicines for reproductive health in their national EMLs (24). For example, magnesium sulphate, which is effective in treating pre-eclampsia and eclampsia, was included in only 40% of the national EMLs reviewed. Furthermore, medicines lists used by other UN agencies involved in reproductive health had many discrepancies (25).

In response, at an Interagency Consultation convened by WHO, a number of nongovernmental organizations and UN agencies working in reproductive health, together with WHO, agreed to develop a harmonized list of essential medicines for reproductive health (26) and a list of essential commodities (non-medicine items) (27). Existing WHO STGs on reproductive health needed to be updated in order to ensure that these are consistent with the harmonized lists.

It was agreed to submit 16 medicines for possible addition to or deletion from the WHO Model List. In March 2005, the Expert Committee decided to include the following medicines: misoprostol and mifepristone; cefixime and clotrimazole; and nifedipine as a tocolytic (28). The Interagency List of Essential Medicines for Reproductive Health was subsequently endorsed by all partner organizations in reproductive health. In addition, a guide was developed to assist countries in the selection process (29). Meanwhile, there is a continuing tension between the aims of reproductive health advocates, who wish to broaden patient choice by providing a range of alternative similar products, and essential medicines programme managers, who wish to limit the range of products being provided to ensure availability and the most effective use of funds. The resulting tension can only be resolved at national level through the active involvement of both groups in the selection process.

#### 1.4.3

*National cancer control programme should include essential medicines for prevention, optimal treatment, symptom control and supportive care.*

#### Essential Medicines in Oncology

Cancer is an illness that contributes increasingly to morbidity and mortality in developing countries. While the availability of essential medicines for cancer therapy is important for treating the many different forms of cancer, many of the cancer medicines available today are costly and may have limited benefits. Meanwhile, efforts to assess the effectiveness of these agents are complicated by the variation in therapeutic end-points and the use of surrogate markers for assessing the impact of treatments. As a result, selection of cytotoxic medicines for an essential medicines list is challenging, especially for countries with limited resources.



One of the difficulties is that the treatment of cancer is not determined by the selection of appropriate cytotoxic medicines alone. Treatment with an effective cytotoxic protocol is just one single component of a national cancer control programme. A national cancer control programme also consists of primary prevention, such as hepatitis B immunization for the prevention of hepatoma and tobacco control for the prevention of lung cancer. It should also include a programme for early diagnosis, screening, and optimal treatment and symptom control. And since cancer patients often develop complications, it is equally important to provide supportive care with analgesics, antibiotics and anti-emetics.

In 1999, a consultation article described a systematic approach for the selection of cytotoxic medicines (30). The most commonly occurring types of cancer were categorized according to their treatability, and medicines were placed into different categories according to their cost-benefit ratio. Medicines categorized as treating curable cancers, and cancers for which the cost-benefit ratio favoured treatment with cytotoxic medicines, were suggested for inclusion in an essential medicines list. This kind of systematic approach has not yet been implemented at a global level because of the wide differences that exist between countries in the provision of other services. However, a similar approach was adopted in Zimbabwe in 1990. At the time, the Zimbabwe Essential Drugs Action Programme was active and the approach used by the cancer specialists in the country was consistent with the national programme. The categorization of conditions and cytotoxic products could serve as a possible model process for other countries planning to develop national programmes (31).

#### 1.4.4

#### Essential Medicines for Orphan Diseases

Orphan diseases are a complex and heterogeneous mosaic of an estimated 5000–8000 conditions. In the USA, they are defined as a disorder affecting less than 200 000 people, while in Europe a prevalence rate of less than 5 per 10 000 is used. Most of these disorders are of genetic origin and children account for 50%–75% of patients with rare diseases (32). Medicines for orphan diseases are a special challenge for the selection of essential medicines. In general, many of the medicine selection systems, such as the WHO Model List, focus primarily on essential medicines for the most common health problems in a region – thereby excluding medicines for treating rare orphan diseases.

*For developing countries, inclusion of medicines for orphan diseases will remain problematic.*

As a result of new research initiatives and government incentives created in the USA and Europe to help accelerate the development of medicines for rare diseases, new products are now available to treat orphan diseases. Developed countries have made special provisions to pay for these very expensive treatments for the few patients who need them. But for most developing countries, selection of medicines for orphan diseases will remain problematic – not only because of the costs but also because the necessary diagnostics and service facilities may not exist.

In 2006, an article by Stolk et al. in the *WHO Bulletin* proposed that a model list of essential medicines for orphan diseases should be created as a complement to the existing WHO Model EML and that it should be based on different selection criteria (33). In response, an editorial in the same issue by Reidenberg, Chairman of the Expert Committee at the time, argued that the existing criteria for inclusion in the Model List were based on the principle of distributive justice (i.e. the proper distribution of benefits and burdens) and that highly cost-effective medicines for rare diseases would be considered essential medicines under these criteria. Therefore there was no need to create a new separate list for orphan diseases, based on different criteria.



In 2007, the Expert Committee considered the topic of selection of medicines for orphan diseases. After review of the above publications (33,34), the Expert Committee decided to maintain their approach for the selection of all essential medicines, including medicines for orphan diseases.

At country level, decisions about the selection of medicines for orphan diseases will need to be taken within the context of the overall health system. The treatment of orphan diseases requires a complex arrangement of diagnostics, treatment monitoring and counselling services. Unless the full range of these services is available, selection of orphan disease medicines is likely to lead to the provision of ineffective, expensive care. However, a recent article from China by Wang JB et al. advocated for a national orphan diseases programme in China (35).

## 1.5

## CONCLUSION

The WHO Model List provides an evidence-based list of medicines, including children's medicines, for priority diseases and conditions. The Model List and its supporting documentation provide a valuable resource for countries developing national EMLs.

To facilitate the development of national EMLs, WHO is developing guidance for countries (36). The new guidance document, which will be reviewed at the 2011 Expert Committee meeting, describes the steps that must be completed – from obtaining an overview of the most common health problems prevalent in the region to developing evidence-based standard treatment guidelines. The document provides guidance on forming essential medicines committees, systematically reviewing and evaluating the evidence, and ensuring transparency in the process.

The production of a national EML can help countries make the best use of limited resources to procure and make available the most appropriate treatments for the priority diseases and conditions. However, regular revision is essential to ensure that the selection remains current and credible.

## REFERENCES

1. *The selection and use of essential medicines. Report of the WHO Expert Committee* (including the 12th Model List of Essential Medicines). Geneva, World Health Organization, 2002 (WHO Technical Report Series, No. 914). Available at: [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_914\\_eng.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_914_eng.pdf)
2. *The selection of essential drugs. Report of the WHO Expert Committee*. Geneva, World Health Organization, 1977 (WHO Technical Report Series, No. 615).
3. Howard NJ, Laing RO. Changes in the World Health Organisation essential drug list. *Lancet*, 1991; 338:743–745.
4. Laing R Et al. Twenty-five years of the WHO essential medicines lists: progress and challenges. *Lancet*, 2003; 361:1723–1729.
5. *The use of essential drugs. Report of the WHO Expert Committee*. Geneva, World Health Organization, 2000 (WHO Technical Report Series, No. 895). Available at: <http://apps.who.int/medicinedocs/en/d/Js2281e/16.html>

6. WHO. Updating and disseminating the WHO Model List of Essential Drugs: the way forward. Geneva: World Health Organization, May 2001. Available at [http://dcc2.bumc.bu.edu/richardl/WHO\\_Select\\_docs/whoedlprocess15May31\\_eng.doc](http://dcc2.bumc.bu.edu/richardl/WHO_Select_docs/whoedlprocess15May31_eng.doc)
7. WHO. Updating and disseminating the WHO Model List of Essential Drugs: the way forward. Revised version, 10 September 2001. Available at [http://dcc2.bumc.bu.edu/richardl/WHO\\_Select\\_docs/whoedlprocess19-4-revised.doc](http://dcc2.bumc.bu.edu/richardl/WHO_Select_docs/whoedlprocess19-4-revised.doc) Accessed May 3 2010
8. *The selection and use of essential medicines. Report of a WHO Expert Committee* (including the 12th Model List of Essential Medicines). Geneva, World Health Organization, 2002 (WHO Technical Report Series, No. 914). Available at: [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_914\\_eng.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_914_eng.pdf)
9. *Country pharmaceutical situations. Fact book on WHO Level 1 indicators*. Geneva, World Health Organization, 2007. Available at: <http://apps.who.int/medicinedocs/documents/s16874e/s16874e.pdf>
10. Application form for addition, change or deletion of a medicine from the WHO Model List of Essential Medicines. Available at: [http://www.who.int/selection\\_medicines/committees/AppForm.pdf](http://www.who.int/selection_medicines/committees/AppForm.pdf)
11. Boyd E, Bero L. Improving the use of research evidence in guideline development. 4. Managing conflicts of interest. *Health Research Policy*, 2006, 4:16. Available at: <http://www.health-policy-systems.com/content/4/1/16>
12. Comparative table of medicines on the WHO Model List of Essential Medicines from 1977-2011. Available at: [http://www.who.int/entity/medicines/publications/essentialmedicines/EMLsChanges1977\\_2011.xls](http://www.who.int/entity/medicines/publications/essentialmedicines/EMLsChanges1977_2011.xls) Accessed 28 June 2011
13. WHA Resolution 60.20 *Better medicines for children*. Geneva, World Health Organization, 2007. Available at: <http://www.who.int/childmedicines/publications/WHA6020.pdf>
14. *WHO/UNICEF Essential Medicines for Children Expert Consultation*. 4 September 2006. Meeting report. Geneva, World Health Organization, 2006. Available at: <http://apps.who.int/medicinedocs/index/assoc/s14092e/s14092e.pdf>
15. Make medicines child size WHO web site: <http://www.who.int/childmedicines/en/index.html>
16. Hill SR, Gray A, Weber M. Setting standards for essential children's medicines. *Bulletin of the World Health Organization*, 2007, 85(9):650. Available at: <http://www.who.int/bulletin/volumes/85/9/07-046151/en/>
17. Beggs SA, Cranswick NE, Reed MD. Improving drug use for children in the developing world. *Archives of Disease in Childhood*, 2005; 90:1091-1093. Available at: <http://adc.bmj.com/content/90/10/1091.full>
18. Choonara I. WHO wants safer medicines for children. *Archives of Disease in Childhood*, 2008; 93:456-457. Available at: <http://adc.bmj.com/content/93/6/456.full.pdf>
19. Hoppu K. *A summary of the EU paediatric initiatives*. Document used in the WHO Expert Consultation on Essential Medicines for Children, 9-13 July 2007, Geneva, Switzerland. Available at: [http://archives.who.int/eml/expcom/children/Items/EU\\_Initiatives.pdf](http://archives.who.int/eml/expcom/children/Items/EU_Initiatives.pdf)

20. Hirschfeld S, Zajicek A. *Brief selective history of pediatric initiatives in the United States of America*. Document used in the WHO Expert Consultation on Essential Medicines for Children, 9–13 July 2007, Geneva, Switzerland.
21. WHO/UNICEF *Essential Medicines for Children Expert Consultation*. 4 September 2006. Meeting report. Geneva, World Health Organization, 2006. Available at: <http://apps.who.int/medicinedocs/index/assoc/s14092e/s14092e.pdf>
22. EB121.R2. Agenda item 6.5. Expert Committee on the Selection and Use of Essential Medicines: establishment of a subcommittee, 24 May 2007. Geneva, World Health Organization. Available at: [http://apps.who.int/gb/ebwha/pdf\\_files/EB121/B121\\_8-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/EB121/B121_8-en.pdf)
23. First meeting of the Subcommittee of the Expert Committee on the Selection and Use of Essential Medicines. 2007, Geneva, World Health Organization, 2007. Documents available at: [http://archives.who.int/eml/expcom/children/INDEX\\_children\\_07.htm](http://archives.who.int/eml/expcom/children/INDEX_children_07.htm)
24. *Reproductive Health medicines in national essential medicines lists*. A research report. Background Discussion Paper No. 3 for the Interagency Consultations on the Selection and Delivery of Essential Medicines and Commodities for Reproductive Health. Geneva, World Health Organization, 2003.
25. *UN reproductive health medicines lists and recommendations for harmonization*. A research report. Background Discussion Paper No. 1 for the Interagency Consultations on the Selection and Delivery of Essential Medicines and Commodities for Reproductive Health. Geneva, World Health Organization, 2003.
26. *Interagency List of Essential Medicines for Reproductive Health*. Geneva, World Health Organization, 2006. Available at: [http://whqlibdoc.who.int/hq/2006/WHO\\_PSM\\_PAR\\_2006.1\\_eng.pdf](http://whqlibdoc.who.int/hq/2006/WHO_PSM_PAR_2006.1_eng.pdf)
27. *Interagency List of Medical Devices for Reproductive Health*. Geneva, World Health Organization, 2008. Available at: <http://apps.who.int/medicinedocs/documents/s16440e/s16440e.pdf>
28. *The selection and use of essential medicines. Report of the WHO Expert Committee* (including the 14th Model List of Essential Medicines). Geneva, World Health Organization, 2005 (WHO Technical Report Series, No. 933). Available at: [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_933\\_eng.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_933_eng.pdf)
29. *Essential medicines for reproductive health: Guiding principles for their inclusion on national medicines lists*. March 2006. Available at: [http://www.pphprevention.org/files/RH\\_essential\\_meds.pdf](http://www.pphprevention.org/files/RH_essential_meds.pdf)
30. Sikora K et al. Essential drugs for cancer therapy: A World Health Organization consultation. *Annals of Oncology*, 1999,10:385–390.
31. The Oncology Committee, Zimbabwe. Rational use of cytotoxic drugs in a developing country. *Health Policy and Planning*, 1990, 5:378–385.
32. Weely S, Leufkens HG. Orphan diseases. Background Chapter 7.5. In: *Priority medicines for Europe and the World*. Kaplan W, Laing R, eds. Geneva, World Health Organization, 2004. Available at: <http://archives.who.int/prioritymeds/index.html>

33. Stolk P, Willemen MJ, Leufkens HG. Rare essentials: drugs for rare diseases as essential medicines. *Bulletin of the World Health Organization*, 2006, 84(9):745–751. Available at: <http://www.who.int/bulletin/volumes/84/9/06-031518.pdf>
34. Reidenberg MM. Are drugs for rare diseases “essential”? *Bulletin of the World Health Organization*, 2006, 84:686. Available at: <http://www.who.int/bulletin/volumes/84/9/06-034447.pdf>
35. Wang JB et al. Rare diseases and legislation in China. *Lancet*, 2010, 375(9716):708–709.
36. How to develop a National Essential Medicines List. Agenda item for the 18th WHO Expert Committee on the Selection and Use of Essential Medicines. Available at: [http://www.who.int/selection\\_medicines/committees/expert/18/How\\_to\\_developNEML\\_agenda\\_paper.pdf](http://www.who.int/selection_medicines/committees/expert/18/How_to_developNEML_agenda_paper.pdf) Accessed May 3 2010

## ABBREVIATIONS

EML	Essential Medicines List
EMLc	Essential Medicines List for Children
FDC	Fixed-dose combination
STGs	Standard Treatment Guidelines
STI	Sexually transmitted infection
WHO	World Health Organization

## ANNEXES

## Annex 1. Comparison of criteria for selection in 1977 and in 2009 (10,11)

Where are we coming from? (1977)	Where are we now? (2009)
<ul style="list-style-type: none"> <li>– The selection of drugs should be based on the results of benefit and safety evaluations obtained in controlled clinical trials and/or epidemiological studies.</li> </ul> <p>When several drugs are available for the same indication, select the drug, pharmaceutical product and dosage form that provide the highest benefit/risk ratio.</p> <p>When two or more drugs are therapeutically equivalent, preference should be given to the drug that: is most thoroughly investigated, has the most favorable pharmacokinetic properties, has local reliable manufacturing facilities, has favourable stability, or storage facilities.</p>	<p>Comparative effectiveness in a variety of clinical settings:</p> <ul style="list-style-type: none"> <li>– identification of clinical evidence (search strategy, systematic reviews identified, reasons for selection/exclusion of particular data)</li> <li>– summary of available data such as appraisal of quality including clinical evidence, available estimates of comparative effectiveness.</li> <li>– summary of available estimates of comparative effectiveness.</li> </ul>
<p>The selection of drugs should be based on the results of benefit and safety evaluations obtained in controlled clinical trials and/or epidemiological studies.</p>	<p>Comparative evidence of safety:</p> <ul style="list-style-type: none"> <li>– estimate of total patient exposure to date</li> <li>– description of adverse effects/reactions</li> <li>– identification of variation in safety due to health systems and patient factors</li> <li>– summary of comparative safety against comparators.</li> </ul>
<p>Cost of the total treatment has to be taken in to account, together with the comparison between other drugs and non-pharmaceutical treatments.</p>	<p>Comparative cost and cost-effectiveness:</p> <ul style="list-style-type: none"> <li>– range of costs of the proposed medicines</li> <li>– comparative cost-effectiveness presented as range of cost per routine outcome (e.g. cost per case, cost per cure, cost per month of treatment, cost per case prevented, cost per clinical event prevented, or, if possible and relevant, cost per quality-adjusted life year gained)</li> </ul>
<p>Local health authorities should decide the level of expertise required to prescribe single drugs or a group of drugs in a therapeutic category.</p>	<p>Treatment details (reference to existing WHO and other clinical guidelines, need for special diagnostic or treatment facilities skills).</p>
<p>Regulations and facilities should be available to ensure that the quality of selected pharmaceutical products meets adequate quality control standards, including stability and, when necessary, bioavailability.</p>	<p>Regulatory status of the medicine (in country of origin, and preferably in other countries as well).</p>
<p>Fixed-ratio combinations are only acceptable if the following criteria are met:</p> <ul style="list-style-type: none"> <li>– justified by clinical documentation</li> <li>– therapeutic effect is greater than the sum of the effect of each</li> <li>– the cost of the combination product is less than the sum of the individual products</li> <li>– compliance is improved</li> <li>– sufficient drug ratios are provided to allow dosage adjustments satisfactory for the majority of the population</li> </ul>	<p>Most essential medicines should be formulated as single dose compounds. Fixed-dose combination products should be selected only when the combination has proven advantage in therapeutic effect, safety, and adherence or in decreasing the emergence of drug-resistance in malaria, tuberculosis and HIV/AIDS.</p>
Not considered in 1977	Medicine is internationally available.
Not considered in 1977	Availability of pharmacopoeial standards (BP, IP, USP).
Not considered in 1977	Medicine has proven to be relevant for public health with information regarding to disease burden, assessment of current use and target population.

## Comparison of national EMLs with WHO Model Essential Medicines List 2005

	Total number of medicines on national EML (excluding duplicates)	Total number of dosage forms on national EML	Ratio of dosage forms to medicines
Tanzania (2007)	319	504	1.6
Congo (2006)	264	435	1.7
South Africa (2006)	413	707	1.7
Brazil (2006)	359	597	1.7
Djibouti (2007)	218	281	1.3
Egypt (2006)	385	579	1.5
Yemen (2007)	309	397	1.3
Latvia (2007)	313	661	2.1
Moldova (2006)	447	821	1.8
Bhutan (2007)	299	366	1.2
Sri Lanka (2006)	335	415	1.2
Philippines (2007)	248	523	2.1
<b>WHO Model List (2005)</b>	<b>312</b>	<b>620</b>	<b>1.7</b>

Countries were purposively chosen based on the following criteria: the list must be from the year 2006 or 2007 and the WHO Regions (AFRO, AMRO, EMRO, EURO, WPRO, SEARO) must each be represented with a minimum of two countries. All the lists are compared with the 14th WHO Model EML (2005).

## Annex 2. Medicines appearing on national EMLs but not on the WHO Model List 2005

Section of WHO Model EML	Medicines <sup>a</sup>	On WHO Model List 2009
Anaesthetics	propofol (5)	—
Analgesics	diclofenac (9), indomethacin (5), fentanyl (7), pethidine (7), tramadol (6)	—
Antiallergics	cetirizine (7), cromoglicic acid (5)	—
Anti-infectives	cefotaxime (6), cefalexin (6), cefazolin (5)	cefotaxime, cefalexin, cefazoline
Antimigraine medicines	ergotaminetartrate (5)	—
Cytotoxic medicines	carboplatin (6)	carboplatin
Antiparkinsonism	trihexylphenidyl (8)	—
Medicines affecting the blood	enoxaparin (6)	—
Cardiovascular medicines	amiodarone (8), dobutamine (6), atorvastatin (6), simvastatin (5)	amiodarone, simvastatin
Dermatological medicines	zinc oxide ointment (6)	—
Gastrointestinal medicines	omeprazole (9), lactulose (7), glycerine/glycerol (5)	omeprazole
Hormones, other endocrine medicines and contraceptives	gliclazide (5), carbimazole (7)	—
Immunologicals	DTP-vaccine (8)	—
Ophthalmological preparations	acyclovir (7), chloramphenicol (7), diclofenac (5)	acyclovir
Psychotherapeutic medicines	risperidone (5), fluoxetine (6)	fluoxetine
Medicines acting on the respiratory tract	theophylline (9), aminophylline (7)	—
Solutions correcting water, electrolyte, and acid-base disturbances	sodium bicarbonate (8)	—
Vitamins and minerals	vitamin B complex (5)	—

<sup>a</sup> Medicines appear on 5 or more of the 14 national EMLs analysed and are not accommodated by a square box on the WHO Model List 2005. The third column indicates whether the medicine was added to the WHO Model List after 2005, during revisions in 2007 and 2009.

**Annex 3. Medicines appearing on the WHO Model List 2005 but not on national EMLs**

Section	Medicines <sup>a</sup>
Anti-infective medicines	pyrantel, suramin sodium, triclambendazole, oxamniquine, cefixime, imipenem + cilastatin, spectinomycin, trimethoprim, p-aminosalicylic acid, capreomycin, cycloserine, ethionamide, levofloxacin, flucytosine, potassium iodide, meglumine antimoniate, pentamidine, amodiaquine, mefloquine, artemether, artesunate, proguanil, eflornithine, benznidazole, nifurtimox <sup>a</sup>
Cytotoxic medicines	chlormethine, daunorubicine, levamisole
Dermatological medicines	sodium thiosulfate, selenium sulfide, neomycin sulfate + bacitracin, aluminium diacetate, dithranol, fluorouracil
Oxytocics and antioxytocics	mifepristone + misoprostol

<sup>a</sup> Medicines that do not appear in 10 or more national EMLs reviewed



# THE WORLD MEDICINES SITUATION 2011

## RATIONAL USE OF MEDICINES

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Irrational use of medicines is an extremely serious global problem that is wasteful and harmful. In developing and transitional countries, in primary care less than 40% of patients in the public sector and 30% of patients in the private sector are treated in accordance with standard treatment guidelines.
- Antibiotics are misused and over-used in all regions. In Europe, some countries are using three times the amount of antibiotics per head of population compared to other countries with similar disease profiles. In developing and transitional countries, while only 70% of pneumonia cases receive an appropriate antibiotic, about half of all acute viral upper respiratory tract infection and viral diarrhoea cases receive antibiotics inappropriately.
- Patient adherence to treatment regimes is about 50% worldwide and lower in developing and transitional countries, where up to 50% of all dispensing events are inadequate (in terms of instructing patients and/or labelling dispensed medicines).
- Harmful consequences of irrational use of medicines include unnecessary adverse medicines events, rapidly increasing antimicrobial resistance (due to over-use of antibiotics) and the spread of blood-borne infections such as HIV and hepatitis B/C (due to unsterile injections) all of which cause serious morbidity and mortality and cost billions of dollars per year.
- Effective interventions to improve use of medicines are generally multi-faceted. They include provider and consumer education with supervision, group process strategies (such as peer review and self-monitoring), community case management (where community members are trained to treat childhood illness in their communities and provided with medicines and supervision to do it) and essential medicines programmes with an essential medicine supply element. Printed materials alone have little effect and for guidelines to be effective they need to be accompanied by reminders, educational outreach and feedback.
- Less than half of all countries are implementing many of the basic policies needed to ensure appropriate use of medicines, such as regular monitoring of use, regular updating of clinical guidelines and having a medicine information centre for prescribers or drug (medicine) and therapeutics committees in most of their hospitals or regions.
- The second International Conference on Improving Use of Medicines in 2004 and World Health Assembly Resolution WHA60.16 in 2007 recognized the difficulty of promoting rational use of medicines in fragmented health systems. They recommend a cross-cutting health system approach and the establishment of national programmes to promote rational use of medicines, which would require much more investment than governments and donors have so far been willing to give.

## 1.1

## INTRODUCTION

## What is rational use?

Medicine use is rational (appropriate, proper, correct) when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and the community (1). Irrational (inappropriate, improper, incorrect) use of medicines is when one or more of these conditions is not met. Worldwide, it is estimated that over half of all medicines are prescribed, dispensed or sold inappropriately (2,3). Moreover, it has been estimated that half of all patients fail to take their medication as prescribed or dispensed (4). Irrational use may take many different forms, for example, polypharmacy, over-use of antibiotics and injections, failure to prescribe in accordance with clinical guidelines and inappropriate self-medication. However, despite the global problem of inappropriate use, few countries are monitoring medicines use or taking sufficient action to correct the situation (5).

## Consequences of irrational use

Irrational use is wasteful and can be harmful for both the individual and the population. Adverse medicines events cause significant morbidity and mortality and rank among the top 10 causes of death in the United States of America (6,7). They have been estimated to cost £466 million annually in the United Kingdom of Great Britain and Northern Ireland and up to US\$ 5.6 million per hospital per year in the USA (8-10). Antimicrobial resistance is dramatically increasing worldwide in response to antibiotic use, much of it inappropriate overuse (and is causing significant morbidity and mortality (3). It has been estimated that antimicrobial resistance costs annually US\$ 4000-5000 million in the USA and €9000 million in Europe (11,12). The use of unsterile injections is associated with the spread of bloodborne infections, such as hepatitis B and C and HIV/AIDS (13). Although evidence-based medicine has gained importance the use of both diagnostic and treatment guidelines is sub-optimal and could be greatly improved.

## Inappropriate antibiotic use

Overuse and misuse of antibiotics is a particularly serious global problem. Established and newly emerging infectious diseases are increasingly threatening the health of populations. If antibiotics become ineffective, these diseases will lead to increased morbidity, health-care use and eventually premature mortality (14-16). Furthermore, antibiotics are required for other treatments (taken for granted in developed countries), such as surgery and cancer chemotherapy, which would become unavailable with the disappearance of effective antibiotics. Unfortunately, while resistance to older antibiotics is increasing, the development of new generations of antibiotic medicines is stalling (17). Therefore, efficient use of existing antibiotics is needed to ensure the availability in the long term of effective treatment of bacterial infections. Efficient use includes both restrictive and appropriate use. However inappropriate and incorrect use of antibiotics occurs in both developing and developed countries. Doctors prescribe antibiotics to patients who do not need them, while patients do not adhere to their treatment causing the risk of antibiotic resistance (18). Two thirds of all antibiotics are sold without prescription, through unregulated private sectors. Even in those European countries where over-the-counter delivery of antibiotics is not allowed, patients use antibiotics without prescription (19). Low adherence levels by patients are common, many patients taking antibiotics in under-dose or for shortened duration – 3 instead of 5 days (20,21).

*Irrational use of medicines is both wasteful and harmful.*

This chapter covers irrational use of medicines in both developing and developed countries, with a focus on developing and transitional countries. Since there is very little information on medicines use for chronic diseases or on the use of over-the-counter (OTC) medicines in developing countries, the chapter will focus mainly on use of prescription-only medicines in acute disease, particularly antibiotics, although mention will be made of treatment of chronic diseases, especially in terms of adherence to medication.

## 1.2

## PRESENT SITUATION AND TRENDS

Monitoring the use of medicines is essential to ensuring that they are properly used. This section covers the assessment of medicines use, including the disparity in the amount of data available in developed and developing countries, and methods which can help in assessments of medicines use. Patterns and trends are also examined, with discussion of the findings from WHO's database of studies on the use of medicines in primary care in developing and transitional countries. In addition, antibiotic use and patients' adherence to treatment are covered. The section on targeted interventions to increase rational use concludes that multi-faceted interventions improving both education and managerial systems have tended to be more effective than those that employ one strategy.

### 1.2.1

### Assessing (measuring) medicines use

It is essential to have reliable data on how medicines are used in order to:

- assess the accessibility, quality and cost-effectiveness of care
- monitor trends in consumption
- provide a benchmark for comparison with similar countries, regions, facilities
- compare medicines use against evidence-based guidelines
- increase awareness of stakeholders about medicine use
- identify problematic areas to develop targeted intervention strategies.

In many developed countries, medicines use is routinely monitored, often through insurance data and electronic medical records. Data generated in this way have been effective in improving use through feedback to prescribers and policy-makers. However, in developing countries, electronic medical records and insurance data are often absent and such monitoring of use not undertaken, nor are interventions to improve use widely implemented. There are several well-established, but quite different, methods which can be used to assess medicines use. Aggregate methods, such as the Anatomical Therapeutic Classification (ATC)/Defined Daily Dose (DDD) methodology (developed by WHO's Collaborating Centre for Drug Statistics in Oslo, Norway: <http://www.whocc.no>), can be used to compare consumption among institutions, regions and countries. However, judgements about the appropriateness of use can only be made indirectly, either by comparison with consumption elsewhere, morbidity data and/or adherence to evidence-based guidelines.

Rapid appraisal of prescriptions, using standard methods and indicators, can usefully identify general prescribing problems and quality of care. The WHO/INRUD (International Network for the Rational Use of Drugs) indicators can be used to identify general prescribing and quality of care problems at primary care facilities (22). The WHO/IMCI (Integrated Management of Childhood Illness) indicators can be used to assess the quality of treatment in children (23). Focused medicines use evaluation through examination of medical records and prescriptions, and linking diagnosis to treatment, can be used to identify medicines use problems in depth, especially in hospitals. The ATC/DDD methodology has been used

*Standard methods and indicators can identify prescribing problems and quality of care.*

extensively in developed countries, while the WHO/INRUD and WHO/IMCI methodologies have been used much more in developing and transitional countries.

## 1.2.2

### Patterns and trends in medicines use

#### Medicines use in developing and transitional countries

WHO has created a database of studies on the use of medicines in primary care (generally for acute conditions) in developing and transitional countries. The database consists of systematically extracted quantitative information on medicines use measured in these studies, plus details on study setting and methodology extracted from articles and reports published or produced during the period 1990–2006. Details of the methodology, the methodological limitations and analysis are reported elsewhere (3) but some of the major results are reported here. Six hundred and seventy-nine studies from 97 countries were identified, 71% had been undertaken in the public sector, 26% in the private-for-profit sector and 3% in the private-not-for profit sector.

Figures 1.1, 1.2 and 1.3 show medicines use over time, by region and by health facility ownership in developing and transitional countries. The figures show that use has remained sub-optimal in all regions of the world over the last 20 years, that it appears not to be improving, and that it is worse in the private sector as compared to the public sector. Figure 1.1 shows that while use of generic and essential medicines may have increased slightly over the past 20 years, overall use of medicines has increased and compliance with guidelines has remained low. Figure 1.2 shows that medicines use is similarly poor in all regions, and Figure 1.3 shows that use of generic and essential medicines and compliance with guidelines are better in the public sector compared to the private sector. Better treatment of acute diarrhoea (greater use of oral rehydration solution and less use of antibiotics and antidiarrhoeals) and acute respiratory tract infection (greater use of *appropriate* antibiotics for pneumonia and less inappropriate use of antibiotics for upper respiratory tract infection) is also seen in the public as compared to the private sector. In addition it can be seen that the use of antibiotics, often inappropriate as in their use for acute upper respiratory tract infection and acute diarrhoea, is increasing.

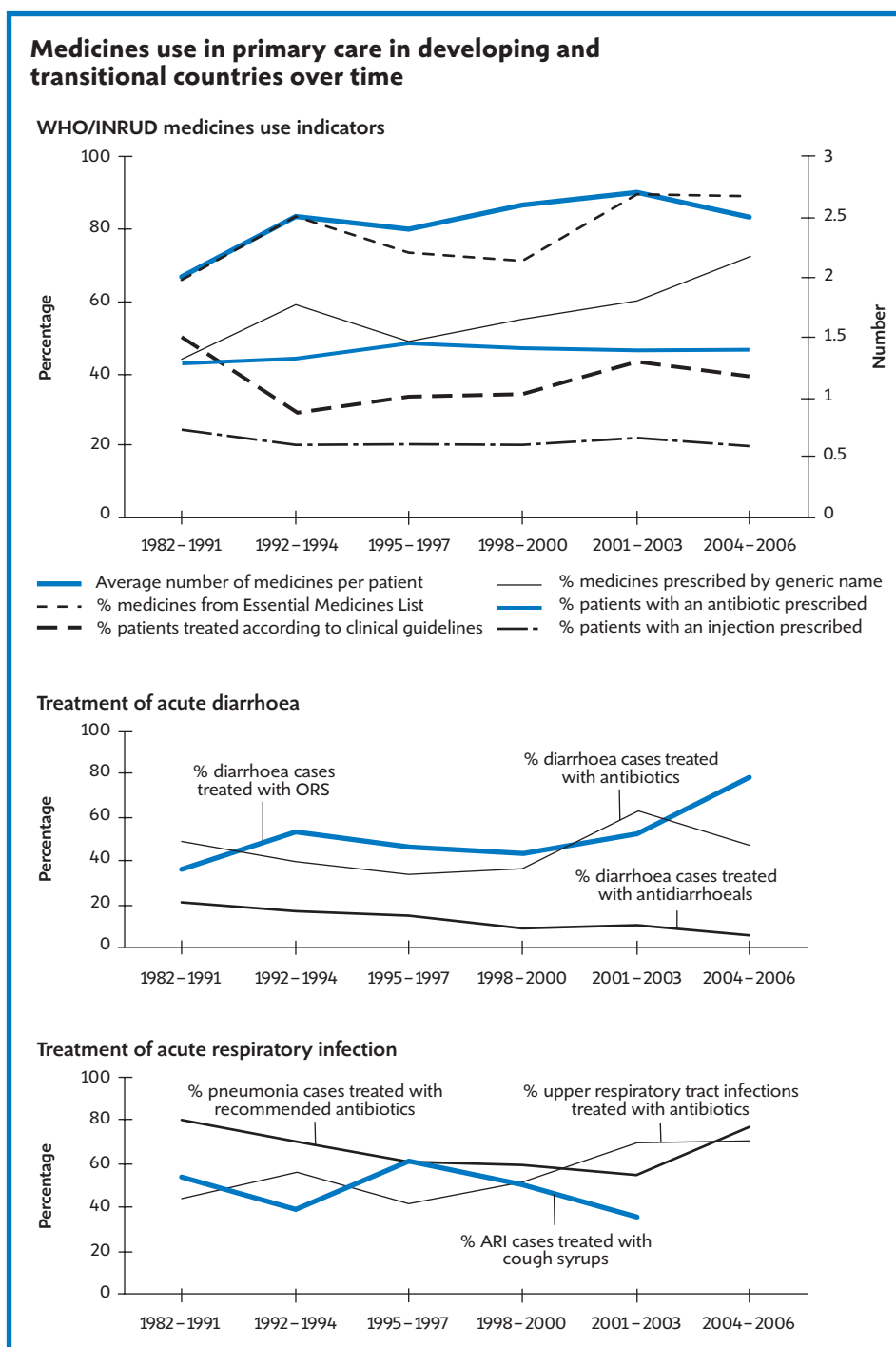
The dispensing process greatly influences how medicines are used. Data from the WHO database show that about 80% of all prescribed medicines are dispensed but often by unqualified personnel. The WHO database further shows that, on average, dispensing time is 1 minute, only half of patients are told how to take their medicines, about one third of patients do not know how to take their medicines immediately on leaving the facility, and that 20–50% of medicines dispensed are not labelled. In such circumstances it is not surprising that patient adherence to medicines is poor (see section on adherence below).

#### Medicines use in developed countries: studies on antibiotics

The problem of irrational use of antibiotics is also widespread in the rich developed nations. Figure 1.4 shows data from the European Surveillance of Antibiotic Consumption (ESAC) project comparing outpatient antibiotic consumption in 25 countries in 2003. It can be seen that there is large variation in antibiotic use across European countries. The number of DDDs per 1000 inhabitants is around 30 in Greece and France, while the Netherlands uses less than half this volume. Also, the types of antibiotic used vary across countries. In Greece, for example, the share of macrolides is much higher than in the Netherlands. Outpatient systemic antibiotic use in the USA is similar to that in southern European countries (24). Another European study showed that antimicrobial medicine self-medication prevalence

*Antibiotics are misused and over-used in rich developed countries with wide variation in types and volume.*

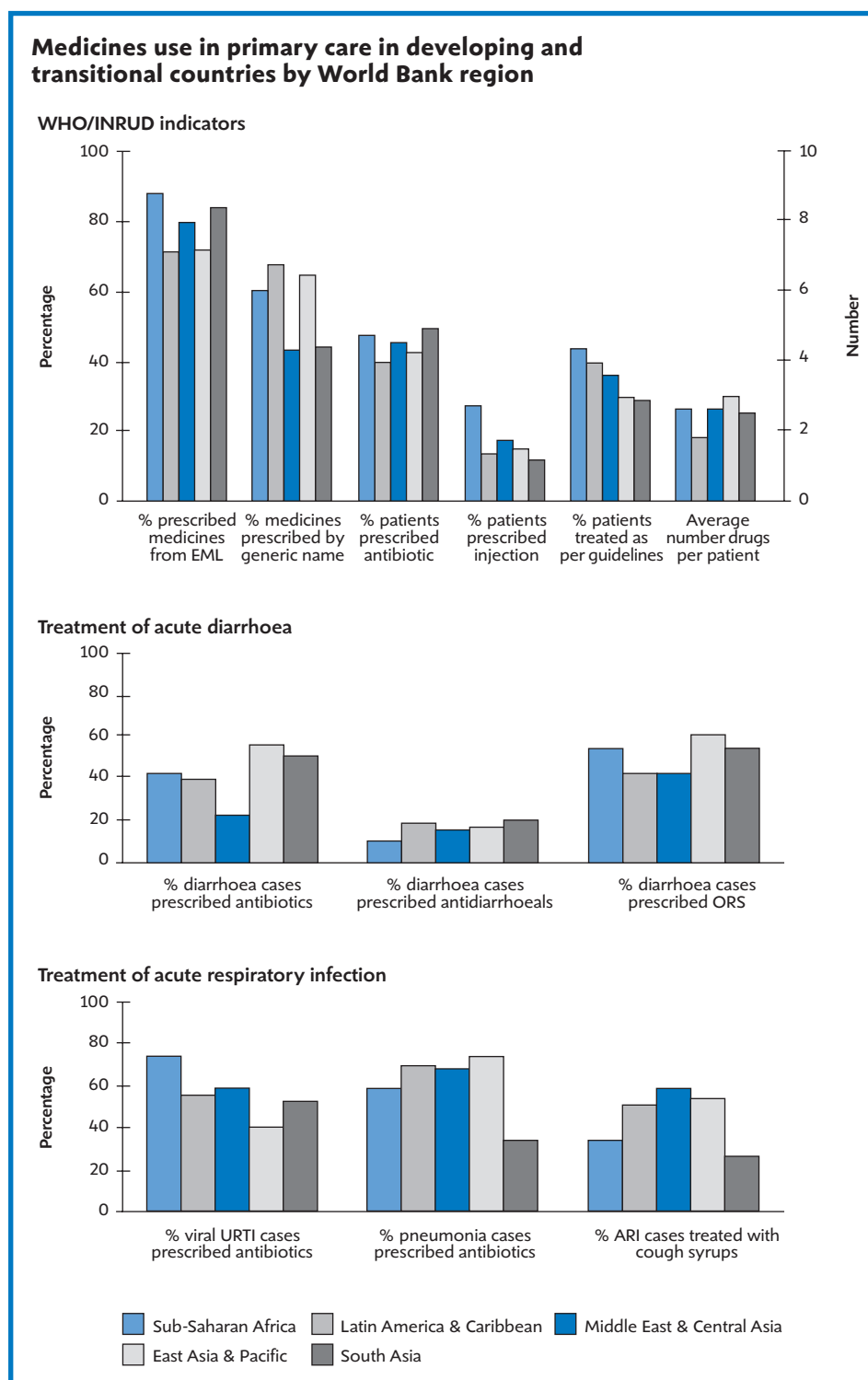
FIGURE 1.1



Source: WHO/EMP database 2009.

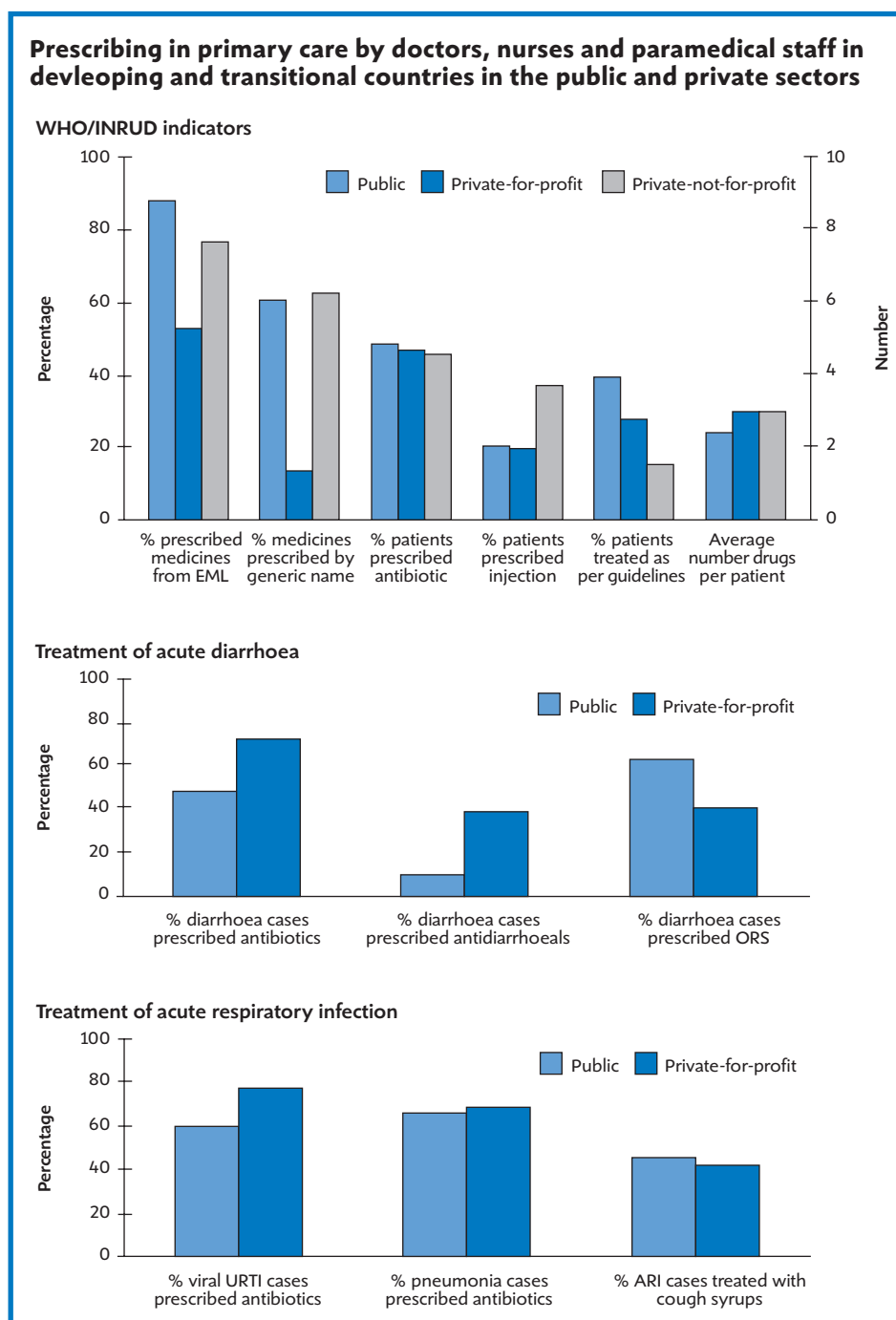


FIGURE 1.2



Source: WHO/EMP database 2009.

FIGURE 1.3



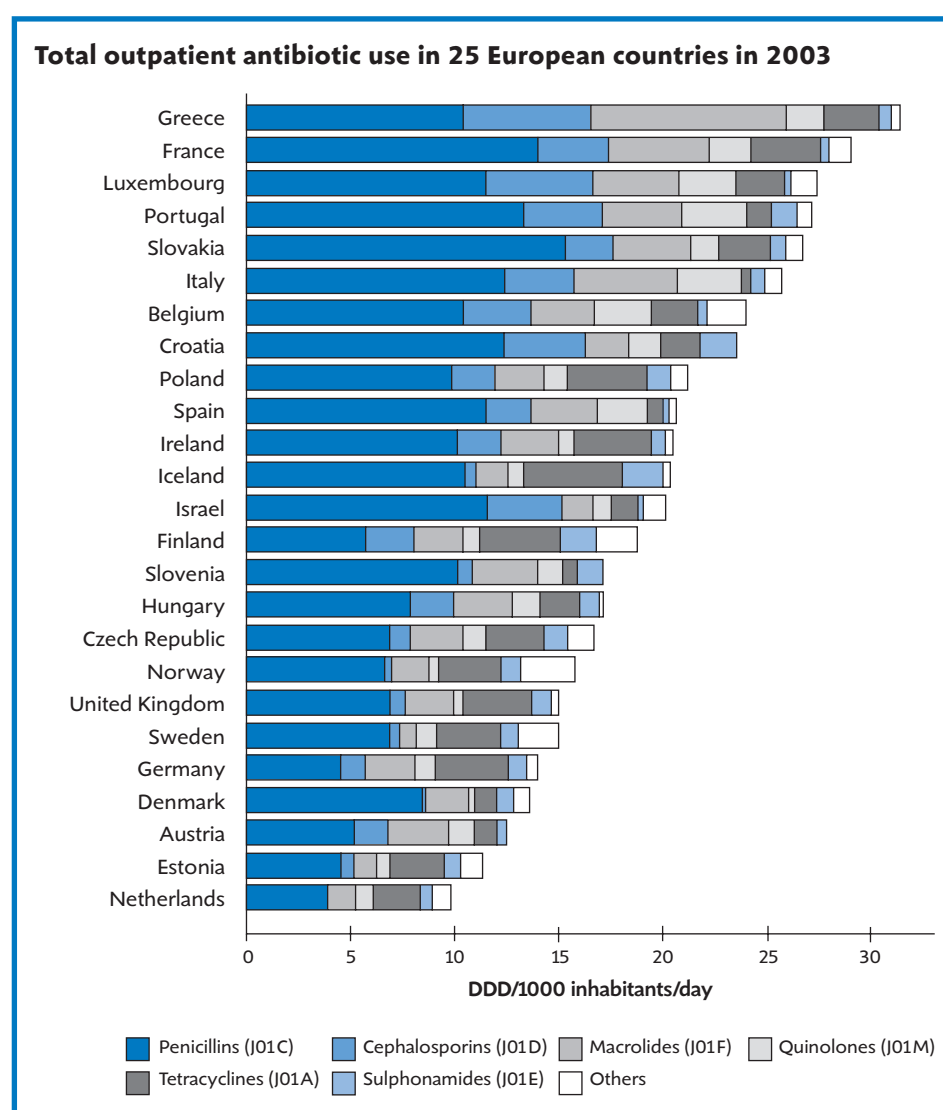
Source: WHO/EMP database 2009.

The medicine (drug) use indicators used in figures 1.1, 1.2 and 1.3 include: % medicines prescribed that belong to the EML; % medicines prescribed by generic name; % patients prescribed one or more antibiotics; % patients prescribed one or more injections; % patients treated in accordance with clinical guidelines; average number of medicines prescribed per patient; % viral upper respiratory tract infection cases treated with antibiotics; % pneumonia cases treated with appropriate antibiotics; % respiratory tract infection cases treated with cough syrups, antitussives or expectorants; % acute diarrhoea cases treated with oral rehydration solution; % acute diarrhoea cases treated with antibiotics; % acute diarrhoea cases treated with antidiarrhoeals.

varies widely among different European regions, with the highest rates in eastern and southern countries, and the lowest in northern and western (25).

There is a clear correlation between outpatient antibiotic use and penicillin-resistant *pneumococci*, emphasizing the importance of restrictive antibiotic prescribing policies (26). Nevertheless, even in the Netherlands, a country with low antibiotic use, overprescribing exists as was shown in a national survey among general practitioners (GPs). Six diseases for which national guidelines advised against prescribing of antibiotics were included. The percentage of consultations in which GPs prescribed an antibiotic for these diseases ranged from 6% (asthma in children < 12 years) to 67.2% (sinusitis) (27). Figure 1.5 shows the impact of antibiotic consumption on antimicrobial resistance with regard to *Streptococcus pneumoniae*. It can be clearly seen that those countries with higher consumption also have higher resistance.

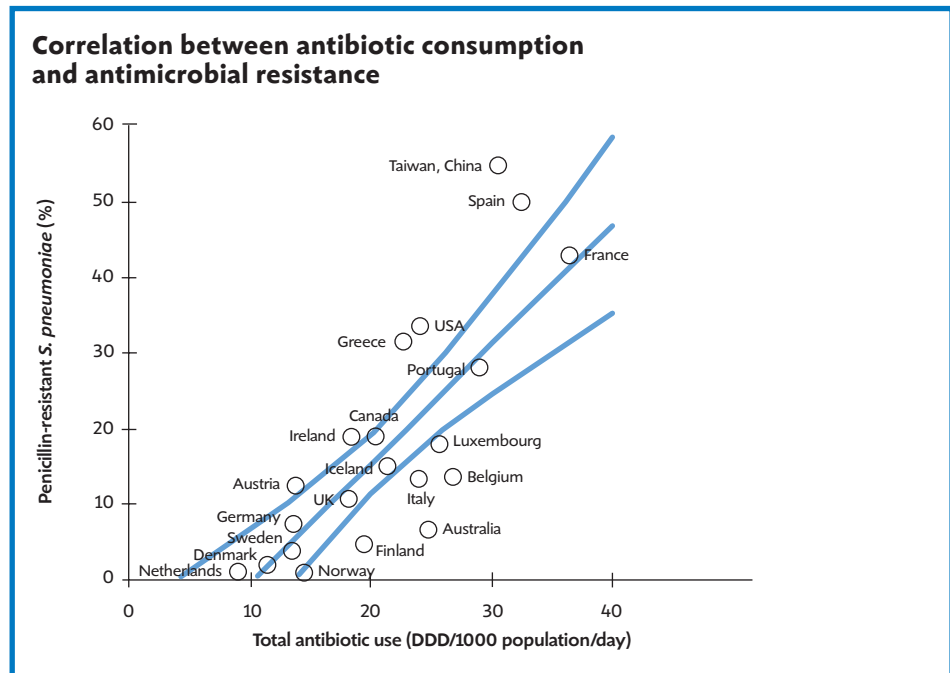
FIGURE 1.4



Source: Ferech, M. et al. *J. Antimicrob. Chemother.* 2006, 58:401–407; doi:10.1093/jac/dkl188.

FIGURE 1. 5

Countries with higher consumption have higher rate of antimicrobial resistance.



Source: Albrich, Monnet and Harbarth. *Emerg. Infect. Dis.*, 2004, 10(3):514-7.

#### Patient adherence to treatment: antibiotics and chronic medication

An important aspect of rational use is whether or not patients adhere to their treatment. Many studies show that patients often are not adherent. With regard to antibiotics, a patient survey in 11 countries across the world showed that 22.3% of patients who received antibiotic medication for acute community infections admitted not finishing the therapy. However, adherence rates varied widely across countries. The Asian countries, China and Japan, had the highest admitted non-adherence rates and the two European countries, Italy and the Netherlands, the lowest (18).

Patient adherence to treatment regimes is about 50% worldwide.

The problem of non-adherence is not only relevant for acute complaints, but even more so for chronic diseases. Due to the increasing number of patients suffering from diseases such as diabetes, cardiovascular disease, mental health problems, epilepsy, and chronic obstructive pulmonary disease (COPD) adherence to medication is becoming increasingly important. Overviews that quantify the extent of adherence abound, beginning in 1979 with the classic work of Haynes et al., *Compliance in Health Care*, (28). DiMatteo compiled 50 years of adherence research from 1948 to 1998. She calculated adherence rates in a meta-analysis of 569 studies and found an average non-adherence rate of 24.8% (29). She concluded that adherence is highest in patients with HIV-disease, arthritis, gastrointestinal disorders and cancer, and lowest in patients with pulmonary disease, diabetes mellitus and sleep-disorders. Consistent adherence among patients with chronic conditions is disappointingly low, dropping most dramatically after the first six months of therapy (30). For WHO, Sabaté undertook an overview of adherence for various medical conditions and concluded that it is a complicated problem affected by factors at different levels: social and economic factors, therapy-related factors, patient-related factors, condition-related factors and health system factors (4). Sabaté estimates that adherence to long-term therapies in the general population is around 50%, but lower in developing countries than in western society.

### 1.2.3

### Targeted interventions to improve use of medicines

Both in developing and developed countries numerous interventions studies have been performed to improve the rational use of medicines. The WHO *Fact Book on Medicines Use in Primary Care in Developing and Transitional Countries* summarized such studies for developing countries (3).

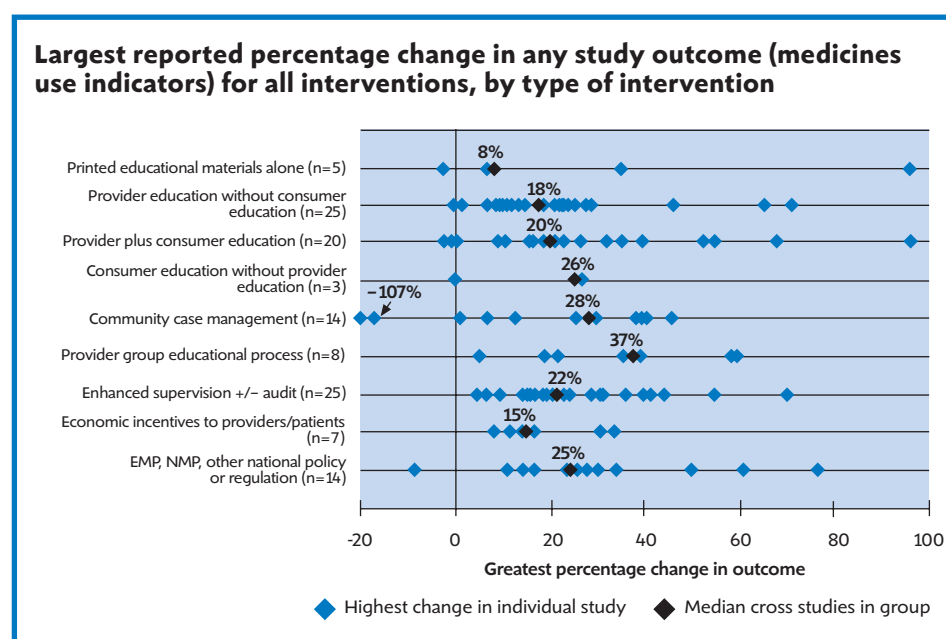
#### 1.2.3.1

#### Targeted interventions in developing and transitional countries

The WHO database of studies on the use of medicines in primary care in developing and transitional countries also contains information on 386 interventions (from 313 studies). Only 121 interventions (from 81 studies) were adequately evaluated (using randomized controlled trial, pre-post with control or time series study design) for their impact on medicines use. Two methods were used to summarize the effects of different types of intervention across studies which used various outcome measures, mostly INRUD and IMCI indicators. Firstly, the largest reported improvement in a key medicines use outcome that was targeted by the individual authors was compared across studies and the results are shown in Figure 1.6. Secondly, a composite indicator of improvement for each study was estimated by calculating the median effect across all outcomes measures reported in the main category of outcomes targeted by the authors. A comparison across studies was then conducted using this composite indicator and the results are shown in Figure 1.7. The second method provides a much more conservative estimate of effect than the first (3).

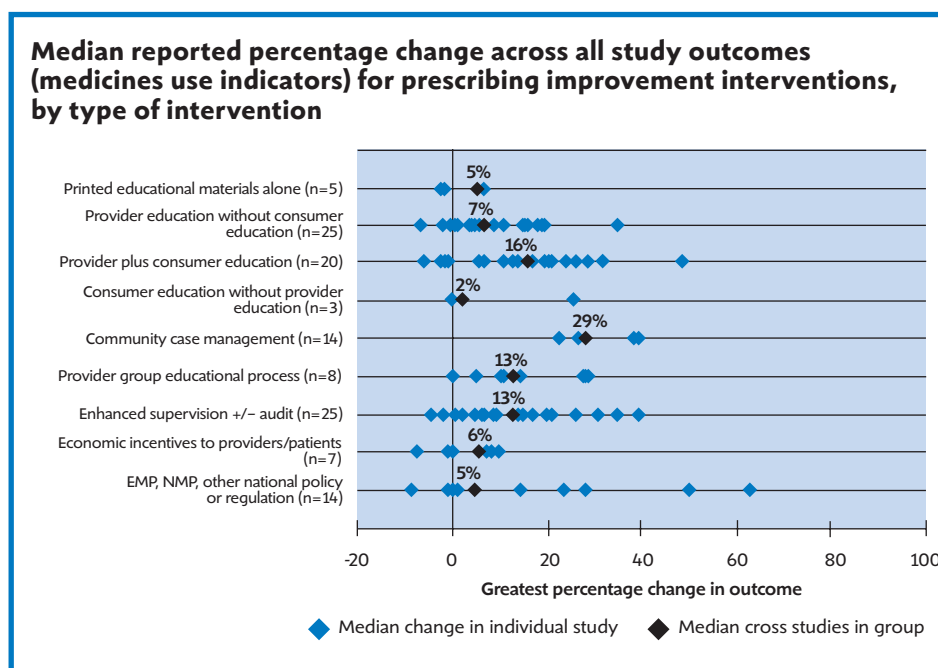
Most of the interventions were educational in nature. It was found that the multi-faceted interventions, involving both educational and managerial components, were more effective than those employing only one strategy. Interventions characterized by provider and consumer education, enhanced health worker supervision and group process educational strategies (such as self monitoring and peer review) were particularly effective. The use of printed materials and national medicine policies alone had limited impact.

FIGURE 1.6



Source: WHO/EMP/MAR/2009.3 (Reference 3).

FIGURE 1.7



Source: WHO/EMP/MAR/2009.3 (Reference 3).

Further analysis (3) showed that the median largest effect size and the median reported percentage change across all study outcomes were respectively:

*Effective interventions to improve use of medicines are generally multi-faceted. Printed materials alone have little effect.*

- 22% and 14% more where there was provider and consumer education with supervision compared to provider and consumer education without supervision, and
- 12% and 10% more where there was an essential medicines programme (with a medicines supply component) compared to a national medicine policy.

Many of these intervention studies and other experiences from developing countries were presented at the first and second international conferences for improving the use of medicines held in Chiang Mai, Thailand, in 1997 and 2004 (ICIUM 1997 and 2004: <http://www.icium.org>). The 2004 conference found that while many successful interventions had been undertaken, global progress remains confined primarily to demonstration projects and that few large scale national projects that could achieve public health impact had been implemented. Three major recommendations were made:

- Countries should implement national medicines programmes to coordinate long-term interventions on multiple levels of the health-care system to improve medicines use in the public and private sectors.
- Successful multi-faceted interventions should be scaled up to national level in a sustainable way, with in-built monitoring systems using valid indicators to monitor the long-term impacts.
- Interventions should address medicines use in the community, particularly focusing on education of children in schools, and provider education in pharmacies and medicine shops in the informal sector, regulation of medicine promotional activities, and involvement of civil society, such as community representatives and professional bodies.



## 1.2.3.2

## Targeted interventions in developed countries

Many types of interventions to improve rational use of medicines have been undertaken in developed countries. In this section we will focus on three subjects: 1) the improvement of guideline adherence by health care professionals, 2) the improvement of patient adherence to medication, and 3) public education.

## Guideline adherence by providers

*A combination of strategies to improve implementation of guidelines is usually most effective.*

Clinical guidelines that give recommendations about appropriate health care aim to improve the quality of care. A wide variety of guidelines has been developed in the last decades for hospitals and physicians. For both acute and chronic diseases, the implementation of guidelines is a complex process and the effects in terms of cost-effectiveness and long-term outcomes in patients are not well-studied (31-34). Research suggests that the implementation of guidelines is enhanced by higher quality of evidence supporting the recommendations, better compatibility of the recommendation with existing values; less complexity of the decision-making needed; more concrete description of the desired performance; and fewer new skills and organizational changes needed to follow the recommendations (33). Also, the baseline level of adherence to recommended practice seems important: in a review on the effect of audit and feedback in improving professional practice, published in 2006, Jamtvedt et al. conclude that effects of these interventions are likely to be greater when baseline adherence is low (35).

In 2004, Grimshaw et al. conducted a review to evaluate several implementation strategies (32). They conclude the following:

- Reminders: the results of intervention studies suggest that reminders are potentially effective and are likely to result in moderate improvements in process of care.
- Educational outreach is often a component of a multifaceted intervention. Combinations of educational materials and educational outreach appeared to be relatively ineffective. As such, educational outreach may result in modest improvements in process of care, which needs to be offset against the resources required to achieve this change and practical considerations.
- Educational materials and audit and feedback showed modest effects. The addition of educational materials to other interventions did not seem to increase the effectiveness of those interventions.
- Multifaceted interventions do not appear to be more effective than single interventions and the effects of multifaceted interventions do not appear to increase with the number of interventions.

However, other review studies in developed countries state that a combination of strategies to improve the implementation of guidelines is usually most effective (31,36). Differences in review findings may relate to whether the review focused on developed or developing countries. In developed countries a single intervention may be as effective as multiple ones due to existing health infrastructure. However, in developing countries, multiple intervention packages often include building infrastructure, such as supervisory systems, which are likely to increase impact.

## Improving patient adherence: limited success

There have been many interventions to improve patient adherence to medication in developed countries. These are diverse in approach and intensity. A number of systematic reviews

have addressed their effectiveness (for example, Haynes et al. (2008), Bosch-Capblanch et al. (2007), Vermeire et al. (2005), (37–39). Van Dulmen et al. (2007) performed a meta review, including 38 review studies — representing over 1300 original studies — on interventions targeted at improving adherence (40). They conclude that effective adherence interventions include technical solutions such as simplifications of dosage and packaging. However, generally interventions on adherence have had varied and rather limited success. Effective interventions for long-term treatment are usually complex including combinations of solutions. But even the most effective interventions do not induce large improvements in both adherence and treatment outcomes (37). Haynes et al. state that “important innovations are more likely to occur if investigators join across clinical disciplines to tackle the problem, and take into account the resistance that many patients have to taking medicines..., perhaps including patients in the development of new interventions” (37). An international expert forum on patient adherence confirmed that interdisciplinary solutions and patient involvement are crucial for the development of interventions, as is the need for interventions that are simple to implement in daily clinical practice (41).

### Public education campaigns: an example

Many European countries have undertaken public education campaigns in recent years to reduce inappropriate overuse of antibiotics. While some of these campaigns have had limited success, others have been very effective (see Boxes 1.1 and 1.2) (42). Box 1.1 shows information on a French programme directed towards antibiotic use.

#### BOX 1.1

##### Public information campaign in France

In 2002, the French National Health Insurance launched a long-term nationwide campaign to decrease antibiotic use in the community by 25%. The campaign targets the use of antibiotics in young children and is repeated every winter, because of the higher level of prescribing during this season.

With the central theme “Antibiotics are not automatic”, the public education campaign is directed at the parents of young children. It highlights issues such as higher consumption rates are linked to higher resistance levels, that antibiotics do not cure viral respiratory infections or even shorten duration of illness, and that it is important to fully respect the treatment duration and dosage prescribed. Information appeared in national media outlets, (prime-time television and radio and newspaper advertisements, and a web site, and in physicians’ offices, including putting booklets, handouts and posters in their waiting rooms). The total number of antibiotic prescriptions per 100 inhabitants decreased by 26.5% over five years (compared to the two years before the campaign was launched), with the greatest decrease observed in children aged 6–15 years (35.8%). In this way the French national campaign has succeeded in reducing unnecessary use of antibiotics.

*Source:* Sabuncu E et al. Significant reduction of antibiotic use in the community after a nationwide campaign in France. 2002–2007, *PLoS Med*, 2009; 6(6):e1000084.

#### 1.2.4

### National policies to improve rational use of medicines

National policies, as well as interventions, can influence the rational use of medicines. WHO recommends that countries implement the following national policies to encourage or ensure more appropriate use of all medicines (2):

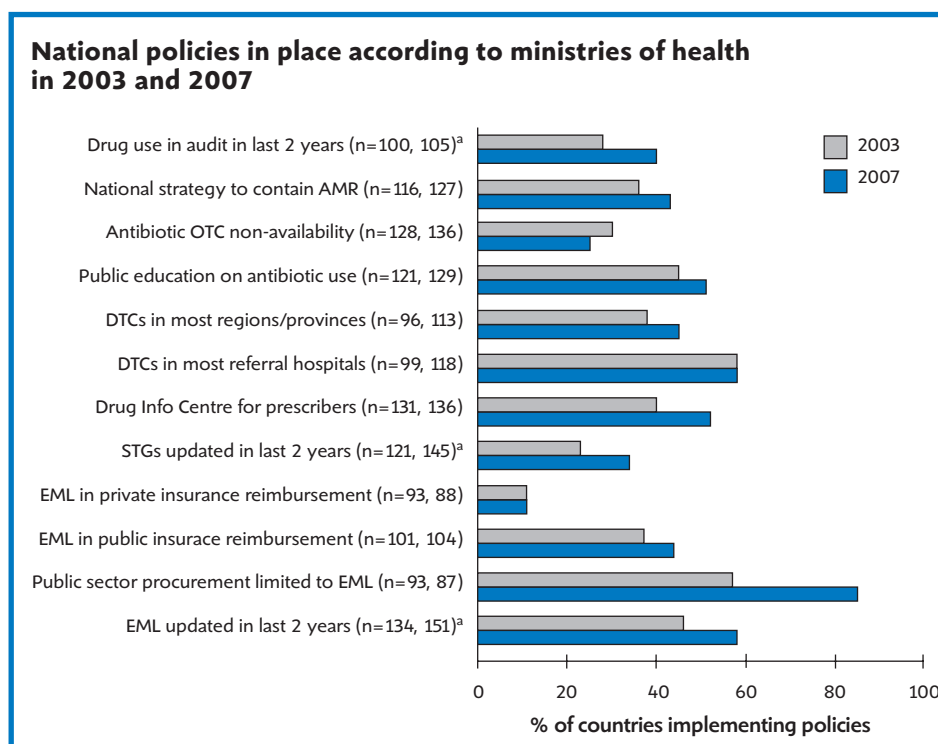
- establishing a mandated multidisciplinary national body to coordinate policies on medicines use and monitor their impact;

- formulating and using evidence-based clinical guidelines or standard treatment guidelines (STGs) for training, supervision and supporting critical decision-making about medicines;
- selecting, on the basis of treatments of choice, lists of essential medicines (EMLs) that are used in medicine procurement and insurance reimbursement;
- setting up drug (medicine) and therapeutics committees (DTCs) in districts and hospitals to improve the use of medicines;
- promoting problem-based training in pharmacotherapy in undergraduate curricula;
- making continuing in-service medical education a requirement of licensure;
- promoting systems of supervision, audit and feedback in institutional settings;
- providing independent information (including comparative data) about medicines;
- promoting public education about medicines;
- eliminating perverse financial incentives that lead to irrational prescribing;
- drawing up and enforcing appropriate regulation, including regulations to ensure that medicinal promotional activities are in keeping with the WHO Ethical Criteria for Medicinal Drug Promotion adopted in resolution WHA41.17 (see chapter on medicines promotion);
- reserving sufficient governmental expenditure to ensure equitable availability of medicines and health personnel.

WHO has also created a database on pharmaceutical policy based on a questionnaire that is sent to ministries of health once every four years. The last two such surveys were done in 2003 and 2007. Figures 1.8 and 1.9 show the results for 2003 and 2007 (5,43). Figure 1.8 shows that less than half of all countries are implementing many basic policies to encourage rational use of medicines, even though the proportion of countries implementing many policies has increased slightly from 2003 to 2007. Thus, for example, less than half of countries regularly monitor the use of medicines, update their STGs every two years, have a medicine information centre for prescribers, or have DTCs in the majority of their hospitals or regions.

Many countries allow OTC sales of antibiotics, some have run public education programmes on antibiotics but few have a national strategy to contain AMR, as is recommended by WHO (44). Although there appears to have been a big increase in the number of countries limiting public sector procurement exclusively to essential medicines still only a minority of countries are using the EML in insurance reimbursement. Figure 1.9 shows that the undergraduate training of doctors, nurses and paramedical staff has changed very little between 2003 and 2007. Only about 60–70% of countries stated that they trained their medical students on various aspects of prescribing and only about 50% required any form of continuing medical education. The basic training for nurses and paramedical staff, who often do the majority of prescribing, was even less, only about 40% of countries giving them any basic training on prescribing concepts, the EML, STGs or pharmacotherapy. The situation is probably even worse than described here because many policies that ministries of health state are in place are, in fact, poorly implemented. Furthermore, in both 2003 and 2007, about 27% of ministries of health mentioned that revenue from the sale of medicines is used to pay for or supplement health worker salaries and this is a serious incentive for over-prescribing. The existence of most policies tended to be higher in high-income compared to low-income countries (5).

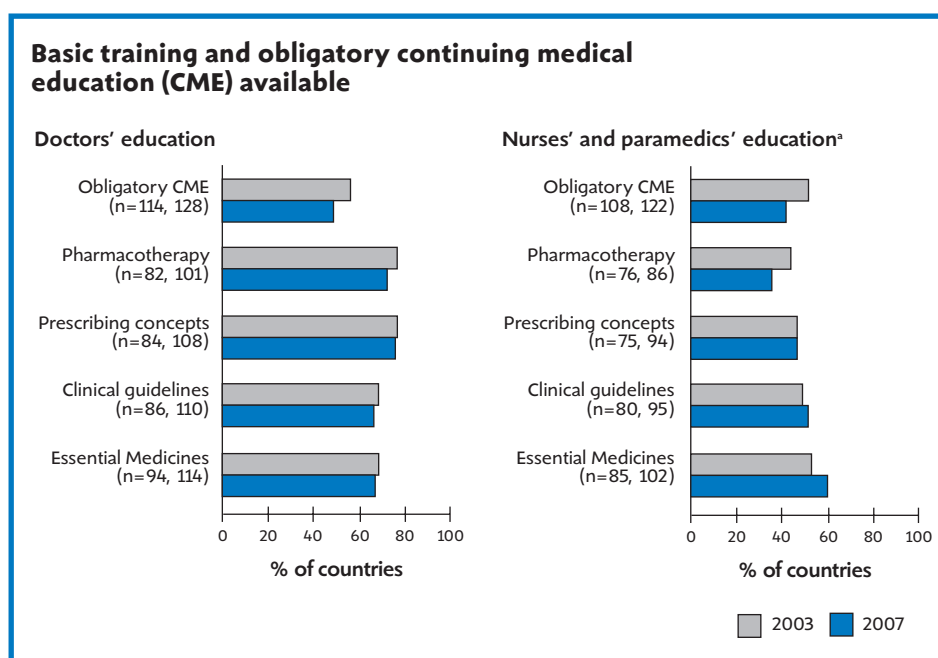
FIGURE 1.8



<sup>a</sup> Over half of countries responding to this question did not give a date and were assumed not to have done a drug use audit or updated the EML/STG in the last 2 years; n = the number of countries responding to the question, the first number in 2003 and the second number in 2007.

Source: Level 1 pharmaceutical policy surveys 2003 and 2007.

FIGURE 1.9



<sup>a</sup> For prescribing concepts in undergraduate education, an average was estimated across nurses and paramedics.

Source: Level 1 pharmaceutical policy surveys 2003 and 2007.

Austvoll-Dahlgren et al. undertook a review that evaluated policies to improve drug use or to save drug spending (or both) which were implemented by governments, non-government agencies and health insurance companies (45). They evaluated five policies that made patients financially contribute for their medicines while filling their prescription in the pharmacy. These five included: 1) caps, which means that patients receive reimbursement for this medicine up to a maximum amount and have to pay the rest themselves; 2) fixed co-payments, where patients pay a fixed amount per prescription or medicine; 3) tier co-payments, where co-payment depends, for example, on whether the prescribed medicine is a generic or not; 4) co-insurance, meaning that patients pay a proportion of the medicine's price and 5) ceilings, which means that patients pay a maximum amount (e.g. per year) and do not pay once they have reached this maximum. The review showed that cap and co-payment policies have the potential to decrease overall medicines use and the costs for health insurers. These decreases were also found for medicines that are important in treating chronic conditions, which made the authors warn against potential negative consequences. Thus there is a potential imbalance between quality and costs, which should be taken into account. In 2000, Australia tried to find such balance by formally adopting the National Medicines Policy with as its overall policy goal "to meet medication and related service needs, so that both optimal health outcomes and economic objectives are achieved" (46). For that purpose the National Prescribing Service was established (see Box 1.2).

Only a few studies have evaluated the impact of national policies on medicines use. One such study was done in the Republic of Korea, where a national policy, introduced in 2000, prohibiting dispensing by GPs, was associated with a reduction in antibiotic use from 80.3% to 72.8% of viral illness episodes and from 91.6% to 89.7% for bacterial illness episodes (47). Another study was done in Chile, where a new regulation in 2000 prohibiting the dispensing of antibiotics without prescription by private retail outlets was associated with a reduction in overall sales of antibiotics in the private sector – from 0.34 DDD/1000 inhabitant-days (US\$37,603,688) in 1996 to 0.25 DDD/1000 inhabitant-days (US\$32,141,856) in 2000 (48).

### 1.3

### FUTURE CHALLENGES AND PRIORITIES

Irrational use of medicines is a global public health crisis and the lack of investment to improve the situation is a major challenge for the future. In order to advocate for more investment, more research must be done and informational needs addressed.

#### 1.3.1

#### Unaddressed global public health crisis of irrational use of medicines

There is now substantial global evidence for continuing irrational use of medicines. Less than 40% of patients in the public sector and less than 30% in the private sector are treated in accordance with existing guidelines, and the situation is not improving in either developing or transitional countries. Likewise, in developed countries there is much evidence of irrational use of medicines. While much intervention research has been undertaken and effective interventions identified for improving the use of medicines, few of these interventions have been scaled up to national level. Furthermore, about half of all countries are not implementing many basic policies recommended by WHO to promote rational use of medicines. Many health system factors and stakeholders influence the use of medicines and due to these complex underlying factors, it has been recommended that countries develop a coordinated national approach to promoting rational use of medicines and containing antimicrobial resistance (ICIUM 2004, WHO 2001). Furthermore, WHO Member States endorsed such a coordinated approach in adopting Resolutions WHA 58.27 in 2005 and WHA60.16 in 2007 (49,50).

*Countries should develop a coordinated national approach to promoting rational use of medicines and containing antimicrobial resistance.*

## BOX 1.2

**Antibiotic programmes of the National Prescribing Service in Australia**

Australia has an extensive National Medicines Policy (see also chapter on medicine policy). One of its main objectives is Quality Use of Medicines (QUM). In 1998, the National Prescribing Service (NPS) was established to undertake work in QUM. Its purpose is to support the best use of medicines to improve health and well-being. The NPS provides health professionals and consumers access to information and other supports for good prescribing and medicines use decisions. For health professionals this includes professional education activities (e.g. peer group meetings and meetings with QUM facilitators [academic detailing], case studies, clinical audits and pharmacy practice reviews) and access to a range of information resources (e.g. new medicines information [NPS Radar], therapeutic topic reviews [NPS News], a journal on drug and therapeutic issues [Australian Prescriber]) via a variety of channels (e.g. print, web, prescribing software). In addition, medical and pharmacy students use the National Prescribing Curriculum, a set of online learning modules modelled on the WHO manual, *Guide to Good Prescribing*. Consumers have access to a range of information resources (e.g. new medicines information [Medicines Update], factsheets on medicines [Consumer Medicines Information] and about managing your medicines [Medicines Talk], and on topics such as help with managing common colds. Mass media campaigns are run from time to time and work is undertaken with specific groups in the community (e.g. seniors).

The NPS ran seven antibiotic programmes for general practitioners (GPs) and pharmacists between 1999 and 2009. Key messages of these programmes were: “antibiotics are not indicated for most upper respiratory tract infections” and “when indicated amoxicillin is generally first line”, and they have been consistent with national clinical practice guidelines (*Therapeutic Guidelines*). At first GP participation was low but in 2005, 5000 GPs took part in the programme through academic detailing or clinical audits. All campaigns included prescribing feedback and newsletters. In addition, consumer campaigns have been run regularly since 2000 to make the public aware that antibiotics are not effective for coughs and colds. The campaigns involved promotion of key messages through local newsletters, radio, TV, storybooks and distribution of resources to all GPs and community pharmacies. The campaigns cost Aus\$1 million in 2007 and Aus\$500,000 in 2008. During this past decade of provider and consumer education campaigns, it was found that the number of prescriptions for those antibiotics commonly used for upper respiratory tract infections declined from 80 per 1000 consultations in 1996 to 50 per 1000 consultations in 2007. Furthermore, the number of prescriptions for all antibiotics fell from 15.5 per 100 encounters in 1999 to 13.25 per 100 encounters in 2007.

*Source:* National Prescribing Service, Australia: <http://www.nps.org.au> and personal communication from Lynn Weekes and Jonathan Dartnell of NPS.

A major reason for this failure to adopt a coordinated approach is that promoting rational use of medicines has not been “institutionalized” within health systems in many countries and so there is no structure to undertake the necessary monitoring and coordination of policy. While many rich nations have adapted their health systems to address this issue by setting up national systems for medicines selection, prescription monitoring and obligatory continuing medical education, few low- and middle-income countries have done this. Although such efforts in rich countries may seem to be piecemeal and not within a national programme, they are effective because they are implemented within an existing coordinated underlying national infrastructure, including strong health insurance systems. Such an infrastructure often non-existent in low- and middle-income countries where there may be a need for a different national model which is cost-effective (due to the inevitable resource limitations). A major challenge will be to adapt health systems to “institutionalize” promotion of the rational use of medicines and incorporate the necessary structures within their health systems.

### 1.3.2

#### Lack of investment in promoting rational use of medicines

At present there appears to be relatively little investment in promoting rational use of medicines. Restructuring health systems on the lines mentioned above and undertaking the necessary monitoring and implementation of interventions and policy will require significant extra investment. It could be argued that such investment would be paid back many times over by the savings from better use of medicines, particularly reduced misuse (46). However, these savings would take some time to achieve and thus might not be felt by the investing government, particularly in health systems where there is a very large private sector and most medicines are paid for out-of-pocket by patients and not by government.

In developed and some transitional countries, where a large proportion of the population is covered by health insurance, the health insurance agency may play a significant role in promoting rational use of medicines by only reimbursing prescriptions that comply with guidelines or that contain essential medicines. In some high- and middle-income countries insurance agencies are reimbursing medicines according to whether they are essential medicines, generic medicines or approved for a certain use. However, in many low-income countries, insurance coverage is low and there is insufficient infrastructure to establish health insurance in the short term. A major future challenge will be to persuade governments, donors, and the international community to invest sufficiently in promoting rational use of medicines.

An added challenge is that while governments are not investing in promoting more prudent use of medicines, the pharmaceutical industry is promoting increased use of its products. Globally, most prescribers receive most of their prescribing information from the pharmaceutical industry and in many countries this is the only information they receive. Unfortunately, information from the industry may be biased, and the huge imbalance in expenditure between industry and government with regard to providing prescribers with adequate information needs to be addressed urgently (see the chapter on medicine promotion).

### 1.3.3

#### Research and informational needs

Much is now known about medicines use in primary care and how to improve it (even if few governments have adopted proven interventions on a national scale). However, relatively little is known globally about medicines use outside of primary care facilities and how to promote rational use of medicines in these settings. Particular areas that need further research include:

- community use of medicines, including informal medicine sellers in the private sector;
- prescribing and dispensing in the private sector where financial incentives encourage over use of medicines and the use of more expensive medicines;
- hospital use, particularly with regard to antibiotic use in developing countries;
- establishing quality assurance mechanisms on prescribing, including monitoring systems, supervisory systems and DTCs;
- national policy implementation and monitoring;
- improving adherence in patients with chronic diseases, particularly since there will be a global increase in the number of patients who need chronic medication (see chapter 2).



Unlike the situation for medicines use in primary care, for which robust standardized indicators to assess use have been developed and utilized, equivalent indicators have yet to be developed for those areas requiring further research listed above (i.e. indicators to assess medicines use in hospitals, communities and the informal sector, indicators to assess patient adherence and indicators on the functionality of DTCs, and the degree of implementation of national policies). This makes monitoring progress difficult, if not impossible. Future areas of research should include the development of standardized indicators in each of the above areas. While the urgent need for indicator development may seem more obvious in some areas, such as hospital or community use or adherence to treatment, it equally applies to the areas of policy implementation, and functional supervisory systems and DTCs. Without the latter, progress in improving the rational use of medicines will remain extremely limited.

## REFERENCES

1. *The rational use of drugs. Report of the Conference of Experts*. Geneva, World Health Organization, 1985.
2. *Promoting rational use of medicines: Core components*. WHO Policy Perspectives on Medicines, No.5. Geneva, World Health Organization, 2002. Available at: <http://apps.who.int/medicinedocs/pdf/h3011e/h3011e.pdf>
3. *Medicines use in primary care in developing and transitional countries: Fact book summarizing results from studies reported between 1990 and 2006*. Geneva, World Health Organization, 2009. Available at: [http://www.who.int/medicines/publications/primary\\_care\\_8April09.pdf](http://www.who.int/medicines/publications/primary_care_8April09.pdf)
4. Sabaté E. *Adherence to long-term therapies. Evidence for action*. Geneva, World Health Organization, 2003.
5. *Using indicators to measure country pharmaceutical situations: Fact book on WHO Level I and Level II monitoring indicators*. Geneva, World Health Organization, 2006. Available at: <http://apps.who.int/medicinedocs/index/assoc/s14101e/s14101e.pdf>
6. White TJ, Araekelian A, Rho JP. Counting the costs of drug related adverse events. *Pharmacoeconomics*, 1999, 15(5):445–458.
7. Lazarou J, Pomeranz BH, Corey PN. 1998. Incidence of adverse drug reactions in hospitalized patients: A meta-analysis of prospective studies. *Journal of the American Medical Association*, 279(15):120–125.
8. Hitchen L. Adverse drug reactions result in 250 000 UK admissions a year. *British Medical Journal*, 2006, 332:1109. Available at: <http://www.bmj.com/cgi/reprint/332/7550/1109>
9. Pirmohamed M et al. Adverse drug reactions as cause of admission to hospital: Prospective analysis of 18,820 patients. *British Medical Journal*, 2004, 329:15–19. Available at: <http://www.bmj.com/cgi/reprint/329/7456/15>
10. Reducing and preventing adverse drug events to decrease hospital costs. *Research in Action*, Issue 1, March 2001. Agency for Healthcare Research and Quality. Available at: <http://www.ahrq.gov/qual/aderia/aderia.htm>
11. Institute of Medicine. *Microbial threats to health: emergence, detection and response*. Washington, D.C., National Academies Press, 1998.

12. *Resistance: a sensitive issue. The European roadmap to combat antimicrobial resistance*. Utrecht, The Strategic Council on Resistance in Europe, 2004.
13. Simonsen L et al. Unsafe injections in the developing world and transmission of bloodborne pathogens: a review. *Bulletin of the World Health Organization*, 1999; 77(10): 789–800. Available at:  
[http://www.who.int/injection\\_safety/toolbox/Simonsen.pdf](http://www.who.int/injection_safety/toolbox/Simonsen.pdf)
14. Livermore DM. Bacterial resistance: Origins, epidemiology, and impact. *Clinical Infectious Diseases*, 2003, 36(Suppl. 1):S11–S23.
15. Levy SB. Antibiotic resistance: The problem intensifies. *Adverse Drug Delivery Reviews*, 2005, 57:1446–1450.
16. Harbarth S, Samore MH. Antimicrobial resistance determinants and future control. *Emerging Infectious Diseases*, 2005, 11:794–801.
17. Kaplan W, Laing R. *Priority medicines for Europe and the world*. Geneva, World Health Organization, 2004. Available at: <http://hinfo.humaninfo.ro/gsdldata/collect/medicinedocs/index/assoc/s14208e/s14208e.pdf>
18. Pechère JC et al. Non-compliance with antibiotic therapy for acute community infections: a global survey. *International Journal of Antimicrobial Agents*, 2007, 29:245–253.
19. Grigoryan L. *Self-medication with antibiotics in Europe and its determinants*. Dissertation, Groningen University, 2007.
20. Lansang M et al. Purchase of antibiotics without prescription in Manila, the Philippines: Inappropriate choices and doses. *Journal of Clinical Epidemiology*, 1990, 43(1):61–67.
21. Van der Geest S, Hardon A. Self-medication in developing countries. *Journal of Social and Administrative Pharmacy*, 1990, 7(4):199–204.
22. *How to investigate drug use in health facilities: Selected drug use indicators*. Geneva, World Health Organization, 1993. Available at:  
<http://apps.who.int/medicinedocs/pdf/s2289e/s2289e.pdf>
23. *Indicators for IMCI at first-level facilities and households (Rev 1)*. Geneva, World Health Organization, 2001. Available at:  
<http://www.paho.org/English/AD/DPC/CD/imci-indicators-7-01.pdf>
24. Goossens H et al. European Surveillance of Antimicrobial Consumption Project Group. Comparison of outpatient systemic antibacterial use in 2004 in the United States and 27 European countries. *Clinical Infectious Diseases*, 2007, 44:1091–1095.
25. Grigoryan L et al. Self-medication with antimicrobial drugs in Europe. *Emerging Infectious Diseases*, 2006, 12(3):452–459.
26. Goossens H. Antibiotic consumption and link to resistance. *Clinical Microbiology and Infection*, 2009, 15(Suppl. 3):S12–S15.
27. Van Roosmalen MS et al. Antibiotic prescribing in primary care: First choice and restrictive prescribing are two different traits. *Quality and Safety in Health Care*, 2007, 16(2):105–109.
28. Haynes RB, Taylor DW, Sackett DL. *Compliance in health care*. Baltimore, MD, The Johns Hopkins University Press, 1979.

29. DiMatteo MR. Variations in patients' adherence to medical recommendations: A quantitative review of 50 years of research. *Medical Care*, 2004, 42:200–209.
30. Myers LB, Midence K. *Adherence to treatment in medical conditions*. Amsterdam, Harwood Academic Publishers, 1998.
31. Francke AL et al. Factors influencing the implementation of clinical guidelines for health care professionals: A meta-review. *BMC Medical Informatics and Decision Making*, 2008, 8:38.
32. Grimshaw JM et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment*, 2004, 8(6):iii–iv, 1–72.
33. Grol R, Grimshaw J. From best evidence to best practice: Effective implementation of change in patients' care. *Lancet*, 2003, 362:1225–1230.
34. Lu CY et al. Interventions designed to improve the quality and efficiency of medication use in managed care: A critical review of the literature — 2001–2007. *BMC Health Services Research*, 2008, 8:75.
35. Jamtvedt G et al. Audit and feedback: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*, 2006, 19(2):CD000259.
36. Wensing M, van der Weijden T, Grol R. Implementing guidelines and innovations in practice: which interventions are effective? *British Journal of General Practice*, 1998, 48:991–997.
37. Haynes RB et al. Review: Evidence on the effectiveness of interventions to improve patient adherence to prescribed medications is limited. *Evidence-based Nursing*, 2008, 11(4):109.
38. Bosch-Capblanch X et al. Contracts between patients and healthcare practitioners for improving patients' adherence to treatment, prevention and health promotion activities. *Cochrane Database of Systematic Reviews*, 2007, (2):CD004808.
39. Vermeire E et al. Interventions for improving adherence to treatment recommendations in people with type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews*, 2005, (2):CD003638.
40. van Dulmen S et al. Patient adherence to medical treatment: A review of reviews. *BMC Health Services Research*, 2007, 7:55.
41. van Dulmen S et al. International Expert Forum on Patient Adherence. Furthering patient adherence. A position paper of the International Expert Forum on Patient Adherence based on an internet forum discussion. *BMC Health Services Research*, 2008, 8:47.
42. Huttner B et al. CHAMP Consortium. Characteristics and outcomes of public campaigns with the aim to improve outpatient antibiotic use in high income countries. *Lancet Infectious Diseases*, 2010; 10(1):17–31.
43. Country pharmaceutical situations. Fact book on WHO Level 1 indicators 2007. Geneva, World Health Organization, 2009. Available at:  
<http://apps.who.int/medicinedocs/documents/s16874e/s16874e.pdf>
44. WHO global strategy for containment of antimicrobial resistance. Geneva, World Health Organization, 2001. Available at: [http://www.who.int/csr/resources/publications/drugresist/en/EGlobal\\_Strat.pdf](http://www.who.int/csr/resources/publications/drugresist/en/EGlobal_Strat.pdf)

45. Austvoll-Dahlgren A et al. Pharmaceutical policies: Effects of cap and co-payment on rational drug use. *Cochrane Database of Systematic Reviews*, 2008, 23(1):CD007017.
46. *National medicines policy 2000*. Canberra, Commonwealth Department of Health and Aged Care, 2000. Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/nmp-objectives-policy>
47. Park S et al. Antibiotic use following a Korean national policy to prohibit medication dispensing by physicians. *Health Policy and Planning*, 2005, 20(5):302-309.
48. Bavestrello L, Cabello A, Casanova D. Impact of regulatory measures in the trends of community consumption of antibiotics in Chile. *Revista Médica Chile*, 2002, 130(11):1265-1272.
49. World Health Assembly Resolution 58.27. *Improving the containment of antimicrobial resistance*. Geneva, World Health Organization, 2005.
50. World Health Assembly Resolution 60.16. *Progress in the rational use of medicine*. Geneva, World Health Organization, 2007.

## ABBREVIATIONS

AMR	Antimicrobial Resistance
ATC	Anatomical Therapeutic Classification
ARI	Acute Respiratory Tract Infection
CME	Continuing Medical Education
COPD	Chronic obstructive pulmonary disease
DDD	Defined Daily Dose
DTC	Drug (medicine) and Therapeutics Committee
EML	Essential Medicines List
ESAC	European Surveillance of Antibiotic Consumption
GPs	General Practitioners
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICIUM	International Conference for Improving the Use of Medicines
INRUD	International Network for Rational Use of Medicines
IMCI	Integrated Management of Childhood Illness
NPS	National Prescribing Service
ORS	Oral Rehydration Solution
OTC	over-the-counter
QUM	Quality Use of Medicines
STG	Standard Treatment Guidelines
WHA	World Health Assembly
WHO	World Health Organization
URTI	Upper Respiratory Tract Infection
USA	United States of America



# THE WORLD MEDICINES SITUATION 2011

## PROCUREMENT OF MEDICINES

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Public sector health-care procurement systems can play an important role in helping countries achieve the Millennium Development Goals.
- Public sector procurement of medicines in developing countries occurs mainly at two levels – the national level and the international level – with multilateral agencies playing an increasingly significant role. However a number of countries have chosen to decentralize their national procurement process as part of health sector reforms or in an effort to meet local needs through increased local involvement, accountability and flexibility.
- At the national level, developing countries are faced with increasing tasks and responsibilities for procurement of quality medicines, but often have limited financial resources, procurement capacity, and regulatory capacity for meeting these obligations.
- At the international level, efforts by bilateral donor and multilateral agencies to address these limitations and support access to medicines include: new funding, procurement, and pricing mechanisms; supporting prequalification systems for selected medicines to address limited quality assurance capacity at the national level; and strengthening country procurement systems.
- There is increased global recognition of the continuing need to strengthen developing country health-care procurement systems through a comprehensive, system-wide approach to capacity building.



## 1.1

*Systemic and operational challenges still exist in national-level public sector health-care procurement.*

## BACKGROUND/INTRODUCTION

This chapter looks at public sector procurement of medicines. The procurement process is one of several critical, interrelated components of the public sector health-care supply system. These components include product manufacturing, product selection, product quantification, financing, regulatory control, quality assurance, distribution and service provision.<sup>1</sup> In 2005, the Organisation for Economic Co-operation and Development (OECD) noted that “Effective and efficient public sector procurement systems are essential to the achievement of the Millennium Development Goals and the promotion of sustainable development.”<sup>(1)</sup> The chapter outlines the current situation in public sector health-care procurement, identifying some of the common financial, policy and operational constraints that exist and the efforts that have been made at the national and international levels over the past decade to address them. While new funding, procurement and pricing mechanisms implemented by multilateral agencies and donors have improved public sector access to medicines, significant systemic and operational challenges still exist in national level public sector health-care procurement. Addressing these challenges will require strong commitment at the national government level, and continued multilateral agency and donor engagement and support, including capacity building that is harmonized and conducted on a system-wide basis.

## 1.2

## CURRENT SITUATION

## 1.2.1

## Procurement models and methods

The majority of public sector health-care procurement occurs mainly at two operational levels – at the national/country level through the use of different procurement models, and at the international level through the funding mechanisms and procurement activities of multilateral agencies and bilateral donors.

## 1.2.1.1

## National level procurement

A number of different procurement models are used by developing country governments for procuring medicines and health commodities. The more common procurement models include:

- **Centralized procurement.** At the national level, the traditional model for public sector health-care procurement has been one in which a centralized government procurement agency (e.g. a central medical store) or a government procurement unit under the ministry of health is tasked with the responsibility for procuring consolidated national health-care requirements on the local and international market.
- **Parastatal organization or autonomous supply agency.** These are similar to central medical stores in that the procurement activity is centralized. A parastatal organization is owned or governed wholly or partly by the government, but has been granted autonomy to develop its own financial and procurement regulations. The Kenya Medical Supplies Agency (KEMSA) is one example of a parastatal organization. An autonomous supply agency also performs a centralized procurement function but is managed by an independent agency reporting to the government. The Medical Stores Depot (MSD) in the United Republic of Tanzania is an example of an autonomous supply agency. Both organizations are overseen by a board of directors that includes non-government representatives (2).

<sup>1</sup> In this chapter, the discussion of public sector health-care procurement includes procurement of pharmaceuticals, medical devices and other health products in the public sector.

*The procurement method chosen depends on national policies and regulations, funder requirements, procurement expertise available, management capacity, quality assurance capabilities and product price.*

- **Decentralized procurement.** A growing number of countries have chosen to decentralize their national procurement process as part of health-sector reforms or in an effort to meet local needs through increased local involvement, accountability and flexibility. Decentralized procurement devolves varying degrees of procurement responsibility from the national level to the regional, district or municipal levels (2,3,4).
- **Procurement agents.** Often used when government procurement capacity is limited or in response to funder requirements, there are several types of procurement agencies that provide medicines and health-care commodities. These include UN agencies, such as the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP) and the United Nations Population Fund (UNFPA), and international nongovernmental supply agencies, such as the IDA (International Dispensary Association) Foundation and Imres. In addition to sourcing products for sale to public-sector agencies, the UN agencies involved offer reimbursable procurement services. They have also established framework contracts with suppliers that can allow for shorter procurement lead times. Procurement agents typically charge a handling fee for their services, which can range from 3% to 10% of the value of the goods procured. There are also private-sector commercial groups, such as Crown Agents and Charles Kendall, that provide procurement services at a negotiated contract price.

The public-sector procurement models discussed above use several different procurement methods to obtain medicines and health-care commodities. The more common methods include:

- **Competitive bidding.** This process uses standardized public sector procedures for high-financial-value transactions when there is more than one potential supplier. The competition engendered through this method is designed to elicit favourable prices. The three predominant types of competitive bidding include International Competitive Bidding, Limited International Competitive Bidding and National Competitive Bidding.
- **Small-scale competition.** Used for low-financial-value transactions, this method is also referred to as shopping and includes direct procurement. Offers are requested from suppliers and prices may be negotiated.
- **Sole-source procurement.** Under this method, contracts are issued without competition in cases when only a single supplier is available or when required to address an emergency situation (5).

The use of a particular procurement method is determined by factors such as national procurement policies and regulations, funder requirements, procurement expertise, management capacity, quality assurance capacity, and the impact on product price.

### 1.2.1.2

### Regionally-focused pooled procurement

In addition to the public-sector health-care procurement that occurs at a national level, there are a few established, regionally-focused pooled procurement models that provide procurement services for member countries. These include the Pan American Health Organization's (PAHO) Expanded Program on Immunization (EPI) Revolving Fund for vaccines and the PAHO Strategic Fund,<sup>1</sup> the Organization of Eastern Caribbean States/Pharmaceutical

<sup>1</sup> See PAHO web site [http://www.paho.org/english/hvp/hvi/revol\\_fund.htm](http://www.paho.org/english/hvp/hvi/revol_fund.htm) for additional information on the Revolving Fund for Vaccines.

Procurement Service (OECS/PPS),<sup>1</sup> and the Gulf Cooperation Council group-purchasing programme. These agencies pool member product requirements, establish financing mechanisms (as in the case of PAHO's and OECS/PPS's revolving funds), adhere to a prequalification process, and promote secure and timely payment arrangements that minimize suppliers' risk, all of which help to ensure timely delivery of quality medicines and vaccines at favorable prices (6,7,8,9).

### 1.2.1.3

### International/multilateral-level funding and procurement mechanisms

At the international level, funding for and procurement of medicines and health-care commodities for developing country programmes have historically been addressed by donor agencies – such as the US Agency for International Development (USAID), the UK Department for International Development (DFID), the Japan International Cooperation Agency (JICA), the Norwegian Agency for Development Cooperation (NORAD) and the Canadian International Development Agency (CIDA) – in the form of bilateral aid and donated medicines, requiring little or no procurement activity by the recipient country. While bilateral aid continues to play a significant role in providing access to medicines, beginning in the 1990s, credits and grants from development banks, such as the World Bank, were used to support Sector-Wide Approaches (SWAs) and basket funding to recipient countries. SWAs and basket funding, in which donors and lending institutions pool and directly transfer funds to recipient countries, are now playing an important role in the financing and procurement of commodities for government health-care programmes (2).

## 1.3

## TRENDS OVER THE PAST FIVE TO TEN YEARS

### 1.3.1

### Developing countries are receiving increased funding to procure medicines for their health-care programmes

Over the past decade, the increased use of SWAs, basket funding and Global Fund financing has increased the amount of direct budgetary support available to countries for medicines and health-care supplies. This increase in direct budgetary support has resulted in a corresponding increase in country-level procurement of medicines and health-care supplies. The budgetary support is often accompanied by funder procurement requirements designed to promote transparent and efficient procurement. However, compliance with funder procurement requirements, such as those of the World Bank, may be new to country-level procurement agencies and can place an additional burden on the procurement system.

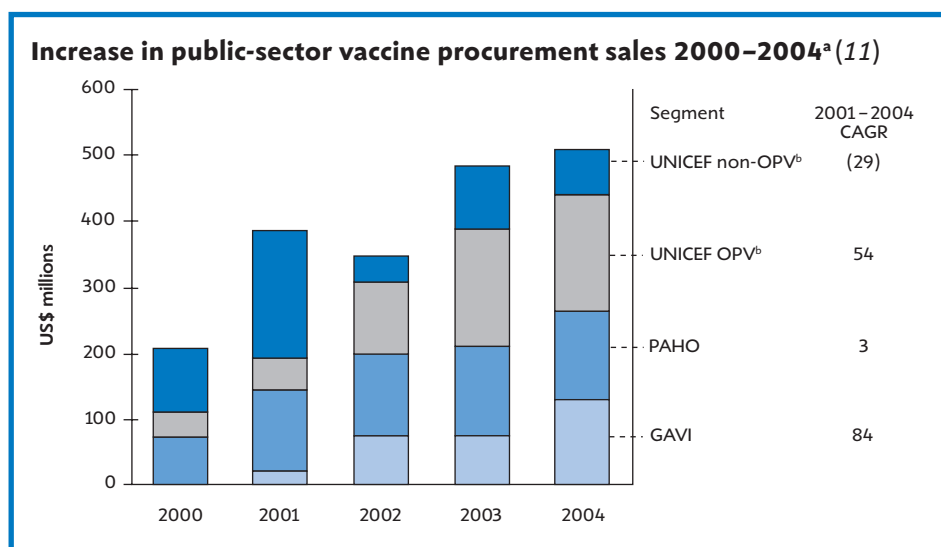
*Over the past decade, increased funding for medicines procurement has been made available by global financing initiatives which may have their own procurement requirements.*

Another factor in the increase in country-level procurement is the donor practice of phasing out direct support to countries that are considered to be no longer in need of such support. For example, in several countries USAID has phased out direct donations of contraceptives. As a result, these countries have had to take responsibility for establishing new procurement methods for addressing their contraceptive needs (10).

There has also been a general increase in pharmaceutical expenditures across all countries. As noted in the chapter on Medicine Expenditures, per capita pharmaceutical expenditures in high-income countries were 1.94 times greater in 2005 than in 1996. Over the same period, expenditures were 1.64 times greater in upper-middle-income countries, 1.66 times greater in lower-middle-income countries and 1.78 times greater in low-income countries. One illustration of the increase in health-care commodity expenditures is seen in the rise in public-sector vaccine procurement sales from 2000 to 2004 as noted in Figure 1.1.

<sup>1</sup> See OECS web site <http://www.oecs.org/pps> for additional information on the Pharmaceutical Procurement Service.

FIGURE 1.1



<sup>a</sup> CAGR = Compound annual growth rate. Assumes constant rate of growth from first year to last year.

<sup>b</sup> OPV = Oral polio vaccine

Efforts to effectively manage this resulting increase in procurement responsibility are challenging for many developing countries as their procurement systems often lack capacity in areas ranging from creating proper bidding documents, evaluating bids and awarding contracts, to managing contracts. These problems are often compounded by limited financial resources, a lack of process transparency (see the chapter on Good Governance), and a lack of understanding of the complexity and time requirements of the public sector procurement process (1).

The increase in national procurement also imposes increased responsibility on public-sector procurement systems and national regulatory authorities (NRAs) to ensure that procured medicines comply with regulatory requirements. Medicine quality assurance is a complex process that requires an effective regulatory system with adequate testing capacity to verify product quality (see the chapters on Medicines Regulation and Quality Assurance).

National regulatory authorities in some developing countries do not have the required infrastructure, resources and technical expertise to fully implement the range of functions required to ensure product quality. A 2007 WHO review of NRAs in vaccine-producing countries determined that only 70% of the countries adequately performed the six regulatory functions that WHO deems critical for vaccine quality assurance.<sup>1</sup>

### 1.3.2

#### Activities to improve access to quality-assured medicines

Recognizing the constraints faced by public-sector procurement and regulatory systems in developing countries, donors and multilateral agencies have introduced new funding and procurement and pricing mechanisms to increase country access to quality medicines. The efforts also include prequalification (PQ) of selected medicines and strengthening country regulatory systems.

<sup>1</sup> The six critical functions are: 1) a published set of requirements for licensing; 2) surveillance of vaccine field performance; 3) a system of lot release; 4) use of laboratory when needed; 5) regular inspections for good manufacturing practices; and 6) evaluation of clinical performance. For additional information see: [http://www.who.int/immunization\\_standards/national\\_regulatory\\_authorities%20role/en/index.html/](http://www.who.int/immunization_standards/national_regulatory_authorities%20role/en/index.html/)

## 1.3.2.1

## Establishing new funding and procurement mechanisms

In addition to the traditional bilateral funding support provided by donors and the increased use of SWAp and basket funding by donor and multilateral agencies, several new funding mechanisms have been introduced in the last decade to help increase developing countries' access to medicines to fight high-burden diseases such as HIV/AIDS, tuberculosis (TB) and malaria (see the chapter on Financing Medicines).

- **Global Alliance for Vaccines and Immunization (GAVI).** Founded in 2000, this partnership of public and private stakeholders has focused on funding activities to accelerate the uptake and use of underused and new vaccines and technologies, and improve vaccine supply security. Using an innovative financing mechanism, the International Finance Facility for Immunization (IFFIm), the GAVI Alliance borrows on capital markets against donor countries' pledges, raising funds to finance the loans used for vaccine procurement through issuing bonds. Under a memorandum of understanding with the GAVI Fund, UNICEF is appointed as the procurement agent for specified vaccines (11).
- **Global Drug Facility (GDF).** Launched in 2001, the GDF provides a funding mechanism for procurement of TB medicines through its Grant Services. Housed and administered by WHO within the Stop TB Partnership secretariat, the GDF has seen a significant growth in annual contributions from US\$ 15.2 million in 2001 to almost US\$ 63.8 million in 2006 (12,13). In addition to its Grant Services, the GDF also provides a procurement mechanism through its Direct Procurement Service, which purchases anti-TB drugs for governments, donors and nongovernmental organizations (NGOs) for those countries that lack adequate procurement capacity. The Direct Procurement Service uses international competitive bidding, pooled demand and systematized forecasting to obtain competitive prices for quality anti-TB drugs (12).
- **Global Fund to Fight AIDS, Tuberculosis and Malaria.** Founded in 2002 as a partnership between governments, civil society and the private sector, the Global Fund has become the primary source of funding for programmes addressing HIV/AIDS, TB and malaria. The Global Fund is providing financial support to more than 570 programmes in 140 countries. It is estimated that 45% of funding is spent on procurement of health products and commodities. Since its inception, the Global Fund has provided funding for three quarters of all international financing for malaria, two thirds of all international financing for TB and a quarter of all international financing for HIV/AIDS (14). In June 2009, the Global Fund launched its voluntary pooled procurement (VPP) service, its procurement capacity-building service (CBS), and its supply chain management assistance (SCMA) service. Available to principal recipients of Global Fund grants on a voluntary basis, the VPP consolidates forecasts, establishes long-term supplier contracts, and establishes direct payments to obtain favourable pricing and delivery conditions from suppliers. Procurement of medicines and health-care commodities for the VPP is managed by two Procurement Service Agents contracted by the Global Fund (15).
- **UNITAID.** Launched in 2006, UNITAID is an international facility for the purchase of medicines for HIV/AIDS, TB and malaria. UNITAID uses an innovative financing mechanism in which member countries levy a tax on airline tickets, to be used for the purchase of medicines. UNITAID works with other partner organizations, such as the Clinton Foundation, to negotiate reduced prices for HIV/AIDS, TB and malaria medicines for use in low-income countries (16).

- **President's Emergency Plan for AIDS Relief (PEPFAR).** Although bilaterally funded by the US Government and not a new funding mechanism, PEPFAR has provided a significant source of funding to address endemic diseases. Launched in 2003 with US\$ 15 billion in funding over a five-year period for global HIV/AIDS, TB and malaria efforts, PEPFAR was renewed in 2008 with US\$ 48 billion in funding up to 2013 (17).
- **President's Malaria Initiative (PMI).** As with PEPFAR, PMI is bilaterally funded by the US Government and was established in 2005 with US\$ 1.2 billion in funding over five years to reduce the incidence of malaria in 15 focal countries.

Summary information on these funding mechanisms is provided in Table 1.1.

**TABLE 1.1 Funding mechanism summary information**

Organization/ date founded	Area of focus	Source of funding	Funding received since inception (USD) <sup>a</sup>	Procurement service
GAVI Alliance 2000	Immunization	<ul style="list-style-type: none"> <li>• Donor contributions</li> <li>• IFFIm pledge</li> <li>• AMC pledge<sup>b</sup></li> </ul>	3.7 billion <sup>c</sup>	UNICEF designated as procurement agent for specific vaccines
Global Drug Facility 2001	TB	Donor contributions	268.2 million <sup>d</sup>	Offers direct procurement service
Global Fund 2002	HIV/ AIDS, TB, malaria	Donor contributions	15.6 billion <sup>e</sup>	Offers voluntary pooled procurement service (since 2009)
PEPFAR 2003	HIV/ AIDS, TB, malaria	US Government	63 billion <sup>f</sup>	Products procured by supply chain management service
PMI 2005	Malaria	US Government	1.2 billion <sup>g</sup>	Products procured by USAID I DELIVER Project
UNITAID 2006	HIV/ AIDS, TB, malaria	<ul style="list-style-type: none"> <li>• Airline ticket tax</li> <li>• Donor contributions</li> </ul>	730 million <sup>h</sup>	Does not provide a procurement service

<sup>a</sup> Funding received is for a broad range of programmatic activities including procurement of health commodities.

<sup>b</sup> Donors can make pledges to the International Finance Facility for Immunization (IFFIm) or pledge to the Advanced Market Commitment which supports the development of a pneumococcal vaccine for developing countries.

<sup>c</sup> Funding approved by GAVI from 2000 to 2015, as of 7 August 2009. GAVI web site: <http://www.gavialliance.org/performance/commitments/index.php>

<sup>d</sup> Funds raised for GDF operations from 2001 to 2008, as of 7 August 2009. GDF web site: [http://www.stoptb.org/gdf/assets/documents/GDF%20Annual%20Report%202008\\_Final.pdf](http://www.stoptb.org/gdf/assets/documents/GDF%20Annual%20Report%202008_Final.pdf)

<sup>e</sup> The Global Fund has committed US\$15.6 billion in 140 countries to support prevention, treatment and care programmes, as of 7 August 2009. Global Fund web site: <http://www.theglobalfund.org/en/>

<sup>f</sup> Total funding projected through to 2013, as of 24 June 2009. PEPFAR web site: <http://www.pepfar.gov/about/index.htm>

<sup>g</sup> Total funding projected through to 2010, as of 5 April 2010. PMI web site: <http://www.fightingmalaria.gov/funding/index.html>

<sup>h</sup> \$730 million committed since 2006 to support 16 projects in 93 countries, as of 7 August 2009. UNITAID web site: <http://www.unitaid.eu/en/Achievements.html>



- **Regional Procurement Mechanisms.** In addition to the established pooled-procurement mechanisms described earlier, such as the PAHO EPI Revolving Fund for vaccines, the OECS Pharmaceutical Procurement Service and the Gulf Cooperation Council group-purchasing programme, two regional initiatives have been working to establish the foundations for pooled procurement of selected medicines. The South African Development Community (SADC) – representing 14 countries in southern Africa – is in the preparatory stage of planning a pooled-procurement mechanism, focusing on implementation of a strategic plan, development of a shared information network and establishment of a joint procurement protocol for HIV/AIDS, TB and malaria medicines (7). Elsewhere, the East African Community (EAC) is working on harmonization activities for national medicines regulation and national medicines procurement systems (7,18).

### 1.3.2.2

### Pricing mechanisms

In the face of a burgeoning AIDS epidemic and the resulting strain placed on national health budgets by the high cost of medicines, donors and international agencies recognized that additional measures were needed to obtain better value for money when procuring medicines to treat HIV/AIDS, malaria and other high-burden diseases. As a result, three new pricing mechanisms were introduced over the past decade, which involve third parties directly negotiating medicine pricing with suppliers to obtain favourable prices and improve access to medicines.

- **Accelerating Access Initiative.** This mechanism, launched in 2000, is based on negotiation by international agencies and several pharmaceutical manufacturers of a differential, or tiered pricing arrangement for antiretroviral medicines (ARVs) under which the manufacturers agree to sell selected brand ARVs to low- and middle-income countries at prices below those charged to high-income countries (19).
- **Clinton HIV/AIDS Initiative (CHAI).** Introduced in 2002, CHAI negotiates price ceilings with generic ARV suppliers that reflect suppliers' costs plus a reasonable profit margin. In 2006, CHAI formed a partnership with UNITAID to combine the purchasing power of UNITAID with CHAI's price-negotiation model to increase availability of paediatric and second-line ARV medicines. As a result, cumulative price reductions of 30% have been achieved for second-line ARVs and 60% for paediatric ARVs (20).
- **The Affordable Medicines Facility for Malaria (AMFm).** Established in 2009, the AMFm, a US\$ 200 million-funded partnership, is designed to reduce the price of Artemisinin Combined Therapy (ACT) medicines through the negotiation of reduced prices from manufacturers in exchange for increased and predictable demand. The AMFm is also organizing a subsidy funded by international donors to increase the affordability of ACT medicines for patients in the public, not-for profit and private sectors (21). The first phase of the AMFm was launched in 2009 in eight countries and following the success of Phase 1 implementation has proceeded with the first co-paid ACTs delivered to Ghana and Kenya in August, 2010.<sup>1</sup>

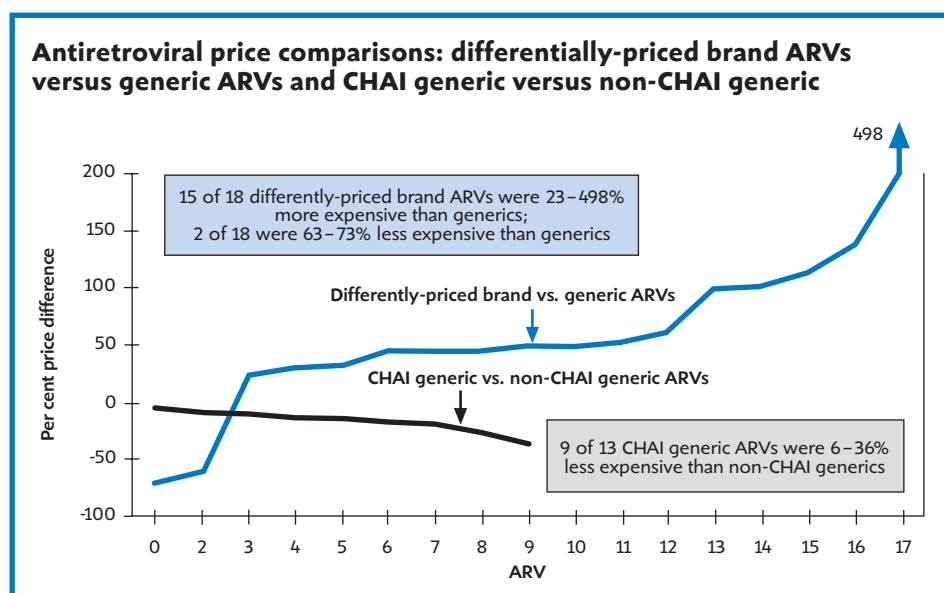
A recent study by Brenda Waning et al (22) reviewed data on ARV procurement reported either to the Global Fund or WHO, to assess the relative impact of different mechanisms on reducing the price of ARVs. The study reviewed the purchase history for 24 ARV dosage

<sup>1</sup> From AMFm web site: <http://www.theglobalfund.org/en/amfm/>  
Applications for Phase 1 of AMFm were invited from the following countries: Benin, Cambodia, Ghana, Kenya, Madagascar, Niger, Nigeria, Rwanda, Senegal, Uganda and the United Republic of Tanzania.



forms and found that for 19 of the 24 ARV dosage forms, there was no association between price and the volume purchased. The study also found that 9 of 13 generic ARVs were priced 6%–36% lower for CHAI consortium members compared to generic purchases outside the CHAI consortium (Figure 1.2).

FIGURE 1.2



*To reduce prices, sound forecasting and reliable financing with secure and timely supplier payments are necessary.*

While the study questions the overall impact of pooled or high-volume purchases on ARV prices compared to the price reductions achieved through third-party-negotiated price ceilings, other factors besides volume can impact product prices. For any strategic mechanism to achieve maximum effectiveness in reducing prices, it should be supported by sound forecasting data, reliable financing, and a system for secure and timely supplier payments. See Annex 1 for highlights of the assessment and its findings.

### 1.3.2.3

#### Activities to address quality assurance risks

As the global market for generics has increased over the past decade, these medicines now represent a greater proportion of medicine expenditures. While generic medicines of good quality offer price competition to innovator medicines, generic medicines manufactured in countries that do not have stringent regulatory authorities can create product-quality risks.

Product-quality risks have also been reported as a result of the increase in counterfeit and substandard medicines found on the market. Through the use of simple screening methods, a recent testing of antimalarial medicines purchased from private pharmacies in six cities in African countries highly endemic for malaria found that 35% of the medicines, mostly generics, were substandard (23).

In response to risks posed by the increase in substandard and counterfeit medicines on the market, public-sector procurement systems and NRAs need to implement appropriate quality assurance measures to ensure all medicines procured are of acceptable quality. However, in many developing countries public-sector procurement systems and NRAs do not have sufficient technical expertise, financial resources, or the infrastructure support needed to effectively implement their product quality assurance responsibilities. They may also be constrained by weak national policies and regulations governing procurement and

regulatory requirements. In such situations the WHO Prequalification Programme (PQP), described below, can serve as a valuable resource through its prequalification of medicines to international standards.

### WHO Prequalification Programme (PQP)

Originally intended to give United Nations procurement agencies, such as UNICEF, the choice of a range of quality medicines to procure, the WHO Prequalification Programme (PQP) is also helping to address the risk of poor quality medicines entering the market as a result of the varying capacity of NRAs and national procurement systems to enforce national quality assurance standards (24). WHO's first PQP was established in 1989 for vaccines. Then in 2001, in response to the critical need for quality HIV/AIDS medicines, WHO initiated the PQP for medicines, in partnership with UNAIDS, UNICEF and the United Nations Population Fund (UNFPA) and with support from the World Bank. The PQP for medicines was expanded to include anti-TB medicines the same year, malaria medicines in 2002, and reproductive health products (contraceptives) in 2006. As of November 2010, the PQP had prequalified 249 medicines (24). The PQP follows a rigorous process to assess the quality, safety and efficacy of a medicine based on a comprehensive assessment of the site master file and product dossier followed by site inspection with periodic reevaluations (24).

The PQP is increasingly being incorporated by multilateral agencies and donors into their quality assurance requirements for procurement of medicines. The Global Fund's Quality Assurance Policy for Pharmaceutical Products requires that for the procurement of ARVs, anti-TB medicines and antimalarials using Global Fund resources, the finished pharmaceutical products (FPPs) must comply with the following quality requirements:

- FPPs must be WHO prequalified, or
- FPPs must be approved by a stringent regulatory authority, or
- FPPs are permitted for use based on the recommendation of the Expert Review Panel (for a time-limited period).<sup>1</sup>

The principal recipient is also responsible for the random quality control monitoring of all pharmaceutical products procured in accordance with the Global Fund guidelines (25). Recognizing that globalization of pharmaceutical production has led to a diversification of sources of active pharmaceutical ingredients (APIs) and made verification of API quality more challenging, in October 2010, WHO announced the introduction of a pilot project to prequalify APIs for medicines for treating HIV/AIDS, malaria and tuberculosis.

In addition, the International Medical Products Anti-Counterfeiting Taskforce (IMPACT), a partnership of international organizations, NGOs, enforcement agencies, pharmaceutical manufacturers and regulatory authorities, launched in 2006, coordinates activities between countries to halt the production, trading and selling of counterfeit medicines (26).

### 1.3.3

### Assistance to strengthen country level procurement systems

Over the past decade, there has been increased recognition within the international community of the important role an effective public sector procurement system plays in helping a country achieve its development goals. Early acknowledgment of the importance of public sector procurement and the need to establish procurement standards came in 1999 with the

<sup>1</sup> For additional information on the Global Fund's Quality Assurance Policy for Pharmaceutical Products see: [http://www.theglobalfund.org/documents/psm/Annex1-%20FullTextRevisedQualityAssurancePolicy\\_en.pdf](http://www.theglobalfund.org/documents/psm/Annex1-%20FullTextRevisedQualityAssurancePolicy_en.pdf)

*The WHO document Operational Principles for Good Pharmaceutical Procurement has been widely endorsed and serves as the basis for many procurement policies.*

publication by WHO of the document *Operational Principles for Good Pharmaceutical Procurement* (27). Endorsed by the Interagency Pharmaceutical Coordination Group (which included WHO, the World Bank, UNFPA and UNICEF), the document introduced four strategic procurement objectives and a set of operational principles for good pharmaceutical procurement, which can be adapted to different procurement settings (28).

In 2000, the World Bank – in view of its increased funding of health-sector goods – issued a *Technical Note for the Procurement of Health Sector Goods* to provide specific guidance to funding recipients on acceptable practices for the procurement of pharmaceuticals, contraceptives, vaccines and nutritional supplements (29). The World Bank also plays an important role in strengthening national procurement systems. In Bangladesh, for example, the World Bank funded the Public Procurement Reform Project of 2002-2007 that updated the Government of Bangladesh's Public Procurement Regulations (2003), developed a set of standard bidding documents for government agencies, and provided training on procurement regulations and procedures to over 1800 Government staff (see Annex 2).

In 2002, the Global Fund stipulated the procurement principles with which Principal Recipients must comply, including adherence to WHO's Operational Principles for Good Pharmaceutical Procurement or comparable systems that employ competitive bidding, quality assurance practices and transparency (30).

Global recognition of the key role of public-sector procurement culminated in 2005, when 90 countries, 26 multilateral and bilateral development institutions and 13 civil society organizations signed the Paris Declaration on Aid Effectiveness. Confirming the important role of procurement in the effective implementation of aid programmes, the Paris Declaration included specific commitments to strengthen national procurement systems, support procurement capacity development and use country procurement systems as they become functional (31). Several institutions and organizations have established functional units and services to support national procurement capacity development.

Over the past decade, the OECD has taken a leading role in promoting and supporting activities designed to strengthen national procurement systems (32). In 2002, the OECD Development Assistance Committee (DAC), in partnership with the World Bank, established the Round Table on Strengthening Procurement Capacities in Developing Countries for the purpose of creating better tools and techniques to improve public procurement systems in developing countries (33). The OECD/DAC established the Joint Venture for Procurement in 2005 to support procurement reform and implementation of the Paris Declaration procurement commitments.

Responding to the need to improve public-sector procurement systems, several other international organizations are providing technical assistance to support procurement capacity development.

- **Global Drug Facility (GDF).** The GDF provides technical support services to train national TB programme staff on the procurement and management of anti-TB drugs.
- **UN Procurement Capacity Development Centre (UNPCDC).** Launched by the UNDP in 2008 in partnership with the Danish International Development Agency (DANIDA), the UNPCDC provides procurement-focused, field-based advocacy and advisory support services to help develop national and sub-national procurement capacities (34).
- **Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM).** The Global Fund has identified three operational areas where it will provide technical assistance through

capacity-building services and supply chain management assistance: quantification/forecasting; procurement planning; and logistics management. The Global Fund selected contractors to provide this technical assistance to grant recipients, and by December 2009 capacity building services and supply chain management assistance services were underway in two countries with consultations ongoing in six other countries (4,35).

- **Bilateral donors.** Several bilateral donors, such as USAID (through the USAID DELIVER Project) and the PEPFAR-funded Supply Chain Management System Project, provide direct technical assistance to support procurement and logistic system strengthening (36).
- **Commercial agencies.** Specific procurement and supply chain technical assistance is also provided by private sector commercial companies, such as Crown Agents and Charles Kendall.

## 1.4

### FUTURE CHALLENGES AND ISSUES

The increased recognition of the important role public sector procurement systems play in supporting development objectives and the accompanying application of international resources have helped to improve access to medicines and strengthen procurement systems in developing countries. However, challenges to effective public sector procurement still persist, and will require continued, coordinated international and national efforts that support long-term, sustainable systemic improvements. Such efforts will need to take a more comprehensive approach to procurement capacity-building than previous efforts, which tended to more narrowly focus on improving technical skills, and look to strengthen the range of policies, institutions and organizations that play different, but important roles in supporting an effective and efficient procurement process (1,37).

Some of the key challenges in public-sector procurement of medicines are outlined below.

### 1.4.1

#### Price-versus-quality challenges

**Emphasis on price.** In some countries, national procurement policies stipulate that contracts must be awarded to the supplier submitting the lowest price. When strictly interpreted, such policies create risk when procuring health products as they allow contracts for medicines and health-care commodities to be awarded to suppliers without adequate consideration being given to the quality assurance status of the product.

### 1.4.2

#### Financing challenges

- **Limited financing.** In low- and middle-income countries, public sector medicines financing is limited and insufficient for addressing the basic medicine needs of the majority of the population (38). Limited national financial resources often create an iterative and lengthy budget review and approval process that can delay procurement and lead to product shortages and stock-outs.
- **Release of procurement funds.** In some countries the release of public sector funds to pay for procurement is hindered by cash flow and treasury management constraints. The resulting payment delays to suppliers can create stock-outs and disrupt treatment regimens. Payment delays to suppliers can also impact the ability of the purchaser to secure competitive prices from suppliers. Release of budgeted procurement funds on

a periodic basis (for example, quarterly instead of at one time) may result in smaller volume purchases being issued, as opposed to a consolidated bulk purchase that may secure more favourable pricing from suppliers (10).

### 1.4.3

*A preference for local distributors or manufacturers without adequate competition, can result in higher prices.*

### National policy challenges

- **Restrictive procurement or registration policies.** Some countries have national procurement or registration policies that, in effect, limit competition. For example, in Latin America, the procurement regulations in Nicaragua, Peru and the Dominican Republic do not contain a provision for international tendering (10). In several other Latin American countries, international tendering and procurement are legal only under special circumstances. This underlying preference for local distributors and manufacturers creates limited competition, which tends to produce higher prices.
- **Regulatory barriers** (see the chapter on Intellectual Property and Trade Issues). Some countries impose regulatory barriers, such as duties, value added tax (VAT), and tariffs on medicines that are imported, which increases medicine prices (39) and can impact the procurement environment by indirectly limiting competition.
- **Decentralizing procurement to sub-national levels.** A number of countries have decentralized procurement, shifting varying degrees of responsibility from the national to the provincial, district or municipal level (4). Experiences with decentralized medicines procurement have been mixed. General concerns include:
  - **Impact on costs.** Decentralized procurement reduces the size of orders, shifts purchases to local suppliers and eliminates economies of scale, which in most cases results in higher prices (2,3).
  - **Impact on quality.** Decentralization increases the difficulty of ensuring product quality assurance as lower-level staff frequently lack both the skills and the specialized equipment needed to oversee formal quality control procedures (40).
  - **Management burden.** A significant challenge in decentralizing procurement is in ensuring that in each district trained staff are available with the skills needed. A decentralized approach in essence means that health systems are duplicating existing skills at the central level many times over, which is inherently inefficient and costly (40).

*When procurement is decentralized, it may be necessary to retain some functions, such as price setting and quality control (QC) at central level.*

To address the challenges posed by decentralization, it may be appropriate to retain some functions, such as price negotiations and quality control compliance, at the central level.

### 1.4.4

### Quality assurance challenges

National procurement of selected products (such as vaccines, essential medicines for HIV/AIDS, TB and malaria, and key reproductive health medicines) that receive international agency and donor support generally has minimal quality assurance risks, given the quality assurance requirements donors will impose. However, procurement of essential medicines outside these categories faces greater quality assurance risks. These include limited NRA capacity (see section 1.3.1) and the increase in substandard and counterfeit products (see section 1.3.2.3).

## 1.4.5

**Multilateral agency and bilateral donor challenges**

- **Multiple donor procurement requirements.** Developing countries that receive funding from a donor are bound to comply with the donor's procurement requirements. When several different donors provide funding support, the resulting range of donor compliance requirements can impose an administrative burden on the national procurement unit.
- **Variability of donor funding and government procurement cycles.** Studies of procurement of reproductive health supplies have found that a lack of alignment of donor funding with government procurement cycles can lead to higher product costs due to: smaller volume contracts issued to suppliers, product stock-outs, emergency shipments and overall inefficiency in managing the in-country supply chain (41,42). In response, multilateral agencies and donors agreed in the Paris Declaration on Aid Effectiveness to make aid more predictable, establishing an indicator to monitor the percentage of aid disbursements released according to agreed schedules in annual or multi-year frameworks.

## 1.4.6

**Operational challenges**

*Lack of reliable quantification data is one of the major impediments to effective procurement.*

- **Weak forecasting and quantification.** Forecasting and quantification systems are limited in many developing countries and do not provide the requisite data needed to support procurement activities, largely due to weaknesses in stock management, consumption monitoring and reporting, and challenges in compiling supply data from multiple sources (43). Lack of reliable quantification data is one of the major impediments to effective procurement and while this lack of data can be addressed to a limited extent through buffer stock planning, this adds additional cost to the procurement system.
- **Limited performance monitoring and evaluation.** In many developing countries, monitoring and evaluation of procurement performance and supplier performance are done on a limited basis, making it difficult to track progress and plan for system improvements. Monitoring and evaluation systems can range from a simplified approach to a more in-depth analysis as offered in the OECD document *Good Practices for Benchmarking, Monitoring and Evaluation*, which identifies 13 procurement performance monitoring indicators designed to measure fairness, transparency of the system, effective use of competition and efficiency (1).

## 1.4.7

**Human resource challenges**

(see the chapter on Human Resources in Pharmaceuticals)

- **Lack of trained personnel.** In many countries there is a shortage of professionally trained staff in public sector procurement and procurement management. Donors and national governments should continue working together to address this issue.
- **Frequent staff turnover.** Unofficial practices, including the frequent transfer and replacement of procurement and management staff, often result in staff without appropriate procurement training and experience being placed in positions of procurement responsibility. The loss of trained and experienced procurement personnel resulting from turnover negatively impacts the effective and timely processing of procurement requirements.



## 1.4.8

### Corruption and transparency challenges (see the chapter on Good Governance for the Pharmaceutical Sector)

The OECD estimates that approximately US\$ 400 billion is lost annually to corruption and fraud in public procurement (44). While corrupt practices exist throughout private and public sector environments, the OECD notes that “Of all government activities, public procurement is perceived as most vulnerable to corruption in almost all regions of the world” (45).

Given the significant and ongoing problems corrupt practices pose to public procurement, several international agencies including the World Bank (45) WHO (46), the OECD (47), Transparency International, (48) and the Medicines Transparency Alliance (MeTA) (49) are using their resources to address the challenge. These and other organizations provide information and tools on their web sites designed to support government efforts to implement measures and best practices in order to curb corrupt practices and instill transparency in the public procurement process.

#### Transparency and accountability

An OECD survey of procurement personnel responsible for designing, supervising and managing public-sector procurement processes in central governments identified three key drivers for enhancing integrity and reducing corruption in procurement:

- Instill transparency measures throughout the entire procurement cycle, from needs assessment to contract management.
- Provide professional guidance for procurement officials along with integrity management policies that clarify restrictions and prohibitions to prevent conflict of interest and corruption.
- Institute strong accountability and control measures that involve relevant stakeholders (50).

To promote integrity in public procurement and reduce corruption, the OECD Council on Enhancing Integrity in Public Procurement issued a recommendation to its member countries to develop a policy framework that incorporates 10 key principles based on transparency, good management, prevention of misconduct, and accountability and control (Annex 3) (50).

There is some evidence that implementation of e-procurement systems has helped improve integrity and reduce corruption in public-sector procurement. Several countries are in the process of implementing different levels of e-procurement depending upon technical and infrastructure capacities. These include the Philippines (1), Chile (51), and the State of Andhra Pradesh in India (Annex 5).

#### Use of market intelligence

Published information on prices paid for medicines and health-care commodities procured on the international market, often referred to as market intelligence, can be used to help curb corruption in public sector procurement. Published pricing information allows public advocacy groups to monitor and compare local procurement prices with international prices and raise concerns when significant, unsupported discrepancies appear between the two. The primary source of current market intelligence on selected medicines and health commodities is the *International Price Indicator Guide*, published by Management Sciences for Health (Annex 4). The Guide can be used to:

*Market intelligence about medicine prices can be used to combat corruption in procurement.*

- Determine the probable cost of products for a national procurement programme.
- Compare current prices paid to those available on the international market.
- Assess the potential financial impact of changes to a products list.
- Support education in rational prescribing and use of medicines and other health-care products.

Other sources of market intelligence include *Untangling the Web of ARV Prices* (52) published by Médecins Sans Frontières, the WHO Global Price Reporting Mechanism (GPRM), which provides prices on ARVs and TB and malaria drugs (53), and the Global Fund's Price and Quality Reporting System (54). In addition, WHO now publishes on its web site listings of national and international price reporting web sites (55,56).

## REFERENCES

1. *Harmonising donor practices for effective aid delivery, Volume 3: Strengthening procurement capacities in developing countries*. Paris, Organisation for Economic Co-operation and Development, 2005.
2. Rao R, Mellon P, Sarley D. *Procurement strategies for health commodities: An examination of options and mechanisms within the commodity security context*. Arlington, VA, DELIVER, for the U.S. Agency for International Development, 2006.
3. Drug supply choices: What works best? *WHO Essential Drugs Monitor*, 1998, 25-26 (double issue):7-9. Available at: <http://apps.who.int/medicinedocs/collect/medicinedocs/pdf/whozip10e/whozip10e.pdf>
4. Sanchez A et al. *Decentralizing and integrating contraceptive logistics systems in Latin America and the Caribbean: Considerations for informed decision making throughout the health reform process*. Arlington, VA., DELIVER, for the U.S. Agency for International Development, 2006.
5. *Procurement capacity toolkit: Tools and resources for procurement of reproductive health supplies*. Module 3. Assessment of procurement options. Seattle, PATH, 2009.
6. DeRoeck D et al. Regional group purchasing of vaccines: review of the Pan-American Health Organization EPI Revolving Fund and Gulf Cooperation Council group purchasing program. *The International Journal of Health Planning and Management*, 2006, 21(1):23-43.
7. Burnett F. *Critical success factors for pooled procurement*. Paper presented at: Organization of Eastern Caribbean States/Pharmaceutical Procurement Service SEAM Conference, Dar es Salaam, 10-12 December 2003. Available at: <http://www.msh.org/SEAM/conference2003/presentations/Agenda/AgendaDay2/FrancisBurnettParallelTrack.pdf>
8. *Multi-country regional pooled procurement of medicines: Identifying key principles for enabling regional pooled procurement and a framework for inter-regional collaboration in the African, Caribbean, and Pacific Island countries*. Meeting report. 15-16 January 2007. Geneva, World Health Organization, 2007.

9. *Regional pooled procurement of drugs: Evaluation of programs*. Arlington, VA, Management Sciences for Health Center for Pharmaceutical Management, December 2002.  
Available at: <http://www.volksgezondheid.gov.sr/PSM/Complete%20CD%20PSM%20training%20SRE%202008/Pooled%20Procurement%20Experiences/Evaluation%20pooled%20proc%20MSH%202002.pdf>
10. Sarley D et al. *Options for contraceptive procurement: Lessons learned from Latin America and the Caribbean*. Arlington, VA, DELIVER, and Washington, D.C., USAID Health Policy Initiative, for the U.S. Agency for International Development, 2006.
11. GAVI Alliance web site. Available at: [www.gavialliance.org](http://www.gavialliance.org)
12. Matiru R, Ryan T. The Global Drug Facility: a unique, holistic and pioneering approach to drug procurement and management. *Bulletin of the World Health Organization*, 2007, 85(5):348–353.
13. Global Drug Facility Progress Report 12: Available at: [http://www.stoptb.org/gdf/assets/documents/GDF%20Annual%20Report%202008\\_Final.pdf](http://www.stoptb.org/gdf/assets/documents/GDF%20Annual%20Report%202008_Final.pdf)
14. Global Fund to Fight AIDS, Tuberculosis and Malaria web site: <http://www.theglobalfund.org/>
15. *Procurement support services: Voluntary pooled procurement and supply chain management assistance*. Global Fund information note. Available at: [http://www.theglobalfund.org/documents/psm/InformationNote\\_VPP\\_and\\_CBS\\_en.pdf](http://www.theglobalfund.org/documents/psm/InformationNote_VPP_and_CBS_en.pdf)
16. UNITAID web site: <http://www.unitaid.eu/>
17. President's Emergency Plan for AIDS Relief web site: <http://www.pepfar.gov/about/index.htm>
18. 7th Meeting of the East African Community (EAC) Sectoral Council on Legal and Judicial Affairs ongoing in Arusha. EAC press release. Arusha, Tanzania, 16 April 2009. Available at: <http://www.eac.int/component/content/article/1-latest-news/242-press-release-7th-meeting-of-eac-sectoral-council-on-legal-and-judicial-affairs-ongoing-in-arusha.html>
19. *Accelerating access initiative: Widening access to care and support for people living with HIV/AIDS. Progress report*. Geneva, World Health Organization, 2002. Available at: <http://www.who.int/hiv/pub/progressreports/accelerating/en/>
20. Access programs page. Clinton Foundation web site. Available at: <http://www.clintonfoundation.org/what-we-do/clinton-hiv-aids-initiative/our-approach/access-programs>
21. \$200 million partnership to bring effective malaria drugs to all who need them. UNITAID press release. Oslo, 17 April 2009. Available at: [http://www.unitaid.eu/en/20090417197/News/\\$200-million-partnership-to-bring-effective-malaria-drugs-to-all-who-need-them.html](http://www.unitaid.eu/en/20090417197/News/$200-million-partnership-to-bring-effective-malaria-drugs-to-all-who-need-them.html)
22. Waning B et al. Global strategies to reduce the price of antiretroviral medicines: evidence from transactional databases. *Bulletin of the World Health Organization*, 2009; 87:520–528.
23. Bate R et al. Antimalarial drug quality in the most severely malarious parts of Africa: A six country study. *PLoS One*, 2008; 3(5):e2132. Available at: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0002132>

24. WHO Prequalification Programme web site: <http://apps.who.int/prequal/>
25. Quality assurance information page. Global Fund web site. Available at: <http://www.theglobalfund.org/en/procurement/quality/>
26. IMPACT web page: <http://www.who.int/impact/about/en/>
27. *Operational principles for good pharmaceutical procurement*. Geneva, World Health Organization, 1999. Available at: <http://apps.who.int/medicinedocs/pdf/whozip49e/whozip49e.pdf>
28. Ombaka E. Current status of medicines procurement. *American Journal of Health-System Pharmacy*, 2009, 66(5)suppl.3:s20-s28.
29. Procurement of health sector goods. Technical Note. Washington, DC, World Bank, 2006. Available at: <http://siteresources.worldbank.org/INTPROCUREMENT/Resources/health-tn-ev3.doc>
30. The Global Fund to Fight AIDS, Tuberculosis and Malaria. Report of the Third Board Meeting. Geneva, 10-11 October 2002. Available at: <http://www.theglobalfund.org/documents/board/03/ThirdBoardMeetingReport.pdf>
31. Paris Declaration on Aid Effectiveness, Section III: Indicators of progress. March 2005. Available at: <http://www.oecd.org/dataoecd/57/60/36080258.pdf>
32. Organisation for Economic Co-operation and Development web site: <http://www.oecd.org/>
33. *Compendium of country examples and lessons learned from applying the methodology for assessment of national procurement systems*. Paris, Organisation for Economic Co-operation and Development, 2008. Available at: <http://www.oecd.org/dataoecd/48/30/40488586.pdf>
34. UN Procurement Capacity Development Centre web site "About us" page: <http://www.unpcdc.org/about-us.aspx>
35. Procurement support services web page on the Global Fund web site: <http://www.theglobalfund.org/en/procurement/vpp/?lang=en>
36. USAID/DELIVER web site: <http://deliver.jsi.com/dhome> and Supply Chain Management System (SCMS) web site: <http://scmsweb.pfscm.org/scms>
37. Cohen J et al. Taking a comprehensive approach to procurement capacity development for essential reproductive health medicines. Unpublished data, 2009.
38. *Equitable access to essential medicines: a framework for collective action*. WHO Policy Perspectives on Medicines. Geneva, World Health Organization, 2004. Available at: <http://apps.who.int/medicinedocs/pdf/s4962e/s4962e.pdf>
39. Levinson L, Laing R. The hidden costs of essential medicines. *WHO Essential Drugs Monitor*, No.33, 2003. Available at: <http://apps.who.int/medicinedocs/pdf/s4941e/s4941e.pdf>
40. Woodle D. Vaccine procurement and self-sufficiency in developing countries. *Health Policy and Planning*, 2000, 15(2):121-129. Available at: <http://heapol.oxfordjournals.org/cgi/content/short/15/2/121>

41. Dalberg Global Development Advisors. *Designing a global financing and procurement mechanism for reproductive health supplies*. Brussels, Reproductive Health Supplies Coalition, 2008. Available at: [http://www.rhsupplies.org/fileadmin/user\\_upload/Final\\_Report\\_-\\_June\\_2008.pdf](http://www.rhsupplies.org/fileadmin/user_upload/Final_Report_-_June_2008.pdf)
42. Druce N. *Reproductive health commodity security (RHCS) country case study synthesis: Cambodia, Nigeria, Uganda and Zambia*. London, DFID Health Resource Centre, 2006. Available at: [http://www.dfidhealthrc.org/publications/srh/RHCS%20synthesis\\_Mar06\\_final.pdf](http://www.dfidhealthrc.org/publications/srh/RHCS%20synthesis_Mar06_final.pdf)
43. Gurría A. *Building a cleaner world economy*. Opening remarks at The Global Forum on Public Governance. Paris, 4 May 2009.
44. Lonti Z, Woods M. *Towards government at a glance: Identification of core data and issues related to public sector efficiency*. OECD Working Papers on Public Governance No.7. Paris, Organisation for Economic Co-operation and Development, October 2007. Available at: <http://www.oecd.org/dataoecd/52/34/40209928.pdf>
45. Anticorruption web page on the World Bank web site: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPUBLICSECTORANDGOVERNANCE/EXTANTICORRUPTION/0,,menuPK:384461~pagePK:149018~piPK:149093~theSitePK:384455,00.html>
46. WHO Good Governance for Medicines web page: <http://www.who.int/medicines/ggm/en/>
47. Organisation for Economic Co-operation and Development bribery and corruption web page: [http://www.oecd.org/topic/0,3373,en\\_2649\\_37447\\_1\\_1\\_1\\_1\\_37447,00.html](http://www.oecd.org/topic/0,3373,en_2649_37447_1_1_1_1_37447,00.html)
48. Transparency International web site: <http://www.transparency.org/>
49. Medicines Transparency Alliance web site: <http://www.medicinestransparency.org/>
50. From: Recommendations of the Council on Enhancing Integrity in Public Procurement. Paris, Organisation for Economic Co-operation and Development, October 2008. Available at: <http://www.oecd.org/dataoecd/62/24/41549036.pdf>
51. Chile's Government Procurement E-System web page. World Bank eGovernment web site: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTEGOVERNMENT/0,,contentMDK:20486003~menuPK:1767268~pagePK:210058~piPK:210062~theSitePK:702586,00.html>
52. *Untangling the web of antiretroviral price reductions*. Geneva, Médecins Sans Frontières, 2008. Available at: [http://www.msfaaccess.org/fileadmin/user\\_upload/diseases/hiv-aids/Untangling\\_the\\_Web/Untanglingtheweb\\_July2008\\_English.pdf](http://www.msfaaccess.org/fileadmin/user_upload/diseases/hiv-aids/Untangling_the_Web/Untanglingtheweb_July2008_English.pdf)
53. WHO HIV/AIDS Global price reporting mechanism web page: <http://www.who.int/hiv/amds/gprm/en/>
54. Price and quality reporting web page on the Global Fund web site. Available at: <http://pqr.theglobalfund.org/PQRWeb/Screens/PQRLogin.aspx?Lang=en-GB>
55. National medicine price sources web site: [http://www.who.int/medicines/areas/access/sources\\_prices/national\\_medicine\\_price\\_guide\\_sources.pdf](http://www.who.int/medicines/areas/access/sources_prices/national_medicine_price_guide_sources.pdf)
56. International medicine price guides web site: [http://www.who.int/medicines/areas/access/sources\\_prices/International\\_medicine\\_price\\_guides\\_lists.pdf](http://www.who.int/medicines/areas/access/sources_prices/International_medicine_price_guides_lists.pdf)

## ABBREVIATIONS

ACT	Artemisinin Combined Therapy
ATC	Anatomical, Therapeutic, Chemical (Classification system)
AIDS	Acquired Immunodeficiency Syndrome
AMFm	Affordable Medicines Facility for Malaria
API	Active Pharmaceutical Ingredient
ARVs	Antiretroviral medicines
CHAI	Clinton HIV/AIDS Initiative
CIDA	Canadian International Development Agency
DAC	Development Assistance Committee
DANIDA	Danish International Development Agency
DDD	Defined daily dose
DFID	UK Department for International Development
EPI	Expanded Programme on Immunization
FPP	Finished pharmaceutical product
GAVI	GAVI Alliance
GDF	Global Drug Facility
GoAP	Government of Andhra Pradesh (India)
GPRM	Global Price Reporting Mechanism
HIV	Human immunodeficiency virus
IFFIm	International Finance Facility for Immunization
IMPACT	International Medical Products Anti-Counterfeiting Task Force
JICA	Japan International Cooperation Agency
MeTA	Medicines Transparency Alliance
NGO	Nongovernmental organization
NRA	National Regulatory Authority
OECD	Organisation for Economic Co-operation and Development
OECS	Organization of Eastern Caribbean States
OECS/PPS	OECS Pharmaceutical Procurement Service
OPV	Oral polio vaccine
PAHO	Pan American Health Organization
PEPFAR	President's Emergency Plan for AIDS Relief
PMI	President's Malaria Initiative
PQ	Prequalification
PQP	Prequalification Programme
SADC	Southern African Development Community
SWAp	Sector-Wide Approach
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme



UNFPA	United Nations Population Fund
UNICEF	United Nations Children’s Fund
UNPCDC	United Nations Procurement Capacity Development Centre
USAID	US Agency for International Development
USD	United States Dollars
VAT	Value Added Tax
VPP	Voluntary pooled procurement

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## ANNEXES

### Annex 1. ARV Price Comparisons: Global strategies to reduce prices

#### Background

The high price of antiretroviral medicines (ARVs) is a major constraint on universal access to HIV/AIDS treatment. In response, several global strategies have been implemented in an attempt to lower the price of ARVs, including procurement arrangements designed to increase purchase volumes, third-party price negotiation by the Clinton HIV/AIDS Initiative (CHAI) for generic ARVs and differential pricing for branded ARVs.

#### Methods

Waning et al. estimated the impact of these strategies on the price of 24 ARVs in resource-limited settings, using 7253 procurement transactions (July 2002–October 2007) obtained from databases hosted by WHO and the Global Fund to Fight AIDS, Tuberculosis and Malaria. Separate regression models were created for each of the 24 ARV dosage forms using generalized estimating equation linear regression to determine predictors of price.

#### Results

**For 19 of the 24 ARV dosage forms, no association was detected between price and volume purchased.** Only 5 of 24 dosage forms showed any association between volume and price, with high-volume purchases 4%–21% less expensive than medium- and low-volume purchases (Table 2).

#### Associations between ARV purchase volume and price

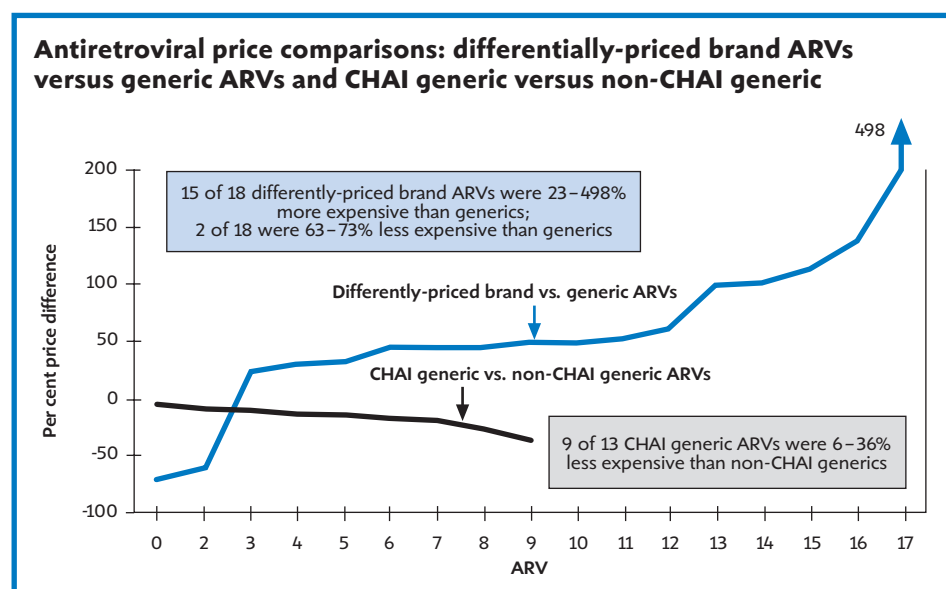
ARV purchases where an association between volume and price was detected

ARV	High volume price versus medium volume price	High volume price versus low volume price
zidovudine 300 mg	-4%	-5%
efavirenz 600 mg		-7%
lamivudine 150 mg/ nevirapine 200 mg/ stavudine 40 mg	-11%	-16%
indinavir 400 mg	-6%	
lopinavir 133.3 mg/ ritonavir 33.3 mg		-21

ARV purchases where no association between volume and price was detected

abacavir 300 mg, didanosine 100 mg, didanosine 200 mg, didanosine 400 mg, lamivudine 150 mg, lamivudine 150 mg/nevirapine 200 mg/stavudine 30 mg, lamivudine 150 mg/stavudine 30 mg, lamivudine 150 mg/stavudine 40 mg, lamivudine 150 mg/zidovudine 300 mg, stavudine 20 mg, stavudine 30 mg, stavudine 40 mg, tenofovir 300 mg, zidovudine 100 mg, efavirenz 50 mg, efavirenz 200 mg, nevirapine 200 mg, nelfinavir 250 mg, ritonavir 100 mg

Out of 13 generic ARVs, 9 were priced 6%–36% lower for CHAI consortium members compared to generic purchases outside the CHAI consortium. And out of 18 differentially-priced brand ARVs, 15 were priced 23%–498% higher compared to non-CHAI generic purchases. Two differentially-priced brand ARVs were priced 63%–73% lower than generic non-CHAI versions.



## Discussion

While conventional wisdom in procurement suggests that the more you buy, the less you pay, this does not seem to be the case for ARVs when price and volume were analysed on a global level. Many other factors are likely to contribute to the final price paid for ARVs, including: purchaser unfamiliarity with current fair market prices, timeliness of payment to suppliers, lead times between when ARVs are ordered and when they are needed, registration status, patent status and corruption.

While pooled procurement arrangements are appealing, in reality they may not achieve lower prices via increased purchase volumes. Even if they do achieve marginal price reductions, these potential savings must be set against the costs required to establish and maintain pooled procurement systems. Pooled procurement systems should include country-level procurement staff, rather than transferring procurement roles to western donors and international organizations. Pooled procurement will decrease the number of purchasers and will likely result in a decrease in the number of suppliers in the long run. Monitoring and evaluation of pooled procurement must include market implications.

Differential pricing schemes for branded medicines should be encouraged, but are unlikely to result in prices that are affordable to low- and middle-income countries. Generic price competition remains the best option for ensuring affordable medicine prices.

Third-party price negotiation shows promise, but may not be effective over the long term. More research is needed to assess the long-term implications of price negotiation on behalf of countries. While this approach may be useful to stimulate price reductions, donors must remain invested in capacity building of country level staff to perform these tasks. Donors should mandate the use of publicly available price information to facilitate country procurement activities.

The study highlights the utility of posting procurement data in the public domain. More countries, donors and international organizations should encourage transparency of medicines information to support an evidence-based approach to policy and programme decision-making.

### Conclusion

Larger purchase volumes do not necessarily result in lower ARV prices. Third-party price negotiation by CHAI has resulted in lower generic ARV prices for most ARVs under the CHAI consortium. Generic ARVs are less expensive than differentially-priced brand ARVs, except where little generic competition exists.

Alternative strategies, including streamlining financial management systems, improving demand forecasting and removing barriers to generics should also be explored in order to help reduce ARV prices.

Source: Waning B et al. Global strategies to reduce the price of antiretroviral medicines: evidence from transactional databases. *Bulletin of the World Health Organization*, 2009;87:520–528.

## Annex 2. World Bank public sector procurement reform in Bangladesh

In 2002, a World Bank country procurement assessment report identified several weaknesses in the Bangladesh public sector procurement system including:

- Absence of a legal framework governing public sector procurement.
- Absence of adequate procurement planning.
- Lack of adequate professional competence of staff to manage public procurement.
- Poor-quality bidding documents and bid evaluation procedures.
- Ineffective administration of contracts.
- Absence of an adequate mechanism for ensuring transparency and accountability.

Based on these findings, the World Bank proposed and the Bangladesh Government approved the “Public Procurement Reform Project” (PPRP), a five-year project (2002–2007) funded through the International Development Association (IDA). The project objectives were to improve public-procurement performance by introducing measures – such as national procurement regulations, standardized bidding documents, and broad-based training of staff – to help bring the public procurement system into compliance with international standards for procurement efficiency, transparency, and accountability.

Under PPRP, significant improvements were made to improve public procurement practices in Bangladesh through the following completed actions:

- Issued the Public Procurement Regulations 2003, which established procurement processing and implementation procedures in line with good international procurement practices.
- Established a specialized technical assistance unit, the Central Procurement Technical Unit (CPTU), to implement and support procurement reforms.
- Developed a set of Standard Bidding Documents for all Government agencies.
- Developed a centralized procurement management information system.
- Developed a critical mass of 25 national trainers and provided training on procurement regulations and procedures to over 1,800 staff through March 2007.
- Prepared the Public Procurement Act, which was ratified by Parliament in 2006.

The Public Procurement Regulations of 2003 were subsequently replaced and updated by the Public Procurement Rules 2008. A follow-on IDA funded project “Public Procurement Reform Project II” (PPRP II, 2007–2012) is underway to continue public sector procurement reform. PPRP II is implemented by the Central Procurement Technical Unit and is focused on four strategic components:

- Furthering policy reform and institutionalizing procurement capacity development.
- Strengthening procurement management at the sectoral level and CPTU.
- Introducing e-government procurement.
- Promoting communication, behavioural change and social accountability.

Source: From *Public Procurement Reform in Bangladesh*, Central Procurement Technical Unit, IMED, Ministry of Planning, Government of the People’s Republic of Bangladesh web site. Available at: <http://www.cptu.gov.bd/PPRP.aspx>

### Annex 3. OECD Principles for Enhancing Integrity in Public Procurement

In October 2008 the OECD Council on Enhancing Integrity in Public Procurement recommended that member countries develop and implement a policy framework to strengthen integrity throughout the entire public procurement cycle. The Policy framework should incorporate ten key principles based on the elements of transparency, good management, prevention of misconduct, and accountability and control.

#### Transparency

1. Member countries should provide an adequate degree of transparency in the entire public procurement cycle in order to promote fair and equitable treatment for potential suppliers.
2. Member countries should maximize transparency in competitive tendering and take precautionary measures to enhance integrity, in particular for exceptions to competitive tendering.

#### Good management

3. Member countries should ensure that public funds are used in public procurement according to the purposes intended.
4. Member countries should ensure that procurement officials meet high professional standards of knowledge, skills and integrity.

#### Prevention of misconduct, compliance, and monitoring

5. Member countries should put mechanisms in place to prevent risks to integrity in public procurement.
6. Member countries should encourage close cooperation between government and the private sector to maintain high standards of integrity, particularly in contract management.
7. Member countries should provide specific mechanisms to monitor public procurement as well as to detect misconduct and apply sanctions accordingly.

#### Accountability and control

8. Member countries should establish a clear chain of responsibility together with effective control mechanisms.
9. Member countries should handle complaints from potential suppliers in a fair and timely manner.
10. Member countries should empower civil society organizations, media and the wider public to scrutinize public procurement.

Source: From: Recommendations of the Council on Enhancing Integrity in Public Procurement. October, 2008. OECD web site: <http://www.oecd.org/dataoecd/62/24/41549036.pdf>



## Annex 4. International Drug Price Indicator Guide

*Julie Frye, Management Sciences for Health*

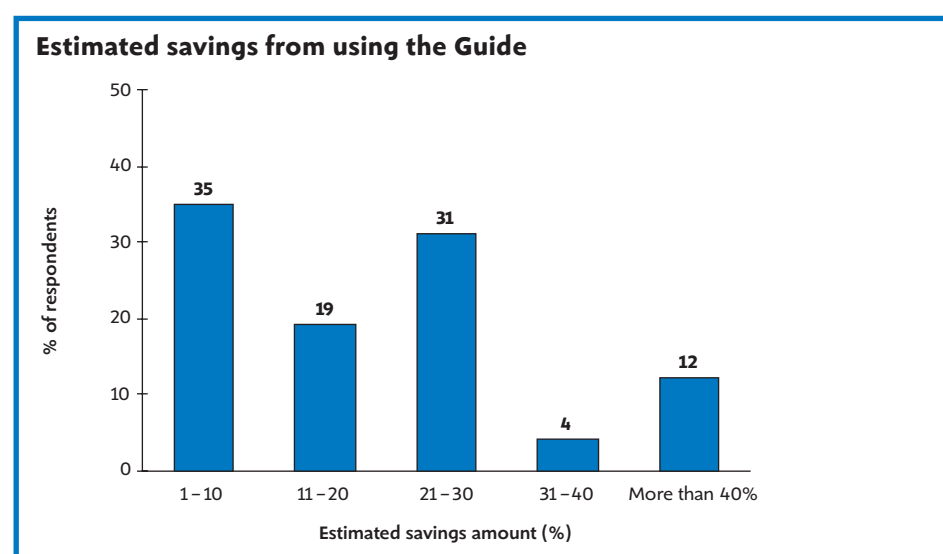
Getting relevant and accurate market intelligence for pharmaceutical and other health-care product prices can be difficult. MSH's International Drug Price Indicator Guide provides an indication of prices on the international market for selected pharmaceuticals, contraceptives, diagnostic tests and medical supplies. Updated annually, the Guide contains a spectrum of prices from suppliers, international development organizations and government agencies.

The Guide aims to make price information more widely available in order to help managers procure quality products for the lowest possible price. Bulk purchasing, competition, skillful negotiation and sound supply management are mechanisms that can lower the prices of medicines. Access to a central, independent, updated database of comparative price information facilitates these endeavors. The Guide provides a useful source of price information for other publications, including Sources and Prices of Selected Drugs and Diagnostics for People Living with HIV/AIDS. Median prices from the Guide are also used as reference prices in the WHO/Health Action International project, "Medicines Prices: A New Approach to Measurement."

Procurement and health-care programme personnel can use the Guide to:

- Determine the probable cost of products for their programmes;
- Compare current prices paid to those available on the international market;
- Assess the potential financial impact of changes to a products list; and
- Support education in rational prescribing and use of medicines and other health-care products.

The Guide contains prices for more than 1,200 items, focusing on essential products. The prices come from 25 sources, grouped into "buyers" and "sellers," or suppliers. The supplier prices are from organizations (usually non-profit) experienced in delivering medicines to the developing world. The buyer prices are usually from government organizations' international competitive bidding. Data are collected annually and are published on the web in a searchable database. MSH often produces CD-ROM and print versions of the Guide as well.



A 2004 survey of users found:

- 65% do not have access to other sources of comparative, international price information.
- 42% use the Guide to assess cost implications of different therapies.
- 46% said that using the Guide has contributed to better acquisition prices or other savings.

Items in the Guide are listed and searchable by name or therapeutic class, using the WHO Essential Medicines List classification. The product's ATC code and defined daily dose (DDD) are included for convenience. Both the pack price and the unit price are listed. The unit price is calculated by dividing the package price by the package size. This facilitates comparison of different pack sizes. A median buyer price and median supplier prices are included.

The 2008 edition of the International Drug Price Indicator Guide was produced in collaboration with WHO and supported by the UK Department for International Development (DFID) and the Medicines Transparency Alliance (MeTA). Data from the 1996 edition to the present edition are available online at <http://erc.msh.org/priceguide>, along with special features to create custom lists of medicines, compare your prices and plan a budget. The explanatory text of the Guide is provided in English, French and Spanish.

## Annex 5. Case Study: e-Procurement in Andhra Pradesh, India

### Background

In 2000, the Government of Andhra Pradesh (GoAP), India, chose to introduce an e-procurement platform for procurement of goods, works and services. Prior to that, the GoAP had been using a manual tendering system which required a lengthy process of internal authorizations and multiple visits by suppliers to departments, and created large volumes of paper-based statements and evaluations.

### Problems of manual tendering

The manual tendering system suffered from the following problems:

- Discrimination and delay by Government departments in the release of tender schedules to suppliers.
- Cartel formation by participating bidders to suppress competition.
- Physical threats by factions against genuine bidders to prevent them from submitting bids.
- Tender boxes were placed at multiple locations to counter the threats of contractor cartels but this created an additional management and transport burden upon Government officials.
- Tender files were tampered with or lost as they were physically transported through the administrative hierarchy.
- Delays in finalizing tenders due to red tape, lack of transparency and manual movement of tender files through the administrative hierarchy.
- Exposure of department personnel to interface with the bidders at every stage of the review and approval process that can lead to subjectivity, favoritism and other undesirable practices.
- Lack of transparency resulting from government departments tightly controlling and closely guarding information, creating a lack of trust in the system by bidders, media and citizens.

A GoAP subcommittee on tender reforms proposed creation of an e-procurement platform to address these challenges. The recommendation was based on the principle that automation of the procurement transactions would reduce human error, enhance the integrity of data, bring transparency to Government procurements and facilitate process standardization. The GoAP e-procurement process was designed to avoid supplier and buyer interaction during pre-bidding and post-bidding. The procurement process and forms used by different departments were standardized, and to bring transparency to the e-procurement process, tender documents containing all essential information and details were hosted on the web site.

### Challenges in implementing e-procurement

The GoAP faced four significant challenges in implementing the e-procurement platform.

1. Selecting a sustainable business model with an appropriate implementation strategy. GoAP decided upon a public-private partnership model in which the private partner

provided technology expertise and upfront investment while recovering costs through charges to user departments for completed transactions.

2. Ensuring interdepartmental coordination. A high-level steering committee comprised of heads of all the participating departments was formed to promote coordination.
3. Managing the change process. Implementation of e-procurement required adopting new ways of doing business for different stakeholders. Supporting this change process was achieved through establishing and monitoring procurement targets for each department, identifying project champions within each department to support implementation, and conducting training workshops to effectively communicate the objectives and benefits of e-procurement.
4. Resolving security and authentication issues.

### Benefits and cost savings from implementing e-procurement

The implementation of e-procurement has improved internal efficiency within Government departments, shortened tender cycle times, eliminated subjectivity in the evaluation of tenders and reduced corruption. Specifically:

- **Tender cycle times were reduced.** Prior to e-procurement, Government departments took 90 to 135 days to finalize high-value tenders. At the end of the first year of e-procurement (2003–2004) tender cycle times had been reduced to an average of 42 days. By the end of the second year (2004–2005) tender cycle times had been reduced to an average of 35 days.
- **Opportunities for corruption were reduced.** Supplier and department interaction during pre-bid and post-bid processes were minimized. The automatic tender evaluation process reduced subjectivity in tender evaluation and helped to curb opportunities for corrupt practices to a significant extent and increased the accountability of procurement officials.
- **Cost savings were achieved.** Tenders processed during the first year of e-procurement were on average 16% less than comparable quotations from the previous year of manual tendering. E-procurement also encouraged competition. Supplier participation increased from an average of 3 per tender in manual tendering to 4.5 in e-procurement. Departments have recognized cost savings with an average reduction of 20% in procurement transaction costs in 2003–2004 and 12% in 2004–2005.

### e-procurement in Andhra Pradesh

Year	Value of transactions completed (US\$ million)	No. of transactions processed	Percentage of transactions in eProcurement out of total GoAP spend	Average tender cycle time (high value tenders) <sup>a</sup>	Average supplier participation per tender <sup>b</sup>	% reduction in GoAP costs of procurement transactions	% reduction in quoted prices from prior year manual procurement system
2003–04	447	564	20%	42 days		20%	16%
2004–05	3522	3746	80%	35 days	4.5	12%	
2005–06	3740	7931	90%				

<sup>a</sup> Prior to e-procurement, government departments took 90–135 days to finalize high value tenders.

<sup>b</sup> Prior to e-procurement, average supplier participation was three per tender.

- **Transparency improved.** The use of automated tender evaluation through smart forms and parameterized qualification criteria has improved transparency, reduced subjectivity in the tender award process and reduced corruption.

### Key lessons learnt

Important factors in the successful implementation of e-procurement in Andhra Pradesh include:

- Establishing support of political leadership and formation of a high-powered steering committee.
- Pursuing a participative design process that included workshops attended by all key stakeholders.
- Establishing a single mode of bid submission through the e-procurement platform.
- Using technical experts to act as change agents in implementing e-procurement.
- Selecting a sustainable model that is rational and affordable for the government and its implementing partners.
- Identifying committed project teams to support help desk and security features.

Case study authors: K. Bikshapathi, Project Manager, e-procurement; P.Ramarajo, Chief Engineer, Immigration Department, GoAP; S. Bhatnagar, IIM, Ahmedabad, India. Submitted March 2006.



# THE WORLD MEDICINES SITUATION 2011

## STORAGE AND SUPPLY CHAIN MANAGEMENT

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Even though service levels at health facilities remain low, warehousing and distribution costs are a substantial part (up to 16%) of the medicines budget in low- and middle-income countries.
- A variety of institutional and physical structures involving public, private and nongovernmental organization actors exist for warehousing and distribution of medicines.
- Duplication and fragmentation still exist in the public sector distribution system due to vertical programme design but physical integration is under way in many countries.
- Governments are providing more autonomy to distribution organizations, such as the central medical stores. They are also contracting out transport to achieve efficiency and scope economies by consolidating loads from different clients destined for the same end-point whenever possible.
- Storage capacities and conditions are inadequate at the peripheral level in many countries.
- Many countries are shifting from push to pull distribution systems – thereby creating the need for health facility data for distribution planning and ordering.
- Distribution in the private sector is effective, except in remote areas, but the distribution margins are often very high. There is increasing pressure on these distribution margins, resulting in consolidation in many countries.
- Singular government-run medicine distribution systems are slowly giving way to pluralistic distribution structures where the private sector wholesalers and distributors play a stronger role.
- Sustained investments and increased efficiency are needed to make distribution systems effective and sustainable in the public and private sectors.

## 1.1

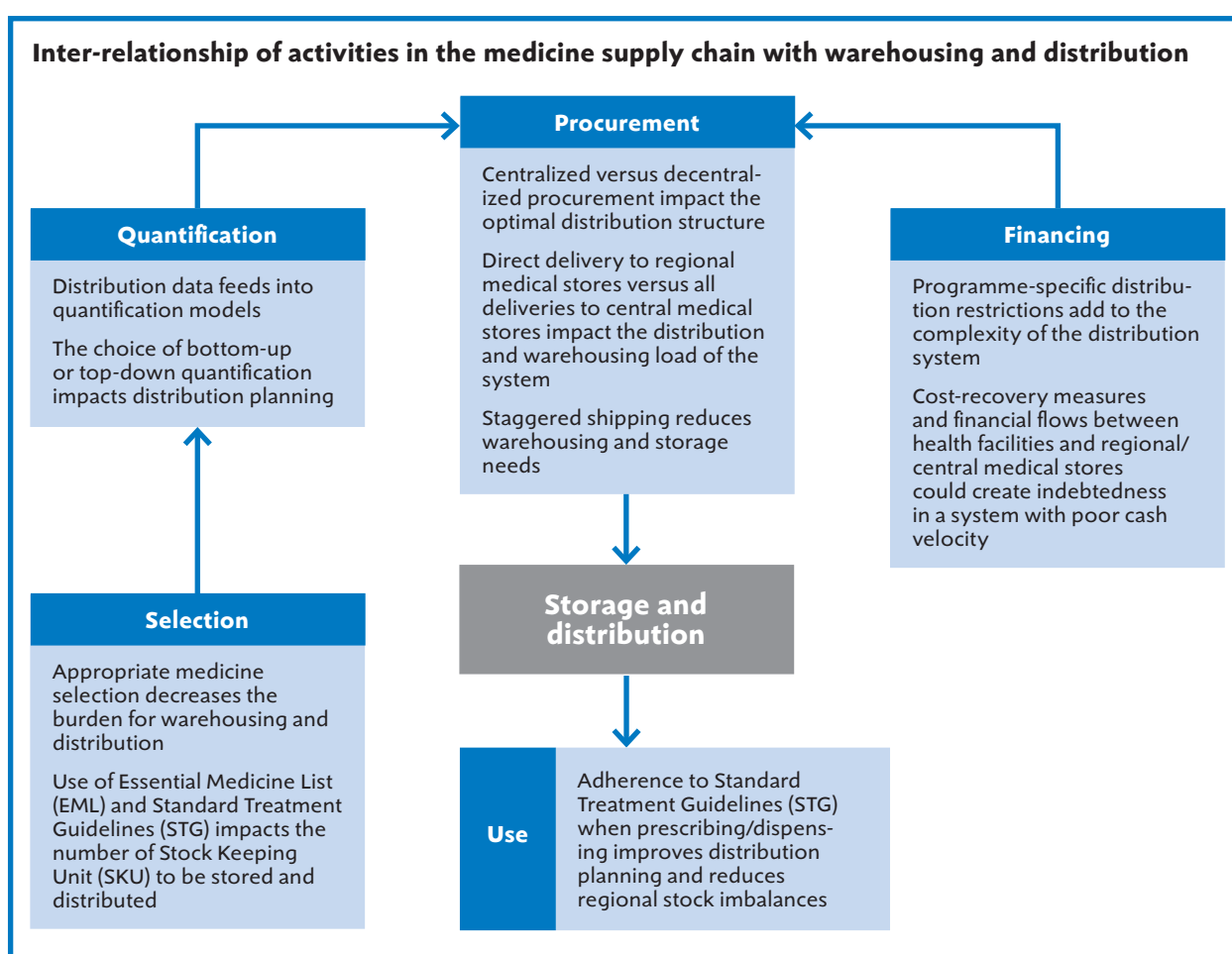
## BACKGROUND/INTRODUCTION

The distribution of medicines is the process by which they are transported from a central warehouse to storage depots and health facilities. A well designed medicines supply system ensures that procurement, warehousing and transportation are seamlessly linked to form a network that can deliver the requested medicines to health facilities and pharmacies in good time, in the correct quantities and at the lowest possible cost. In order to guarantee that the quality of the medicines distributed is preserved, the distribution system also has to ensure that good storage and distribution practices are maintained throughout the distribution chain (1,2).

Figure 1.1 shows the inter-relationships between warehousing and distribution relative to other activities in the medicines supply chain, such as product selection, quantification, procurement, financing and use. It is important to view warehousing and distribution in the context of a holistic medicine supply chain, as short-sighted decisions on other activities can severely impact or undermine the effectiveness and efficiency of the warehousing and distribution functions.

A single central warehouse cannot always distribute efficiently to all health facilities and so it is necessary to have a tiered distribution network, with storage and distribution at multiple levels. In distribution systems with multiple levels, effective management of ordering, receipt, storage, distribution and resupply at each level of the distribution network becomes

FIGURE 1.1



*An ineffective or poorly designed distribution system is likely to cause stock-outs at health facilities despite the availability of stock at the central warehouse.*

crucial to ensuring consistent and timely supply of essential medicines to health facilities and clinics. This requires efficient logistics management capacity at each level of the distribution system.

In many public sector programmes, the system for warehousing and distribution of medicines is often a major constraint on efforts to meet the health-care needs of large sectors of the population, particularly in rural areas. An ineffective or poorly designed distribution system is likely to cause stock-outs at health facilities despite the availability of stock at the central warehouse. On the other hand, an inefficient distribution system can result in an increase in the system's financing requirements, making it unsustainable over time. A balanced approach that acknowledges the current state of technical capacity, administrative structures and resource availability should guide the proper design and operation of a distribution system.

## 1.2

### CURRENT SITUATION

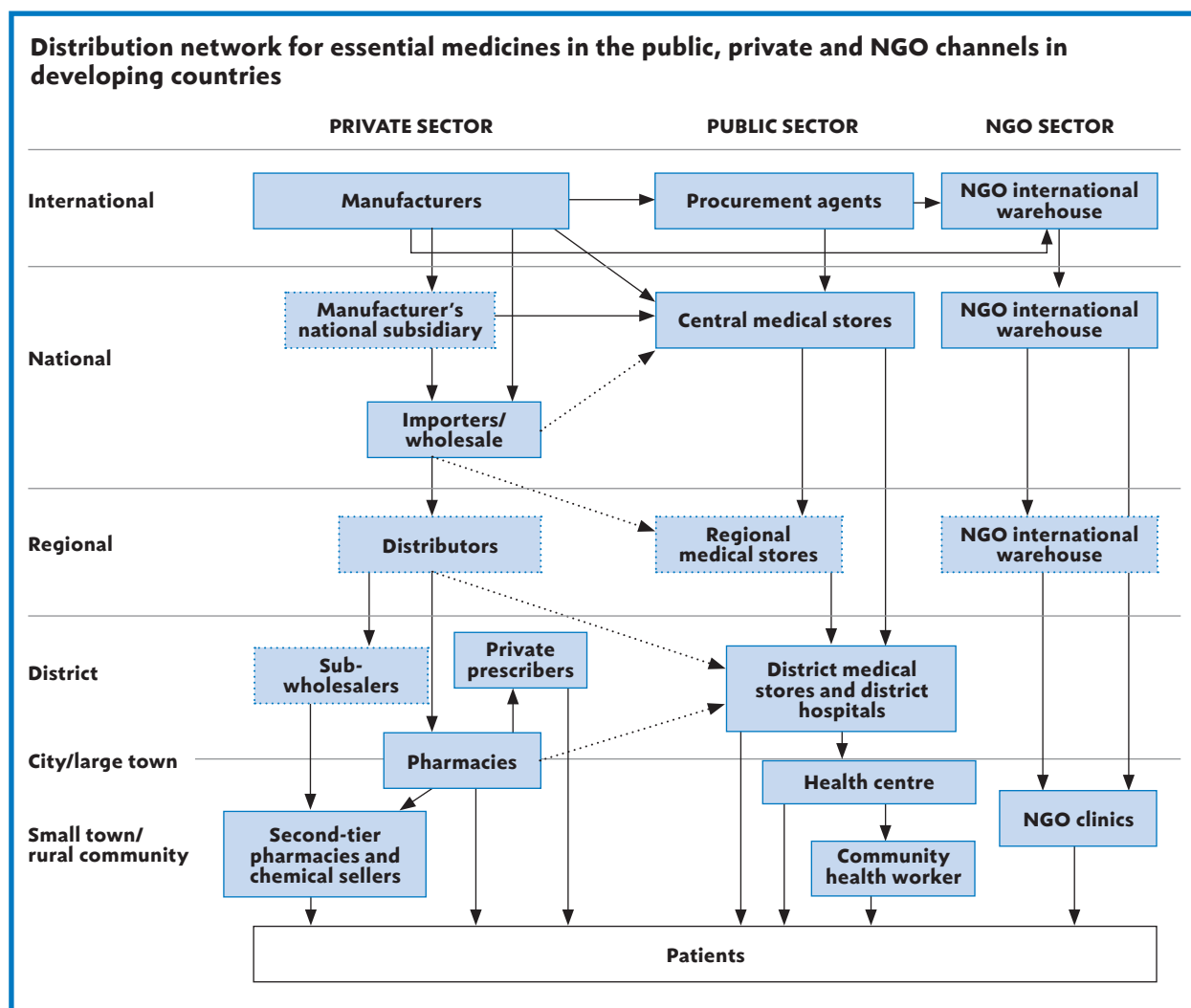
In most low- and middle-income countries, public, private and nongovernmental organizations (NGOs) co-exist as channels of distribution for medicines, with various interconnected flows between the three channels. In Organisation for Economic Co-operation and Development (OECD) countries, medicines are distributed largely through the use of private sector distributors, whereas in a number of low-income countries the distribution of medicines is carried out primarily by the government and NGO sector. Figure 1.2 illustrates the commonly observed structures for distribution in the private, public and NGO sectors in low- and middle-income countries.

Although pharmaceutical distribution is organized in slightly different ways in different countries (3), most primary health facilities and private retail pharmacies cannot keep a large quantity of medicines in stock. Instead they rely on obtaining their supplies periodically from district or regional warehouses in the public sector, and from private wholesalers and distributors in the private sector. This leads to multiple tiers of storage and distribution between the manufacturer and the patient at the end of the supply chain. The number of entities involved at different layers of the distribution system, their ownership and governance structure (publicly owned, privately owned or public-private partnerships) and the roles they play vary considerably from one country to another. Determining the optimum number of levels in the distribution system depends on geographical factors, the population to be served, variability in demand, and the availability of storage space, maintenance staff and transport facilities.

In most developed countries, there are a few privately owned national wholesalers who maintain a stock of the full range of pharmaceutical products from multiple manufacturers and distribute to clinics, hospitals and pharmacies. Such wholesalers make deliveries to retail pharmacies several times a day (4).

In low-income countries, especially in sub-Saharan Africa, the predominant public distribution model involves the government distributing the medicines to health facilities using a central medical store (CMS), regional or district stores and a government/CMS owned transport fleet. Additionally, in the public sector run pharmaceutical provision system, procurement and distribution are often organized as separate functions, decoupled from each other, with a limited and infrequent flow of information between them, especially for the procurement of medicines for health programmes funded by donors (AIDS, malaria, tuberculosis (TB), vaccines, reproductive health). Indeed, WHO-supported surveys carried out over the

FIGURE 1.2



past four years in 16 African countries<sup>1</sup> on mapping of partners and financial flows in the medicines supply system (5) highlighted that an average of 77.96% of funding partners use international procurement agencies to purchase medicines with warehousing and distribution performed by the public distribution system or by a private/NGO distribution system. Thus, in addition to CMS, medicines procurement in the countries studied is undertaken by an average of 19 different procurement agencies.

Moreover, surveys also highlighted that there is no national coordination mechanism/structure in place to share financial or logistical information among funding partners, programmes, national regulatory authorities and CMS, except in two countries for antiretrovirals (ARVs) and artemisinin combination therapies (ACTs) (5). This situation does not allow for the establishment of a national procurement and distribution plan that is coordinated, coherent and efficient.

<sup>1</sup> Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, the Congo, Democratic Republic of the Congo, Ghana, Madagascar, Mali, Nigeria, Rwanda, Senegal, Sudan, United Republic of Tanzania, Zambia.

### 1.2.1

#### Public sector distribution system

The typical structure for distribution of medicines in the public sector consists of a CMS which serves as the primary warehousing and distribution point in the medicines supply chain. In Francophone Africa the equivalent organization is called the Centrale d'Achat de Médicaments Essentiels because its main function is to procure medicines on behalf of the ministry of health. The CMS of 21 Francophone countries in Africa and the Indian Ocean<sup>1</sup> are members of ACAME, Association Africaine des Centrales d'Achat de Médicaments Essentiels, which was established in July 1996 with a mandate to contribute to improving the performance of CMS.

Depending upon the geography and the number of health facilities in a country, either regional stores (RS) or district-level stores (DS) serve as the second or third level distribution points. Table 1.1 shows the number of central, regional and district stores in 12 African countries for the public distribution of essential medicines (5).

In many developing countries, in addition to the principal public CMS and designated regional or district stores, there are a larger number of primary and secondary distribution locations due to product- or programme-specific vertical supply chains set up by various funding partners, as shown in Table 1.2.

Most of these additional storage locations are depots belonging to the partners. An average of only 52% of partners uses the CMS as the primary storage entity. These additional storage locations have contributed to making the medicines supply system very complex in these countries – increasing the difficulty in coordinating the management of medicines procurement and distribution at all levels of the supply chain and leading to a greater risk of stock-out or overstock and product expiry. Figure 1.3 shows the complexity of the medicines supply system in the Democratic Republic of the Congo.

**TABLE 1.1 Number of storage locations in public sector chains in selected countries (5)**

Country	Central medical stores	Regional stores	District stores
Burundi	1	17	
Burkina Faso	1	7	63
Cameroon	1	10	
Chad	1	22	
The Congo	1		41
Democratic Republic of the Congo	2	15	228
Ghana	1	5	
Mali	1	5	49
Rwanda	1		30
Senegal	1	11	63
United Republic of Tanzania	1	8	
Zambia	1		72

<sup>1</sup> ACAME members: Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, the Congo, Côte d'Ivoire, Democratic Republic of the Congo, Gabon, Guinea, Guinea Bissau, Madagascar, Mali, Mauritania, Niger, Rwanda, Senegal, Togo, Tunisia.

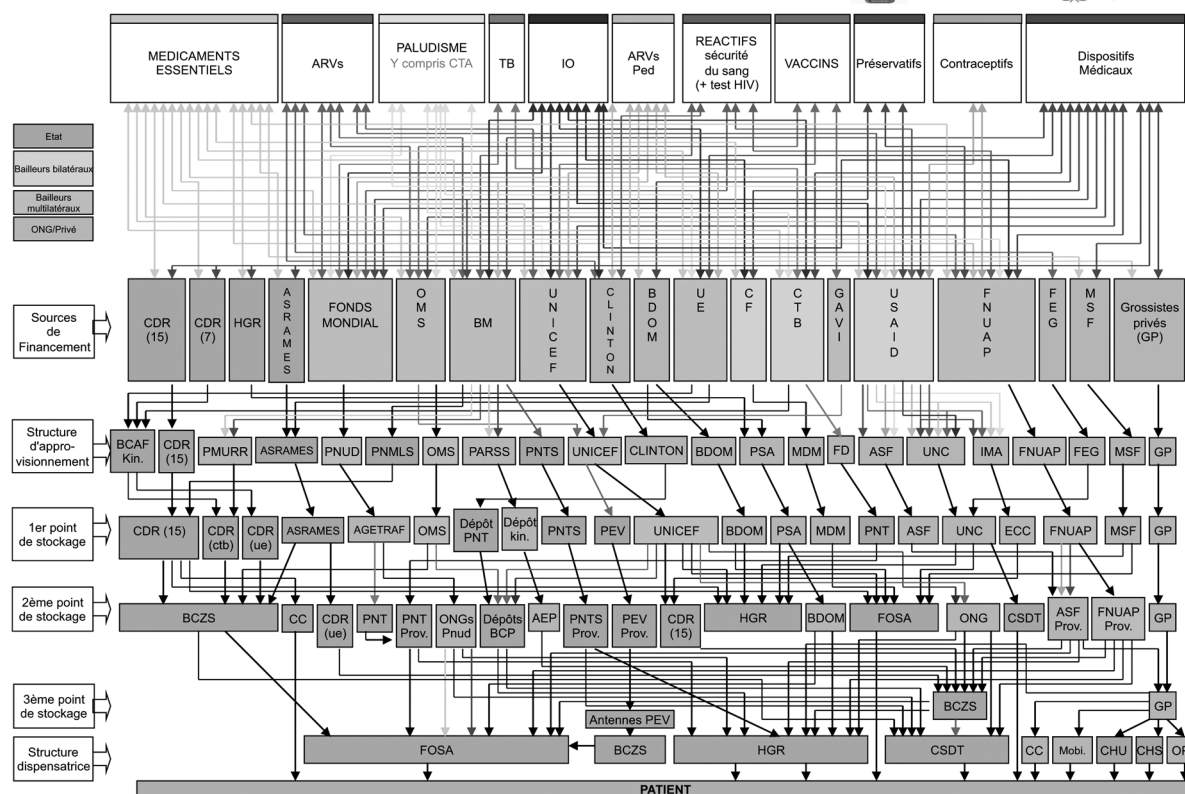


**TABLE 1.2 Primary and secondary storage entities in public sector supply chains in selected countries (5,6)**

Country	Public storage locations		Additional storage locations	
	1st tier	2nd tier	1st tier	2nd tier
Burundi	CMS	RS	14	7
Burkina Faso	CMS	RS	6	1
Cameroon	CMS	RS	2	1
Chad	CMS	RS	8	7
The Congo-	CMS	DS	13	3
Democratic Republic of the Congo	CMS	RS	16	13
Ghana	CMS	RS		
Mali	CMS	RS	8	4
Rwanda	CMS	DS	6	2
Senegal	CMS	RS	6	1
United Republic of Tanzania	CMS	RS	7	2
Zambia	CMS	DS	7	2

**FIGURE 1.3****Map of the medicines supply system in the Democratic Republic of the Congo (5)**

Systèmes d'approvisionnement des produits pharmaceutiques en RDC Mai 2009

République de la RDC  
Ministère de la santéWorld Health  
Organization

In most public sector distribution systems a multi-tiered distribution network is mapped directly to the administrative structure of the health system for convenience of administration and governance, instead of having a design based on technical or operational considerations.

In most countries, CMS ensure the delivery to the regional level but the district level and health facilities may have to use their own means to pick up their products from the higher level.

Two main approaches are used to distribute stock from the higher level store to a lower level store or health facility. In a **push** system, the CMS or the regional or district store determines what quantities of medicines are to be issued to each lower level store or the health facility, based on centrally estimated allocation quantities. In a **pull** system, each health facility (or store) determines the medicines requirements to be requisitioned or bought (in a cost recovery system) from the higher level warehouse. A pull system uses local information about demand, which often does not reach the CMS and depends on good decision-making ability and accountability at the decentralized level. A push system is robust to weak order and stock management capabilities at the lowest level of the distribution system. It also enables more equitable rationing decisions when there is scarcity of stock, but needs to have a very good logistics management information system in place with data consolidation at each level.

The push system is generally used for the distribution of medicines from vertical programmes and in countries where the funding of medicines is ensured by the government and managed at the central level. For countries where there is a cost recovery system in place (most of the Francophone countries in Africa), the pull system is used.

*The choice of a push or pull system depends largely on in-country capacity to conduct stock planning and forecasting at each level of the supply chain as well as the level of maturity of the supply chain.*

The choice of a push or a pull system depends largely on in-country capacity to conduct stock planning and forecasting at each level of the supply chain as well as the level of maturity of the supply chain. Often a combination of push and pull systems is used in which the regional or district stores pull stock from the CMS but then in turn use push-based allocation to distribute stock to the health facilities. Such an arrangement is currently used in multiple countries as it acknowledges the lack of stock planning capacity at the health facility level while achieving the benefits of the pull system for the primary leg of distribution (i.e. from CMS to district or regional stores).

Another important variable in the design of the distribution system is the resupply interval. In distribution models such as the ones currently in use in Kenya or The Gambia, each health facility receives a delivery of stock every three months. This ensures the transport cost of the distribution system is reduced. A more frequent resupply interval is used in three-tiered distribution models, such as in the United Republic of Tanzania or Zambia, where delivery from the CMS to the health facilities through DS is once a month. Although more frequent resupply intervals lead to higher transport costs, they also result in a shorter forecast horizon for the health facilities, thereby allowing for better stock management and a lower chance of stock-outs.

The quantity of stock held at each tier is based on a system of minimum-maximum rules for each level. Under such a system, orders are placed by the health facilities or lower level stores at regular intervals, but a product is ordered only if it has reached its minimum stock level; products reaching the minimum stock level are ordered/resupplied to the maximum stock level. Although most countries surveyed have some form of minimum-maximum rule, strict adherence to the ordering rules remains poor.

TABLE 1.3

**Typology of different distribution models used in public sector distribution for essential medicines (5,6,7)**

Distribution model	Country example	Key advantages	Key disadvantages
<b>CMS to Health Facility</b> 	Kenya	Better visibility of consumption data at CMS Lower total stock in the system Less reliance on district or regional store stock planning capacity	Higher transport costs Lower frequency of delivery Many health facilities not reachable using formal transport
<b>CMS to DS to Health Facility</b> 	The Congo, Rwanda, Zambia	Stock positioned closer to health facilities Relies on DS stock planning capacity	Lower visibility of consumption data at CMS Greater risks of pilferage and theft due to large stocks at DS
<b>CMS to RS to Health Facility</b> 	Burundi, Cameroon, Chad, The Gambia, Ghana	Few RS easier to manage than a larger number of DS	Lead time from RS to health facilities can be long
<b>CMS to RS to DS to Health Facility</b> 	Burkina Faso, Democratic Republic of Congo, Mali, Senegal	Except for DRC, RS is a branch of CMS, thus better visibility of consumption data at CMS level Stock positioned closer to health facilities Relies on district or regional store stock planning capacity More frequent deliveries	More total stock in the system
<b>CMS to DS to Health Facility with DS as pass-through</b> 	United Republic of Tanzania	Combines the primary transport cost benefits of DS model with the other benefits of the direct to health facility model	Relies on health facilities estimating their needs and placing orders to the CMS

**TABLE 1.4 Logistics cost in public sector supply chains in selected countries (8)**

Country	Product	Logistics cost as a % of stock value
Bangladesh	Contraceptives	1%
Malawi	ACT	18%
Uganda	Contraceptives	3%
Nigeria	ARVs	4.8%
Liberia <sup>a</sup>	Bed nets	44%
Zimbabwe	Condoms	12%
Ghana <sup>a</sup>	Essential health commodities	13%
Egypt		6%
Zambia <sup>a</sup>	ARVs	16.1% rural, 9.0% to 10.4% urban
Honduras	Essential drugs	6.5%

<sup>a</sup> Costs in these countries include administrative costs related to procurement in addition to storage, handling and distribution costs

*Warehousing and distribution costs often account for a large part of a country's medicines budget.*

Warehousing and distribution costs often account for a large part of a country's medicines budget. When designing and managing supply chains for medicines, stakeholders are often faced with the competing demands of improved service level at the health facilities (higher availability, more frequent delivery) and lower distribution costs. This makes it harder to compare distribution costs across programmes with varying service levels. A recent survey by Sarley et al. in 2009 (8) of existing studies on distribution costs in public health supply chains found that the distribution cost estimates varied from 13% of product cost for essential health commodities in Ghana to 44% of the value of the bed nets for a bed net delivery project in Liberia. Analysis conducted in Zambia concluded that the distribution cost for ARVs was 16.1% to rural health facilities and was 9.0% to 10.4% for urban health facilities.

Logistics costs are funded either by the public budget or, for countries where the cost-recovery system is in place (most of the Francophone countries), by the margins applied to define the selling price.

However, logistics costs for the distribution of medicines of vertical programmes are often not clearly identified, and in many cases do not exist in either the public budget for medicines or in the funding provided by partners (5,6). Moreover, when funding for distribution exists, it is difficult to know if the amount has been calculated based on an efficient methodology. In many cases, the risk of stock-out is high because the funding for distribution is either not available or may be insufficient.

Additionally, in countries where a cost recovery system is in place, when vertically funded programmes do not provide adequate funds for the existing systems, the distribution of the medicines involved tends to be funded through resources taken from the margins of the overall medicines distribution system. This practice can undermine the financial viability of distribution systems and force them to raise the prices of the other essential medicines being distributed – thereby making them less affordable.

Results of the in-depth assessment of the medicines supply carried out in six sub-Saharan African countries over four years (2007–2010) show that the average of the mean percentages of availability of a basket of essential medicines in these countries is 82.82% at CMS, 84.33% at RS, 91.31% at DS and 77.93% at the health facilities level (6). The basket of essential medicines used in this survey included basic essential medicines, antiretrovirals, TB medicines, ACTs, vaccines, contraceptives and diagnostic tests for HIV. The increasing avail-

ability of medicines, in particular those funded by donors, shows that predictably access to medicines is linked to access to funds. Unfortunately, the vertical approach used for funding medicines supports the emergence of disparities and inequalities in access to medicines between the different categories of products.

*The distribution system also has to ensure that good storage practices are maintained in order to guarantee the quality of the medicines throughout the distribution chain.*

The distribution system also has to ensure that good storage practices are maintained in order to guarantee the quality of the medicines throughout the distribution chain. However, while storage conditions may be adequate at the CMS, they are often sub-optimal at the peripheral level. On average only 45% of health facilities had good storage conditions in the six sub-Saharan African countries studied and only 6.14% of them had adequate storage areas. Storage capacity was also reported to be inadequate at all levels: none of the CMS had adequate storage capacity; and for RS, DS and health facilities, the average percentage of structures that had adequate storage capacity was 31.4%, 23.7% and 41.4% respectively (6).

### 1.2.2

#### Private sector

Distribution in the private sector is carried out through a network of importers, wholesalers, sub-wholesalers, and pharmacies and drug stores. Pharmaceutical importers and wholesalers form the link between pharmaceutical manufacturers (located outside or within the country) and retail pharmacy outlets, dispensing doctors and hospitals in the country.

Pharmaceutical wholesalers provide both a distribution and stockholding function. This enables retail pharmacies to be supplied with products in the quantities they require to meet their daily needs, while ensuring that pharmacies do not have to maintain large stocks of a wide range of pharmaceuticals. Retail pharmacists and dispensing doctors then keep a working stock of medicines. Full-line wholesalers stock a full range of pharmaceutical products and short-line wholesalers sell only a restricted range of the faster-moving products.

The number of wholesalers varies in each country depending on the size of the market, government regulation and political economics. In Uganda, there are over 100 officially registered importers/distributors, and 12–14 “industry leaders.” In Nigeria, there are 292 licensed medical importers. In Zambia, there are over 30 licensed wholesalers, but of these only 5 or 6 account for a large part of the volume. Fewer licensed wholesalers/importers exist in Francophone African countries. There are an average of 5 wholesalers/importers per country, except for Burundi, Mali and Rwanda for which there are 14, 23 and 32 respectively (5,7). Kyrgyzstan is reported to have over 200 wholesalers but again around 10 of them are the volume leaders. In comparison, in most OECD countries there are 3–5 large wholesalers who supply to all retail pharmacies several times a day (7).

In most low- and middle-income countries, including the ones where there are a large number of importers and wholesalers, the wholesalers exercise some degree of market power over retail pharmacies. At the time of product registration, regulatory authorities need a single in-country entity to file for registration to ensure that the responsibility for safety, efficacy and quality is with a single entity. In cases where the manufacturer has an in-country subsidiary, the manufacturer’s subsidiary becomes the registering entity. However, when the manufacturer does not have an in-country subsidiary, the importer acting as the manufacturer’s agent registers the product and thus may become a monopolistic importer.

Wholesalers rely on three primary methods of distribution – delivery by wholesaler vehicle, delivery by private courier, and customer pick-up. While distribution by wholesaler vehicles is typically concentrated in the capital cities and principal towns, some wholesalers use

smaller vans to distribute beyond the main roads and into more rural areas. Some wholesalers also leverage public transport, such as mini-buses, for sending their products to customers who are located farther away (way-bill). Staff from pharmacies or drug stores located in smaller towns and rural areas often travel into urban areas to pick up their stock either directly from the wholesalers or from sub-wholesalers.

Although distribution in the private sector may be effective in ensuring product availability, except for in remote areas, the distribution margins are often very high (9). The linkages among retail, wholesale, and manufacturer prices of essential drugs continue to be of considerable interest in the access-to-medicines debate. The evidence of direct relationships among prices at different levels of exchange becomes increasingly difficult to evaluate without considering the structure and costs of the supply chain (10).

### 1.2.3

#### NGO and faith-based sector

In many countries, NGOs and faith-based organizations (FBOs) also act as important sources of medicine supply and distribution. Although the share of overall health service provision and essential medicines provision by NGOs and FBOs varies considerably between countries, according to 2004 estimates an average of 43% of the rural population is served by 15 faith-based drug distribution organizations (with the range varying from 25% to 60%) (11).

A range of distribution options are used by FBOs but the two most common are:

- Hospitals, clinics and health posts pick up their orders using their own transport from the distribution warehouse of the FBO.

TABLE 1.5

#### Customer base of NGO and FBO drug distribution organizations in 11 sub-Saharan African countries in 2003 (11)

Country	NGO or FBO medicines distribution entity	No. of member hospitals	No. of member health care centres	No. of member health posts	No. of non-member customers	Total no. of customers in 2003
Cameroon	CAP/EPC	8	32			40
Cameroon	CBC	2	21	40	10	73
Cameroon	EEC	5	8	34	0	47
Cameroon	OCASC	10	200			210
Cameroon	OSEELC	3	0	10	15	28
Cameroon	PCC	6	14			20
D.R. Congo	ECC/DOM	12	75	600	2513	3200
Ghana	CDC	31	60	6	20	117
Kenya	MEDS	66	153	385	396	1000
Malawi	CHAM	20	129			149
Nigeria	CHANpharm	150	1200	500	70	1920
Rwanda	BUFMAR	13	95		9	117
South Africa	AMFA	23	0			23
Tanzania	CSSC	0	29			29
Uganda	JMS	114	346		711	1171
Zambia	CHAZ	34	58	5	28	125
<b>Total no. of customers</b>		<b>497</b>	<b>2420</b>	<b>1580</b>	<b>3772</b>	<b>8269</b>



**TABLE 1.6 Drug distribution/delivery services by FBO distribution organizations (11)**

Customer's own arrangement	62%
Courier services	44%
Drug supply organization delivery services	31%
Direct delivery services	18%

- Hospitals, clinics and health posts submit orders electronically or by phone and the FBO arranges for delivery using their own or contracted transport.

In practice, most FBOs use a combination of the two approaches and some also use private couriers for delivery to their customers. In a multi-country study of FBO supply systems in sub-Saharan Africa published in 2006, four drug distribution models were identified (see Table 1.6).

### 1.3

### TRENDS OVER THE PAST 5–10 YEARS

Over the past decade, the effectiveness and efficiency of medicine distribution systems have received considerable attention. Several factors seem to be driving this trend:

- the considerable increase in funding available for procuring medicines, particularly for priority diseases, has highlighted the weakness of medicines supply systems as they struggle to cope with this significant increase in activity and funding;
- the large number of funders and the fragmentation of their activities has contributed to more complex supply systems in countries and underlined the need for better coordination among technical and financial partners and with the ministry of health;
- improvements in procurement and financing have meant that the availability of stock at CMS has increased – together with the realization that simply having more medicines will do little to mitigate the problem of stock-outs for patients unless the supply chain is efficient.

More widely available information about the availability of medicines at the health facility level (9) and the incidence of stock-outs has led to advocacy campaigns in pursuit of greater accountability on distribution aspects of the medicine supply system. Increased technical assistance from WHO, the USAID/DELIVER Project, the Partnership for Supply Chain Management, ACAME and Management Sciences for Health/Strengthening Pharmaceutical Systems (MSH/SPS) has led to a focus on strengthening the in-country pharmaceutical distribution system. Financing for health system improvement projects from global health funders such as the GAVI Alliance, the Global Fund and the World Bank has opened new avenues of resources for investments in the distribution system. The creation of the Supply Chain Management System – a unique partnership of public and private entities for improving supply chains for HIV medicines within the US President's Emergency Plan for AIDS Relief (PEPFAR) was an indication of the high-level commitment to issues of procurement, storage and distribution in the health sector. Even though it was focused only on HIV commodities, it enhanced the importance of storage, distribution and transport issues for policy advocacy and for financing from other large donors.

### 1.3.1

#### Parastatal, semi-autonomous central medical stores

In a fully government run central medical stores (CMS) the managers often face severe challenges in improving the operational performance of the storage and distribution system. While they often have difficulty hiring people with business experience and skills because of the poor wages and incentive systems in the public sector, they also often lack the authority to remove incompetent workers (4).

Many governments have granted autonomous or semi-autonomous status to their CMS with increased financial and managerial autonomy (12), and sign agreements with CMS organizations to define the tasks and duties of each party. These changes have been part of a wider effort to incorporate private sector management features in public sector medicines supply chains (13).

**TABLE 1.7 Impact of autonomous/semi-autonomous CMS on operational performance (12)**

Management aspect	Burkina Faso		Cameroon		Senegal	
	Pre	Post	Pre	Post	Pre	Post
Drug selection	-1	2	-1	2	-1	1
Quantification	NIA	2	-1	1	-2	0
Supplier selection, monitoring	-2	2	1	1	-2	0
Procurement	-1	1	0	1	-1	0
Inventory management	0	1	1	1	-1	1
Storage	0	2	0	2	-1	-1
Dispatch and delivery	0	1	1	2	-1	1
AVERAGE SCORE	-0.6	1.6	0.1	1.4	-1.3	0.3

Note: Key to performance ratings: -2=very poor; -1=poor; 0=adequate; 1=good/moderate improvement; 2=very good/substantial improvement; NIA=no information available.

A large number of countries, including Benin, Burkina Faso, Cameroon, the Congo, Democratic Republic of the Congo, Ghana, Guinea, Kenya, Mali, Nigeria, Rwanda, Senegal, Sudan, the United Republic of Tanzania, Togo, Tunisia, Uganda, Yemen, Zambia and Zimbabwe, have created autonomous or semi-autonomous medical stores, creating more agility and flexibility in the medicines distribution system.

### 1.3.2

#### Computerization

A large number of CMS in sub-Saharan Africa (e.g. the United Republic of Tanzania, Zambia and the majority of Francophone countries) now have warehouse management systems (WMS) to provide computerized process management and inventory control at the CMS but also at the RS for some of these countries. Such CMS systems support tasks such as ordering, receiving, put-away, replenishment, picking/packing, shipping, cycle counting, and inventory control aim to reduce lead times, increase storage capacity and improve labour productivity at the CMS.

The majority of the 21 CMS members of ACAME use the same software for warehouse management in order to facilitate exchange of information (price, logistics information, dashboard...). This harmonization of the software has enabled ACAME to organize pooled

training of staff of several CMS. In Burkina Faso, the regional stores, which are branches of the CMS, all use the same software and are connected online with CMS for sharing logistics management information.

### 1.3.3

#### Decentralized procurement at lower levels of the distribution system

Inability to procure medicines for distribution from the CMS has also prompted some countries to decentralize drug procurement to lower levels of the distribution system. Providing some degree of autonomy in purchasing to the health facilities, district or regional medical stores increases the speed and flexibility of procurement but entails the loss of the price advantages from central procurement and makes it difficult to monitor quality.

For example, in Ghana health facilities fund their medicines through cost recovery from clients and procure their supplies from either the higher levels of the supply system (RS or CMS) or from the private market if not available at the higher levels (13). Guatemala has an 'open contract' system whereby the national government contracts with medicine suppliers to provide specific medicines on demand from local administrative levels at a tendered fixed price (including transportation costs) (14). Such systems allow the health facilities to decide on quantities and to order their medicines from one of often several optional suppliers. And since the prices are pre-established it does not compromise the large quantity discounting and other scale efficiencies that the government gets from central procurement. Ghana has also attempted to create a central price contract, local ordering and delivery system under its National Health Insurance System (13).

### 1.3.4

#### Integrated physical distribution of verticalized programmes

*There is growing awareness among disease-specific vertical programmes that the distribution of their products cannot be conducted in isolation from the overall national distribution system.*

There is a growing awareness among disease-specific vertical programmes that the distribution of their products cannot be conducted in isolation from the overall national distribution system and that the integration of physical infrastructure, such as trucks and warehousing space, will benefit distribution efficiency and long-term sustainability. For example, in the United Republic of Tanzania, about 61% of partners use the Medical Stores Department (MSD) as the first point of warehousing, 29% use their own storage facilities and 10% send products directly to the health facilities. In Cameroon, 77% of partners use the CMS (CENAME) to purchase medicines they finance and 86.7% of them use the public distribution system (SYNAME) to distribute medicines. In Burkina Faso, while only 35.7 % of partners use the CMS (CAMEG) to buy medicines, this purchase accounts for more than 55.8% of the total value of funding by partners. Many countries where specific programmes had set up parallel distribution systems are now trying to integrate the physical logistics of distribution for different vertical programmes.

However, the information reporting needs of the programmes are very different and they remain highly verticalized. And not all countries have taken steps towards physical integration of distribution. For example, in Nigeria most of the medicines and other products procured by partners are distributed by privately contracted agents and the donors themselves. Only 29% of the products procured by partners are distributed through government structures.

### 1.3.5

#### From push to pull distribution and greater reliance on demand data

Countries that now have well-trained staff at the lower levels of the distribution system have started to implement a true pull distribution system based on stock status and consumption at the health facility. As pull distribution requires the staff at the lower levels in the distribution system to determine how much of each product to order, this has further highlighted the need for timely and accurate data on stocks and medicines consumption. A large number of the countries which provided input for this work either already have some form of a Logistics Management Information System (LMIS) or are in the process of implementing one. In-depth assessment of the public medicines supply chain of six sub-Saharan African countries (6) shows that LMIS is available in 100% of CMS studied, 82.5% of RS, 88.87% of DS and 57.2% of health facilities. In most countries studied, LMIS data are currently recorded through a software system at the central and sometimes regional level, and on store ledgers, stock control cards and requisition forms at the district and health facility level. However, reporting such data to the higher levels of the distribution system for better supply planning is often difficult. In the six countries studied, only 46% of health facilities collect logistics data and send this information to the higher levels, 50.67% of DS and 74.08% of RS (5). The main difficulties in implementing a functional LMIS are the existence of a different LMIS for each programme; the increasing complexity of donor reporting requirements; and the burden for the health professional in maintaining multiple systems. Harmonization and standardization of logistics data to be recorded are prerequisites for a functional and efficient integrated LMIS.

A push from large donors, such as the Global Fund and PEPFAR, to use consumption data for national quantification has led to new initiatives to replace antiquated paper-based stock requisition systems with computerized forms and electronic ordering in some countries. Similar initiatives for electronically recording and reporting of immunization clients are helping in better managing and tracking vaccine inventory across the supply chain.

Countries that lack well trained staff at health facilities and districts and usually rely more on trained staff at the central or regional medical store level continue to use a push system. This is also the case in those countries that have a skeletal health staff at primary health centre level and want to minimize the pharmaceutical stock management workload of lower-level staff.

### 1.3.6

#### Distribution model design being decoupled from administrative structure

Many countries are now realizing that the perceived operational management convenience from using a distribution system that reflects the administrative and governance structures is limited and that the resulting losses in efficiency are large. Several initiatives are under way to design distribution systems based on geography, demand, storage and other technical conditions.

*Several initiatives are under way to design distribution systems based on geography, demand, storage and other technical conditions.*

For example, in Zambia districts currently carry stock and decide the quantity of resupply from the CMS based on the aggregate consumption of all health facilities in the district. This design matches the administrative structure of the Ministry of Health where the District Health Management Team (DHMT) is responsible for all health facilities in the district. Since the district communicates only its resupply quantity to the CMS, there are no data at the central level on consumption or stock levels at each facility. Under a new pilot programme the districts no longer hold stock for lower levels, but are solely a pass-through for distributing drugs which are packaged at the CMS specifically for each health facility. In

*When health facilities have extremely poor capacity to manage the storage and ordering of medicine, a supply system where the district or regional delivery team visits the health facilities to replenish serves as a potential solution.*

this large-scale randomized pilot study, the district acting as a pass-through system experienced better availability of essential medicines as compared to the current system or a system with enhanced stock management capacity. ARV supply programmes in multiple countries use a similar system for supply of ARVs to antiretroviral therapy (ART) sites. Such arrangements for achieving optimized transport costs without holding stock at a regional point are a common feature of commercial sector supply chains (15,16).

When health facilities have extremely poor capacity to manage the storage and ordering of medicines, a supply system where the district or regional delivery team visits the health facilities to replenish serves as a potential solution. Zimbabwe has implemented a Delivery Team Topping Up (DTTU) system in which, instead of health facilities doing stock management and ordering, a delivery truck loaded with supplies arrives at the health facility, counts the stock, and tops up inventory levels accordingly (17). This decouples the loci of the ordering decision from the administrative structure. The delivery team makes the ordering decision based on consumption and stock status at the health facility. In 2009, John Snow Inc. reported that the stock-out rates for nevirapine tablets decreased from 33% to 2% after the DTTU system was implemented.

### 1.3.7

#### Outsourced transport

A shortage of functioning transport is a key challenge for the public sector distribution system, both from the CMS to the regional or district stores and even more from the district/regional store to the health facility level. The availability of vehicles for distribution of medicines is limited due to lack of transport planning, poor vehicle maintenance and non-compliance with vehicle use policy within the public sector distribution system. Some countries such as Kenya have contracted a third party transport company instead of using a CMS fleet of vehicles to distribute stock to the health facilities. The Gambia has outsourced its transport function to an NGO that maintains a vehicle fleet and charges the Government on a Cost per Kilometer (CPK) basis. In some geographies and contexts, a third party logistics provider can offer higher frequency of delivery at better rates if contracting and service level agreements can be appropriately structured. Such initiatives require ongoing monitoring of the transportation contractor and enforcing the pre-established performance standards, activities which are not always easy within the public sector.

### 1.3.8

#### Trends in the private distribution market

The private distribution market is going through a period of consolidation as manufacturers have increased demand on their wholesaler/distributors and smaller marginal wholesalers have limited access to inexpensive sources of capital needed to improve both the reach and efficiency of distribution. In countries where wholesaling is very fragmented, consolidation of wholesaling is being driven by policy measures such as enforcing better distribution practices and stricter information reporting requirements. For instance, in China when a nationwide “Good Supply Practice” (GSP) enforcement campaign was launched in 2004, the number of pharmaceutical wholesalers dropped from 16 000 to 7445. As government and international donor-run programmes become aware that a large public infrastructure for medicine distribution is not sustainable in the long run, they are starting to realize that having a healthy and robust wholesaling and distribution system within the private sector could help achieve many public health distribution objectives more sustainably.

At the same time, both pharmaceutical companies and policy-makers are paying greater attention to wholesale and distribution margins. Some countries, such as India and South

Africa, regulate the wholesale and distributor margins in a similar way to markets in the European Union. This has increased the use of logistics service providers and created new initiatives, such as regional distribution hubs.

### 1.3.9

#### Trends in NGO/FBO distribution

A large number of faith-based distribution organizations that previously received their medicines through donations of medicines or financial support for capitalization have now established themselves as recipients of long-term external donor support. This has enabled them to build better storage and distribution systems.

## 1.4

### FUTURE CHALLENGES AND ISSUES

- Efforts to increase the effectiveness and efficiency of distribution systems will become more important over the next decade as the cost of disease programmes escalates and sources of financing are constrained. Countries will have to make their distribution systems more sustainable by using consumption and stock status data to optimize efficiency and create integrated logistics platforms for distribution of medicines.
- In-country distribution systems that are still at an early stage of improvement will face the challenge of cost containment and long-term sustainability relatively early in their development. In such countries large investments are still needed to improve distribution. If implemented too early, cost containment could put these distribution systems in jeopardy. It also becomes imperative to examine the role of the private sector wholesalers and distributors in achieving higher service levels in public health facilities.
- Medicine availability indicators at the point of dispensing are very successfully captured using the WHO/Health Action International (HAI) survey methodology. The WHO in-depth assessment of the medicines supply system survey measures the performance of structures (for the different processes of the medicines management cycle) at different levels in the supply chain (CMS, RS, DS, clinic etc.) including stock availability. Measurement of stock availability at the central, regional or health facility level is not carried out systematically and routinely. Gathering evidence on stock at each level in the distribution system and consumption at the health facility level will be crucial in efforts to understand the best distribution system structure for each country and context and to better manage the supply chain.
- The shift in the burden of disease from communicable to non-communicable diseases in low- and middle-income countries will require a different supply chain and distribution planning system. Maintaining an inventory of several categories of medicines using specific tools for the various stocks will be expensive. To manage the resupply of a limited number of medications for chronic diseases requires that the health-care workers and clinicians adhere to standard treatment guidelines. Some of the medicines for chronic diseases may also require controlled temperature distribution, placing an additional strain on already weak and severely constrained cold or controlled temperature distribution chains in most countries.
- Opportunities may exist to improve distribution through public-private partnerships or by outsourcing select functions to the private sector, but this will require strong institutional contracting capacity within ministries of health. Efforts to improve distribution through procurement of auxiliary services from the private sector will require greater trust between the private sector logistical service providers and the ministries of health.



- Preservation of the quality of medicines throughout the supply chain can occur only if the structures involved are in compliance with good distribution practice (GDP). Compliance of structures with GDP at all levels of the supply chain can be achieved through adequate human, material and financial investments and strong and continuous training of staff (18).

## REFERENCES

1. Quick JD et al., eds. *Managing drug supply*, 2nd ed. Hartford, Kumarian Press; 1997.
2. Foster S et al. Ensuring supplies of appropriate drugs and vaccines. In: Jamison DT et al., eds. *Disease control priorities in developing countries*, 2nd ed. Washington DC, World Bank, 2006. Chapter 72. Available at: <http://www.ncbi.nlm.nih.gov/books/NBK11723/>
3. Attridge CJ, Preker AS. *Improving access to medicines in developing countries. Application of new institutional economics to the analysis of manufacturing and distribution issues*. World Bank Discussion Paper, March 2005. Available at: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/AttridgeImprovingAccessFinal.pdf>
4. Yadav P, Stapleton O, Van Wassenhove LN. *Always cola, rarely essential medicines. Comparing medicine and consumer product supply chains in the developing world*. Working Paper, INSEAD, 2010. Revised 2011 version available at: <http://apps.who.int/medicinedocs/documents/s17990en/s17990en.pdf>
5. WHO - country reports on mapping of partners and financial flows in the medicines supply system - Burundi, Burkina Faso, Cameroon, Congo-Brazzaville, DRC, Mali, Nigeria, Rwanda, Senegal, United Republic of Tanzania, Chad - 2007 to 2010. Available at: [http://apps.who.int/medicinedocs/en/cl/CL1.2.1.2.10/clmd,50.html#hlCL1\\_2\\_1\\_2\\_10](http://apps.who.int/medicinedocs/en/cl/CL1.2.1.2.10/clmd,50.html#hlCL1_2_1_2_10)
6. WHO - country reports on in-depth assessment of the medicines supply system - Cameroon, the Congo Mali, Rwanda, Senegal, Chad - 2007 to 2010. Published reports available at: [http://apps.who.int/medicinedocs/en/cl/CL1.2.1.2.10/clmd,50.html#hlCL1\\_2\\_1\\_2\\_10](http://apps.who.int/medicinedocs/en/cl/CL1.2.1.2.10/clmd,50.html#hlCL1_2_1_2_10)
7. Yadav P. *Findings and recommendations from exploratory supply chain studies in selected MeTA countries*. Technical report. London, Department for International Development, 2010.
8. Sarley D, Allain L, Akkihal A. *Estimating the global in-country supply chain costs of meeting the MDGs by 2015*. Arlington, Va, USAID/DELIVER Project, 2009. Available at: [http://pdf.usaid.gov/pdf\\_docs/PNADP080.pdf](http://pdf.usaid.gov/pdf_docs/PNADP080.pdf)
9. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet*, 2009, 373, (9659):240-249.
10. Goodman C. *An economic analysis of the retail market for fever and malaria treatment in rural Tanzania* [thesis]. London School of Hygiene and Tropical Medicine, 2004.
11. Banda M et al. *Multi-country study of medicine supply and distribution activities of faith-based organizations in sub-Saharan African countries*. Geneva, World Health Organization, 2006. Available at: [http://www.who.int/medicines/areas/access/EN\\_EPNstudy.pdf](http://www.who.int/medicines/areas/access/EN_EPNstudy.pdf)

12. Govindaraj R, Herbst CH. *Applying market mechanisms to central medical stores. Experiences from Burkina Faso, Cameroon and Senegal*. Health, Nutrition and Population Discussion Paper. Washington DC, World Bank, July 2010. Available at: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/ApplyingMarketMechanisms.pdf>
13. Dalberg Global Development Advisors, MIT-Zaragoza. *The private sector's role in health supply chains*. Final report. New York, The Rockefeller Foundation, 2008. Available at: <http://apps.who.int/medicinedocs/documents/s16323e/s16323e.pdf>
14. Nieves I, La Forgia GM, Ribera J. Large scale government contracting of NGOs to extend basic health services to poor populations in Guatemala. In: Rösenmoller M, ed. *Challenges for health reform: reaching the poor*. Barcelona, Estudios y Ediciones S.A., 2000.
15. Cottrill, K. A supply chain remedy that saves lives. *Supply Chain Frontiers* No. 37, June 2010. MIT Center for Transportation and Logistics.
16. Vledder M et al. *Enhancing public supply chain management in Zambia*. World Bank Evidence to Policy Paper. Washington, DC, The World Bank, 2010.
17. *Delivery team topping up: Bringing about reliable distribution in difficult environments*. Arlington, VA, USAID/DELIVER Project, 2009. Available at: [http://deliver.jsi.com/dlvr\\_content/resources/allpubs/logisticsbriefs/ZW\\_DTTUBrin.pdf](http://deliver.jsi.com/dlvr_content/resources/allpubs/logisticsbriefs/ZW_DTTUBrin.pdf)
18. Good distribution practices for pharmaceutical products. Annex 5 in: *WHO Expert Committee on Specifications for Pharmaceutical Preparations*. Geneva, World Health Organization, 2010 (WHO Technical Reports Series No. 957).

## ABBREVIATIONS

ACAME	Association Africaine des Centrales d'Achat de Médicaments Essentiels (African Association of Central Medical Stores for Essential Medicines)
ACT	Artemisinin combination therapy
ART	Antiretroviral therapy
ARV	Antiretroviral
CMS	Central medical stores
CPK	Cost per Kilometer
DHMT	District Health Management Team
DRC	Democratic Republic of the Congo
DS	District (medical) store
DTTU	Delivery Team Topping Up
FBO	Faith-based organization
GAVI	The GAVI Alliance
GDP	Good Distribution Practice
GSP	Good Supply Practice
HAI	Health Action International
LMIS	Logistics Management Information System

MSD	Medical Stores Department
MSH/SPS	Management Sciences for Health/Strengthening Pharmaceutical Systems
NGO	Nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
PEPFAR	US President's Emergency Programme for AIDS Relief
RS	Regional (medical) stores
TB	Tuberculosis
WMS	Warehouse management system



# THE WORLD MEDICINES SITUATION 2011

## ACCESS TO CONTROLLED MEDICINES

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**World Health  
Organization**

**GENEVA 2011**



## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Controlled medicines are medicines that are listed under the international conventions on narcotic and psychotropic drugs and their precursors. These were established to prevent harm from substance abuse and dependence. However, the international drug treaties state the imperative to make psychotropic and narcotic substances available for medical and scientific use.
- Some controlled medicines used to treat important health conditions are listed in the WHO Model List of Essential Medicines. Opioid analgesics, such as morphine for the treatment of moderate to severe pain; opioid agonists used for treatment of opioid dependence, such as methadone; ergometrine and ephedrine used in emergency obstetric care; and phenobarbital and benzodiazepine for treatment of epilepsy are essential medicines but they are also classified as controlled medicines.
- Global morphine consumption – an indicator of access to pain treatment – has increased over the past two decades, but mainly in a small number of developed countries. In 2003, six developed countries accounted for 79% of global morphine consumption. Developing countries, which represent about 80% of the world's population, accounted for only about 6% of global morphine consumption.
- Concern about abuse and dependence is a major factor in limiting access to opioids and other controlled medicines that are used in treating important health conditions. In practice, most patients, who are appropriately prescribed controlled medicines, do not become dependent from rational use of these medicines.
- The cost of opioid medicines at supplier level does not represent a substantial barrier to access. Methadone and morphine unit prices are only a few US cents, although buprenorphine is much more expensive than methadone. However, the retail prices of opioid medicines at country level can be prohibitive.
- Barriers to access to controlled medicines include lack of medical knowledge, national policies and regulations that are more stringent than is required by the international conventions, and obstacles in the supply of this category of medicines. The provision of reliable annual estimates on opioid medicines' requirements to the International Narcotics Control Board is also a barrier for several countries. The procurement of narcotic and psychotropic substances can often be a challenge given the complex system of export and import authorizations.



## 1.1

## INTRODUCTION

Millennium Development Goal 8E aims for affordable access to essential medicines. Essential medicines, as defined by WHO, are those that “satisfy the health-care needs of the majority of the population” and that should therefore “be available at all times in adequate amounts”. However, there is a category of medicines that faces a unique challenge in terms of availability. These are the medicines governed by the international conventions on narcotic and psychotropic substances. “Controlled medicines” is the common definition for pharmaceuticals whose active principles are listed under the 1961 United Nations Single Convention on Narcotic Drugs as amended by the 1972 Protocol, such as morphine and methadone (1); the 1971 United Nations Convention on Psychotropic Substances, such as diazepam and buprenorphine (2); and the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, such as ergometrine and ephedrine (3). The conventions list substances in “Schedules” according to their different levels of potential for abuse and harm, and the commensurate severity of control measures to be applied by countries.

The conventions were established with the primary purpose of preventing substance abuse and dependence, and the social and health harm related to such abuse, but recognize that controlled medicines should remain available for medical and scientific purposes. Indeed, abuse of controlled medicines prescribed for medical purposes and therapeutic use, such as opioid analgesics, is rare. A recent systematic review reports only 0.43% abuse in patients using long-term opioid analgesics to relieve chronic non-malignant pain (4). Furthermore, diversion of narcotic substances from the licit to the illicit market is reported only from very few countries and is generally assumed to be “virtually non-existent” globally (5).

The international drug treaties clearly state that narcotic and psychotropic substances need to be made available for medical use and scientific research. More specifically, the 1961 convention recognizes that “medical use of narcotic drugs continues to be indispensable for the relief of pain and suffering”, and that “adequate provision must be made to ensure the availability of narcotic drugs for such purposes.” Similarly, the 1971 convention affirms that “the use of psychotropic substances for medical and scientific purposes is indispensable and that their availability for such purposes should not be unduly restricted.” Essential medicines in the WHO Model List of Essential Medicines that are scheduled under the conventions are shown in Table 1.1. A number of unique barriers affect access to essential controlled medicines, including national control measures that are enforced beyond the requirements of the international drug control treaties.

This chapter specifically presents and analyses the situation related to the availability and access of two different classes of controlled medicines: opioid analgesics for pain relief and opioid agonists<sup>1</sup> for treatment of opioid dependence. Opioid analgesics, such as morphine, are the most effective medicines in treating moderate to severe pain while opioid agonists, such as methadone and buprenorphine, are essential medicines used for the treatment of opioid dependence in injecting drug users. For these two categories of essential medicines sufficient data and reports are available to allow an analysis of the current global situation and the challenges faced by countries. For other controlled medicines considered essential to

<sup>1</sup> In pharmacology, an agonist is a substance that binds to a receptor and triggers a response in the cell. Methadone is a full agonist for the  $\mu$ -opioid receptor, while buprenorphine is a partial agonist for the  $\mu$ -opioid receptor. These two medicines are used in the treatment of opioid dependence on heroin, morphine or other opioids for opioid maintenance and withdrawal. In this chapter, we will refer to methadone and buprenorphine as “opioid agonists for treatment of opioid dependence” or simplify this to “opioid agonists”.

**TABLE 1.1 Essential medicines that are listed under the international drug conventions**

International drug convention	Controlled medicines listed in the 2009 WHO Model List of Essential Medicines		Therapeutic category
1961 United Nations Single Convention on Narcotic Drugs <i>Schedule II and III</i>	Codeine	15, 30 mg tablet	Opioid analgesic, antidiarrhoeal
1961 United Nations Single Convention on Narcotic Drugs <i>Schedule I</i>	Morphine	10 mg/1 ml ampoule, 10 mg/5ml oral liquid, 10 mg tablet, 10, 30, 60 mg prolonged-release tablets, 20, 30, 60, 100, 200 mg modified-release granules	Opioid analgesic
	Methadone	5 mg/5 ml, 10 mg/5 ml oral liquid, 5 mg/ml, 10 mg/ml concentrate for oral liquid	Opioid agonist for treatment of opioid dependence
1971 United Nations Convention on Psychotropic Substances <i>Schedule III</i>	Buprenorphine	2 mg, 8 mg sublingual tablets <sup>a</sup>	
1971 United Nations Convention on Psychotropic Substances <i>Schedule IV</i>	Diazepam <sup>b</sup>	5 mg/ml/2 ml ampoule, 2 mg, 5 mg tablets, 5 mg/ml/0.5 ml gel or rectal solution, 2 ml, 4 ml tubes	Anxiolytic, antiepileptic, anticonvulsant, preoperative sedative
	Phenobarbital	200 mg/ml–15 mg/5 ml elixir, 15 to 100 mg tablets	Anticonvulsant, antiepileptic
1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances <i>Table I</i>	Ergometrine	200 microgr/1ml ampoule	Obstetric emergency (oxytocics)
	Ephedrine	30 mg/1 ml ampoule	Obstetric emergency (used in spinal anaesthesia to prevent hypotension)

<sup>a</sup> Dosages indicated in the “Proposal for inclusion of buprenorphine in the WHO Model List of Essential Medicines”, 2005 [http://www.who.int/substance\\_abuse/activities/buprenorphine\\_essential\\_medicines.pdf](http://www.who.int/substance_abuse/activities/buprenorphine_essential_medicines.pdf). Refer to the WHO Report of the Expert Committee on the Selection and Use of Essential Medicines, p.33–34. 2005 <http://www.who.int/medicines/services/expertcommittees/essentialmedicines/TRS933SelectionUseEM.pdf>

<sup>b</sup> Other benzodiazepines listed in the 2009 WHO Model List of Essential Medicines.

treat different medical conditions, such as epilepsy and obstetric emergencies, no exhaustive reports have been published or global surveys undertaken to determine the extent to which regulatory barriers are affecting availability in countries.

## 1.2

### PRESENT SITUATION: CONSUMPTION AND AVAILABILITY OF CONTROLLED ESSENTIAL MEDICINES

Data and reports focusing on access to opioid analgesics and opioid agonists for treatment of opioid dependence allow analysis of the current global situation on availability, pricing and market size of these two categories of controlled medicines. The requirements set by the international drug conventions and national drug control regulations are also presented

in this section, as are barriers to access for these essential medicines and the impact of these barriers at country level.

### 1.2.1

#### Opioid medicines: essential and controlled

Table 1.1 outlines the medicines included in the WHO Model List of Essential Medicines and the corresponding international drug convention and schedule. Strong opioid analgesics and methadone, an opioid agonist, are strictly controlled under the 1961 United Nations Single Convention on Narcotic Drugs as amended by the 1972 Protocol, under Schedule I. Buprenorphine, the other essential opioid agonist, is listed under Schedule III of the 1971 United Nations Convention on Psychotropic Substances, which contains less stringent requirements than the Single Convention on Narcotic Drugs. These conventions recognize both the importance of prevention of abuse and dependence and the imperative of making opioids available for medical use (6).

### 1.2.2

#### Consumption of opioid analgesics for moderate to severe pain

The International Narcotics Control Board (INCB), is the United Nations body responsible for monitoring the implementation of the conventions on narcotic and psychotropic drugs. As strong opioid analgesics are listed as “narcotics” under Schedule I, they are subject to a system of annual reporting on production, importation/exportation and inventory by the signatory countries. This allows the INCB to gather and publish data on the annual consumption for medical use for each substance.<sup>1</sup>

*Developing countries, representing 80% of the world population accounted for about 6% of global morphine consumption.*

Global morphine consumption can be used as a proxy indicator on access to management of moderate to severe pain associated with various medical conditions. Although this has increased substantially over the past two decades, the increase has occurred only in some countries. The INCB acknowledged in its annual report that in 2003, six developed countries accounted for 79% of global morphine consumption. Conversely, developing countries which represent 80% of the world population accounted for only about 6% of global morphine consumption (6). The most recent data show that this gap persists. In 2007, six developed countries reported the highest level of morphine consumption and 132 of 160 signatory countries that reported consumption were below the global mean (see Figure 1.1). This implies that millions of patients with moderate to severe pain caused by different diseases and conditions are not getting treatment to alleviate their suffering.

### 1.2.3

#### Coverage of opioid agonists for treatment of opioid dependence

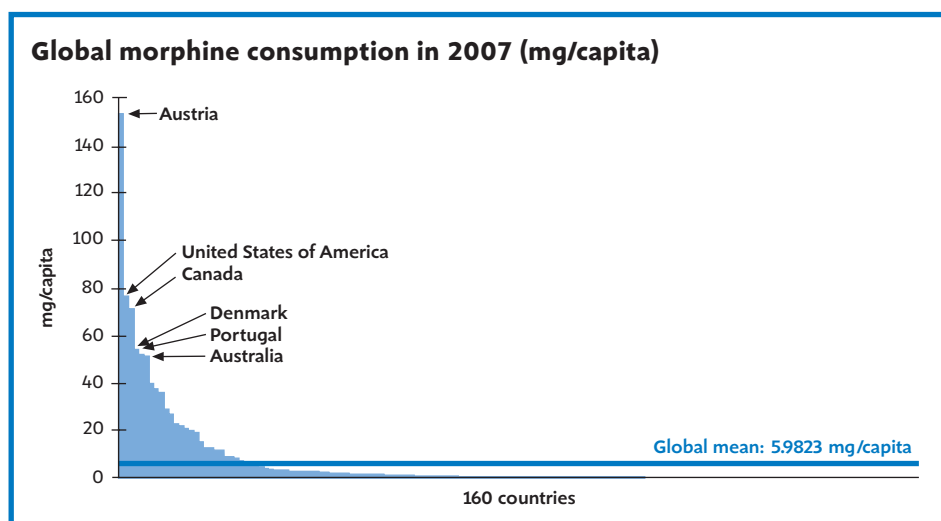
Methadone and buprenorphine are opioid agonists used for the treatment of opioid dependence. There are an estimated 16 million injecting drug users in the world, of whom 11 million inject heroin, mainly in Asia and Europe (7,8). In Western Europe, treatment with opioid agonists is a standard option for the treatment of heroin dependence and this reaches, on average, about 67% of the target population. Yet, globally, treatment of dependence with methadone and buprenorphine reaches only 8% of injecting drug users (9). In 2007, only 2% of injecting drug users in developing countries with injection-driven HIV epidemics were accessing treatment for opioid dependence. Several countries have introduced national programmes on drug dependence to tackle injecting drug use and HIV transmission

*Globally, only 8% of injecting drug users are treated with methadone and buprenorphine.*

<sup>1</sup> Consumption in this context relates to the amounts of narcotic substances that have been distributed to the peripheral level of the supply chain.

FIGURE 1.1

*Six developed countries accounted for 79% of global morphine consumption.*



Source: International Narcotics Control Board, United Nations data. Graphic created by the Pain and Policy Study Group, University of Wisconsin/WHO Collaborating Center, 2009.

through needle and syringe programmes and/or the provision of treatment with oral opioid agonists' formulations. Although the treatment of opioid dependence with methadone and buprenorphine is supported by medical, public health, human rights, social and economic arguments (10,11,12), access to this effective intervention is constrained by several factors, including the knowledge, regulatory and supply barriers related to these two medicines.

### 1.3

#### 1.3.1

*The main attitudinal barriers to use of opioid analgesics are fear of dependence and tolerance.*

### BARRIERS TO ACCESS TO CONTROLLED ESSENTIAL MEDICINES

#### Perceptions and attitudes towards the use of opioid analgesics and opioid agonists

One reason for the low rate of use of opioid analgesics is the fear of both health providers and patients that the latter will become dependent on or will abuse these medicines. Because of the lack of correct information, health professionals, patients and their families are often reluctant to use opioid analgesics for the relief of moderate and severe pain. Currently, the training curricula of medical doctors, nurses and other health professionals in many parts of the world fail to include the rational use of opioids. The main attitudinal barriers include fear of dependence, tolerance, hyperalgesia and dose escalation. There is an unfounded assumption that opioid pain treatment impairs quality of life. For example, patients incorrectly assume that opioid analgesics can only be administered parenterally; and medical practitioners believe that opioid analgesia may delay accurate diagnosis and that opioid doses should be related to the severity of the disease rather than the intensity of pain. There is widespread anxiety about the side-effects of opioid analgesics with a perception that their use is limited to end of life conditions, such as terminal cancer. The overall result is lack of access to adequate pain treatment and the denial of the human right to access the highest attainable standard of health, and the right not to be subject to torture or to cruel, inhuman or degrading treatment or punishment (13,14,15,16,17).

In several countries, drug dependence is not recognized as a disease and treatment with opioid agonists is not acknowledged as effective. There are reported cases of strong resistance and attacks by government officials against the provision of treatment for opioid dependence by governmental HIV programmes and by civil society organizations (11,18). Too many policy-makers disregard evidence on the effectiveness of the intervention in reducing

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the social and public health harm of opioid dependence, such as its impact on reducing the transmission of HIV and other blood-borne diseases (9). Moreover, injecting drug users are not considered patients in need of assistance and with a right to access treatment. In many countries, injecting drug use is approached as a criminal justice problem rather than a health problem. An extreme consequence is that the provision of buprenorphine and methadone treatment has been faced with enormous problems from law enforcement agencies in certain countries, and this has affected and is still impacting government and authorized NGO pilot projects. As an example, there have been well-documented cases of police harassment and patient arrests outside treatment centres (10,11,18,19,20). The situation regarding the provision of opioid agonists is changing in several countries. However, major efforts are needed to address the huge gaps in the provision of effective treatment of opioid dependence worldwide.

### **1.3.2**

#### **International drug control and stringent national drug control regulations**

As has been stated, the availability of opioid analgesics and opioid agonists is influenced by the specific procedures and requirements for controlled substances. The requirements are set in the conventions and vary according to the scheduling of each controlled medicine in the conventions (Table 1.1). Accessing opioid medicines requires countries to comply with international and national drug control regulations. Countries that have ratified the international drug control conventions in their national laws and regulations have established bodies to deal with narcotic and psychotropic substances, and thus with controlled medicines. However, often national laws and regulations are more stringent than the conventions require, and this can hamper the availability of and access to controlled medicines for medical purposes.

#### **1.3.2.1**

##### **Provision of estimates to the International Narcotics Control Board**

Every year, the signatory countries to the Single Convention on Narcotic Drugs are required to report on the imported and exported amounts of substances in Schedule I, such as morphine and methadone, to the INCB. In addition, countries are required to submit annual estimates of their requirements for narcotic substances and these are the basis for setting the limits on the quantities of medicines that the countries can procure for medical use for the next year. The treaty requires the INCB to confirm the national estimate before importation of narcotic substances under Schedule I occurs in the country. If an annual estimate proves to be inadequate, the competent national authority can submit supplementary estimates to the INCB during the course of the year. For psychotropic substances no estimates are required but for certain substances, such as buprenorphine, the INCB requires the annual submission of statistical reports on the quantities manufactured, exported and imported during the previous year.

Currently, several countries face difficulties in providing the INCB with adequate estimates of their requirements for narcotic substances under Schedule I to the INCB. As a result of this inaccuracy, they frequently submit supplementary estimates, although this procedure should only be used in the case of unforeseen circumstances and for the introduction of new treatments (5).

## 1.3.2.2

## Importation and exportation licensing system for controlled medicines

Additionally, for all narcotics and many psychotropics, a complex system of import and export licences is in force. Hence, procurement of controlled medicines requires procurement officials to acquaint themselves with and to abide by the obligatory licences and procedures in both the exporting and importing countries. The international conventions require that all enterprises and individuals involved in the procurement, storage and distribution of controlled medicines are properly authorized or licensed by the national competent authority. Only authorized or licensed individuals can apply for an import certificate to be issued by the competent authority in the importing country. Similarly, only authorized agencies can apply for an export certificate from the competent authority in the exporting country. The sequence of steps to request and obtain the necessary certificates to import, export and receive shipments of narcotic and psychotropic substances requires specific knowledge and implies longer procurement timelines than for other essential medicines (21).

## 1.3.2.3

## Supply chain challenges for controlled medicines

The storage, distribution and dispensing of controlled medicines require the adoption of measures to prevent diversion to the illicit market throughout the supply chain. Implementation of control measures, which are defined by national regulations, can be challenging and expensive. The conventions state, in general terms, the need to prevent diversion, but sometimes countries enforce very strict controls. For example, as anti-diversion measures some countries require the installation of alarm systems, safes and ironclad rooms to store medications and special vehicles to transport controlled medicines. Supply challenges also include overly stringent requirements for prescribing and dispensing opioid medicines, such as limitations on the daily dosage of opioid analgesics that physicians can prescribe and limitations on the number of days of treatment allowed in one prescription. In several countries, stringent and overly complicated regulations have also resulted in the disruption of the supply of opioid agonist treatment. An uninterrupted supply of medicines is essential if this treatment is to be effective (22).

## 1.3.2.4

## National regulations going beyond the convention requirements

*Law-makers often fail to ensure the availability of narcotic and psychotropic substances for medical use when defining national drug control laws and regulations.*

As mentioned above, several countries regulate controlled medicines even more strictly than required by the international conventions and may have undue provisions in their regulations that hinder medical use of opioids and other controlled medicines. For example, several countries handle buprenorphine – an opioid agonist – in their national laws and regulations as a narcotic drug although it is listed in the international convention of psychotropic substances under Schedule III. This makes buprenorphine's procurement and supply more onerous. There are also extreme situations in which regulatory constraints make controlled medicines unavailable in emergency situations (Box 1.1) and whereby essential medicines, not listed in the conventions, are handled in the national regulations as narcotic or psychotropic substances (Box 1.2). Governments often concentrate efforts on drug control without balancing the obligation to ensure availability for medical and scientific use and without considering the impact of control measures on the accessibility of essential medicines to those who need them. Law-makers often fail to ensure the availability of narcotic and psychotropic substances for medical use when defining national drug control laws and regulations (23,24).



## BOX 1.1

**Accessing controlled medicines in emergency situations**

The Interagency Emergency Health Kit was conceived to provide all the necessary essential medicines, health products and medical equipment for 10 000 people for three months in humanitarian emergency situations. This includes opioid analgesics for trauma and surgery. The constraints in procuring and supplying controlled medicines in emergencies impacted the formulation of this kit. It has become common practice for organizations involved in the provision of medical supplies in emergency situations to disassemble it into two kits, a basic unit and a supplementary unit containing controlled medicines. The supplementary units are often blocked at the procurement agent's warehouse or while in transit awaiting the procurement authorizations required between importing and exporting countries. Despite the provision of guidance for facilitating the procurement of controlled medicines in emergency situations, regulatory constraints often result in populations affected by wars and natural disasters not receiving morphine for pain relief, antiepileptics, such as diazepam and phenobarbital, anaesthetics, such as ketamine (Box 2) and other controlled medicines in the kits. The lack of these medicines results in additional, unnecessary suffering.

Source: The interagency emergency health kit 2006. Geneva, World Health Organization, 2006. <http://apps.who.int/medicinedocs/en/d/Js13486e/#Js13486e>

## BOX 1.2

**Impact of drug control measures on medical availability of essential medicines: ketamine**

Ketamine provides an extreme example of an essential medicine whose access is limited by regulatory constraints. This affordable general anaesthetic is listed in the WHO Model List of Essential Medicines and The Interagency Emergency Health Kit. In developing countries, ketamine is widely used in adults and children for elective and emergency procedures, for general surgical, orthopaedic, obstetric and gynaecological interventions. In many rural district hospitals in low-income countries, anaesthesia is largely dependent on the availability of ketamine.

Ketamine is not listed in any of the international drug conventions. This medicine was reviewed in 2006 by the WHO Expert Committee on Drug Dependence, (the body that makes recommendations to the United Nations Commission on Narcotic Drugs on what, if any, control measures it considers appropriate). The Committee concluded that the information contained in the critical review was not sufficient to warrant scheduling of ketamine and that an updated critical review must be submitted to its next meeting.

While to date no recommendation has been made to schedule ketamine in the drug conventions, many countries started to classify it as a controlled substance and to enforce control measures on its procurement, supply and use for medical purposes. The extent to which ketamine is becoming less available is not known. In middle- and low-income countries where other general anaesthetics with good safety profiles are not available or are too expensive to access, the unavailability of ketamine may pose a serious threat to the provision of surgery care.

Sources: Hodges SC, Walker IA, Bösenberg AT. Paediatric anaesthesia in developing countries. *Anaesthesia*, 2007 Dec; 62(Suppl 1):26–31.

Hodges SC et al. Anaesthesia services in developing countries: defining the problems. *Anaesthesia*, 2007 Jan; 62(1):4–11.

WHO Expert Committee on Drug Dependence. Thirty-fourth Report. Geneva, World Health Organization, 2006 (WHO Technical Report Series No. 942). [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_942\\_eng.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_942_eng.pdf)  
Report of the International Narcotics Control Board for 2008. New York, United Nations, 2009.

### 1.3.5

#### Cost of opioid medicines and their market size

The cost of essential opioid analgesics does not appear to be a barrier taking into consideration the prices in developed countries for morphine formulations at manufacturer and supplier levels. The price of morphine tablets is only a few US cents per unit (Table 1.2). However, studies and surveys have reported that opioid analgesic retail prices are a barrier in developing countries and that they are priced higher than in developed countries. Their high retail prices make them unaffordable to patients outside health system treatment schemes. Where palliative care programmes and pain relief are not subsidized by national health systems, the cost of opioid analgesics limits their accessibility, particularly in developing countries. In this case, the market size is based on the out-of-the-pocket purchasing power of patients, which may not make the market attractive to pharmaceutical companies. On the other hand, in places where purchasing power does exist it can lead to the situation in which opioid analgesics are marketed but at very high prices and only in the expensive dosage forms (25,26).

Similarly, prices for buprenorphine and methadone vary widely from country to country, from the order of cents to several US dollars per unit, as reported in public global price databases (Table 1.2) and by international harm reduction initiatives (10,11). Because buprenorphine is much more expensive than methadone, many countries are scaling up national programmes for opioid dependence treatment with methadone. However, both of these two medicines are necessary as they are alternatives to each other in case of adverse effects or when patients fail to respond to one of them (10,11,18,19). Opioid agonists are normally procured and provided through harm reduction programmes, but not all national programmes provide free treatment to patients. Surveys and data collection of prices paid in countries is extremely limited. No studies have been published to document the cost of these medicines in countries delivering opioid dependence treatment programmes, including those funded by major donors, such as the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria (27). Data on suppliers of quality-assured methadone and buprenorphine formulations suitable for use in opioid dependence treatment programmes, and their Ex-Works prices, are not readily available to countries initiating and scaling up national programmes to tackle opioid dependence.

The size of the current global medical opioid market is very small compared to the global need for pain relief and for opioid dependence treatment. The estimates on opioid analgesics and methadone, which countries are obliged to submit to the INCB in order to manufacture and procure, constitute the annual upper limit of the global opioid market for medical use. The annual estimates, published by the INCB, provide information on global production volumes.<sup>1</sup> Except for buprenorphine, the small market size seems due more to attitudinal, knowledge, policy and legal barriers that impact on the supply of opioid medicines than to the manufacturing cost of these essential medicines.

<sup>1</sup> Ex-Works is an International Commercial Term or INCOTERM which means that the seller, in this case the manufacturer, makes the goods available at his/her premises and the buyer is responsible for all charges. <http://www.iccwbo.org/incoterms/preambles/pdf/EXW.pdf>

TABLE 1.2 Prices of opioid essential medicines as reported by three sources

Opioids listed in the 2009 WHO Model List of Essential Medicines			eMIT prices (no VAT) <sup>b</sup> Rolling mean of 4 months prior procurement			MSH International Drug Price Indicator (Supplier) <sup>c</sup> Median			WHO GPRM (Buyer EX WORKS) <sup>d</sup> Mean (Range)
Medicine	Strength	Formulation	Pack size (unit or ml)	Pack price UK Pound	Unit price UK Pound	Pack size (unit or ml)	Pack price US\$	Unit price US\$	Unit price US\$
Morphine <sup>a</sup>	10 mg/1 ml (hydrochloride, sulfate)	ampoule	10	£2.36	£0.24	10	\$4.40	\$0.44	–
	10 mg (sulfate)	tablet	56	£3.63	£0.06	100	\$12.28	\$0.12	–
	10 mg (sulfate)	prolonged-release tablet	60	£1.81	£0.03	–	–	–	–
	30 mg (sulfate)		60	£4.34	£0.07	30	\$13.37	\$0.44	–
	60 mg (sulfate)		60	£8.59	£0.14	–	–	–	–
Methadone	5 mg/5 ml	oral liquid	30	£0.56	£0.02	–	–	–	–
			50	£0.93	£0.02	–	–	–	–
			500	£3.55	£0.01	–	–	–	–
	5 mg/ml	concentrate	–	–	–	–	–	–	\$0.01 (0.01–35)
	10 mg/ml	for oral liquid	150	£8.57	£0.06	1000	\$76.93	\$0.07	\$0.12 (0.05–1.75)
Buprenorphine	2 mg	sublingual tablet	–	–	–	–	–	–	\$1.18 (0.92–1.18)
	8 mg	sublingual tablet	–	–	–	–	–	–	\$3.61

<sup>a</sup> For the oral liquid formulation of morphine (10 mg/5ml as hydrochloride or sulfate), no price data were retrieved from these three sources.

<sup>b</sup> Source: The Generic Pharmaceuticals Electronic Market Information Tool (eMIT) provides information pertaining to the generic pharmaceutical products that are covered within the framework agreements of the National Health Service in the United Kingdom of Great Britain and Northern Ireland. December 2008. <http://www.pasa.nhs.uk/PASAWeb/Productsandservices/Pharmaceuticals/Medicines/Generic/eMIT.htm>

<sup>c</sup> Source: Management Sciences for Health (MSH) International Drug Price Indicator contains a spectrum of prices from pharmaceutical suppliers, international development organizations, and government agencies. Supplier prices recorded in 2009 were considered for this table. [http://erc.msh.org/dmpguide/index.cfm?search\\_cat=yes&display=yes&module=dmp&language=english&year=2009](http://erc.msh.org/dmpguide/index.cfm?search_cat=yes&display=yes&module=dmp&language=english&year=2009)

<sup>d</sup> Source: The Global Price Reporting Mechanism (GPRM) is a web-based transaction database which contains information on transaction prices and quantities of medicines procured for HIV programmes since 2005. Information accessed in May 2009. <http://apps.who.int/hiv/amds/price/hdd/>

### 1.3.6

#### **Additional factors affecting the provision of opioid medicines in developing countries**

As described above there are overarching limiting factors for accessing controlled medicines because national controls, regulations and implementation measures have been introduced that are stricter than those set by the international drug control conventions for the procurement, distribution and dispensing of opioid medicines. Other factors affect primarily developing countries and contribute to the huge disparity in global provision and consumption between developed and developing countries. In developing countries, problems are exacerbated by the loss of the health work force through migration and by the limited financial resources for running health systems. The supply of controlled medicines is more challenging and difficult to operate in these countries. Opioid medicines supply requires: obtaining the necessary authorizations or certificates in both the importing and exporting country; formulating and submitting estimates; and reporting on production, importation, exportation and consumption to the INCB. These actions require the time, understanding and experience of country procurement officers, who are often working in difficult conditions. Even when opioid medicines are available at country level, the entire population may not have geographical access to them. Their use is often limited to specialized centres or to main regional and district hospitals without reaching patients in rural areas and in the community. The access problem in developing countries is intrinsically linked to the state of the countries' health system and work force.

## 1.4

### **IMPROVING ACCESS TO CONTROLLED ESSENTIAL MEDICINES IN THE PAST DECADE**

Over the past five to 10 years, there has been evidence of improvements in access to opioid analgesics and opioid agonists for treatment of opioid dependence worldwide. However, countries are moving at different speeds. The benefits of opioid dependence treatment in reducing the HIV infection rate has been a crucial factor in fostering rapid progress in introducing and scaling up treatment in a number of countries. The promotion of access to opioid analgesics to relieve moderate to severe pain appears more complex.

### 1.4.1

#### **Inclusion of new controlled medicines and formulations in the WHO Model List of Essential Medicines**

Opioid analgesics, such as morphine, have always been included in the WHO Model List of Essential Medicines although this has not automatically resulted in their ensured availability in countries. More recently, in 2007, the list was extended to include oral slow-release formulations of morphine. In the same year, WHO issued the first Model List of Essential Medicines for Children. This list also includes opioid analgesic formulations as injectable, oral liquid, prolonged-released tablets and immediate-release tablets. Long-acting opioid agonists for the treatment of opioid dependence – methadone and buprenorphine – were only added to the WHO Model List of Essential Medicines in 2005. The two were added to the Complementary List,<sup>1</sup> as medicines that should only be used within established support programmes for the treatment of opioid dependence.

<sup>1</sup> The Complementary List presents essential medicines for priority diseases, for which specialized diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training are needed.

### 1.4.2

#### Tackling attitudinal and educational barriers to access

Because of the lack of correct information, health professionals, patients and their families are often reluctant to use opioid analgesics for the relief of moderate to severe pain. The main attitudinal barrier is fear of dependence. Steps to overcome attitudinal barriers to the rational use of opioid analgesics still have a long way to go although global advocacy campaigns have been launched by civil society organizations and UN reports have pledged increased access to these essential medicines. In 2007, WHO and the INCB jointly developed an assistance mechanism to facilitate adequate treatment of medical conditions using opioids, to be implemented by WHO's Access to Controlled Medications Programme (ACMP) (28,29). This initiative was a response to the worldwide shortfall of medicines for pain relief, and was launched at the request of other bodies, in particular the UN's Economic, Cultural and Social Council (ECOSOC) and WHO's World Health Assembly. One of ACMP's priorities is to develop WHO treatment guidelines for the management of chronic and acute pain in adults, children and infants. The provision and dissemination of these guidelines, which are currently in development, are intended to help overcome the attitudinal and educational barriers to opioid analgesics.

Attitudinal barriers to opioid agonists are being addressed forcefully. As a first step, the UN agencies, among them WHO, UNAIDS and UNODC, clearly stated in 2004, that their position is to support treatment with opioid agonists, such as methadone and buprenorphine (30). This joint statement on the efficacy of treatment with opioid agonists has enhanced a necessary change in the attitudes of politicians in several countries. Civil society organizations working on harm reduction at national and international levels are also playing a huge role in promoting access to opioid agonist therapy as part of the right to health and other human rights. The UN Special Rapporteur on the Right to Health has also devoted reports and interventions on the undeniable right to access harm reduction and opioid agonist treatment for injecting drug users (17,31,32). Technical documents have been developed to support implementation of projects and their scale up to attain the largest possible coverage for injecting drug users. In 2009, WHO published the *Guidelines for psychologically assisted pharmacological treatment of opioid dependence* (33). In the same year, WHO, UNAIDS and UNODC also jointly published a technical guide for countries to set targets for HIV prevention and treatment in injecting drug users, to assess countries' progress in providing a comprehensive package of core interventions (34).

### 1.4.3

#### Tackling some of the supply chain problems

UN agencies have also provided joint guidance for opioid agonist procurement to enable countries to initiate and scale up national programmes on drug dependence treatment. The algorithm on step-by-step procurement of opioid agonists can be used as guidance for opioid analgesics because the importation requirements for methadone are the same as for morphine and other strong opioid analgesics (25). WHO and the INCB acknowledge that one of the challenges countries face is to provide reliable estimates of opioid medicines' requirements, based on epidemiological needs and on the absorptive capacities of countries to procure, supply and use these medicines. The two organizations have therefore started to develop a manual to enable countries to provide the INCB with reliable annual estimates of opioid medicines, as required by the treaty on narcotic drugs. This manual is expected to be finalized and published by 2011.

## 1.4.4

**Improving access to pain management in middle- and low-income countries: recent success stories**

Although the intrinsic challenges of health systems in developing countries may suggest that the provision of pain management can be extremely difficult to operate, successes show that improvements are feasible regardless of a country's gross domestic product. Changes in policies, laws and regulations, training programmes and coordinated approaches to address country-specific barriers to pain relief can bring about a complete transformation. A number of examples can be quoted in this respect, such as those of Uganda, Romania and the State of Kerala in India (see Boxes 1.3, 1.4 and 1.5).

**BOX 1.3****CASE STUDY: Improving access to pain relief in Uganda**

**Uganda**, classified a least developed country, has been able to implement a comprehensive plan for integrating pain relief in its health system. This included training plans on pain management and rational use of opioids for nurses and other health-care workers, such as pharmacists, and also a change in the National Drug Policy and Authority Statute of 1993 to allow specialized palliative care nurses and clinical officers, (a specialized Ugandan health worker category), to prescribe morphine. By early 2009, 79 nurses and clinical officers had received training on pain management and been authorized to prescribe oral morphine; several thousand health-care workers had attended a short course on pain and symptom management; and 34 out of 56 districts in Uganda had oral morphine available and in use. Accessing palliative care is now a reality for many patients and their families in Uganda. Numerous challenges remain, however, including ensuring availability and affordability of oral morphine throughout the country and training all relevant health workers. No reports of abuse or of diversion have been documented following implementation of these initiatives to increase opioid availability for pain relief (16,23).

Source: Jagwe J, Merriman A. Uganda: Delivering analgesia in rural Africa: Opioid availability and nurse prescribing. *Journal of Pain and Symptom Management*, 2007, 33(5):547–551..

**BOX 1.4****CASE STUDY: Romania**

**Romania**, an upper-middle-income country, is addressing the lack of access to opioid analgesics in a holistic manner. The Romanian Ministry of Health has appointed a special commission to explore the changes required to improve access for patients affected by severe pain. It has sourced technical expertise to evaluate the national legislation and subsequently, drafted and approved a new narcotic control law in 2005. In 2007, additional regulations to implement the new law were issued, and these lifted a number of administrative constraints on the prescription of opioid medicines. For example, the length of time for which oral morphine can be prescribed at one time has been extended from 3 to 30 days. Recognizing that changes in legislation were insufficient to increase availability of medicines, the country developed and implemented a comprehensive plan for the dissemination of new policies and regulations, together with a nationwide programme to educate doctors and pharmacists (14,16,23).

Source: Mosoiu D, Ryan KM, Joranson DE, Garthwaite JP. *Lancet*, 2006, 367(9528):2110–2111.



## BOX 1.5

**CASE STUDY: The State of Kerala, India**

In Kerala, India, the state controlled substances regulations have been progressively simplified since the 1990s, and a new licensing system has increased the number of community-based palliative care centres with oral morphine, with little or any diversion or misuse. The positive example of the Indian State of Kerala contrasts with other Indian states. Indeed, not all states and territories in India have amended their state legislation and rules according to the revised central government legislation on opioids, and if they have done so, they omitted operationalizing policy changes and education for professionals, administrators and the public to ensure palliative care for their population. About 80 % of India's palliative care is reported to be delivered in Kerala State. In July 2009, the State Directorate of Health Services issued an order to integrate palliative care into the primary health-care system. The circular included a series of guidelines for service delivery, administration and reporting. Kerala, world leader in community participation in the provision of care to the terminally ill, is likely to become the first Government in the world to formally incorporate palliative care into primary health care (14,23).

Sources: Rajagopal MR, Joranson DE, Gilson AM. Medical use, misuse, and diversion of opioids in India. *Lancet*, 2001, 358(9276):139–143.

McNeil D. In India, a quest to ease the pain of the dying. *New York Times*, 11 September 2007. [http://www.nytimes.com/2007/09/11/health/11pain.html?\\_r=1&ref=health](http://www.nytimes.com/2007/09/11/health/11pain.html?_r=1&ref=health)

Basheer K. Palliative care becomes part of primary health care system in State. *The Hindu Newspaper*, August 2009. <http://www.thehindu.com/2009/08/07/stories/2009080757540600.htm>

## BOX 1.6

**CASE STUDY: Ukraine**

Ukraine is in the process of rapidly scaling up treatment with opioid agonists – treatment that was initiated as a pilot project in 2004. Widespread and coordinated advocacy efforts contributed to reducing the persistent resistance to such treatment and to speeding up the regulatory changes needed to provide opioid agonists to injecting drug users. The Ukrainian President's involvement in issuing a decree eliminating barriers to the scale up of the programme at the end of 2007 was key for the introduction of methadone, in addition to the more expensive buprenorphine, which had been in use since 2004. Very substantial scale up started in 2008, taking the number of people in treatment from 500 to more than 4200 in less than a year and a half. The new drug control law, which became effective in early 2008, also cancelled the monopoly of Government-based structures for providing treatment, allowing scale up through NGOs. Despite the impressive achievements, Ukraine continues to face a number of challenges in reaching the national target of providing treatment to 20 000 injecting drug users. Challenges include: lack of domestic funding for opioid dependence treatment; the non-availability of more suitable formulations of methadone; the ban on dispensing take-home doses to patients; the absence of a functional referral system to ensure continuation of substitution therapy; legal liability for minor non-compliance, which results in medical personnel refusing to provide opioid agonist treatment; unavailability of treatment in prisons; and excessive costs and regulations for pharmaceutical distribution (10,11).

Sources: Substitution maintenance therapy in Ukraine: Can the community respond effectively to the challenges of HIV/AIDS? Kiev, The International HIV/AIDS Alliance in Ukraine, 2008. [http://www.aidsalliance.org.ua/ru/library/our/pbzt/pdf/pb\\_en.pdf](http://www.aidsalliance.org.ua/ru/library/our/pbzt/pdf/pb_en.pdf)

Aggregate data on the patients of substitution maintenance treatment in Ukraine (as at 1 August 2009), Ukrainian Institute on Public Health Policy web site: <http://www.uihp.org.ua/ua/resource/zvedeni-danni>

## 1.4.5

**From criminalization of injecting drug users to the provision of opioid agonists: country successes and challenges**

Besides health system constraints, access to opioid agonist treatment is very often affected by the criminalization of injecting drug use and misconceptions about the efficacy of methadone and buprenorphine for this category of patients. Criminalization has delayed and obstructed the onset of opioid agonist therapy and harm reduction programmes. However, as a result of civil society movements and funding availability, pilot projects have been introduced in a number of developing countries, in conjunction with efforts to reduce HIV transmission through syringe and needle programmes. In this context, there are a number of countries scaling up from pilot phases and facing up to the challenges in procuring and supplying opioid agonists (10,11). (See Boxes 1.6, 1.7 and 1.8.)

**BOX 1.7****CASE STUDY: The Islamic Republic of Iran**

Iran is one of the countries most affected by opioid dependence, with over 200 000 injecting drug users, due to the replacement of the traditional recreational use of opium with readily-available heroin. Iran is also affected by a parallel HIV epidemic among injecting drug users. The Ministry of Health introduced opioid agonist treatment in 2002 as part of a comprehensive package of HIV-prevention measures and also made it available in prisons, with the support of the judiciary system. From 2004 to 2007, Iran increased the number of drug users receiving methadone maintenance treatment from 4300 to 57 000. Among these were over 19 500 people receiving methadone within the prison system in over 55 prison clinics, and 34 after-care centres outside prison. Progress has been facilitated by an evidence-based multisectoral approach, resulting in a large number of practical policy measures, such as a legal provision ensuring that injecting drug users in treatment programmes cannot be prosecuted. Pragmatic approaches on the opioid agonists supply side involved the formulation of a national protocol for opioid dependence treatment, a system for training, licensing and monitoring doctors to operate methadone maintenance centres, and the concurrent formulation and endorsement of the necessary regulations. The authorities are also pursuing the inclusion of methadone syrup in the national pharmacopoeia as the recommended formulation for opioid dependence treatment in the country (10,11).

Sources: UNAIDS Second Independent Evaluation 2002-2008. Country visit to the Islamic Republic of Iran Summary Report, 2009. [http://data.unaids.org/pub/BaseDocument/2009/20090515\\_sie\\_countrysummaryreport\\_iran\\_en.pdf](http://data.unaids.org/pub/BaseDocument/2009/20090515_sie_countrysummaryreport_iran_en.pdf)  
HIV prevention and care among injecting drug users in the Islamic Republic of Iran, WHO Regional Office for the Eastern Mediterranean Region, 2008. [http://www.emro.who.int/asd/pdf/hiv\\_review\\_iran.pdf](http://www.emro.who.int/asd/pdf/hiv_review_iran.pdf)

**BOX 1.8****CASE STUDY: Malaysia**

Malaysia, where 76% of all HIV infections were among injecting drug users, started a pilot project for treatment of opioid dependence with methadone in 2003. The country subsequently endorsed methadone maintenance programmes as part of a harm reduction programme in 2005, to operate beyond the pilot phase. Opioid agonists could be prescribed in a range of settings, including Government hospitals, community clinics and general practitioners' clinics. The programme has also relied on the support of NGOs. At the end of 2007, the country reached the target of 5000 people on methadone. Price negotiations between the Government and suppliers resulted in a decrease in the retail price of methadone from US\$10 to US\$0.80 for 40 mg in the same year. By 2015, the country aims to reach 25 000 injecting drug users with opioid dependence treatment and to extend the provision of methadone in prisons, following the Iranian example (10,11).

Sources: Reid G. Malaysia and harm reduction: the challenges and responses. *International Journal of Drug Policy*. 2007 Mar;18(2):136-140.  
Noordin N. Substitution treatment in Malaysia. *Lancet*. 2008 Sep;372(9644):1149-1150.

**1.5****CHALLENGES AND PRIORITIES**

Substantial work is needed to reverse the current situation of limited access to pain relief and treatment of opioid dependence and to remove the attitudinal, knowledge, supply, legal and administrative barriers to essential medicines at national and global levels. For opioid analgesics and opioid agonists, the key challenges have been identified and action is now required to overcome these and meet patients' needs. However, the extent and causes of access problems for other controlled medicines have not generally been analysed to the same degree, for example for antiepileptics.

The availability of essential controlled medicines and the specificity of barriers to adequate treatment may vary from country to country, as the different barriers listed below can be more or less acute according to the different categories of essential controlled medicines (e.g. opioid analgesics, benzodiazepines). These barrier categories are interrelated, the availability of essential controlled medicines requires a holistic approach to address problems in each of these broad areas.

**1.5.1****Educational needs and strategies**

There is a need for greater awareness among policy-makers, health professionals and the general public to dispel the belief that medical use of opioid analgesics can do harm to patients and cause dependence. Treatment guidelines and training curricula for health workers on rational medicine use have been identified as priorities to overcome educational and attitudinal barriers to adequate pain management. Similarly, the dissemination of guidance and evidence on the effectiveness of opioid agonists in treating injecting drug users is a crucial factor in mobilizing government support and initiating and scaling up national programmes. Education for effective pain relief and treatment of opioid dependence is urgently needed in all countries where the consumption of opioid analgesics and coverage of dependence treatment services is low.

Assessment of the availability of, and knowledge about rational medical use of, antiepileptics, anticonvulsants and medicines for emergency obstetric care would be the first step in order to understand the extent of country-specific barriers to these categories of controlled medicines.

**1.5.2****Balancing national drug control policy and regulations**

National drug control policies should be balanced to meet public health needs and the right to attain the highest possible standard of health, and the right to be free from torture, cruel, inhuman and degrading treatment or punishment. The international drug conventions state the imperative of making controlled pharmaceuticals available for medical and scientific use, but often signatory countries have implemented the conventions into national laws and regulations in a way that does not ensure, and even limits, the availability of essential medicines classified as narcotic and psychotropic substances. Assessing the current policy bottlenecks, operating changes in national policies, regulations and laws, and disseminating these changes among regulators, procurement officials and health workers are crucial steps in ensuring the availability of essential controlled medicines to patients.

Changing policies, however, will not result in enhanced availability of controlled medicines unless laws and regulations are amended accordingly. For example, if a policy is introduced to allow trained nurses to prescribe opioid analgesics, it will require amending or changing

a number of national regulations about dispensing of narcotic drugs and the professional role of nurses in the health system. There are several layers of regulations in countries that need to be considered throughout the supply chain, from procurement to prescription and dispensing. Failure to amend one single layer of regulation may compromise the final objective of making essential controlled medicines available. In this context, it could be useful for WHO to provide and disseminate model laws to guide countries in meeting their obligations under the conventions to provide adequate availability of controlled essential medicines.

### 1.5.3

#### Overcoming supply barriers

Price surveys at country and global levels are needed to enlighten production and supply barriers both for opioid analgesics and for oral formulations of methadone and buprenorphine. Currently, limited information is available for analysing how the manufacturing and retail prices further impact on access to these medicines.

One of the major problems acknowledged with the procurement of these and other medicines is the formulation of adequate need forecasting that take into account the epidemiological figures as well as the absorptive capacities of health systems. This will be a challenge, especially for countries that increase their absorption capacity by tackling the educational, policy and regulatory barriers. The requirement to submit annual estimates for medicines listed under Schedule I of the Single Convention on Narcotic Drugs, such as morphine and methadone, and the formalities for importation and exportation of these pharmaceuticals can indeed become a barrier if procurement and programme managers in countries do not plan adequately. Supply barriers may also be reduced by simplifying existing national regulations related to procurement, distribution and dispensing of controlled medicines while ensuring no diversion to the illicit market.

Meeting Millennium Development Goal 8E to ensure access to affordable essential medicines implies commitment to address these barriers for opioid medicines at national and global levels. It also requires analysis of the extent to which the status of other controlled medicine impacts on their availability for medical use. Life-saving and essential medicines, such as general obstetric emergency treatments, general anaesthetics and antiepileptics, cannot be withheld from health systems purely on the grounds that they are listed in the international drug conventions.

## REFERENCES

1. United Nations Single Convention on Narcotic Drugs.  
[http://www.incb.org/pdf/e/conv/convention\\_1961\\_en.pdf](http://www.incb.org/pdf/e/conv/convention_1961_en.pdf)  
[http://www.unodc.org/pdf/convention\\_1961\\_en.pdf](http://www.unodc.org/pdf/convention_1961_en.pdf)
2. United Nations Convention on Psychotropic Substances.  
[http://www.incb.org/pdf/e/conv/convention\\_1971\\_en.pdf](http://www.incb.org/pdf/e/conv/convention_1971_en.pdf)  
[http://www.unodc.org/pdf/convention\\_1971\\_en.pdf](http://www.unodc.org/pdf/convention_1971_en.pdf)
3. United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.  
[http://www.incb.org/pdf/e/conv/1988\\_convention\\_en.pdf](http://www.incb.org/pdf/e/conv/1988_convention_en.pdf)  
[http://www.unodc.org/pdf/convention\\_1988\\_en.pdf](http://www.unodc.org/pdf/convention_1988_en.pdf)
4. Noble M, Tregear SJ, Treadwell JR, Schoelles K. Long-term opioid therapy for chronic noncancer pain: a systematic review and meta-analysis of efficacy and safety. *J Pain Symptom Management*, 2008 Feb;35(2):214–28.
5. Report of the International Narcotics Control Board for 2008. New York, United Nations, 2009.  
[http://www.incb.org/pdf/annual-report/2008/en/AR\\_08\\_English.pdf](http://www.incb.org/pdf/annual-report/2008/en/AR_08_English.pdf)
6. Report of the International Narcotics Control Board for 2004. New York, United Nations, 2005. [http://www.incb.org/pdf/e/ar/2005/incb\\_report\\_2005\\_full.pdf](http://www.incb.org/pdf/e/ar/2005/incb_report_2005_full.pdf)
7. Mathers BM et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet*, 2008 Nov 15;372(9651):1733–1745.
8. World drug report 2007. Vienna and New York, United Nations Office on Drugs and Crime, 2007. [http://www.unodc.org/pdf/research/wdr07/WDR\\_2007.pdf](http://www.unodc.org/pdf/research/wdr07/WDR_2007.pdf)
9. Mathers BM et al. 2009 Reference Group to the UN on HIV and Injecting Drug Use. HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *Lancet*, 2010 Mar 20;375(9719):1014–1028.
10. Harm reduction developments. New York, Open Society Institute-International Harm Reduction Association, 2008.  
[http://www.ahrn.net/library\\_upload/uploadfile/file3138.pdf](http://www.ahrn.net/library_upload/uploadfile/file3138.pdf)
11. Barriers to access: Medication-assisted treatment and injection driven epidemics (footnoted version). Public health fact sheet. New York, Open Society Institute-International Harm Reduction Association, 2008.  
[http://www.soros.org/initiatives/health/focus/ihrd/articles\\_publications/publications/barriers\\_20080215/barriersfootnotes040808.pdf](http://www.soros.org/initiatives/health/focus/ihrd/articles_publications/publications/barriers_20080215/barriersfootnotes040808.pdf)
12. The selection and use of essential medicines: report of the WHO Expert Committee, 2005: (including the 14th model list of essential medicines). Pages 33–34, *WHO Expert Committee on the Selection and Use of Essential Medicines*, Geneva, World Health Organization 2005, (WHO technical Report Series, No. 933).
13. Krakauer EL et al. Opioid inaccessibility and its human consequences: reports from the field. *J Pain Palliat Care Pharmacother*, 2010 Sep;24(3):239–243.
14. Taylor A, Lawrence G, Pagonis K. Ensuring effective pain treatment: A national and global perspective, *Journal of the American Medical Association*, 2008, 299(1):89–91.  
<http://jama.ama-assn.org/cgi/content/full/299/1/89>

15. Brennan F, Carr B, Michael C. Pain management: A fundamental human right. *Anesthesia and Analgesia*, 2007, 105(1):205–221.
16. “Please, do not make us suffer any more...”, Access to pain treatment as a human right. Executive summary. New York, Human Rights Watch, 2009. <http://www.hrw.org/en/reports/2009/03/02/please-do-not-make-us-suffer-any-more-0>
17. Letter of the UN Special Rapporteur on Torture and other Cruel, Inhuman or Degrading Treatment or Punishment, and the UN Special Rapporteur on the Right to Health, to the UN Commission on Narcotic Drugs, 10 December 2008, Geneva. <http://www.ihra.net/Assets/1384/1/SpecialRapporteursLettertoCND012009.pdf>
18. Substitution maintenance therapy in Ukraine: Can the community respond effectively to the challenges of HIV/AIDS? Kiev, the International HIV/AIDS Alliance in Ukraine, 2008. [http://www.aidsalliance.org.ua/ru/library/our/pbzt/pdf/pb\\_en.pdf](http://www.aidsalliance.org.ua/ru/library/our/pbzt/pdf/pb_en.pdf)
19. Reid G. Malaysia and harm reduction: the challenges and responses. *International Journal of Drug Policy*. 2007 Mar;18(2):136–140.
20. Beyrer C et al. Time to act: a call for comprehensive responses to HIV in people who use drugs. *Lancet*, 2010, 376(9740):551–563.
21. A step-by-step algorithm for the procurement of controlled substances for drug substitution therapy. Bangkok, United Nations Office on Drugs and Crime Regional Centre for East Asia and the Pacific, World Health Organization Regional Office for South-East Asia and Regional Office for the Western Pacific and Joint United Nations Programme on HIV/AIDS, 2007. <http://www.unodc.org/documents/hiv-aids/Step-by-Step%20procurement%20subs%20treat.pdf>
22. Combating the twin epidemics of HIV/AIDS and drug addiction. A report of the CSIS Taskforce on HIV/AIDS. Washington D.C., Center for Strategic and International Studies, 2008. [http://csis.org/files/media/csis/pubs/080129\\_fiellincombatinghiv.pdf](http://csis.org/files/media/csis/pubs/080129_fiellincombatinghiv.pdf)
23. Joranson D, Ryan K. Ensuring opioid availability: methods and resources. *Journal of Pain and Symptom Management*, 2007, 33(5):527–532.
24. Guidelines for assessment: Achieving balance in national opioid control policies. Geneva, World Health Organization, 2000. <http://apps.who.int/medicinedocs/en/d/Jwhozip39e/>
25. De Lima L et al. E. Potent analgesics are more expensive for patients in developing countries: A comparative study. *Journal of Pain & Palliative Care Pharmacotherapy*, 2004, 18(1):59–70.
26. De Lima L. Opioid availability in Latin America as a global problem: A new strategy with regional and national effects. *Journal of Palliative Medicine*, 2004, 7(1):97–103.
27. Web site of the Global Fund to Fight AIDS, Tuberculosis and Malaria. <http://www.theglobalfund.org/en/>
28. Assistance mechanism to facilitate adequate treatment of pain using opioid analgesics, 2007. A joint report by the Director-General of the World Health Organization and the President of the International Narcotics Control Board. [http://www.who.int/medicines/areas/quality\\_safety/Joint\\_Report-WHO-INCB.pdf](http://www.who.int/medicines/areas/quality_safety/Joint_Report-WHO-INCB.pdf)



29. Access to Controlled Medications Programme Framework. Geneva, World Health Organization, 2007. [http://www.who.int/medicines/areas/quality\\_safety/AccessControlledMedicinesProgr.Framework.pdf](http://www.who.int/medicines/areas/quality_safety/AccessControlledMedicinesProgr.Framework.pdf)
30. Substitution maintenance therapy in the management of opioid dependence and HIV/AIDS prevention. Position paper. Geneva, World Health Organization, United Nations Office on Drugs and Crime and Joint United Nations Programme on HIV/AIDS, 2004. [http://www.who.int/substance\\_abuse/publications/en/PositionPaper\\_English.pdf](http://www.who.int/substance_abuse/publications/en/PositionPaper_English.pdf)
31. Claiming the Millennium Development Goals: A human rights approach. New York and Geneva, Office of the United Nations High Commissioner for Human Rights, 2008. [http://www.ohchr.org/Documents/Publications/Claiming\\_MDGs\\_en.pdf](http://www.ohchr.org/Documents/Publications/Claiming_MDGs_en.pdf)
32. Human rights, health and harm reduction: States' amnesia and parallel universes. Keynote address by Professor Paul Hunt at the International Harm Reduction Association's 19th International Conference, Barcelona, 11 May 2008. <http://www.ihra.net/files/2010/06/16/HumanRightsHealthAndHarmReduction.pdf>
33. Guidelines for the psychologically assisted pharmacological treatment of opioid dependence. Geneva, World Health Organization, 2009. [http://www.who.int/substance\\_abuse/publications/opioid\\_dependence\\_guidelines.pdf](http://www.who.int/substance_abuse/publications/opioid_dependence_guidelines.pdf)
34. Technical guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users. Geneva, World Health Organization, United Nations Office on Drugs and Crime and Joint United Nations Programme on HIV/AIDS, 2009. [http://www.who.int/hiv/pub/idu/idu\\_target\\_setting\\_guide.pdf](http://www.who.int/hiv/pub/idu/idu_target_setting_guide.pdf)

## ABBREVIATIONS

ACMP	Access to Controlled Medications Programme
DFID	Department for International Development
ECOSOC	Economic, Cultural and Social Council
INCB	International Narcotics Board
HIV	Human Immunodeficiency Virus
UK	United Kingdom
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNODC	United Nations Office on Drugs and Crime
WHO	World Health Organization



# THE WORLD MEDICINES SITUATION 2011

## GOOD GOVERNANCE FOR THE PHARMACEUTICAL SECTOR

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Good governance is increasingly understood as necessary for improving access to medicines and contributing to health systems strengthening. This chapter reviews the findings of studies carried out in 25 countries that have examined governance of key functions of pharmaceutical systems within the framework of WHO's Good Governance for Medicines (GGM) programme.
- The goal of the GGM programme, an innovative WHO initiative launched in late 2004, is to reduce corruption in pharmaceutical systems through the application of transparent, accountable administrative procedures grounded in laws and regulations, and the promotion of ethical practices.
- The country studies, which are based on a common methodology, have revealed strengths and several weaknesses in existing pharmaceutical systems and have provided policy-makers with relevant information to help them better understand the nature of the problems facing the sector and where interventions need to take place.
- Common strengths in the pharmaceutical systems and procedures include the use of standard application forms in the registration process of medicines, use of national essential medicines lists, existence of standard operating procedures for procurement of medicines and well-established tender committees.
- Common weaknesses include a lack of access to information, poor enforcement and implementation of laws and regulations, absence of conflict of interest policies among members of various committees, and an inability to ensure that the proper incentives are in place to lessen the likelihood of corruption at both the individual and institutional levels.
- Governments can reduce corruption by promoting transparency and ethical practices, and by introducing simple measures, such as justification for committee membership, terms of reference, conflict of interest policies and descriptions of the purpose of the committees. International organizations, such as WHO, can provide technical support for these efforts.

## 1.1

## INTRODUCTION: THE CASE FOR GOOD GOVERNANCE

Each year, an estimated US\$ 5.3 trillion is spent worldwide on providing health services (1). It is estimated that 25% of total health expenditure is spent on pharmaceuticals (see the chapter on expenditure). Regrettably, and for a variety of reasons, a significant proportion of these resources are wasted – one example being corruption in the system – resulting in significant losses, in terms of both health and economics. Corruption within the pharmaceutical sector is of increasing concern, not simply because of the cost implications but more importantly because it denies many people access to medicines, which, provided they are of good quality and used appropriately, offer a cost-effective solution to many health problems.

It is estimated that anywhere between 10% and 25% of global spending on public procurement is lost to corruption (2). Medicine spending is more or less likely to be beset by such problems. In addition, there is evidence to suggest that the circulation of counterfeit and substandard medicines is increasing globally (3). Such losses are largely the result of the weak and ineffective medicine regulatory systems and poorly managed medicine supply chains that prevail in many countries. As a means of tackling corruption and unethical practices in the pharmaceutical sector, better governance therefore becomes something of a priority. Better governance matters because corruption, when ignored or viewed benignly, diverts government resources from public health services and jeopardises any health gains made by measures to promote equity in access and rational use of medicines. Good governance also matters because corruption hinders development. The World Bank has identified corruption as the single greatest obstacle to social and economic development (4). Furthermore, in 2009 the UN Secretary General stated that corruption represents one of the biggest impediments to the worldwide efforts to achieve the Millennium Development Goals (5).

*Good governance matters because the potential for corruption exists everywhere.*

The potential for corruption exists everywhere, in every country and at any point in the pharmaceutical supply chain. For example, there can be collusion in the procurement process, falsification of efficacy and safety data, price-fixing by cartels, and leakages and diversion in the distribution chain. Although a global phenomenon, affecting both high- and low-income countries, corruption – and its consequences – tend to be more apparent in the pharmaceutical systems of low-income countries, where, due to resource constraints, legislation and regulations are typically enforced less effectively. As a result, in many countries supply and distribution processes are often poorly defined and documented, and institutional checks and balances limited. These systematic deficiencies contribute to an environment that allows corrupt practices to occur unnoticed and without penalty.

*Corruption can divert government resources from public health services with negative impacts on the poor.*

Corruption in the pharmaceutical sector has a disproportionate impact on the poor who are dependent on public health systems for the medicines they need. A recent World Bank publication notes, “While corruption in the pharmaceutical system can affect a country’s entire population, it is typically the poor who are most susceptible to its detrimental effects. When public health-care systems cover pharmaceuticals, it is the poor who are obviously more dependent on the system than the rich and who suffer the consequences of its mismanagement more acutely (6).”

Corruption’s causes are complex, and its presence not easy to confirm. It is often difficult to identify corruption outright, given that it is not always possible to distinguish corrupt practices from inefficient ones. However, this has not stopped the international community from working towards improving good governance in the pharmaceutical sector by building up a basic understanding of what contributes to corruption. As Cohen, Mrazek & Hawkins note, “the first step towards stopping corruption in the pharmaceutical sector is to understand its structure, actors and motivations, and to identify the key points where corruption can occur” (7).

Acknowledging that corruption can no longer be ignored and guided by WHO's medicines strategy for 2004–2007, WHO initiated the Good Governance for Medicines (GGM) programme in late 2004 (8). Its goal is to contribute to strengthening health systems and reducing corruption in pharmaceutical systems through the application of transparent, accountable administrative procedures and the promotion of ethical practices. By helping policy-makers understand where the strengths and weaknesses lie in the pharmaceutical system, appropriate interventions can be applied. The GGM web site provides the details of the programme.<sup>1</sup>

Since the launch of the GGM programme, the drive to reduce corruption and waste in the pharmaceutical sector has gained momentum among public health officials working in ministries of health and national medicines regulatory authorities around the world. The GGM programme is currently active in 26 countries and is fostering complementary initiatives by other international organizations. For example, the World Bank is increasing its work in the area of governance and anticorruption to reduce poverty and improve economic growth in all sectors, including health and the pharmaceutical system (1). Also, the Medicines Transparency Alliance (MeTA) is working to improve transparency in the sector through measures to encourage disclosure of information and multi-stakeholder collaboration (9). The GGM programme also builds on the pioneering anti-corruption efforts of Transparency International and international agencies, such as the World Bank, the United Nations Development Programme (UNDP) and the United Nations Office on Drugs and Crime (UNODC) which made corruption an accepted area in development.

## 1.2

### ASSESSING VULNERABILITY TO CORRUPTION IN THE PHARMACEUTICAL SECTOR

#### 1.2.1

#### The Good Governance for Medicines programme

The GGM programme relies on two core strategies. The first is a “top-down” discipline-based strategy which seeks to help governments establish anti-corruption laws and improve legislation and regulation governing the pharmaceutical sector. The second is a “bottom-up” values-based strategy that aims to help governments build institutional integrity through the promotion of ethical practices.

Implementation occurs through a three-phase model process:

- **Phase I:** national assessment of the level of transparency and potential vulnerability to corruption of the national pharmaceutical system. The results of the assessments conducted to date in 25 countries will be the focus of this chapter.
- **Phase II:** development of a national GGM framework through a consultation process involving key stakeholders. Once officially adopted, the GGM framework document will serve as a policy document and usually includes: an ethical framework and code of conduct, regulations and administrative procedures, collaboration mechanisms with other good governance and anticorruption initiatives, whistle-blowing mechanisms, and sanctions for reprehensible acts.
- **Phase III:** implementation of the national GGM programme. This will require the systematic training of government officials and health professionals, as well as communications and advocacy campaigns, which are essential for enlisting the support of civil servants, for building the momentum to sustain programme implementation, and for ensuring long term positive changes are made that help to improve how the pharmaceutical system functions.

<sup>1</sup> <http://www.who.int/medicines/ggm>



### 1.2.2

### Assessment methodology

The Phase 1 national assessment seeks to measure, in a semi-quantitative manner, the pharmaceutical sector's vulnerability to corruption, by examining and scoring national performance in up to eight core regulatory and supply management functions, as follows:

- medicines registration
- licensing of pharmaceutical establishments
- inspection of pharmaceutical establishments
- control of medicines promotion
- control of clinical trials
- selection of medicines
- procurement
- distribution.

The end result is a baseline situation analysis of sector transparency that can be used to monitor the country's progress over time. The goal of the GGM programme is not to measure corruption per se but rather to examine the resistance or vulnerability of the system to unethical practices. The national assessment is intended to serve as an entry point for the development and promotion of a national programme on good governance (phases II and III) and should not be seen as an end in itself. Its primary purpose is to help policy-makers understand where they need to direct their effort and resources in terms of improving the functioning of their pharmaceutical system.

The analysis of vulnerability to corruption in the pharmaceutical sector that will be discussed in subsequent sections draws on the results obtained from national transparency assessments (Phase I) undertaken since the GGM programme started in 2004. All 26 national transparency assessments conducted to date have used WHO's standardized assessment instrument (10).<sup>1</sup> National assessments have been conducted at different times and used slightly different versions, as the assessment instrument was regularly revised in the light of experience gained in new countries. Additionally, the number of functions assessed in-country vary between three and eight depending on when the country joined the GGM programme.

The objective and methodology of WHO's assessment instrument are summarized in Box 1.1. The assessment instrument includes quantitative and qualitative sets of indicators as well as questions to obtain the perceptions of key informants (KIs). Government "buy-in" and cooperation is vital in order to obtain good results, and most importantly so that appropriate measures are taken to implement the recommendations and fill in the gaps identified by the assessment.

The process of national assessment puts emphasis on a system's actual structure, focusing on mechanisms designed to prevent undesirable practices, such as administrative procedures that either limit or prevent transparency and accountability. It also provides an opportunity to examine how different stakeholders interpret and make use of or follow the systems and procedures in various areas of the pharmaceutical sector.

<sup>1</sup> To date assessment have been conducted in 26 countries, however only 25 had completed their assessments at the time of writing. Likewise several functions were added later therefore not all countries have reported on all functions of the pharmaceutical system.

**BOX 1.1****GGM Phase I – assessment instrument, the process and scoring**

- The objective is to assess the level of transparency of eight functions of pharmaceutical systems (related to regulatory and supply functions). The main assumption is that the more transparent, the lower the rating in terms of corruption vulnerability.
- The goal is not to measure corruption, but to examine how resistant or vulnerable the system is towards corrupt practices.
- The assessment is carried out by at least two national assessors (NAs) from well-known and trusted independent organizations who have a good knowledge of the country's pharmaceutical sector.
- NAs conduct semi-structured interviews to collect (with predefined questionnaires) qualitative and quantitative information on structural and procedural indicators, and on perceptions.
- Four methods are used to determine the level of transparency, however only methods 1 and 2 are used in the final scoring:
  - Method 1: questions requiring a binary answer (yes/no)
  - Method 2: questions with sub-questions requiring a binary answer (yes/no)
  - Method 3: subjective questions probing perceptions (Likert Scale)
  - Method 4: open questions for collecting additional information and recommendations.
- NAs interview KIs from various stakeholders to ensure different perspective are represented: the ministry of health, medicines regulatory authority, public hospitals, private sector companies, wholesalers and manufacturers, professional associations, civil society organizations and international organizations.
- Information is also extracted through a desk review from public government web sites and other relevant sources, to validate the findings.
- Responses from methods 1 and 2 are used to score each function and calculate the vulnerability to corruption. Scoring is converted to a simple scale of 0 (maximum) to 10 (minimum) vulnerability to corruption. This scoring gives an indication of the KI's knowledge about the existence of structures and the processes in place, and to what extent these are used and enforced in the management of pharmaceutical affairs.
- Responses from methods 3 and 4 are used to provide further richness to the information and to give KIs the opportunity to provide other information relevant to the area of assessment.

**1.2.3****Overall country rankings**

The quantitative results of the studies (both published and non-published) are shown in Table 1.1 below. The higher the scores are, the more transparent the function is and the less vulnerable to corruption it will be. The black circles show the functions found vulnerable in the majority of countries, and the blue circles the less vulnerable. From a first glance one can see that all countries show some weaknesses, in various degrees and in different functions, that can be overcome by filling the gaps identified.

Results for individual countries (i.e. scores for each country for each of the assessed functional areas) are given in Annex 1.

Of the eight functions of the pharmaceutical system assessed, control of medicines promotion appears to be the one most vulnerable to corruption. Selection of essential medicines and inspection of pharmaceutical manufacturers and distributors also emerged as areas

**TABLE 1.1 Rating national pharmaceutical sectors according to their vulnerability to corruption (on a scale from 0 to 10)**

Rating system (score)	Pharmaceutical functions (number of countries)							
	Registration	Licensing	Inspection	Promotion	Clinical trials	Selection	Procurement	Distribution
Extremely vulnerable (0.0–2.0)	0	0	0	5	0	1	0	0
Very vulnerable (2.1–4.0)	2	0	3	5	2	4	1	0
Moderately vulnerable (4.1–6.0)	11	3	10	10	1	9	4	1
Marginally vulnerable (6.1–8.0)	11	3	7	1	3	9	16	8
Minimally vulnerable (8.1–10.0)	1	0	1	0	0	2	4	4
Total number of countries	25	6	21	21	6	25	25	13

Source: See reference 10

with greater vulnerability to corruption (see Table 1.1, results ringed in black). In most of the countries surveyed, systems and procedures governing the procurement and distribution of medicines appear to be fairly robust, and the necessary documentation in place, implying that these functional areas are generally less vulnerable to corruption. (see Table 1.1, results ringed in blue).

Comparison of the national assessments reveals an almost universal lack of public access to information about the pharmaceutical sector (e.g. details of legislation, regulations and written procedures). There is also a widespread lack of formalized selection criteria for membership of national drug selection committees (in 18 out of 25 countries) and at least 19 countries acknowledged that their drug registration committees did not have proper (i.e. documented) operating policies and procedures. In those countries where this type of information did exist, it was not always made available to the public. Conflict of interest policies were identified as another area of weakness; these were either entirely absent, or where they did exist, poorly implemented.

The assessment instrument continues to evolve to capture more information and to better suit country needs. Among the 25 countries with completed assessments, systems governing licensing and clinical trials were only examined in only six countries. (see Table 1.1). These two areas were added at a later date, and so countries who conducted their assessments early on and therefore according to an earlier methodology wouldn't have compiled data on these two areas of the pharmaceutical system.

The details of pharmaceutical areas and functions of countries assessed are discussed below.<sup>1</sup> Country examples of specific regulatory and supply management systems and processes are also illustrated in boxes throughout the chapter.

<sup>1</sup> Of the 26 national assessments, 14 have been published to date. The other 12 are being cleared by the government or the report is being finalized by the NAs. In this chapter countries have been named if the report has already been published (whether positive or negative findings). For non-published information we are using only the positive and validated results from countries.

## 1.2.4

*Conflict of interest disclosures in many countries were neither mandatory nor comprehensive.*

## Registration of medicines

In terms of the systems for medicines registration, identified common weaknesses include a lack of written terms of reference for government committee members who determine which medicines should be registered in the market and an absence of both selection criteria and conflict of interest policies for committee members. Even in those countries where procedures for conflict of interest disclosures had been established, many were neither mandatory nor sufficiently comprehensive to have a meaningful impact. For example, in the Philippines, while public sector representatives are covered by a conflict of interest policy, at the time of the study (2005), consultants employed in the private sector were not (12). As many as 14 countries reported that there is a perception that gifts and other benefits offered to public officials in charge of medicines registration have had an influence on decision-making. A similar number of countries do not have a formal appeal process for medicines that were refused registration.

Among the reporting countries, Thailand provides a good practice model, as medicine registration is well documented, the requirements are standardized and public information is readily available.<sup>1</sup>

## 1.2.5

## Licensing of pharmaceutical establishments

So far, assessment of the effectiveness of pharmaceutical sector licensing systems has been limited, this being an area of regulatory activity that has only recently been added to the good governance assessment methodology (see Table 1.1). However, in the six countries that have conducted this part of the assessment, there does appear to be some degree of regulation of the activities of pharmaceutical agents and pharmaceutical companies. All countries scored moderately or marginally vulnerable. Legislation governing the licensing of pharmaceutical agents and companies exists in all six countries and companies are inspected regularly. For example, Costa Rica has adopted legislation requiring the licensing of local medicine manufacturers, and all importing and exporting agents and distributors, as well as the inspection of premises and facilities used to manufacture, store or distribute medicines. There is also a standard checklist which has to be used to assess each application for the relevant licence. However, in most countries, criteria for membership of committees responsible for licensing were poorly documented and opaque. The absence of conflict of interest policies was also highlighted as an area of concern.

## 1.2.6

*Lack of procedures and documentation is common.*

## Inspection of facilities

Inspection of manufacturing and distribution centres was identified as another high risk area in medicine regulation that is prone to corruption. Table 1.1 shows that among the 21 countries in which the inspection system has been assessed, 3 (14.3%) were found to be “very” vulnerable to corruption and of the remaining of 18 countries, 10 (55.6%) were found to be “moderately” vulnerable to corruption. On the basis of these data, it would appear that in general inspection systems are not well organized and are operating below par.

A common finding was the general lack of proper procedures and documentation relating to the inspection of facilities; either such information was not available or, where it did exist, it was not easily accessible by the public. In one African country, Benin, for example, there was

<sup>1</sup> For example, information about the requirements needed to register medicines is available on a web site: (<http://www.fda.moph.go.th>).

no written record of the criteria used to select and recruit inspectors, a critical mechanism for ensuring independence and honesty in the inspection process. In another country, a critical gap in the inspection process was the absence of any statutes for pharmaceutical inspection.

**BOX 1.2****Jordanian legislation on inspection of medicine manufacturers**

In Jordan, comprehensive provision in the legislation covering the inspection of medicine manufacturers and distributors was described as beneficial. This provision includes written guidelines on the classification of good manufacturing practices non-compliance (which describe the types of deficiencies and the corresponding measures to be taken by the national medicines regulatory authority) and written standard operating procedures for inspectors on how to conduct an inspection. There are also stipulations that the inspection findings and conclusions be subject to an internal review by the head of the inspection department.

**1.2.7****Control of medicines promotion**

As mentioned above, medicines promotion control emerged as one of the weakest functions of the pharmaceutical sector. A lack of resources was identified as being the main reason for the high vulnerability to corruption and unethical practices in 20 of the 25 countries that undertook an assessment of this area of activity. Insufficient or no staff, no unit dedicated to the task of monitoring promotional activities, and no standard operating procedures were also frequently cited as being problematic. Although many countries have passed legislation on marketing standards, in many cases, it lacks depth and breadth; the existing laws do not cover all aspects of promotion and it is easy to find loopholes to exploit. The public and even health professionals are often unaware that such legislation even exists. Moreover, sanctions for breaches of the law are poorly enforced. For example, many countries have no formal legal procedures for making complaints about unethical promotional campaigns and practices, and in some only advertising of non-prescription medicines in the mass media is regulated.

**BOX 1.3****Macedonian legislation on medicines promotion**

In one European country Macedonia, current legislation bans the advertising of prescription medicines. It is strictly forbidden to publicly advertise a non-prescription medicinal product by associating it with its therapeutic characteristics; overstating its positive effects; exaggerating and describing effects of a medicinal product in an inappropriate manner; comparing it with other medicinal products; or misleading medicinal product users in any other way.

**1.2.8****Control of clinical trials**

As a standard method for analysing systems for regulating clinical trials has been developed and added to the Good Governance assessment tool only recently, only six countries have completed this part of the programme. Nevertheless, a number of common weaknesses have emerged, including a general absence of systems and procedures for the inspection of clinical trials, a lack of transparency concerning committee membership and very limited conflict of interest policies.

## 1.2.9

**Selection of essential medicines**

A positive finding to emerge from the review of national good governance assessments is that, overall, countries are using national essential medicines lists commensurate with WHO standards to guide their medicines selection and procurement. However, public access to information relating to the processes used to update national medicines lists was found to be limited in many of the participating countries.

*Governance of selection committee was poor, with no defined terms of reference, no conditions and duration of tenure.*

A number of other common, systematic weaknesses were identified. For instance, in many cases national essential medicines lists are not developed in consultation with core stakeholders and not disseminated sufficiently widely. Updating is irregular and is often too infrequent. In common with other areas of activity in the pharmaceutical sector, committee governance was found to be poor. For example, many countries do not have clearly defined and publicly available terms of reference that detail the responsibilities of the essential medicines selection committee members, and the terms and conditions and the duration of their period of tenure on the committee. How committee members are selected is often not specified. While some countries have made efforts to ensure that there are conflict of interest forms available, their use is not necessarily mandatory; this can lead to situations in which an appointed medicine selection committee member could have ties to a manufacturer or a supplier. In the Lao People's Democratic Republic, for example, at the time of the assessment (2005) there were no laws or regulations prohibiting members of the medicine selection committee from accepting support in kind or in cash from pharmaceutical companies. In approximately one quarter of the countries, there are no written criteria for the selection process for including or deleting medicines from the national essential medicines list. In Malaysia, at least at the time of the assessment (2005), almost all information relating to the process of medicines selection was not made public.

## 1.2.10

**Procurement of pharmaceuticals**

Surprisingly, vulnerability to corruption in procurement was revealed to be low. Only four (16%) out of 25 countries had procurement systems that were classed as “moderately” vulnerable to corruption and only one was found to be “very” vulnerable to corruption. Most countries claim to have instituted formal systems to regulate and monitor how procurement and tendering take place. In addition, written standard operating procedures are commonplace and tendering committees for the most part well established.

**BOX 1.4****Kenyan procurement procedures**

A good example was found in Kenya where there are transparent and explicit procedures for procurement, which are heavily informed by the Public Procurement and Disposal Act. A description of the internal process the procurement staff follows is available so that all employees are familiar with the due process of procurement. The procurement office monitors supplier performance for compliance with the contract terms and it is also audited on a regular basis. There is a tender committee whose functions are clearly separated from the functions of the procurement office. There is also a formal appeals process for applicants who have their bids rejected.



Despite these notable successes, several examples of weaknesses in the tendering system and process – generally regarded as an area that is very susceptible to bribery – were exposed. Some countries admitted to having no clear criteria upon which to base procurement committee membership. Procurement committee governance, as in many other areas of activity, tends to be limited by a lack of publicly-available, transparent terms of reference for members and for the committee itself. Malawi is just one example of a country in which basic procurement and tender documents are not made public (13). In Cambodia, there are no standard operating procedures for the procurement of medicines.

### 1.2.11

#### Distribution of pharmaceuticals

Distribution, like procurement, reveals high transparency scores in most countries. The current good governance assessment methodology examines the robustness of systems for medicines procurement and distribution largely from the point of view of the purchase and subsequent delivery to, and management within, central warehouses. The methodology does not cover the distribution of medicines to regional warehouses and health facilities. This may explain the high scores, as leakages and diversions of medicines once they have left the central warehouse are not captured. An example of good practice is provided by Jordan, where not only are medicines purchased by the government easily identified (by special imprints on both containers and packaging), but there is also a systematic and orderly shelving of products in the warehouses (14). Stock is routinely inventoried and procedures are in place for monitoring movements in and out of the warehouses to other parts of the distribution system. In addition, the distribution warehouses are regularly subjected to internal and external auditing. A computerized system provides up-to-date information on stock levels to health facilities. Sanctions are imposed on any individuals found guilty of theft or other corrupt practices.

Elsewhere, however, deficiencies in distribution system functions were noted. In as many as eight countries, key informants (KIs) reported that gift-giving is needed to expedite the medicine distribution process and the port clearing process. In Lebanon, the national assessor (NA) found that there was no security management system at the central drug warehouse. In addition, even though the country has multiple levels and points of distribution, there was no computerized program to link these.

## 1.3

### REVIEW OF LESSONS LEARNED

To date, 26 countries worldwide have either finalized or will soon complete their good governance assessments (see Table 1.2) (10). This level of response to the launch of the good governance for medicines initiative has far exceeded expectations. It indicates that not only is there real interest in addressing corruption in the health sector but also that this issue is increasingly being recognized as something that is detrimental to the intended public health outputs of the pharmaceutical sector.

A number of useful lessons have been learned that will hopefully help make the implementation of the GGM programme more seamless in the future. They include the following:

- Countries with a dedicated, well-resourced team generally fare better in terms of advancing the GGM programme; also high-level political support is essential for the sustainability of the programme. Both need to go hand-in-hand.
- An infrastructure that allows close collaboration between relevant governmental institutions and key stakeholders of the pharmaceutical sector is another contributory factor

to successful implementation of the GGM programme. These include anti-corruption agencies, the private sector, civil society organizations and academia.

- Preventing corruption and promoting good governance and integrity in the health sector is a new area of work for health professionals in most countries. There is a need to build capacity and new leadership combining both pharmaceutical management and good governance skills so that good governance is naturally integrated in daily activities. GGM training workshops ensure that these new issues are promoted not as theoretical models, but in concrete terms to facilitate application.
- The speed of progress will vary depending on country contexts. This is not an issue. What matters is that change is sustained over time and that countries keep progressing until good governance is institutionalized and becomes an integral part of pharmaceutical management.
- The importance of follow up and institutionalization of the GGM programme cannot be underestimated. Unless national governments take steps to implement the recommendations made in the GGM assessment reports, and integrate the promotion of good governance in national plans of action, there is little hope of progress in the global fight against corruption.

Thailand is one country that has reached phase III, with a number of significant achievements as shown in the box below.

#### BOX 1.5

##### Good governance and ensuring access to medicines: Thailand

In 2004, Thailand decided that the WHO Good Governance for Medicines programme would support its goals of increasing transparency and ensuring access to medicines while saving precious resources.

##### Progress after five years

**Lower costs for quality medicine procurement:** the number of hospitals with best practices in medicines procurement has increased. A pooled medicines purchasing scheme by hospitals has been established, with an agreed list of medicines and suppliers.

**National attention focused on the problem:** national pharmaceutical laws and regulations have been reviewed. A national database on good governance in drug systems, containing publications and articles on corruption, unethical practices and corrupt cases has been developed.

**Information more readily available:** newsletters, public communications, including media, brochures, and web sites have been created. The minutes from national medicine meetings are publicly available and the topic of "good governance" has been added to the curriculum of 15 Faculties of Pharmacy.

##### Positive effects beyond the Ministry of Public Health

- Cooperation of the Ministry of Public Health with universities and the Food and Drug Administration of Thailand, as well as internationally with other GGM participating countries.
- The GGM made possible the exchange of information and experiences that has helped in introducing new ideas and ways of doing things.
- There is a more systematic approach and strategy, and a clear direction with goals to meet against a timeline and a greater focus on transparency

TABLE 1.2 **GGM milestones: programme status as of June 2010**

GGM phase	Milestones	Number of countries
Phase I	National assessors trained	26
	Transparency assessment completed	25
	Transparency assessment report drafted	25
Phase II	National GGM workshop	19
	National GGM team nominated	15
	Transparency report officially published	14
	Draft national GGM framework	11
	National GGM framework officially adopted	5
Phase III	Approved national GGM plan of action	5
	Training of national GGM team	4

## 1.4

## FUTURE CHALLENGES AND PRIORITIES

*Improvement in committee governance in every area of the pharmaceutical sector is needed in almost every country.*

It is particularly noticeable that in every area of the pharmaceutical sector and in almost every country, there is a need for improvements in committee governance arrangements. The types of measures that need to be introduced typically include justification for committee membership, terms of reference for committee members, conflict of interest policies, and descriptions of the purpose of the committees. Improved coordination and communication between pharmaceutical departments would also pay dividends in terms of improved pharmaceutical governance. For the most part, these much-needed reforms are low cost and fairly easy to implement, yet their potential impact, in terms of improving transparency in the pharmaceutical sector and ultimately access to medicines, is likely to be significant. The deciding factor is rather government willingness to make the necessary changes, backed by a commitment to see them through.

Future challenges include ensuring that countries' initial enthusiasm and commitment to improving their governance is sustained and that countries progress their GGM programmes, within a reasonable timeframe, from Phase I through to Phase III, while recognizing that in times of economic hardship governance is more likely to have to compete with many other demands on resources. Highlighting the clear connections between good governance, reduced levels of corruption and economic benefits will help to strengthen the case for investment in good governance. WHO is committed to working with countries to help them advance their GGM programmes.

The second major challenge is building sufficient capacity nationally to promote good governance in pharmaceutical systems. Even though 26 countries have committed to GGM programmes, more training is required in countries in leadership, integrity, communications and advocacy campaigns, and other anti-corruption components necessary for good governance initiatives. These need to be tailored to the pharmaceutical sector and once in place will ensure the continuity of GGM efforts.

Thirdly, lessons learned need to be reported and disseminated more widely, so that countries can benefit from the experience of others. This type of information also helps WHO refine and further improve the relevance of its good governance policy guidance and technical documents. Increased use of modern communications technology tools, such as electronic discussion groups, should be made as these provide governments and GGM focal points with ready lines of communication, helping to keep the issue "alive" and encourage "cross-country" learning.

Finally, the reality is that without ongoing donor commitment, the gains made by the WHO Good Governance for Medicines programme in countries will not be sustained. It is important to foster global advocacy for good governance in the pharmaceutical sector. The rationale for investing in good governance in this sector is compelling: it is essential if countries are to make the health gains associated with improved access to quality medicines and their rational use. It is also essential to ensure that donor funding is not wasted and reaches those it is intended for.

## REFERENCES

1. *Spending on health. Fact Sheet No. 319*. Geneva, World Health Organization, 2004. Available at: <http://www.who.int/mediacentre/factsheets/fs319/en/index.html>
2. *Handbook: Curbing corruption in public procurement*. Berlin, Transparency International, 2006. Available at: [http://www.transparency.org/publications/publications/other/procurement\\_handbook](http://www.transparency.org/publications/publications/other/procurement_handbook)
3. IMPACT. *Counterfeit Drugs Kill!* Geneva, World Health Organization, 2008. Available at: <http://www.who.int/impact/FinalBrochureWHA2008a.pdf>
4. Empowering the poor to fight corruption [PovertyNet web site]. Washington, DC, The World Bank, 2009. <http://go.worldbank.org/APAR27YJ50>, accessed 8 May 2010
5. UN Secretary-General's message on International Anti-corruption Day, 9 December 2009. <http://www.un.org/News/Press/docs/2009/sgsm12660.doc.htm>
6. Cohen JC, Mrazek M, Hawkins L. Corruption and pharmaceuticals: Strengthening good governance. In: Campos JE, Pradhan S, eds. *The many faces of corruption: Tracking corruption at the sectoral level*. Washington, D.C., World Bank Publications, 2007:30.
7. Cohen JC, Mrazek M, Hawkins L. Tackling corruption in the pharmaceutical system worldwide with courage and conviction. *Clinical Pharmacology and Therapeutics*, 2007, 81(1):445–449.
8. *WHO Medicines Strategy: Countries at the core 2004–2007*. Geneva, World Health Organization, 2004. Available at: <http://apps.who.int/medicinedocs/en/d/Js5571e/>
9. Medicines Transparency Alliance web site: <http://www.medicinestransparency.org/about-meta/>
10. Baghdadi G, Cohen-Kohler JC, Wondemagegnehu E. *Measuring transparency in the public pharmaceutical sector: Assessment instrument*. Geneva, World Health Organization, 2009. Available at: <http://www.who.int/entity/medicines/areas/policy/goodgovernance/AssessmentInstrumentMeastrapENG>
11. *Good Governance for Medicines programme. Progress Report. February 2009*. Geneva, World Health Organization, 2009. Available at: [http://www.who.int/entity/medicines/areas/policy/goodgovernance/ggmprogressreport\\_feb09.pdf](http://www.who.int/entity/medicines/areas/policy/goodgovernance/ggmprogressreport_feb09.pdf)
12. *Measuring transparency in medicines registration, selection and procurement: Four country assessment studies (Lao People's Democratic Republic, Malaysia, Philippines, Thailand)*. Geneva, World Health Organization, 2006. Available at: <http://www.who.int/entity/medicines/areas/policy/goodgovernance/Transparency4CountryStudy.pdf>

13. *Measuring transparency to improve good governance in the public pharmaceutical sector in Malawi*. Geneva, World Health Organization, 2008. Available at: <http://www.who.int/entity/medicines/areas/policy/goodgovernance/MeasuringTransparencyMalawi/en/index>
14. *Measuring transparency to improve good governance in the public pharmaceutical sector: Jordan*. Cairo, World Health Organization Regional Office for the Eastern Mediterranean, 2006. Available at: [http://www.emro.who.int/publications/Book\\_Details.asp?ID=968](http://www.emro.who.int/publications/Book_Details.asp?ID=968)

## **ABBREVIATIONS**

GGM	Good governance for medicines
KI	Key informant
NA	National assessor

## Annex 1

	WPRO						SEARO			AFRO						EMRO						PAHO				EURO	
	A	B	C	D	E	F	A	B	A	B	A	B	C	D	E	F	A	B	A	B	C	D	E	A	B	A	B
Country																											
Registration	5.1	6.8	7.7	5.6	6.8	4.3	6.9	7.2	4.0	5.5	4.7	4.3	4.8	7.0	6.5	6.0	5.1	7.5	5.7	6.2	8.6	6.1	4.4	5.8	6.8		
Promotion	5.1		4.4			1.7		7.6	1.3	2.6	2.0	4.5	1.4	5.1	4.9	3.8	4.5	1.9	3.6	4.7	4.7	5.0	3.8	4.7	2.4		
Inspection of Production	5.0					2.6		8.7	4.4	4.6	3.7	4.0	4.3	8.0	7.3	5.7	5.9	5.8	7.1	4.3	6.2	7.8	6.0	6.5	5.3		
Selection	6.2	6.2	4.8	6.1	5.8	4.5	8.0	5.5	4.2	3.9	3.7	3.0	1.6	5.2	4.4	3.2	5.7	7.7	6.7	8.0	7.6	8.3	7.2	6.5	4.9		
Procurement	5.4	8.5	6.9	6.9	7.2	6.6	7.1	7.0	5.9	5.1	4.7	7.0	3.5	6.7	6.7	6.5	6.3	8.6	7.5	8.1	6.2	8.1	6.0	6.7	7.1		
Distribution									9.2	4.6	6.6	7.8		9.6	8.4	7.2	6.6	8.4		7.8			7.1	7.6	7.7		
Licensing												5.8	5.2			6.8	7.4			6.3				4.5			
Clinical Trials											3.6	6.3				4.2	3.4			7.9					7.9		

## Legend

- 0.0–2.0: Extremely vulnerable
- 2.1–4.0: Very vulnerable
- 4.1–6.0: Moderately vulnerable
- 6.1–8.0: Marginally vulnerable
- 8.1–10.0: Minimally vulnerable
- Not measured



# THE WORLD MEDICINES SITUATION 2011

## ACCESS TO ESSENTIAL MEDICINES AS PART OF THE RIGHT TO HEALTH

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**World Health  
Organization**

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## **The World Medicines Situation 2011**

### **3rd Edition**

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*When the right to health is debated in national elections, we know this is an issue whose time has come.*

Mary Robinson and  
Andrew Clapham  
*Realizing the Right to  
Health, 2009 (1)*

## SUMMARY

- Human rights constitute an important principle of our time. These fundamental human rights translate the values of equity, freedom, fairness, social justice and non-discrimination into practical entitlements for individuals, which increasingly guide public policies and national judicial systems. Access to essential medicines as part of the right to health has been further refined in recent years.
- An increasing number of patients in developing countries, especially in Central and South America, are claiming their health rights through the courts. However, instead of leaving it to the judiciary to define people's rights, health policy-makers should ensure that human rights principles are incorporated in medicine programmes from the outset.
- The WHO World Health Assembly has agreed to use the legal recognition of the right to health as an indicator of a government's commitment to improving access to essential medicines. Access to essential medicines has also become one of five UN indicators to measure progress in the progressive realization of the right to health.
- At least one third of the world's population has no regular access to medicines. Inequity in access to essential medicines is part of inequity in health care. Key evidence to document such inequities is rarely collected. More than 30 countries have not yet ratified the International Convention on Economic, Social and Cultural Rights and 60 countries do not recognize the right to health in their national constitution.
- The concept of essential medicines with its focus on equity, solidarity and social justice is already very much in line with the principles of human rights. Yet the daily practice of national essential medicine policies and programmes can learn from the growing human rights movement and its emphasis on transparency, accountability and freedom from discrimination. This chapter sets out practical recommendations for governments, United Nations (UN) organizations and non- government organizations (NGOs) on ensuring access to essential medicines as part of the right to health.

## 1.1

## INTRODUCTION

Advocacy for equitable access to and rational use of quality essential medicines takes many different forms. At the time of the Alma-Ata International Conference on Primary Health Care in 1978, “Health for All” was the slogan that encompassed essential medicines. In the last decade, access to essential medicines was recognized as part of the fundamental right to the highest attainable standard of health (in short: “the right to health”). This new approach reinforces the arguments for universal access to essential medicines as part of the renewal of primary health care, and can serve as a guide to assess and further strengthen national essential medicines programmes.

*The “right to health” approach reinforces the arguments for universal access to essential medicines.*

Human rights constitute an important principle of our time. These fundamental human rights translate the values of equity, freedom, fairness, social justice and non-discrimination from abstract concepts into citizen’s rights and State obligations, which increasingly guide public policies and national judicial systems. Human rights mainly concern the relationship between the State and the individual; they generate State obligations and individual entitlements. Human rights are promoted by human rights law, which aims to protect individuals and groups against actions that interfere with their human dignity and their fundamental freedoms and entitlements. Most human rights are interdependent and interrelated. For example, the right to health is closely associated with the right to life: the right to freedom from discrimination and other civil, political, social, economic and cultural rights promoting social justice (2).

WHO’s perspectives and activities are strongly embedded in the right to health. As part of the UN family, WHO’s Constitution is inspired by the UN Charter and the second paragraph reads: *“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition. Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures”* (3).

## 1.1.1

## The right to health in international treaties

On 10 December 1948, the General Assembly of the UN adopted and proclaimed the Universal Declaration of Human Rights (UDHR) as a common standard of achievement for all peoples and all nations. Article 25 establishes that *“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control”* (4).

In order to add more practical guidance to the UDHR, in 1966 the General Assembly adopted the International Covenant on Economic, Social and Cultural Rights (ICESCR). Article 12 of this treaty establishes: *“The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health”* (5,6). The right to health is also recognized in many other binding international<sup>1,2,3</sup> and regional<sup>4,5,6</sup> treaties.

<sup>1</sup> International Convention on the Elimination of All Forms of Racial Discrimination, article 5 (e) (iv), 1965

<sup>2</sup> Convention on the Elimination of All Forms of Discrimination against Women, article 11.1 (f) and 12, 1979

<sup>3</sup> Convention on the Rights of the Child, Article 24 (1989)

<sup>4</sup> European Social Charter, Article 11 (revised) 1965

<sup>5</sup> African Charter on Human and People’s Rights, Article 16 (1981)

<sup>6</sup> Additional Protocol to the American Convention on Human Rights in the Area of Economic, Social and Cultural Rights, Article 10 (1988)

### 1.1.2

#### Immediate obligations and progressive realization of the right to health

It is important to recognize that all necessary actions to protect, promote and fulfil the right to health cannot be secured immediately because States Parties may not have the resources to do so. Yet it is a well-established principle that States Parties, within their available resources, should work towards “progressive realization of the right to health.” Within this allowance for delayed action the ICESCR still imposes on States Parties several *immediate obligations*, two of which are very relevant for the many developing countries with insufficient resources dedicated to health. Firstly, concrete steps must be taken towards progressive realization (Article 2.1). Secondly, the benefits of such steps should be equally available to all citizens without discrimination of any kind (Article 2.2)(7). In recent years, a body of indicators has been developed to independently measure such progress (Box 1.2).

*Immediate obligations of States Parties include progressive realization of the right to health and that benefits should be equally available to all citizens without discrimination.*

Failure to take at least some concrete steps towards progressive realization is therefore seen as a violation of the right to health. Listed examples of such violations are a failure to adopt or implement a national health policy designed to ensure the right to health for everyone: insufficient expenditure or misallocation of public resources; failure to monitor the realization of the right to health at a national level; and failure to take measures to reduce the inequitable distribution of health facilities, goods and services (8). This is generally interpreted to imply that retrogressive measures also constitute a violation of the right to health. This means that once States have taken certain practical steps towards the fulfilment of the right to health (e.g. free health care to some categories of patients) these cannot be withdrawn other than in exceptional circumstances (9).

The WHO Constitution, key international treaties and authoritative commentaries therefore have established the right to the highest attainable standard of health of every human being and have also made States Parties (those countries that have signed and ratified the relevant treaties) explicitly responsible to protect, promote and fulfil this right. But does the right to health also include the right to access to essential medicines?

### 1.1.3

#### Access to essential medicines as part of the fulfilment of the right to health

Article 12.2d of the ICESCR of 1966 mentions access to health facilities, goods and services. In 1978, the Alma-Ata Declaration on Health for All provided a comprehensive vision and framework for health services based on primary health care (PHC), declaring that “*the attainment of the highest possible level of health is a most important world-wide social goal*” (10). By including the provision of essential drugs as one of the eight listed components of PHC it established the link between the social goal of the highest possible level of health and access to essential medicines. WHO’s launch of the first Model List of Essential Drugs a year earlier, in 1977, had already set the scene for essential medicines as an integral part of the Health-for-All strategy.

In 1990, the UN Commission on Economic, Social and Cultural Rights further developed the concept of the right to health of the legally binding ICESCR into practical guidance, through its non-binding but authoritative “General Comments”. In General Comment 3, the Commission confirmed that States parties have a core obligation to ensure the satisfaction of minimum essential levels of each of the rights outlined in the ICESCR, including essential primary care as described in the Alma-Ata Declaration (11). General Comment 14 of May 2000 (already quoted in section 1.2) goes even further and specifically states that the right to medical services in Article 12.2 (d) of the ICESCR includes the provision of essential drugs “*as defined by the WHO Action Programme on Essential Drugs*” (12).

Since 2008 WHO has been making serious efforts to renew PHC by promoting four components of PHC reform which are needed to refocus health systems towards health for all (13). The first component is universal access to health care which, as a matter of course, includes universal access to essential medicines.

With such strong global recognition of essential medicines as a key component of the progressive realization of the right to health and universal access to health care, it is important to assess how this recognition translates into action at the country level. How have these human rights been incorporated in the national constitutions and laws of countries that ratified the various treaties? And how do these treaties, national constitutions and World Health Assembly resolutions inspire social development and national medicine policies and practices?

## 1.2

### 1.2.1

*Several reports written by the UN Special Rapporteur on the Right to Health have promoted the international recognition of the issue of access to essential medicines.*

## RECENT DEVELOPMENTS AND CURRENT SITUATION

### Appointment of a UN Special Rapporteur on the Right to Health

In April 2002, the United Nations Human Rights Council established the mandate of the first Special Rapporteur on *the right of everyone to the enjoyment of the highest attainable standard of physical and mental health* (14). Special rapporteurs are independent experts appointed by the UN to examine and report back on a country situation or a specific human rights issue. This milestone appointment constituted the highest level global recognition of the importance of the rights-based approach in health. It was also significant because by virtue of this mandate the Special Rapporteur has to monitor the situation of the right to health throughout the world and to present annual reports to the Commission and to the UN General Assembly (15).

The Special Rapporteur has worked closely with many stakeholders, including the relevant departments of WHO. In close collaboration with WHO he also prepared several reports on access to essential medicines and the role of the pharmaceutical industry (Box 1.1). These reports have promoted international recognition of the issue and have provided very useful guidance on the practical implications of human rights obligations and simple indicators to measure progress. This work has laid the foundation for including progress by State Parties in ensuring access to essential medicines in the standard reporting format required by the monitoring bodies.

#### BOX 1.1

#### Reports by the UN Special Rapporteur on the Right to Health with relevance to access to essential medicines<sup>a</sup>

*Intellectual property and access to medicines.* Doc.E/CN.4/2004/49/Add.1

*The human right to medicines.* Doc.A/61/338, pp.10–18 (2006)

*The responsibilities of pharmaceutical companies.* Doc.A/61/338, pp.19–21 (2006)

*Health systems and the right to the highest attainable standard of health.* Doc.A/HRC/7/11 (2008)

*Guidelines for pharmaceutical companies.* Doc.A/63/263 (2008)

*Mission to GlaxoSmithKline.* Doc.A/HRC/11/12/Add.2 (2009)

<sup>a</sup> All these documents were issued by the United Nations in New York.



### 1.2.2

#### Treatment access campaigns for HIV/AIDS medicines

The last decade has also witnessed a wave of rights-based civic actions in support of universal access to treatment, especially in relation to HIV/AIDS and international trade agreements. The origin of this movement can be found in a new international patient solidarity, especially between vocal AIDS patients in the USA and the rapidly increasing numbers of patients in Southern Africa. The civil society movements for access to treatment for HIV/AIDS patients in countries such as Brazil, India, Malaysia, South Africa and Thailand have contributed greatly to raising global awareness of the inequitable access to essential medicines in general. For example, in Thailand a patients' movement, together with other civil society organizations, promoted their own version of the "National Health Security Act". In response the Government agreed to create a universal access scheme enacted in 2002. Three years later, HIV/AIDS treatment was included in the scheme.

At the global level, a number of international NGOs such as Médecins Sans Frontières, the Third World Network, OXFAM, Knowledge Ecology International and Health Action International have injected a strong human rights perspective into these discussions. Their campaigns have also raised the level of awareness about the possible negative implications of international trade agreements on the price of new essential medicines (see also the chapter on Intellectual Property, Trade and Medicines). These NGOs continue to closely follow and influence the multilateral negotiations on public health, innovation and intellectual property.

### 1.2.3

#### Developments within WHO

Through its focus on equitable access to essential medicines as part of PHC, in practice the core objectives of WHO's Action Programme on Essential Drugs have always been in line with the human rights concept presented above. However, the link between universal access and the right to health was recognized for the first time as a new priority in the WHO Medicines Strategy of 2004–2007.

The Department of Essential Medicines and Pharmaceutical Policies now actively promotes access to essential medicines as part of the right to health through studies, advocacy and policy guidance. For example, the new standard set of WHO indicators to measure access to essential medicines includes government recognition of access to essential medicines as part of the right to health in the constitution or national legislation. This same country progress indicator was later included in the WHO Medium-Term Strategic Plan for 2008–2013, approved by the World Health Assembly in 2007 (16). Government recognition as part of human rights has therefore become one of the core indicators for access to essential medicines. Conversely, access to essential medicines has also become an indicator for government commitment to the right to health (Box 1.2).

WHO has assisted the Special Rapporteur in preparing several reports related to access to essential medicines and the role of the pharmaceutical industry (Box 1.1). WHO has further promoted the rights-based approach as one additional means to promote access to essential medicines by collecting and disseminating information on successful court cases in developing countries (Box 1.3) and by formulating and providing practical advice to individuals and NGOs active in this field (17,18). WHO also published two documents on the right to health mainly for the general public (2,19). In 2008, in an open letter to *The Lancet*, the six regional directors of WHO expressed their support for the Director-General in the renewal of PHC, recognizing health as a human right (20).

## BOX 1.2

**Access to essential medicines as an indicator for the fulfilment of the right to health**

In recent years two important mechanisms have been created to assess, as objectively as possible, the commitment and performance of governments towards the fulfilment of the right to health and both use access to essential medicines as an indicator.

Firstly, the UN High Commissioner for Human Rights has created sets of indicators for 12 aspects of human rights, including the right to housing and shelter, the right to education, the right to freedom of expression and the right to health (21). The indicators for the fulfilment of the right to health refer to five aspects which are often subject to inequity and discrimination: (1) sexual and reproductive health; (2) child mortality and health care; (3) natural and occupational environment; (4) prevention, treatment and control of diseases; and (5) access to health facilities *and essential medicines*.

Secondly, in 2008 *The Lancet* published a first independent assessment of the fulfilment of the right to health in all countries of the world (22). Of 72 indicators used, 8 measured access to essential medicines, largely taken from those used by WHO and by the UN High Commissioner for Human Rights.

## BOX 1.3

**Enforceability of the right to access to essential medicines through the courts**

Most countries in the world have acceded to or ratified at least one global or regional covenant or treaty confirming the right to health. Ratifying such treaties creates binding State obligations and individual entitlements. But what does this mean in practice? Can these individual entitlements be enforced through the courts? In 2006, WHO presented the results of a systematic search to identify completed court cases in low- and middle-income countries in which individuals or groups had claimed access to essential medicines with reference to the right to health in general, or to specific human rights treaties ratified by their government (23). A total of 71 court cases from 12 countries were identified, mostly from Central and Latin America. In 59 of these cases access to essential medicines as part of the fulfilment of the right to health could indeed be enforced through the courts. The study concluded that individual cases have generated entitlements across a population group, that the right to health was not restricted by limitations in social security coverage, that government policies have successfully been challenged in court, and that skilful litigation can help to promote that governments fulfil their constitutional and international treaty obligations, especially when governments are developing systems of social security. However it should be noted that human rights accountability is more than the purely judicial accountability studied here. Sometimes referred to as "constructive accountability" this oversight may also include parliamentary committees, ombudsmen and national human rights institutions.

*While constitutional recognition of the right to access to essential medicines is an important sign of national values and commitment, it is neither a guarantee nor an essential step taken by many countries.*

## 1.2.4

**Situation at country level**

In September 2005, the UN General Assembly decided to integrate the promotion and protection of human rights into national policies and to support the further mainstreaming of human rights throughout the UN system (24). After years of international discussions on human rights law, an increasing number of governments are now pledging to move towards the practical implementation of their commitments to social justice.

When looking at government commitments to access to essential medicines as a human right at country level it is clear that most countries in the world have indeed acceded to and/

or ratified at least one of the global or regional covenants or treaties confirming the right to health. For example, 160 countries have become States parties to the ICESCR. By 2009, 135 countries had incorporated aspects of the right to health in their national constitution. Of these, 87 constitutions refer to the right to goods and services, and 4 specifically mention access to medical products and technologies. More recent constitutional texts seem to include stronger commitments, possibly reflecting the positive influence of the global development of the right to health over the past 50 years (25,26).

When comparing these statistics with the outcomes of WHO's four-yearly surveys of the pharmaceutical situation in countries, there seems to be little relation between the ratification of international treaties and the existence of operational national essential medicine policies and programmes. While constitutional recognition of the right to access to essential medicines is an important sign of national values and commitment, it is neither a guarantee nor an essential step. This is shown by the many countries with failing health systems despite good constitutional language, and by those countries with good access to essential medicines without it. Yet the many successful court cases on access to essential medicines in the Americas (Box 1.3) have shown that constitutional recognition creates an important supportive environment, especially in middle-income countries where health insurance systems are being created and where patients become aware of their rights and more vocal in demanding them.

In November 2007, the WHO Regional Office for the Western Pacific was the first to hold an informal inter-country consultation to identify possible ways to incorporate the human rights approach in efforts to improve access to essential medicines, taking into account the situation in different countries. At this meeting five assessment questions formulated by WHO (Box 1.4) were for the first time used in practice to assess the national medicine policy of a country, the Philippines. An important observation made at that meeting was that a focus on the right to health within a national medicine policy automatically moves the policy discussion towards promoting equity, universal access and solidarity with the poor and disadvantaged. The rights-based approach provides a strong foundation for promoting universal access to health care.

In September 2010, the 50th Directing Council of the Pan-American Health Organization adopted a resolution in which all countries of the Americas committed themselves to working with governmental human right agencies to evaluate and monitor the implementation of international treaties and standards, with a particular emphasis on the right to health for vulnerable groups, including people with mental disorders or disabilities, older people, women and adolescents, people with HIV and indigenous peoples. In particular, the countries committed themselves to: (1) strengthen the technical capabilities of government

#### BOX 1.4

##### **Five questions to assess the rights-based approach in national essential medicine programmes (21)**

1. Which medicines are covered by the right to health, as committed to by the Government?
2. Have all beneficiaries of the medicine programme been consulted?
3. Are there mechanisms for transparency and accountability?
4. Do all vulnerable groups have equal access to essential medicines? How do you know?
5. Are there safeguards and redress mechanisms in case human rights are violated?

health and human rights agencies to monitor health services' compliance with international human rights treaties and standards; (2) promote systematic technical cooperation in the design of health legislation, plans and policies; (3) strengthen health workers' knowledge and skills in the use of international human rights instruments; (4) adopt legislative, administrative and educational measures to improve the dissemination of international norms and standards that protect the right to health; and (5) strengthen civil society organizations and combat stigma and discrimination.

### 1.3

### FUTURE CHALLENGES

*Inequity and discrimination in access to essential medicines remain the key public health challenge of our times.*

Despite the advances described above, inequity and discrimination in access to essential medicines remain the key public health challenge of our times. A recent study found that in 36 low- and middle-income countries public sector facilities had essential medicines in stock only one third of the time, and in the private sector availability was only two thirds of the time (27). This first exact measurement of access, combined with the results of recent household surveys, comes uncomfortably close to the longstanding WHO intuitive estimate that one third of the world's population have no access to essential medicines (and less than half in some areas).

Inequity in access to medicines is part of inequity in health care. In relying on medicine supply through the private sector and financing through out-of-pocket payments, many governments choose to ignore the fact that this policy largely excludes the poor and vulnerable from obtaining even the most basic essential medicines. Those who need essential medicines the most include the poor, women and girls, the elderly, the internally displaced, people with disabilities, religious or ethnic minorities, and prisoners. Key evidence to document such inequities through disaggregated statistics or targeted surveys is rarely collected, again reflecting a lack of interest in these groups.

*While judicial redress systems seem to work in Latin America, they are largely lacking in most African, Asian and Middle-Eastern countries.*

The rights-based approach is specifically relevant to address such inequities. But while many countries have indeed ratified the ICESCR, more than 30 countries have so far failed to do so and of those who have, many do not implement it in practice. One third of countries do not recognize the right to health in their national constitution, and a similar number do not have an updated national medicine policy. Over 50 countries do not have an updated list of essential medicines as the basis for public supply or reimbursement. Only four countries (Mexico, Panama, the Philippines and Syrian Arab Republic) have made a constitutional commitment to ensure access to essential medicines for their population, although it should be noted here that the number of countries which have made other legally binding commitments is not known. While judicial redress systems seems to work in Latin America, they are largely lacking in most African, Asian and Middle-Eastern countries. The "right to redress" included in UN Guidelines for Consumer Protection of 1985 is often ignored.

### 1.4

### PRACTICAL RECOMMENDATIONS

To address the widespread inequity and discrimination in access to essential medicines, the following practical recommendations are made to governments, NGOs and UN agencies including WHO. They are largely based on general human rights principles and on the specific developments and observations related to essential medicines as mentioned above.

**1.4.1****Recommendations to national governments**

- 1. Ensure that constitutional and other legal provisions on the fundamental right to the enjoyment of the highest attainable standard of health, on the right to life and on the right to non-discrimination are in place.**

*Justification: This will express and enshrine government values and commitments and will create a supportive environment for promoting and enforcing universal access.*

- 2. Specify the obligations of the government and other stakeholders with regard to social welfare, the provision of health-care services and access to essential medicines, with an emphasis on vulnerable groups; this includes a national medicine policy with an implementation plan and an updated national list of essential medicines.**

*Justification: This will establish a further expression of government commitment, and will also serve as a basis for planning, monitoring, transparency and accountability.*

- 3. Collect and publish disaggregated statistics and targeted surveys to monitor access to essential medicines by gender and by vulnerable groups.**

*Justification: This will identify vulnerable groups and will serve as a basis for advocacy and for monitoring progress.*

- 4. Create the necessary legal instruments for enforcement and redress.**

*Justification: This will support different forms of accountability and will create a possibility for the population to monitor and challenge the government.*

- 5. Report regularly (e.g. every five years) on the progressive realization of the right to health, preferably on the basis of disaggregated statistics on access to essential medicines.**

*Justification: This will create an opportunity for the government to make an inventory of activities and report on achievements; and for monitoring bodies and civil society to monitor progress. The use of WHO indicators allows for comparisons between countries and over time.*

**1.4.2****Recommendations to nongovernmental organizations and civil society at large**

- 1. Campaign for constitutional provisions and national redress mechanisms.**

*Justification: This will support the development and recognition of human rights values by the government, as the basis for policies, programmes and enforcement.*

- 2. Prepare shadow (parallel) reports to international monitoring bodies on country progress towards the fulfilment of the right to health, including access to essential medicines, following the standard access indicators developed by WHO.**

*Justification: This allows civil society to make its own assessment of progress, as compared to the official government reports. The use of WHO indicators allows for comparisons between countries and over time.*

- 3. Support targeted litigation cases in support of the development of social security and access to essential medicines.**

*Justification: This is especially relevant in middle-income countries when social security and health insurance are being developed.*

#### **4. Monitor and hold accountable pharmaceutical companies in relation to their human rights responsibilities and access to medicines.**

*Justification: The duties of pharmaceutical companies in this regard have been defined by the report of the Special Rapporteur (Box 1.1) and the Access to Medicines Index of 2010.<sup>1</sup> These constitute excellent tools for external evaluation.*

### **1.4.3**

#### **Recommendations to the United Nations, including WHO**

##### **1. Continue reporting on access to essential medicines in its annual reporting on progress in reaching Millennium Development Goal 8.<sup>2</sup>**

*Justification: This will continue to attract government attention to essential medicines as part of the right to health and as part of achieving the Millennium Development Goals.*

##### **2. Include reporting on access to essential medicines in the standard requirements for national reporting on progress towards respecting, protecting and fulfilling the right to health.**

*Justification: This will force national governments to monitor and report on access to essential medicines as part of the right to health.*

##### **3. Prepare model texts for national constitutions on government commitment to the fulfilment of the right to health, including access to essential medicines.**

*Justification: Political opportunities to update the constitution occur from time to time, presenting a chance to align national values and aspirations with international human rights standards. At such moments, governments are known to have come to WHO for guidance.*

### **1.5**

#### **CONCLUSION**

Governments and health policy-makers should be aware of the increasing trend of the population to demand justice as a right, not as a form of charity. While mechanisms for redress are part of any rights-based approach, governments would do much better to plan their health programmes in line with the principle of the fundamental right to the highest attainable standard of health. The concept of essential medicines with its focus on equity, solidarity and social justice is already very much in line with the principles of human rights. Yet the daily practice of national essential medicine policies and programmes can learn from the growing human rights movement and its emphasis on transparency, accountability and freedom from discrimination.

<sup>1</sup> <http://www.accesstomedicineindex.org/>

<sup>2</sup> MDG8: Develop a global partnership for development. In particular. Target 8E: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.



## REFERENCES

1. Clapham A, Robinson M. *Realizing the right to health*. In: Swiss Human Rights Book Series, vol.3. Zurich, Rüffer & Rub, 2009.
2. *25 questions and answers on health and human rights*. Health & Human Rights Publication Series. Issue No.1, July 2002. Geneva, World Health Organization, 2002. Available at: <http://www.who.int/hhr/information/25%20Questions%20and%20Answers%20on%20Health%20and%20Human%20Rights.pdf>
3. The Constitution of the World Health Organization. Signed on 22 July 1946. Available at: [http://www.who.int/governance/eb/who\\_constitution\\_en.pdf](http://www.who.int/governance/eb/who_constitution_en.pdf)
4. The Universal Declaration of Human Rights. Adopted by the General Assembly of the United Nations on 10 December 1948. Available at: <http://www.un.org/en/documents/udhr/>
5. International Covenant on Economic, Social and Cultural Rights (ICESCR), 1966. Adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966. Entered into force 3 January 1976, in accordance with article 27. Available at: <http://www2.ohchr.org/english/law/cescr.htm>
6. United Nations Declaration on the Right to Development 1986, Article 8.1. Available at: <http://www.un.org/documents/ga/res/41/a41r128.htm>
7. Committee on Economic, Social and Cultural Rights. General Comment No. 14, para 43. Available at: [http://www.unhchr.ch/tbs/doc.nsf/\(symbol\)/E.C.12.2000.4.En](http://www.unhchr.ch/tbs/doc.nsf/(symbol)/E.C.12.2000.4.En)
8. Committee on Economic, Social and Cultural Rights. General Comment No. 14, para 47. Available at: [http://www.unhchr.ch/tbs/doc.nsf/\(symbol\)/E.C.12.2000.4.En](http://www.unhchr.ch/tbs/doc.nsf/(symbol)/E.C.12.2000.4.En)
9. Committee on Economic, Social and Cultural Rights. General Comment No. 14, para 45; and General Comment No.3, para 9. Available at: [http://www.unhchr.ch/tbs/doc.nsf/\(symbol\)/E.C.12.2000.4.En](http://www.unhchr.ch/tbs/doc.nsf/(symbol)/E.C.12.2000.4.En)
10. Declaration of Alma-Ata, Section 7, No.3. International Conference on Primary Health Care, Alma-Ata, 6-12 September 1978.
11. Committee on Economic, Social and Cultural Rights, 1990. General Comment No.3, para 10, Available at: <http://www.unhchr.ch/tbs/doc.nsf/0/94bdfaf59b43a424c12563ed0052b664?Opendocument>
12. Committee on Economic, Social and Cultural Rights. General Comment No. 14, para 12a. Available at: [http://www.unhchr.ch/tbs/doc.nsf/\(symbol\)/E.C.12.2000.4.En](http://www.unhchr.ch/tbs/doc.nsf/(symbol)/E.C.12.2000.4.En)
13. *Primary health care: Now more than ever*. World Health Report 2008. Geneva: World Health Organization, 2008. Available at: <http://www.who.int/whr/2008/en/index.html>
14. Commission on Human Rights Resolution 2002/31. 49th meeting, 22 April 2002. Available at: <http://www.unhchr.ch/Huridocda/Huridoca.nsf/0/5f07e25ce34edd01c1256ba60056deff?Opendocument>
15. Office of the United Nations High Commissioner on Human Rights. Available at: <http://www2.ohchr.org/english/issues/health/right/>
16. *Medium-term strategic plan 2008-2013*. Geneva, World Health Organization, 2008. Available at: [http://apps.who.int/gb/ebwha/pdf\\_files/AMTSP-PPB/a-mtsp\\_1en.pdf](http://apps.who.int/gb/ebwha/pdf_files/AMTSP-PPB/a-mtsp_1en.pdf)

17. Hogerzeil HV. Essential medicines and human rights: what can they learn from each other? *Bulletin of the World Health Organization*, May 2006, 84 (5):371–375. Available at: <http://www.who.int/bulletin/volumes/84/5/371.pdf>
18. Hogerzeil HV. Access to essential medicines as a human right. *WHO Essential Drug Monitor*, 2003; 33: 23–26.
19. The right to health. Geneva: Office of the United Nations and High Commissioner for Human Rights and World Health Organization, 2009. Fact Sheet 31.
20. Gezairy HA et al. Unequivocal regional support for Margaret Chan’s commitment to primary health care. *Lancet*, 2008; 372:25–26.
21. Office of the High Commissioner for Human Rights, Report on indicators for promoting and monitoring the implementation of human rights, 6 June 2008. Document HRI/MC/2008/3. Available at: <http://www2.ohchr.org/english/bodies/icm-mc/docs/HRI.MC.2008.3EN.pdf>
22. Backman G et al. Health systems and the right to health: an assessment of 194 countries. *Lancet*, 2008; 372:2047–2085.
23. Hogerzeil HV et al. Access to essential medicines as part of the fulfilment of the right to health – is it enforceable through the courts? *Lancet*, 2006; 368:305–311.
24. United Nations General Assembly Resolution on the 2005 World Summit Outcome. 16 September 2005. Available at: <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan021752.pdf>
25. United Nations High Commissioner for Human Rights database of signed/ratified treaties. Available at: <http://www.unhchr.ch>
26. *International Human Rights Instruments. Report on indicators for promoting and monitoring the implementation of human rights*. New York, United Nations, 2008. Document HRI/MC/2008/3.
27. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *Lancet*, 2009; 373:240–249.

## ABBREVIATIONS

ICESCR	International Covenant on Economic, Social and Cultural Rights
NGO	Nongovernmental organization
PHC	Primary health care
UDHR	Universal Declaration of Human Rights
UN	United Nations



# THE WORLD MEDICINES SITUATION 2011

## NATIONAL MEDICINES POLICIES – A REVIEW OF THE EVOLUTION AND DEVELOPMENT PROCESSES

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## The World Medicines Situation 2011

### 3rd Edition

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## SUMMARY

- A national medicines policy developed in a collaborative fashion identifies strategies and provides a comprehensive framework to develop all components of a national pharmaceutical sector.
- The policy process is as important as the policy document, since the process creates a mechanism for stakeholders to come together and collective ownership of the final policy can be achieved.
- The analysis of four examples of a national medicines policy formulation process shows that a political window of opportunity usually serves as a key element in reforming a national medicines policy.
- Political pressure by national experts or nongovernmental organizations is generally needed to establish a single comprehensive document.

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## ABSTRACT

Medicines play a major role in protecting, maintaining and restoring people's health. Continuous provision of appropriate medicines of assured quality, in adequate quantities and at affordable prices is a concern for all national governments. A national medicines policy (NMP) developed in a collaborative fashion identifies strategies needed to meet these objectives, and provides a comprehensive framework to develop all components of a national pharmaceutical sector. This review is a quantitative and qualitative (describing the historical development) study of the development process and evolution of NMPs. The number of NMPs and their current status has been obtained from the results of the assessment of WHO Level I indicators. The policy formulation process is examined in more detail with case studies from four countries: Sri Lanka, Australia, former Yugoslav Republic of Macedonia and South Africa.

The number of NMPs worldwide has increased in the last 25 years with the highest proportional increase in the last 5–10 years in high-income countries. Nevertheless, not all countries have an NMP since political pressure by national experts or non-governmental organizations is often needed to establish a single comprehensive document. The analysis of four examples of an NMP formulation process shows that a political window of opportunity usually serves as a key element in reforming a NMP. Furthermore, the case studies demonstrate that the policy process is as important as the policy document, since the process creates a mechanism for stakeholders to come together and collective ownership of the final policy can be achieved. This may be crucial in view of the challenges to implement and monitor an NMP.



## 1.1

**BACKGROUND**

Medicines play a major role in protecting, maintaining and restoring people's health. The regular provision of appropriate medicines of assured quality, in adequate quantities and at reasonable prices is therefore a concern for all national governments [1, 2]. While overuse and misuse of medicines are common in many countries, the poor availability of essential medicines is a major problem in low- and middle-income countries (LMIC) and for the poorer segments of the population [3]. In contrast to wealthier countries, up to 90% of the population in developing countries purchase medicines with out-of-pocket payments [4, 5]. The emergence of new diseases, population ageing, increasing antimicrobial resistance, increasing use of preventive medicines and the availability of new expensive medicines displaying little or no therapeutic benefit over existing treatments, all contribute to increased spending on medicines across all income levels worldwide [6, 7]. In addition to high expenditures, factors such as changing patterns of morbidity, the increasing role of the private sector in delivering medicines, health sector reforms and the presence or absence of health insurance schemes, and the effect of globalization and trade agreements also impact on access [8, 9]. The existence of (or a combination of) these factors is country specific and relates to the national political situation, as well as the economical situation and existing legislation.

These access problems have persisted despite efforts by governments, development agencies and the World Health Organization (WHO) to improve access to essential medicines, to promote rational use and to ensure quality assured medicines are used. The reasons for the failure to achieve universal access and rational use are complex, may differ among countries, and involve a wide range of stakeholders. Thus, there is a general need for medicine policies based on universal principles, but nevertheless adapted to the national situation of a country, to meet the health needs of the inhabitants [10]. A national medicines policy (NMP) helps to identify strategies to meet these objectives, as it provides a comprehensive framework for the development of all components of the national pharmaceutical sector with a future perspective of 10 years to adapt to the changing environment, combined with monitoring and periodic reviews [10].

The final content of an NMP will vary among countries, as it is dependent upon cultural and historical factors, including a country's institutional capacity to regulate and enforce quality assurance, the political values of the government, the level of spending on pharmaceuticals, and economic development. As these factors develop continuously over time it is important to regularly update any NMP. Furthermore, the NMP must take into consideration that the elements are interlinked and that a holistic approach is required; therefore, the development process must be clearly defined. The policy then becomes an expression of the government's commitment to provide medicines to the population and is a framework for action [11].

Since the first publication of WHO's Guidelines for Developing National Drug Policies in 1988, many countries have tried to improve people's access to essential medicines by formulating an NMP [12]. This article reviews the historical development of NMPs, for example, in terms of numbers and the development process across various income levels. In addition, the policy formulation process is examined in more detail with case studies from four countries.

**1.2****METHODOLOGY**

This review is a quantitative and qualitative (describing the historical development) study of the development process and evolution of NMPs. The number of NMPs and their current status have been obtained from the results of the WHO level 1 survey 1999 (as appeared in the *World Medicines Situation Report 2004*), the assessment of WHO Level I indicators conducted in 2007 and the global overview of pharmaceutical sector country profiles in 2011 [13,14]. Level I indicators measure the existence and performance of key national pharmaceutical structures and processes within countries. Finally, four examples of NMP formulation processes are presented: Sri Lanka (a small country with a long history of pharmaceutical policy innovation), Australia (a high-income Western country with an integrated policy), South Africa (a large country with political struggle needed for a radical change) and the former Yugoslav Republic of Macedonia (a small country with a limited capacity and affected by civil disturbance in neighbouring countries). These countries were chosen because they reflect diversity in the NMP development process and a range of economic status. Information about these processes was obtained using PubMed, the 2004 World Medicines Situation report and other literature sources. Three experts, closely involved in the policy formulation processes in three of the four countries, were asked to validate the descriptions of the policy processes.

**1.3****HISTORICAL DEVELOPMENT OF NATIONAL MEDICINES POLICIES****Role of WHO**

In 1985, the Nairobi Conference on The Rational Use of Drugs took place [13]. The experts at the conference aimed to ensure access to essential medicines and rational use of medicines for all people, especially in developing countries. The outcome of this meeting was a recommendation that an NMP should be defined in each country to ensure that essential medicines of assured quality, safety and efficacy would be available at affordable prices to all people who need them, at the right moment and at the right place, and would be used appropriately. Primary responsibility for overseeing rational medicine use would rest with the individual member governments assisted by WHO. It was felt that at the international level WHO should disseminate guidelines on NMPs and this was eventually done in 1988 [1, 14]. In 1989, 14 countries worldwide had formulated or updated an NMP within the previous 10 years [15]. Since then, many countries have formulated an NMP.

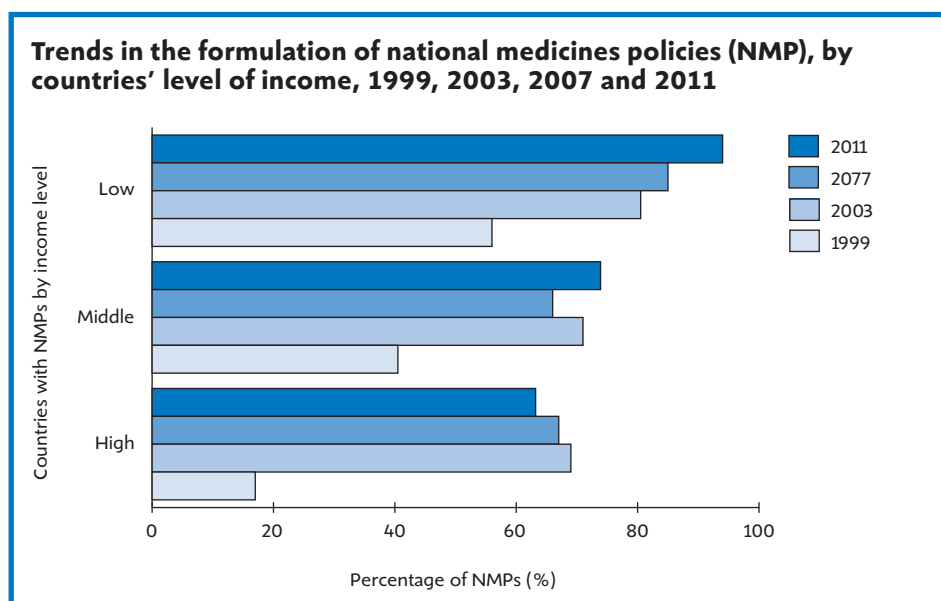
**Trends over time**

Increased awareness of the importance of an NMP in countries with limited resources is reflected by their early development in these countries. From 1985 onwards, the number of NMPs established in low-income countries increased rapidly, with the highest increase between 1985 and 1999. In wealthier countries, formulations of NMPs began only in 1995. Figure 1 shows trends for the formulation of NMPs between 1999–2011, by income level. It reveals that the percentage of NMPs increased across all income categories but the highest proportional increase was seen in high-income countries, from 18% in 1999 to almost 80% in 2011.

**Situation 2007**

In 2007, WHO surveyed 156 countries and found that 132 (85%) countries had an NMP and 62 (40%) were supported by an official document updated within less than five years

FIGURE 1



Source: WHO level 1 survey 1999 (as appeared in the *World Medicines Situation Report 2004*), 2003, 2007 and 2011. Percentages are based on number of countries surveyed by WHO.

TABLE 1

### Status of national medicines policies (NMP) by income level, 2007 [28]

	Country income level							
	Low (48)		Middle (73)		High (35)		Global (156)	
	responding countries	N yes %	responding countries	N yes %	responding countries	N yes %	responding countries	N yes %
NMP official (or draft) document	48	45 94%	73	61 84%	35	26 74%	156	132 85%
Official document updated < 5 years <sup>a</sup>	48	11 23%	73	32 44%	35	19 54%	156	62 40%
NMP implementation plan	45	32 71%	64	40 63%	28	22 79%	137	94 69%
NMP implementation plan updated < 5 years <sup>a</sup>	44	20 45%	64	31 48%	28	21 75%	136	72 53%
NMP integrated in National Health Policy	47	37 79%	60	44 73%	27	19 70%	134	100 75%

<sup>a</sup> Since over 20% of countries with an NMP document / NMP implementation plan did not provide dates and very few indeed provided dates earlier than 5 years previously, it was assumed that those countries not providing dates had not updated their NMP document / NMP implementation plan in the last 5 years.

(see Table 1). Table 1 shows that low-income countries were more likely to have an NMP compared to high-income countries. Nevertheless, these developed countries had updated their NMP more recently than low-income countries. In addition, higher-income countries reported to have more NMP implementation plans available than lower-income countries.

## Situation 2011: Development of Policy Framework(s)

### National Health Policy

In 2011, WHO collected information from 177 countries and found that 119 (86.2%) of 138 reporting countries had a National Health Policy (NHP), and that 88 out of 118 reporting countries (74.6.0%) had developed an associated National Health Policy implementation plan.

### National Medicines Policy

WHO figures showed that 136 out of 177 countries with available data (80.6%) had a National Medicines Policy, and an associated NMP implementation plan had also been developed in 100 of the 170 countries for which data was available. National Medicine Policy documents, and NMP implementation plans where developed, were more common in countries from low and lower-middle income groups than in those from upper-middle and high income countries.

Table 2 and 3 provide additional information on the health and pharmaceutical policies that have been developed, disaggregated by income level and WHO region respectively.

TABLE 2

### Medicines policies developed and implemented, by income group

Country Income Group (number of countries)											
		Low (36)		Lower-middle (52)		Upper-middle (56)		High (52)		Global Total (196)	
	Ratio	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes
National health policy exists	Yes	31	96.9%	39	88.6%	30	78.9%	19	79.2%	119	86.2%
	Total	32		44		38		24		138	
National health policy implementation plan exists	Yes	27	87.1%	30	81.1%	18	62.1%	13	61.9%	88	74.6%
	Total	31		37		29		21		118	
National medicines policy exists	Yes	32	94.1%	41	82.0%	33	66.0%	30	69.8%	136	76.8%
	Total	34		50		50		43		177	
National medicines policy implementation plan exists	Yes	25	73.5%	25	52.1%	24	51.1%	26	63.4%	100	58.8%
	Total	34		48		47		41		170	
Pharmaceutical policy implementation is regularly monitored	Yes	18	62.1%	19	46.3%	17	47.2%	15	60.0%	69	52.7%
	Total	29		41		36		25		131	

Source: Pharmaceutical Sector Country Profiles, 2013.

TABLE 3

**Medicines policies developed and implemented by WHO region**

WHO Region (number of countries)															
		AFR (n=46)		AMR (n=35)		EMR (n=21)		EUR (n=53)		SEAR (n=11)		WPR (n=27)		Other (n=3)	
	Ratio	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes
National health policy exists	Yes	40	90.9%	19	73.1%	15	83.3%	22	91.7%	7	87.5%	13	86.7%	3	100%
	Total	44		26		18		24		8		15		3	
National health policy implementation plan exists	Yes	31	83.8%	15	60.0%	10	76.9%	16	72.7%	5	83.3%	9	75.0%	2	66.7%
	Total	37		25		13		22		6		12		3	
National medicines policy exists	Yes	41	91.1%	15	46.9%	16	80.0%	34	82.9%	10	100%	20	76.9%	0	0.0%
	Total	45		32		20		41		10		26		3	
National medicines policy implementation plan exists	Yes	32	71.1%	11	34.4%	9	50.0%	31	75.6%	4	44.4%	13	59.1%	0	0.0%
	Total	45		32		18		41		9		22		3	
Pharmaceutical policy implementation is regularly monitored	Yes	22	57.9%	8	29.6%	8	47.1%	16	69.6%	5	71.4%	10	62.5%	0	0.0%
	Total	38		27		17		23		7		16		3	

Note "Other" includes three non-Member States and territories of WHO: West Bank and Gaza Strip; Turks and Caicos; and the British Virgin Islands  
Source: Pharmaceutical Sector Country Profiles, 2013.

Pharmaceutical policy implementation was reported to be regularly monitored in 52.7% of 131 reporting countries. The proportion of countries regularly monitoring policy implementation across income groups seems to be associated with the existence of a NMP implementation plan as high and low income countries are both more likely to regularly monitor implementation. However, it was outside the scope of the 2011 pharmaceutical country profile study to assess whether a National Medicines Policy was actually being implemented, irrespective of whether an implementation plan exists.

### National Clinical Laboratories Policy

An official National Clinical Laboratories Policy (NCLP) document existed in nearly half (45.1%) of 113 responding countries. An associated NCLP implementation plan was also developed in 33.7% of 104 responding countries.

### Access to essential medicines and technology

Access to essential medicines and technology as part of the fulfilment of the right to health is recognized in the constitution or national legislation in over three quarters (77%) of 126 responding countries. High and higher-middle income countries were more likely than lower-middle and low income countries to recognize the right of access to essential medicines in their constitution or legislation.

TABLE 4

#### Right of access to essential medicines/technologies and presence of good governance policy, by income group

Country income group (number of countries)											
		Low (36)		Lower-middle (52)		Upper-middle (56)		High (52)		Global Total (196)	
	Ratio	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes
National clinical laboratory policy exists	Yes	15	51.7%	17	47.2%	13	43.3%	6	33.3%	51	45.1%
	Total	29		36		30		18		113	
NCLP implementation plan exists	Yes	14	50.0%	13	38.2%	5	17.2%	3	23.1%	35	33.7%
	Total	28		34		29		13		104	
Right of access to essential medicines	Yes	22	73.3%	28	73.7%	32	84.2%	15	75.0%	97	77.0%
	Total	30		38		38		20		126	
National good governance policy exists	Yes	15	53.6%	22	59.5%	16	43.2%	9	45.0%	62	50.8%
	Total	28		37		37		20		122	

Source: Pharmaceutical Sector Country Profiles, 2013.

### Good governance policy

There was a national good governance policy relating to the pharmaceutical sector in over half (50.8%) of 122 responding countries.

### Medicines donation guidelines

Official written guidelines on medicines donation existed in nearly three quarters (73.2%) of 164 countries, where data was available. The presence of guidelines was more common in low income group countries than in other income groups, and was least common in high income group countries.

### Conflict of interest issues policy

Policy to manage conflict of interest issues in the pharmaceutical sector is in place in 44.7% of 123 responding countries. The proportion of low income countries with such policy was much lower than the other income groups.



### Code of conduct for public officials

A formal code of conduct for public officials was present in 70% of 128 countries. Low income countries are least likely to have such a code in place. A whistle-blowing mechanism, allowing individuals to raise a concern about wrongdoing occurring in the pharmaceutical sector, exists in 58% of 123 responding countries.

TABLE 5

#### Pharmaceutical guidelines and mechanisms, by income group

Country Income Group (number of countries)											
		Low (36)		Lower-middle (52)		Upper-middle (56)		High (52)		Global Total (196)	
	Ratio	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes	Yes/Total countries	% Yes
Official guidelines on medicines donation	Yes	30	88.2%	37	74.0%	36	76.6%	17	51.5%	120	73.2%
	Total	34		50		47		33		164	
Policy to manage conflict of interest issues	Yes	7	23.3%	17	47.2%	20	54.1%	11	55.0%	55	44.7%
	Total	30		36		37		20		123	
Formal code of conduct for public officials	Yes	15	51.7%	29	74.4%	30	78.9%	16	72.7%	90	70.3%
	Total	29		39		38		22		128	
Whistle-blowing mechanism	Yes	16	57.1%	21	56.8%	18	50.0%	14	63.6%	69	56.1%
	Total	28		37		36		22		123	

Source: Pharmaceutical Sector Country Profiles, 2013.

### Process of development

An NMP involves a complex process of development, implementation and monitoring. First, the policy development process results in the formulation of an NMP. Secondly, strategies and activities aimed at achieving policy objectives are implemented by various stakeholders. Finally, the effect of these activities is monitored and the policy adjusted as necessary. Throughout the process careful planning, consideration of the political dynamics and the involvement of all stakeholders occurred. Besides the Ministry of Health, other key stakeholders can be found among regulators, professional organizations, producers, importers and distributors, health-care professionals, patients and consumers, academics and civil society, health planners and managers, health finance authorities, insurance organizations, media and health/medicines donors, funders and major nongovernmental organizations. Thus, it is important to identify political allies, and to maintain their support throughout the process [10, 16].

The process of developing an NMP is almost exclusively a national matter and will differ among countries and regions with disparate income levels. In some countries, the NMP has been introduced as a complete entity (though not necessarily implemented as such), but in other countries, the NMP is developed in components. In many low- and middle-income countries, a national essential medicines programme was the motivation for establishing

such a policy and usually emphasized the selection, procurement, distribution and use of pharmaceuticals in the public sector [17]. During the last decade, these programmes have recognised the importance of finance tracking, medicine prices and financial management [18].

In high-income countries, the strategic goals of an NMP are generally found in various laws, regulations, and administrative procedures – rarely in a single document. The lack of an integrated national policy is unsatisfactory from a public health point of view, as some policies affecting medicines seem to contradict or undermine others [16]. Although medicines policies have generally been developed at a national level in high-income countries, there has been increasing international harmonization among countries, which might be hampering the development of an NMP within a country.

In the past two decades, international trends in market-oriented health sector reforms for meeting new health needs and requirements have been underway or under consideration throughout the world and at all income levels. Although these trends may undermine public services and pose a threat to equity in the well established social-welfare systems of high-income countries, such developments pose more immediate threats to the fragile systems in middle-income and low-income countries [19, 20]. The pharmaceutical sector and its policies are influenced by health sector reforms with increased decentralization, shifting roles and responsibilities from a central department of pharmacy management to the district level, and the establishment of district pharmaceutical management points. In an NMP, the policy must address the implications of an overall health system policy, although there are clearly aspects of pharmaceutical policy that must remain centralized – such as regulation, quality assurance and public sector procurement. The process of deciding which functions fall into which area is complex and difficult and the decision to proceed, and the subsequent success of implementation, depends on political support and the capacity at a local level. Thus, the content of an NMP must be regularly monitored and adjusted as necessary.

TABLE 6

### General statistics of Sri Lanka, Australia, South Africa and the former Yugoslav Republic of Macedonia

	Sri Lanka	Australia	South Africa	former Yugoslav Republic of Macedonia
Year of policy formulation	2006	1999	1996	2001
World Bank income level <sup>a</sup>	Lower Middle	High	Upper Middle	Upper Middle
Region	South East Asia	Western Pacific	Africa	Europe
Total population <sup>b</sup>	19.2	20.5	48.3	2.0
Gross national income per capita (PPP international \$) <sup>b</sup>	3 730	33 940	8 900	7 850
Life expectancy at birth m/f (years) <sup>b</sup>	69/76	79/84	50/53	71/76
Total expenditure on health per capita (international \$, 2006) <sup>b</sup>	213	3,122	869	623
Total expenditure on health as % of GDP (2006) <sup>b</sup>	4.2	8.7	8.6	8.2

<sup>a</sup> Income groups are classified according to World Bank estimates of 2008 Gross National Income (GNI) per capita.

<sup>b</sup> Figures are for 2006. Source: World Health Statistics 2008.

GDP = gross domestic product, PPP = Purchasing Power Parity.

Table 2 presents background information on population and economic data of the four case study countries. Full NMP development processes of these countries can be found in the appendix; the most important aspects of the development processes are outlined below.

### **Sri Lanka's national medicines policy process: promoting generics despite opposition**

Two first attempts (1991 and 1996) to develop an NMP failed. Two important factors were the absence of participation by civil society and lack of a health reform campaign by civil society organizations. Health Action International Asia-Pacific and its network partner, The Peoples Movement for Rights of Patients, began lobbying for an NMP and convened a number of national seminars, meetings and workshops on the need for an NMP, which started a development process including all stakeholders in 2005. Although accepted by consensus and endorsed by the Government in 2006, the current NMP has not been implemented due to strong lobbying by the private pharmaceutical industry against the NMP even though they had participated as a stakeholder. Generic promotion and substitution are two components in the NMP that the industry vehemently opposed and they have successfully lobbied to delay the implementation of the NMP.

### **Australia's national medicines policy process: balancing health and economic objectives**

Australia, as a participant at the 39th World Health Assembly in 1986, contributed to the development of the strategy calling on governments to implement an NMP. In 1991, the Australian Government established the Australian Pharmaceutical Advisory Council (APAC) and the Pharmaceutical Health And Rational use of Medicines (PHARM) Committee. APAC's formation presented an opportunity for all interested parties to positively contribute on a multi-lateral and consensus basis to the development of the NMP, while through the PHARM Committee and a multisectoral participatory process a policy for the improvement of medicines utilisation was formulated and adopted in 1992. In 2000 the first NMP was formally approved by the Government with the overall goal 'to meet medication and related health service needs, so that both optimal health outcomes and economic objectives are achieved' [21, 22]. To satisfy this goal, the policy framework addresses inherent tensions within the objectives of attaining affordable access to medicines, while maintaining a viable pharmaceutical industry, and achieving quality medicines and health systems.

### **South Africa's national medicines policy process: focusing on equity and access**

The focus of South Africa's first single NMP was on equity. Under apartheid, the health-care system was generous and highly effective, but only for the white population, and two separate draft national medicines policy documents were circulating. The key challenge for the new ANC-led Government was to develop the ANC draft policy into a truly national policy, and WHO was invited to participate from the start. After one year the Minister of Health insisted that the process be completed and one policy document be prepared based on the three existing drafts (two old drafts and a new document discussed with all stakeholders). This high-level political support resulted in the final policy document in 1996 [23]. This support also ensured that most of the national components of the policy were successfully implemented in the years that followed, although the new progressive medicine law was challenged in court by the pharmaceutical industry and delayed for three years.

### Former Yugoslav Republic of Macedonia's national medicines policy process: joint effort with WHO involvement

Broad support from WHO in the former Yugoslav Republic of Macedonia, which was seriously destabilized by the Kosovo War in 1999 that led to an exodus of ethnic Albanians into Macedonia, created an opportunity to begin NMP formulation. Prior to the enactment of the Health Care Law in 1991 and the establishment of the Ministry of Health, the system of health care, although offering universal accessibility, was fragmented with little central governance or strategic overview [24, 25]. In February 2000, the Ministry of Health and the WHO Humanitarian Assistance Office in Skopje organized an initial meeting to discuss the implementation of an NMP and to present the main aspects of an NMP. In May 2001, several drafts were combined to produce one comprehensive document which was officially endorsed by the Government of the former Yugoslav Republic of Macedonia in October 2001.

## 2.1

### DISCUSSION

The number of NMPs around the world has increased over the past 25 years with an early increase in low-income countries and a more recent increase in high-income countries. Nevertheless, to date, not all countries have an NMP. If there is no political pressure by national experts or nongovernmental organizations the need to establish a single comprehensive document may be absent. Low-income and lower-middle-income countries may be more likely to have an NMP, because access to medicines is a challenging problem for politicians. In addition, WHO has focused on low- and middle-income countries since the 1980s. In high-income countries, access is generally assured, but complex issues related to rational use, medicines prices, reimbursement and industry concerns confront policy-makers. Although most wealthier high-income countries have managed without a comprehensive NMP, they sometimes encounter problems due to a lack of a single NMP [16]. In most high-income countries components of a medicines policy are often in place, but are rarely addressed in a single comprehensive NMP. In the USA, for example, matters tend to be managed separately by the Food and Drug Administration (regulation), the Federal Trade Commission (trading and competition issues), the National Institutes of Health (research) and by individual states (dispensing). Moreover, states and professional associations develop and implement many different aspects of medicines policy.

The policy development processes of the four case studies show that the development of an NMP is a complex process that is country specific. Lessons learnt from the four policy processes described demonstrate that an appropriate political window is needed for the policy to be passed (for South Africa and the former Yugoslav Republic of Macedonia, a major political event acted as a trigger for initiating the policy development). Furthermore, all stakeholders must be involved at an early stage, and NMPs offer a stable system to guarantee access, and rational use of medicines. During the policy development process, countries are forced to consider a transparent framework. This is so that stakeholders understand their roles and responsibilities and in order to define national priorities based on a balance between meeting patients' needs as well as ensuring effective use of the countries' resources and other incentives (e.g., maintaining a viable national industry as seen in the Australian case study).

Policy-making, however, does not stop with the official adoption of a policy but should create mechanisms for implementation and monitoring. Large differences exist between NMPs in terms of how the implementation is managed and funded. Unless there is a performance-related budget linked to the policy, good implementation (and monitoring) is unlikely to

occur. The policy process of Sri Lanka clearly showed the struggle to implement the policy due to generics use guidelines, which the local industry opposed. A clear policy should be reassessed from time to time and revised as appropriate – ideally every 4–5 years. Sufficient staff with appropriate technical and professional capabilities are required [26]. Indicators or performance standards are a tool to determine whether adequate progress is being achieved and to assess the effects of changes on medicines policy objectives. Independent consultants or external professionals may be invited to complement a national evaluation team. Resources needed for these revisions should be allocated from the start of the development process. The NMPs of the four case studies show that although all policies address the importance of monitoring and evaluation, indicators for monitoring or an actual monitoring framework are often lacking within the policy. The NMP of the former Yugoslav Republic of Macedonia is the only policy that provides indicators for monitoring. None of the policies included independent external evaluation of the implementation of the NMP.

Although an NMP may indeed exist in a Ministerial Declaration or even in the law, and there may have been an implementation plan, this does not always mean that the policy works effectively. Shortcomings in regulatory performance, lack of access to essential medicines and irrational use may exist despite the existence of a comprehensive policy document. An example of this shortcoming was seen in the failure to protect Australia (and other countries) from the COX-2 inhibitor regulatory failure [27]. Thus, a more complex NMP with major divisions of responsibilities between the central and state governments must include both the easily agreed-upon common interests but must also resolve the conflict areas in order to reach an agreed, national compromise involving all parties.

Although most pharmaceutical problems are best addressed at the national level through the use of NMPs, there could be cases where medicines policy issues are better managed at a regional or global level because some problems extend beyond the boundaries of national borders. There are many regional organizations working together to harmonize the regulatory aspects of NMPs and implementation of various aspects of the NMP, e.g. the European Medicines Agency centralized registration process. Regional groupings such as ASEAN and COMESA are collaborating to harmonize regulation and pricing information and coordinate NMPs across countries within their regions.

In conclusion, experiences in many countries have shown that pharmaceutical problems can best be addressed in a comprehensive policy, as piecemeal approaches can leave important problems unsolved. Case studies in four countries showed that the policy process is just as important as the policy document since the process must create a mechanism by which all stakeholders are brought together and a sense of collective ownership of the final policy may be achieved. This may be crucial in view of the challenges to implement and monitor the NMP.

## REFERENCES

1. Kanji N et al. Drugs policy in developing countries. London, Zed Books, 1992.
2. Another development in pharmaceuticals. Development Dialogue, 1985, Vol.2. Uppsala, Dag Hammarskjöld Foundation. Available at:  
<http://www.dhf.uu.se/publications/development-dialogue/another-development-in-pharmaceuticals/>
3. Frisher M et al. Trends in drug misuse recorded in primary care in the UK from 1998 to 2005. Journal of Public Health, 2009, 31(1):69–73.
4. Equitable access to essential medicines: a framework for collective action. WHO Policy Perspectives on Medicines No.8. Geneva, World Health Organization, 2004. Available at: <http://www.who.int/medicines/publications/policyperspectives/en/index.html>
5. Cameron A et al. Medicine prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. Lancet, 2009, 373(9659):240–249.
6. Mossialos E, Mrazek M. Data needed for developing and monitoring policies. Chapter 2 in: Dukes MNG, Haaijer-Ruskamp FM, de Joncheere CP, Rietveld AH, eds. Drugs and money. Prices, affordability and cost containment, 7th ed. Amsterdam, IOS Press, 2003. Available at:
7. 't Hoen EFM. The global politics of pharmaceutical monopoly power. Diemen, the Netherlands, AMB Publishers, 2009. Available at:  
[http://www.msfacecess.org/.../ACCESS\\_book\\_GlobalPolitics\\_tHoen\\_ENG\\_2](http://www.msfacecess.org/.../ACCESS_book_GlobalPolitics_tHoen_ENG_2)
8. Delivering on the Global Partnership for Achieving the Millennium Development Goals. In: MDG Gap Task Force Report 2008. New York, United Nations, 2008. Available at: <http://www.un.org/en/development/desa/news/policy/mdg-gap-2008.shtml>
9. Calabrese LH. Changing patterns of morbidity and mortality in HIV disease. Cleveland Clinical Journal of Medicine, 2001, 68(2):109–110.
10. How to develop and implement a national drug policy. WHO Policy Perspectives on Medicines, No.6. Geneva, World Health Organization, 2003. Available at:  
<http://www.who.int/medicines/publications/policyperspectives/en/index.html>
11. Hogerzeil HV. The concept of essential medicines: lessons for rich countries. BMJ, 2004. 329(7475):1169–1172. Doi 10.1136/bmj.329.7475.1169
12. Guidelines for developing national drug policies. Geneva, World Health Organization, 1988. Available at: [whqlibdoc.who.int/publications/1988/9241542306\\_eng.pdf](http://whqlibdoc.who.int/publications/1988/9241542306_eng.pdf)
13. The Rational Use of Drugs: Report of the Conference of Experts, Nairobi, 25–29 November 1985. Geneva, World Health Organization. 1987.
14. Division of International Health, I.O.M., Pharmaceuticals for Developing Countries. 1979, Washington: National Academy of Sciences.
15. World medicines situation. Geneva, World Health Organization, 2004. Available at: <http://apps.who.int/medicinedocs/en/d/Js6160e/#Js6160e>
16. Walley T, E.-S.A., Haycox A, Bagust A. An integrated national pharmaceutical policy for the United Kingdom? BMJ, 2000, 321(7275):1523–1526.



17. Laing R, Hogerzeil HV, Ross-Degnan D. Ten recommendations to improve use of medicines in developing countries. *Health Policy and Planning*, 2001, 16(1):13–20. doi: 10.1093/heapol/16.1.13
18. Securing Ugandans' Right to Essential Medicines (SURE) Program web site: <http://www.sure.ug>
19. Whitehead M, Dahlgren G, Evans T. Equity and health sector reforms: can low-income countries escape the medical poverty trap? *Lancet*, 2001, 358(9284):833–836.
20. Berman P. Health sector reform: making health development sustainable. *Health Policy*, 1995, 32(1–3):13–28.
21. Roughead EE. Australia's National Medicines Policy: Providing an integrated policy platform for pharmaceuticals. Adelaide, School of Pharmacy and Medical Sciences, University of South Australia, 2006. Available at: [http://www.allhealth.org/.../rougheadbackground\\_fnl\\_062006-356.doc](http://www.allhealth.org/.../rougheadbackground_fnl_062006-356.doc)
22. Commonwealth Department of Health and Aged Care, National Medicines Policy 2000. 1999, Canberra, Commonwealth Department of Health and Ageing: Canberra. 1–10.
23. Department of Health, National Drug Policy for South Africa. January 1996.
24. European Observatory on Health Care Systems, Health Care Systems in Transition; The former Yugoslav Republic of Macedonia. 2000.
25. World Bank, Former Yugoslav Republic of Macedonia; Transitional Support Strategy. 2001, World Bank.
26. Government of Zimbabwe, Departmental Mandate Department of Policy Implementation, Editor. 2004, Government of Zimbabwe.
27. Vitry A, Lexchin J, Mansfield PR. Is Australia's national medicines policy failing? The case of COX-2 inhibitors. *International Journal of Health Services*, 2007, 37(4):735–744.
28. Country Pharmaceutical Situation; Factbook on WHO Level 1 indicators 2007 Geneva, World Health Organization, 2010. Available at: <http://apps.who.int/medicinedocs/en/m/abstract/Js16874e/>
29. Mamdani M, W.G., Essential Drugs and Developing Countries, in EPC Publications, G. Walt, Editor. 1985, London School of Hygiene and Tropical Medicine: London.
30. National Medicinal Drug Policy for Sri Lanka. 2006: p. 1–6.
31. Dag Hammarskjöld Foundation, Making National Drug Policies a Development Priority; A Strategy Paper and Six Country Stories. Development Dialogue. Vol. 1. 1995, Uppsala: Dag Hammarskjöld Foundation.
32. Laing R et al. 25 years of the WHO essential medicines lists: progress and challenges. *Lancet*, 2003, 361(9370):1723–1729.
33. The World medicines situation. Geneva, World Health Organization, 2004.
34. Murray M. Australian National Drug Policies. Facilitating or Fragmenting Health? In: Development Dialogue: Making National Drug Policies a Development Priority, Dag Hammarskjöld Centre, Editor. 1995: Uppsala.
35. Quality Use Of Medicines: – A Decade Of Research, Development and Service Activity 1991–2001 Department of Health and Ageing, 2001, Australian Government,.

36. Developments in the South African Drug Action Programme. 2001 [cited 2011 April]; Available from:  
<http://apps.who.int/medicinedocs/en/d/Js2230e/2.html#Js2230e.2.1>
37. Comparative analysis of national drug policies. Geneva, World Health Organization, 1996.
38. Report on “Measuring Transparency in Medicines Registration, Promotion, Inspection, Selection, Procurement and Distribution in the former Yugoslav Republic of Macedonia”. 2009: Geneva.
39. Drug policy of the Republic of Macedonia. Skopje, Ministry of Health, 2001.
40. Petrova GI. Reform in the pharmaceutical sector in Balkan countries: critical moments. Sophia, Faculty of Pharmacy, Medical University-Sofia, 2002.

## **ABBREVIATIONS**

ANC	African National Congress
APAC	Australian Pharmaceutical Advisory Council
LMIC	Low- and middle-income countries
NMP	National medicines policy
PHARM	Pharmaceutical Health And Rational use of Medicines
WHO	World Health Organization

## APPENDIX: FULL DESCRIPTION OF NMP DEVELOPMENT POLICY PROCESSES

### Sri Lanka's national medicines policy process: promoting generics despite opposition

In 1959, Sri Lanka had a limited list of essential medicines and the use of generics was compulsory in public health care. The country's limited list of medicines was extended to the private sector in 1972, when the state became the sole importer of all pharmaceuticals through its trading arm, the State Pharmaceuticals Corporation, which also supplied the private market. The government's attempt to extend control to the private sector provoked controversy within the health services, private sector and industry, and particularly within the pharmaceutical industry. Cooperation with international organisations and non-governmental organisations was necessary to develop and implement a medicine policy that addressed the country's growing dependence on a number of multinational companies that monopolised the global trade in medicines [29]. In 1977, a new government came into power with neoliberal policies. The limited list of medicines was applied only to the public sector and the use of brand names and aggressive promotion of brands in the private sector returned. In 1991 an attempt was made to develop an NMP, but the attempt failed, as did a subsequent attempt in 1996. These efforts were not confined to the NMP alone; both in 1991 and 1996, a health task force was set up to recommend ways and means of restructuring the entire health service system. The documents they produced were accepted by the Ministry of Health, but were not endorsed by the government. Two important factors for this failure were the absence of participation by civil society in the two task forces and lack of health reform campaigns by civil society organizations.

In 2006 Sri Lanka succeeded in developing an NMP. In that year, the process was quite different from the previous attempts. Health Action International Asia – Pacific (HAIAP) and its network partner 'The Peoples Movement for Rights of Patients' (PMRP) began campaigning and lobbying for the formulation of an NMP and convened a number of national seminars, meetings and workshops on the need for an NMP. In 2005, two workshops facilitated by WHO/SEARO were held for all stakeholders, including representatives from the Ministry of Health, academia, health professionals and associations, trade unions, the private pharmaceutical industry and trade and civil society. HAIAP and PMRP took an active role and the NMP was accepted by consensus, forwarded to the Ministry of Health, approved by the cabinet, and passed by the Parliament in 2006.

The objectives of the current 2006 NMP for Sri Lanka for both public and private sectors are:

- 1) to ensure the availability and affordability of effective, safe and quality medicines relevant to health care needs of the people in a sustainable and equitable manner;
- 2) to promote the rational use of medicines by healthcare professionals and consumers;
- 3) to promote local manufacture of essential medicines [30, 31].

In the three years since the endorsement of the policy by the government, the Ministry of Health appointed a National Standing Committee (NSC) with 18 members representing all stakeholders and a mandate to implement the NMP. The NSC appointed a subcommittee to prepare a draft 'Act to Regulate Medicinal Drugs and Devices, Cosmetics, Nutraceutical and Functional Foods'. The draft was presented to the Ministry of Health in early 2008; however, to date, little has happened. There was strong lobbying by the private pharmaceutical industry and trade against the NMP even though they had participated as a stakeholder. Generic promotion and substitution are two components in the NMP that the industry vehemently opposed and they have successfully lobbied to delay the implementation of the NMP. The

PMRP has filed a fundamental rights petition in the supreme court of Sri Lanka asking the court to direct the Ministry of Health to implement the NMP. PMRP argues that any delay in the implementation causes a denial of the fundamental right of the people to access life saving medicines at affordable prices (Balasubramaniam K. Personal communication).

### Australia's national medicines policy process: balancing health and economic objectives

Australia, as a participant at the 39th World Health Assembly in 1986, contributed to the development of the strategy calling on governments to implement an NMP. The need for an NMP was further illustrated in the 'Health for All Australians' document issued jointly by all State and Federal Australian Health Ministers in 1988. It was recognised that there was considerable medicine-related morbidity and mortality in Australia, much of which was preventable. There were, however, very few strategies or structures in place to support improvements in medication use. Furthermore, the research effort and knowledge of successful strategies to improve medication use was also limited, both within Australia and internationally. In 1989, the Consumers Health Forum widely circulated a document 'Towards a National Drug Policy' which crystallised the concept of an integrated medicine policy, and the need for action on how medicines are used. In 1991, the Australian Government established the Australian Pharmaceutical Advisory Council (APAC) and the Pharmaceutical Health And Rational use of Medicines (PHARM) Committee. Through the PHARM Committee and a multisectoral participatory process, a policy for the improvement of medicines utilisation was formulated and adopted in 1992.

Eight years later, in 2000, the first NMP was formally approved by the Australian government [21, 22]. Under the auspices of the APAC, the policy integrated pre-existing elements within the new Quality Use of Medicines policy. The NMP was formulated in a partnership of government, health-care professional organizations, the pharmaceutical industry, distributors, health-care consumers and other stakeholders. APAC's formation in 1991 presented an opportunity for all interested parties to positively contribute on a multi-lateral and consensus basis to the development of the NMP. Australia, with the most recent policy from a developed country, is one of the few developed countries with a comprehensive NMP. The Australian policy's four major objectives are to ensure:

- 1) timely access to the medicines that Australians need, at a cost individuals and the community can afford; through the Therapeutic Goods Administration and through the Pharmaceutical and Repatriation Benefits Schemes;
- 2) that medicines meet appropriate standards of quality, safety and efficacy;
- 3) maintaining a responsible and viable national pharmaceutical industry; through the industry portfolio
- 4) quality use of medicines [22].

The overall policy goal of Australia's NMP is 'to meet medication and related health service needs, so that both optimal health outcomes and economic objectives are achieved'. To satisfy this goal, the policy framework addresses inherent tensions within the objectives of attaining affordable access to medicines, while maintaining a viable pharmaceutical industry, and achieving quality medicines and health systems.

Political pressure by national experts and non-governmental organizations was a major influence on the development of Australia's NMP [11, 32-34]. While much has been achieved in a decade, the development and marketing of new medicines, the use of new technologies

and sources of medicines information, the costs of medicines, and perhaps most importantly, the increased interest consumers have taken in their health care, present further issues for policy development and implementation [35].

NMPs often do not address problems in other countries or what has been experienced when safety issues were at stake. Although this is a matter that concerns many countries, Vitry and colleagues showed that policy stakeholders failed to protect Australia from the COX-2 (cyclo-oxygenase-2) inhibitor regulatory failure, although Australia's NMP has aims that include quality use of medicines. They found that regulators did not appropriately warn prescribers about potential cardiovascular risks. The Pharmaceutical Benefits Scheme (PBS) did not limit unjustified expenditures on COX-2 inhibitors and pharmaceutical companies ran intense and misleading promotional campaigns on COX-2 inhibitors without adequate controls. Independent medicines information was insufficient to counter the effects of the millions of dollars spent on advertising in Australia. Their conclusion was that the core elements of the NMP, in particular the medicine approval process, the post-marketing surveillance system, the control of medicine promotion, and the quality of independent medicine information, required major reappraisal to avoid similar disasters in the future [27]. Fundamental to this is the development and utilization of performance indicators to provide a set of objective criteria by which the implementation and effect of strategies for quality use of medicines can be monitored.

### **South Africa's national medicines policy process: focusing on equity and access**

In 1993, prior to the first democratic elections after apartheid, two separate draft national medicines policy documents were circulating. One was written by the government at the time, with input from academics at the University of Cape Town (a famous 'white' university), and another by the African National Congress (ANC). After a democratically elected ANC-led government was established in April 1994 under President Mandela, a national pharmaceutical policy committee was appointed by the Minister of Health with the following objectives:

- 1) develop a pricing plan for medicines to be used in South Africa in the public and private sectors;
- 2) develop a plan to ensure that medicines are tested and evaluated for effectiveness in the South African context of treatment using epidemiological approaches;
- 3) develop an Essential Medicines List to be used in the public sector and prepare treatment guidelines for health personnel;
- 4) develop specific strategies to increase the use of generic medicines in South Africa;
- 5) prepare a plan for effective procurement and distribution of medicines in South Africa, particularly in the rural areas;
- 6) investigate traditional medicines; and
- 7) rationalize the structure for pharmaceutical services [23].

The key challenge for the new Government was to develop the ANC draft policy into a truly national policy, and WHO was invited to participate from the start. In November 1994, the committee presented a first report of its findings to the Minister of Health, and a new discussion document was disseminated based on the recommendations. This draft was used as the basis for wide consultations and discussions with health-care providers, academia, other

ministries, provincial and district representatives, professional organizations, pharmaceutical industry and patients. The process took time and after one year the Minister of Health insisted that the process be completed and one policy document be prepared based on the three existing drafts. This high-level political support resulted in the final policy document, which was adapted by the Cabinet and published in 1996 [23].

The focus of the new policy was on equity. Under apartheid, the health care system was generous and highly effective, but only for the white population. Less than one quarter of the national health care budget was left for the remaining three quarters of the population along legally defined racial categories. The real challenge was to reduce overconsumption in the sophisticated parts of the system, e.g. the teaching hospitals, without losing their good quality and reputation, and make these facilities available for everyone, as well as using the savings to strengthen the rural services, which were the main source of care for the majority of the population. In all segments of the system, overuse and waste of medicines had to be reduced. Key tools, in this respect, were the development of national treatment guidelines and lists of essential medicines for all levels of health care. WHO contributed to the policy process by breaking the technical isolation that international sanctions had caused, and by supplying the government with information on practical experiences from successful countries, such as Zimbabwe and Australia. WHO also acted as an 'honest broker' to support the government to reach consensus among the various stakeholders, and helped develop and implement a five-year technical support programme – the South Africa Drug Action Programme (SADAP) [36].

The policy was largely successful, especially due to the political window of opportunity after the 1994 election and the high-level political support. Most of the national components of the policy (treatment guidelines, national medicine list, review of the national regulatory agency) were successfully implemented in the years that followed. However, the new medicine law, which included several progressive, but controversial, pricing policy components, such as generic substitution and parallel importation, was challenged in court by the research-based local and international pharmaceutical industry and delayed for three years. For various political reasons, some of the provinces remained skeptical and hesitated to become partners in the process. Yet, overall the policy was effective in making the government and the various stakeholders aware of the need for change, and in paving the way for the development of the pharmaceutical sector in the decade to follow. Several senior Government officials, now in high office, were involved in SADAP in their formative years. The policy document of 1996 remains a strong text which can serve as an example for other countries [10, 37].

### **The former Yugoslav Republic of Macedonia's national medicines policy process: joint effort with WHO involvement**

The former Yugoslav Republic of Macedonia became independent in 1991 following the break-up of Yugoslavia and remained at peace during the Yugoslav wars of the early 1990s. However, the country was seriously destabilized by the Kosovo War in 1999. Following the exodus of ethnic Albanians from Kosovo into Macedonia and Albania at the end of the Balkan civil conflict, broad support from WHO in the former Yugoslav Republic of Macedonia also created an opportunity to begin NMP formulation. Prior to the enactment of the Health Care Law in 1991 and the establishment of the Ministry of Health, the system of health care, although offering universal accessibility, was fragmented with little central governance or strategic overview [24, 25]. In February 2000, the Ministry of Health and



WHO Humanitarian Assistance Office in Skopje organized an initial meeting to discuss the implementation of an NMP and to present the main aspects of an NMP. In April 2000, a group of 14 experts were appointed by the Minister of Health to work on the development and formulation of the NMP strategy document. Five working groups were created to develop specific elements of the policy: legislation and regulations, medicine selection, medicine information, rational medicine use, supply and economic strategies, and human resource development. Several meetings facilitated by international consultants were held before the NMP adoption workshop. In May 2001, several drafts were combined to produce one comprehensive document which was officially endorsed by the former Yugoslav Republic of Macedonian Government in October 2001. While the Ministry and the Health Insurance Fund have continued to further develop and implement the medicines policy, a national working group completed an analysis of the pharmaceutical sector under the umbrella of the WHO Good Governance for Medicines Project [38]. In collaboration with the Ministry of Health, policy implementation will be supported in the future. The country's NMP includes a list of indicators for monitoring NMP implementation [39, 40].



# THE WORLD MEDICINES SITUATION 2011

## RESEARCH AND DEVELOPMENT

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Pharmaceutical research and development (R&D) has been critical to the reduction and control of disease but it faces unprecedented challenges. Many have questioned the sustainability of pharmaceutical R&D in the face of burgeoning clinical trial costs and a consistently high failure rate across all development phases.
- The mismatch between investments and the likely return from neglected diseases research is a key reason why commercial R&D has been unable to plug all pharmaceutical gaps or to invest in proportion to disease burden.
- The industry makes a growing contribution to neglected disease research, even if this remains a relatively small proportion of total research activity. Academic institutions appear to largely follow the same pattern as industry.
- Many initiatives have been launched to streamline the research, development and regulatory processes. These will help reduce the costs of innovation. Countries need, however, to strike the appropriate balance between developing new innovative capacity and making more of existing tools, including measures to improve public health through improved diagnosis and prevention. The choice will be different from country to country and depend on economic and technological circumstances.
- The need for cost efficiencies has driven a substantial number of clinical trials away from Europe and the USA and into other locations. This movement adds to an increasingly complex regulatory future where a variety of initiatives are emerging that will bring products to market faster, but in a way that requires greater regulatory oversight post-launch. Resources will be needed in all countries to adequately fund such scrutiny.

## 1.1

## BACKGROUND/INTRODUCTION

Since the large-scale introduction of antibiotics in the 1940s, pharmaceutical innovation has continued to contribute to significant improvements in the treatment and prevention of disease. However, in the minds of some commentators at least, that innovation has both failed to address the needs of the developing world and is now unsustainable given the rising costs of R&D.

In 1986, the Commission on Health Research for Development published a report indicating that only 5% of the global R&D budget (then estimated to be in the region of US\$ 30 billion) was spent on diseases that predominantly affect people in low-income countries, and it led the call for a change in emphasis (1). In 2004, the Priority Medicines for Europe and the World Project reported that concerns had been expressed "...both at the international level and in Europe, at the lack of research to fill pharmaceutical gaps", these being identified as "diseases of public health importance for which pharmaceutical treatments do not exist (lack of basic scientific knowledge or market failure) or are inadequate (lack of efficacy or safety concerns or because the delivery mechanism or formulation is not appropriate for the target patient group)" (2).

In 2006, the Global Health Diagnostics Forum concluded that the current diagnostic tools "are largely inadequate for meeting health needs in developing countries" and that commercial partners have "shown limited willingness to engage in the development of new diagnostics for the developing world" (3). In the same year, the Commission on Intellectual Property Rights, Innovation and Public Health reached a similar conclusion, claiming that "...current government policies and company strategies including incentive and funding mechanisms, both in developed and developing countries, have not generated sufficient biomedical innovation relevant to the needs of most developing countries..." and that "This tragic failure by all governments to address poverty and sickness in developing countries has become a worldwide subject of great concern." (4)

At the same time as industry and the public sector have been encouraged to increase their focus on diseases affecting lower-income countries, the average costs and complexity of developing pharmaceuticals successfully have escalated to an apparent all-time high. Estimates said to be appropriate to the industry's situation give a range of out-of-pocket expenditure of between US\$ 403–873 million, which when capitalized gives figures of US\$ 802–1778 million (5).

These estimates are acknowledged to be much higher than those presented by the TB Alliance (US\$115–240 million) (4). It is, however, clear that estimates vary dramatically according to the scope of the costs included in the various estimates (for example, drug target discovery or technology licences), the therapeutic area and thus the state of the science and probability of success, geographical focus and regulatory requirements. Individual companies also appear to operate with dramatically different costs. While this means that averages can be difficult to interpret, a review of 60 years of pharmaceutical innovation calculates that the costs of new molecular entities (NMEs) "...have been growing exponentially at an annual rate of 13.4% since the 1950s." (6)

Along with these rising costs it appears that the number of products in development has declined, or at best, in some clinical areas, remained relatively constant (7). This is echoed by the relatively stable number of U.S. Food and Drug Administration-approved NMEs and biological licence applications since at least 2005 (8). Overall, analysis suggests that new drug output from pharmaceutical companies over the last 60 years has "essentially been constant, and remains so despite the attempts to increase it." (6)

In 2004, Rawlins raised the question of whether the current medicine development process is still sustainable given the rocketing costs and the decline of pharmaceutical innovations in many clinical areas (9). This concern is as relevant today as it was then, if not more so. Paul et al. argue that given the relative probability of success of any molecule entering clinical development, the number of molecules entering clinical development every year must be 9 (or 11 if all small molecules) to yield a single NME launch per year. It is claimed that most large companies aim for 2–5 launches per year and therefore 18–45 Phase I starts would be required annually (5). Analysis of the top 50 companies in terms of the numbers of products in development at January 2009, as shown in IMS Health's R&D Focus database (7), reveals that only 10 achieved more than 9 Phase I starts, and 3 more than 18 in the whole of 2009 (see Table 1.1).

**TABLE 1.1 Phase 1 starts for the whole of 2009 for those companies with the most compounds in development in January 2009**

Number of Phase 1 starts in 2009	Number of companies
≤9	40
≤18	7
≤27	1
≤36	2
≤45	0

Source: IMS Health (7)

The unprecedented challenge to the industry's business model together with the failure of market-based incentives to develop sufficient medicines for the developing world has led to a wide range of different initiatives. Some are focused on the innovation process, such as the Innovative Medicines Initiative in Europe (10) or the Critical Path Initiative in the USA (11), and at the same time a significant discussion has started on the role of regulatory systems in bringing medicinal products to the patient in a timely, and, from a benefit-risk perspective, responsible fashion (12). Others, such as the Intergovernmental Working Group on Public Health, Innovation and Intellectual Property have begun a programme to ensure greater clarity of R&D needs within tropical diseases and childhood illnesses, greater innovative capacity within the developing world and sustainable financing of such R&D efforts (13,14). Still more, such as the initiatives and organizations established by the Bill and Melinda Gates Foundation, have provided new finance and resources to drive R&D in diseases that primarily affect the developing world.

This chapter looks at both the success and failure rates of pharmaceutical R&D, reviews the latest information on diagnostics and examines the focus of both public and private sector efforts in pharmaceutical R&D. The final section looks at these issues from the perspective of policy-makers and the challenges that they face.

## 1.2

## SITUATION ANALYSIS

### 1.2.1

### Pharmaceutical R&D: success rates

In order to explain current pharmaceutical gaps it is helpful to examine how individual molecules are developed into successful medicinal products. Although the classical phased model of drug development now no longer consistently reflects the true pharmaceutical



R&D process, the model can nevertheless provide useful insight into the susceptibility of drug development to failure.

Overall failure rates in pharmaceutical R&D are high. The most common reasons given for failure are lack of efficacy (25%), clinical safety concerns (12%) and toxicological findings in pre-clinical evaluation (20%) (10). Strategic reasons also play their part. In an analysis of Phase II failures from 2008–2010 for new medicines and major indications of existing medicines, strategic reasons were given as the reason for failure in 29% (25/87) of cases, although the figure for Phase III and submission failures between 2007–2010 was just 7% (6/83) with lack of efficacy being cited as the primary reason for failure (66%) (15,16). Some have argued, however, that the high rates of failure due to lack of efficacy may be due to commercial incentives that “could encourage poor decisions to pursue the development of compounds that only generate weak evidence of effectiveness at Phase II and have an even higher risk than typical of failure at Phase III.” (17)

A study of success and failure in pharmaceutical R&D since 1990 concluded that “...during the Nineties, the attrition rate of pharmaceutical R&D projects ...increased, especially in [Phases] II and III. In [Phase] II, the probability of success has dropped from almost ½ to less than ⅓ while projects that started phase III in year 2000 have a probability of success that is almost one half [that of] projects that entered phase III ten years before.” The same study also found that over this time period, projects that targeted lethal diseases, pathologies causing complications and organ damage or pathologies with a multifactorial or unknown aetiology generally had lower success rates (18).

In the analysis that follows, data held within IMS’ R&D Focus database were used to study the success or otherwise of R&D activities by both the public and private sectors. A total of 6666 compounds, including drug delivery systems, listed as being in active development in January 2000 were followed through to April 2009, a period of just over nine years. Compounds that were described as being suspended or discontinued were classified as failures as were compounds for which no activity had been recorded at any time in the three years prior to April 2009. Only 5440 compounds were able to be linked to the August 2009 database, with 1226 not found. A further 253 compounds were excluded on the basis that they had been redesignated as a “Technology” and for an additional 1450 compounds the actual phase of failure could not be determined. Marketed drugs being further investigated were placed in a separate category.

Only 11% of compounds in pre-clinical development in January 2000 progressed beyond that phase. For compounds in Phase II, only 34% progressed to Phase III or beyond and for those in Phase III, 52% progressed further (Table 1.2). The proportion of compounds that failed is shown in Table 1.3. Ninety-five percent of all those molecules in the pre-clinical phase had failed by August 2009 and the rate of failure was still 55% for Phase III. The progression rates in Phases I and II seen in this study are very similar to those derived from the 13 companies belonging to the Pharmaceutical Benchmarking Forums whereas those for pre-clinical and for Phase III are lower. Other sources thus appear to paint an even bleaker picture but if another analysis is to be believed, failure rates in R&D may actually be getting still higher – at least in Phase II (15).

One area that continues to show higher success rates, however, is further investigation of marketed drugs. In this analysis an additional 828 launched molecules were found to be being further investigated. The attrition rate for these was just 2% (including those products that were withdrawn from the market).

**TABLE 1.2 Progression rates by phase<sup>a</sup>**

2000 stage	Number proceeding to next phase or later by April 2009	%
Pre-clinical (n=1768)	201	11%
Clinicals and Phase I (n=367)	183	50%
Phase II (n=421)	144	34%
Phase III (n=214)	112	52%
Pre-registration & Registration (n=144)	102	71%

Source: IMS Health (7)

<sup>a</sup> Calculated as the percentage of molecules in a given phase in January 2000 progressing to at least the next phase of development by April 2009<sup>b</sup> Clinicals is a term used to mean in clinical development but of unknown phase**TABLE 1.3 Percentage of compounds failing by phase**

Phase (number of molecules at this stage in January 2000)	Number of compounds that had failed by August 2009	% failed
Pre-clinical (n=2518)	2380	95%
Clinicals (n=20)	16	80%
Phase I (n=573)	446	78%
Phase II (n=768)	594	77%
Phase III (n=298)	164	55%
Pre-registration (n=129)	59	46%
Registered (n=53)	18	34%

Source: IMS Health (7)

Biological compounds have been said to have a greater chance of success than traditional small molecules (Table 1.4). More recent data confirm this impression. In this study of 4275 drugs in development between 2003–2010, biologics were “almost twice as likely as new molecular entities (NMEs) to get approved for a lead indication (26% and 14% respectively).” Biologics constituted 31% of total NMEs launched in the USA between 1998 and 2003, and 32% in the period 2004 to 2008. In 2010, biologics constituted 25% (6/21) of the U.S. FDA’s Center for Drug Evaluation and Research approvals, these figures excluding the six additional biologics approved by the Center for Biologics Evaluation and Research.

**TABLE 1.4 Comparison of progression and success rates of biotech and conventional pharmaceuticals**

Transition rates	Biotech <sup>a</sup>	Pharmaceuticals <sup>b</sup>
Phase I–II	83.7%	71.0%
Phase II–III	56.3%	44.2%
Phase III – Approval	64.2%	68.5%
Overall success	30.2%	21.5%

Source: DiMasia JA, Grabowski HG (22)

<sup>a</sup> 522 compounds in clinical development between 1990–2003.<sup>b</sup> 534 compounds in clinical development between 1983–1994.

### 1.2.2

### Pharmaceutical R&D: in relation to disease burden

In an ideal world, spending and investment in pharmaceutical R&D would be driven by medical need, and there would be a direct correlation between the burden of diseases and conditions and R&D spending on medical products for those diseases and conditions. The reality is, however, far from this notional ideal. In 2002, the Global Forum for Health Research reported that only 10% of R&D spending is directed at the health problems that are responsible for 90% of the global disease burden. A disparity between medical need and the make up of pharmaceutical R&D investment in terms of the type of compounds in development suggests one of, or a mix of, three things – adequate treatments are already available; current understanding of the disease or science does not allow new medicines to be developed; or that there is no commercial or other incentive to work on new medicines for that disease.

Using information from the IMS Health's R&D Focus database it is possible to compare the number of disability-adjusted life years (DALYs) lost to a given disease with the number of compounds in development for that disease. In this particular analysis, the number of DALYs lost has been broken down by country income category (high, middle and low), it being assumed that diseases that affect high-income countries are more likely to be attractive targets for R&D investments than are those that only affect low-income countries.

According to IMS Health, in April 2009 there were 6491 compounds in active development (excluding those defined as drug delivery systems or reformulations). The IMS database holds information on the medical indications for which the compounds are being developed, with many compounds being investigated for more than one indication. The database sometimes uses terms that cannot be easily linked to the International Classification of Diseases (ICD), for example "pain" or "inflammation". However in 8487 instances, it was possible to link the indication listed in the database to an ICD code, which in turn allows links to be made to WHO's published DALY rates (23). In order to compare the distribution of DALYs lost and that of indications, both sets of information were converted to percentages. The conversion was carried out within each ICD level. Hence, the percentage contribution of noncommunicable conditions to disease burden was calculated using the total number of DALYs as the denominator, whereas the percentage contribution of endocrine disorders was calculated using the total number of DALYs attributable to noncommunicable conditions only as the denominator.

The results of the analysis indicate that the vast majority of products currently being investigated are for noncommunicable diseases and conditions. Noncommunicable conditions constitute 85% of all medical conditions being investigated.

Among the noncommunicable diseases, malignant neoplasms and neuropsychiatric disorders have the greatest impact in terms of DALYs lost across all country income categories. R&D activity also focuses in these areas (Table 1.5) although the focus on malignant neoplasms is almost twice the burden of the disease (7–17% of lost DALYs versus 35% of all indications cited). More information on the types of work being done in malignant neoplasms and neuropsychiatric disorders is described below:

- **Malignant neoplasms:** Only 75% of all the compounds in development for the treatment of malignant neoplasm could be linked to a lower level within the ICD classification. Within this subset, however, it appears that little work is being carried out on compounds for mouth and oropharynx cancers or cancers of the cervix and uterus, despite their rather significant contribution to DALYs lost. In contrast skin

TABLE 1.5

**Noncommunicable disease indication distribution in active R&D programmes**

	DALYs			No. conditions being investigated
	High-income %	Middle-income %	Low-income %	All phases %
<b>Non communicable conditions</b>				
Malignant neoplasm	17%	12%	7%	35%
Other neoplasms	0%	0%	0%	5%
Diabetes mellitus	3%	3%	2%	4%
Endocrine disorders	2%	1%	1%	7%
Neuropsychiatric disorders	30%	27%	27%	16%
Sense organ disorders	9%	12%	13%	3%
Cardiovascular diseases	17%	21%	21%	8%
Respiratory diseases	7%	8%	8%	5%
Digestive diseases	5%	5%	7%	4%
Diseases of the genitourinary system	1%	2%	2%	2%
Skin diseases	0%	1%	1%	3%
Musculoskeletal diseases	5%	5%	3%	7%
Congenital abnormalities	2%	2%	6%	1%
Oral diseases	1%	1%	1%	0%

Source: IMS Health (7)

cancer represents a relatively small proportion of the disease burden (2–4%) but takes a relatively high proportion of indications cited (9%).

- **Neuropsychiatric disorders:** IMS data suggest that development activity is focused on Alzheimer and other dementias, schizophrenia, Parkinson disease and multiple sclerosis. Only schizophrenia has a significant impact in lower-income countries. In contrast unipolar depressive disorders contribute a third of all DALYs lost to neuropsychiatric disorders across all income categories (32–36%) but there is currently little activity in this area (8%), probably a reflection of the state of current science and the availability of existing medicines.

Within the group of infectious and parasitic diseases, the most striking disparity between need and investment is in diarrhoeal diseases. There appears to be very little current development activity in this area (see Table 1.6). Part of the apparent mismatch may be a consequence of early work on diarrhoeal diseases being categorized as bacterial infection, and so not being classified appropriately. The relatively high focus on HIV and hepatitis C is almost certainly influenced by the burden of these diseases in high-income countries. That malaria and TB also feature relatively highly should also not be a surprise given the recent not-for-profit sector's work on these conditions.

TABLE 1.6

**Infectious and parasitic disease indication distribution in active R&D programmes**

	DALYs			No. conditions being investigated
	High-income %	Middle-income %	Low-income %	All phases %
<b>Infectious and parasitic diseases</b>				
Tuberculosis	7%	20%	9%	3%
STDs excluding HIV	8%	4%	3%	1%
HIV/AIDS	23%	26%	18%	17%
Diarrhoeal diseases	16%	23%	25%	1%
Childhood-cluster diseases	2%	4%	11%	3%
Meningitis	4%	4%	4%	1%
Hepatitis B	3%	1%	1%	3%
Hepatitis C	6%	1%	0%	10%
Malaria	0%	2%	14%	3%
Tropical-cluster diseases	1%	2%	4%	1%
Leprosy	0%	0%	0%	0%
Dengue	0%	0%	0%	1%
Japanese encephalitis	0%	0%	0%	0%
Trachoma	0%	1%	0%	0%
Intestinal nematode infections	1%	2%	1%	0%
Other infectious diseases	38%	13%	13%	56%

Source: IMS Health (7)

**1.2.3****Pharmaceutical R&D: in relation to “pharmaceutical gaps”**

WHO's Priority Medicines for Europe and the World Project identified pharmaceutical diseases and conditions for which drug therapies are still lacking or are inadequate (and which it has defined as “pharmaceutical gaps”) (2). Although these gaps affect all citizens of the world, in drawing up its list of priority areas for health research, the Priority Medicines Project placed emphasis on those research needs that were also relevant for countries in economic transition. In all, 16 areas were identified, some rather more specific than others. In the case of cancer, for example, the requirement is for greater R&D investment overall (i.e. across all cancer types) whereas in the case of depression, the perceived need is for treatments for young people in particular.

In Table 1.7 below, R&D activity as of August 2009 is summarized in volumetric terms for a number of these pharmaceutical gaps – those that can be defined using the ICD system. Treatments for depression in young people cannot, for example, be distinguished in this way. In all of the cases investigated some R&D activity was detected but its quality and likely success are unknown. Public-private partnerships are involved in about half of the compounds in development for neglected disease and a quarter of those for malaria and TB

The level of antibacterial R&D activity using different sources has been the subject of a detailed review, conducted jointly by the European Centre for Disease Prevention and Control (ECDC) and the European Medicines Agency. The authors of the review confined their analysis to products at later stages of development (Phase II or later). The findings published in a Joint Technical Report (24) revealed that of 66 new active agents in

TABLE 1.7

**R&D activity in areas identified as needing research, as of August 2009**

	TREATMENT					
	PHASE					
	Discovery	Preclinical	Phase 1	Phase II	Phase III	Pre-registration and Registration
Smoking cessation	1	4				
Alcoholic liver disease	1	4		1		
COPD	12	28	26	37	3	3
Osteoarthritis	5	7	4	11	2	1
Alzheimers	44	99	40	42	8	
ND – Trypanosomiasis	5	1	1			
ND – Chagas	6		1			
ND – Leishmaniasis	4	3	1		1	
Malaria (also excluding FDC)	11	8	2	4	2	
TB	13	10	2	3		1
HIV – FDC		1	2	2		
HIV – Other	46	51	23	35	9	
Stroke (neuroprotectant)	3	11	6	2	3	
Stroke (other)	5	23	8	9	6	
Anti-diabetics	71	111	92	74	22	8
Anti-diabetics (long acting)		5		4		1
CV – FDC		6	2	3	11	4
Influenza	9	26	1	3	2	
Antibacterial	49	154	34	27	10	5
Antibacterial (MRSA)	2	45	12	13	2	4
Antibacterial (New <sup>a</sup> )	6	19	4	4		2

<sup>a</sup> New defined as any record of the following terms: DNA topoisomerase inhibitor, DNA gyrase inhibitor, dihydrofolate reductase inhibitor and monoclonal antibody

	VACCINE					
	PHASE					
	Discovery	Preclinical	Phase 1	Phase II	Phase III	Pre-registration and Registration
Smoking cessation				3		
ND – Trypanosomiasis		1				
ND – Chagas	1					
ND – Leishmaniasis		3	1			
Malaria	4	9	6	3		
TB	3	8	2	3		
HIV	9	22	12	16	1	
Influenza	10	38	22	8	5	11

Source: IMS Health (7)



development as of March 2008, only 27 were considered to have either a new target or a new mechanism of action, so potentially offering a benefit over existing antibiotics. Of these 27, 15 could be systemically administered and of these 15, 8 were active against Gram-negative bacteria, and 7 against Gram-positive bacteria. Of the 8 active against Gram-negative bacteria, only 4 had activity based on actual data, and of these, none acted via new mechanisms of action. The authors concluded that “...the lack of systemically administered agents with activity against Gram-negative bacteria displaying new mechanisms of action found in this study is particularly worrisome, and more so when the high attrition rates for agents in early stages of clinical development is taken into consideration. In fact it is unclear if any of these identified agents will ever reach the market, and if they do, they may be indicated for use in a very limited range of infections.... Therefore, a European and global strategy to address this serious problem is urgently needed, and measures that spur new antibacterial drug development need to be put in place.”

A similar conclusion was reached in a paper commissioned by the European Union. In their final report the authors also suggest a series of push, pull and hybrid finance mechanisms to stimulate innovation in antibiotic development (25). More recently, a WHO Expert Group critically reviewed about 45 such models as part of a wider effort to evaluate options for R&D financing of Type II and III disease research. (Type I diseases are those that have similar prevalence within both developed and developing countries, such as heart disease, asthma, diabetes or cancer. Type II diseases are those that have a greater prevalence in developing countries, e.g., AIDS or TB, and Type III are those that only afflict the very poor, such as river blindness, malaria, or Chagas disease) (26). A new indirect tax, voluntary business and consumer contributions and/or new donor funds emerged as being the best hope of providing sustainable and substantial funds for research in the future (14).

In addition to identifying priority areas for new drug development, the 2004 Priority Medicines for Europe and the World Project also highlighted the urgent need for better diagnostic tools, especially for TB, Alzheimer disease, osteoarthritis and chronic obstructive pulmonary disease (COPD). As shown in Table 1.8, the potential benefits of improved diagnostic tools in the developing world are immense. Their potential in the developed world is no less significant.

Promising developments in the field of diagnostic R&D include the use of rapid diagnostic tests (RDTs) to identify targeted pathogens; this would greatly improve the use of antibiotics as well as reduce the cost and time needed to conduct clinical trials.” (21) Genomics-based molecular diagnostics that can be linked to therapeutic products have also been deemed to be critical to targeted drug developments of the future.

Analysts report that up to August 2009 there had been 28 drug-diagnostic co-development projects – 17 are in the oncology area and the remainder covering cardiovascular, central nervous system, autoimmune disease, infectious diseases, HIV and growth factors (28).

Despite these promising developments, in lower- and middle-income countries at least, the gap between the need for new diagnostic tools and delivery remains large. The workshop held by the Academy of Medical Sciences at the end of 2008 concluded that “...efforts to address the burden of infectious diseases in LMIC [low- and middle-income countries] have largely focused on new therapeutic interventions, whilst the importance of diagnostics has been comparatively neglected. As a result, current diagnostic methodologies are often inappropriate to local needs and contexts of LMIC...Importantly, there has been a focus on developing RDTs for infectious diseases at the expense of tests for noncommunicable diseases and this imbalance will need to be addressed in the coming years.” (29)

TABLE 1.8

**The potential of diagnostic tool R&D in infectious diseases**

Infectious disease area	Clinical decision points	Potential DALYs or lives saved per year
ALRI	Identification of children <5 years with bacterial ALRI among those presenting with ALRI for antibiotic treatment or in severe cases for hospitalization	A new diagnostic test for bacterial ALRI with at least 95% sensitivity and 85% specificity accompanied by greater treatment access and minimal laboratory infrastructure requirements could save >405 000 adjusted lives. A new diagnostic for severe ALRI would also bring significant benefit provided access to effective hospital care is increased globally.
HIV/AIDS	Identification of HIV infection in infants aged <12 months	A test with 90% sensitivity, 90% specificity and minimal laboratory infrastructure requirements could save ~180 000 DALYs if 5% of the targeted population had access to ART, and ~2.5 million DALYs could be saved if 100% of the population has access to ART.
Diarrhoeal diseases	The detection of <i>G. lamblia</i> , <i>C. parvum</i> and enteroaggregative <i>E. coli</i> to reduce diarrhoea-related stunting in children	A test with 90% sensitivity, 90% specificity and minimal laboratory infrastructure requirements for each of the pathogens <i>G. lamblia</i> , <i>C. parvum</i> and enteroaggregative <i>E. coli</i> could reduce the prevalence of stunting by 12.5% and save 2.8 million DALYs. The result assumes that the cost of treatment is US\$ 6 and the positive externalities associated with treatment are equal to 0.25 DALYs.
Malaria	Diagnosis in febrile children aged <5 years in sub-Saharan Africa	A test with 95% sensitivity, 95% specificity and minimal laboratory infrastructure requirements could save ~1.8 million adjusted lives and prevent 996 million unnecessary treatments a year. A new test with no infrastructure requirements and 90% sensitivity and specificity would save ~2.2 million adjusted lives and prevent ~447 million unnecessary treatments per year.
TB	Diagnosis of active infections in symptomatic individuals with or without concomitant HIV infection	A rapid diagnostic requiring no laboratory infrastructure, with at least 85% sensitivity for smear-positive and smear-negative cases could save ~400 000 lives annually.
Sexually transmitted infections	Syphilis screening of antenatal women	A new diagnostic test that is at least 86% sensitive, 72% specific, requires minimal laboratory infrastructure and has either a 100% rate of return for test results or a 100% treatment rate could save >138 000 adjusted lives and avert > 148 000 still births. A similar test requiring no laboratory infrastructure could save >201 000 adjusted lives and avert 215 000 stillbirths.
Sexually transmitted infections	Gonorrhoea and chlamydia screening and diagnosis in female CSWs	A new diagnostic with 86% sensitivity and 90% specificity for both gonorrhoea and chlamydia that requires minimal laboratory infrastructure could save ~3 million DALYs, avert >12 million incidents of gonorrhoea and chlamydia infections, and prevent >161 000 HIV infections among female CSWs in sub-Saharan Africa, China and south-east Asia. A test that requires no laboratory infrastructure could save ~4 million DALYs, avert >16.5 million incidents of gonorrhoea and chlamydia infections, and prevent <212 000 HIV infections.

AIDS – acquired immunodeficiency syndrome, ALRI – acute lower respiratory infection, ARI – acute respiratory infection, *C. parvum* – *Cryptosporidium parvum*, CSW – commercial sex worker, DALYs – disability adjusted life years, *E. coli* – *Escherichia coli*, *G. lamblia*, *Giardia lamblia*, HIV – human immunodeficiency virus, TB – tuberculosis

Source: Urdea M et al. (27)

### 1.2.4

#### Driving pharmaceutical R&D: the changing roles of the public and not-for-profit sectors

Several groups and organizations, among them the European Union, philanthropic foundations such as the Bill and Melinda Gates Foundation, the National Institutes for Health in the USA and other organizations have established mechanisms to support public sector research into diseases where there is little or no commercial incentive.

The IMS R&D Focus database contains information about which organizations are responsible for the development of which compound. These data have been used to analyse the level of academic and/or not-for-profit involvement in pharmaceutical R &D; the results are shown in Tables 1.10 and 1.11. Compounds in active development that are the responsibility of academic organizations alone are flagged as such in the database and scrutiny of the other compounds allowed the identification of those involving academic or not-for-profit organizations as a patentee, licensor or developer. Spin-off companies established by universities are classified as for-profit organizations.

According to IMS Health, a total of 6491 molecules were in active development in August 2009. Academic or not-for-profit organizations alone were responsible for 608 compounds. Joint ventures between academic or not-for-profit organizations and industry were responsible for an additional 358 compounds. An analysis of drugs approved by the FDA between 1998 and 2007 (as opposed to an analysis of drugs in development) confirms this impression. In this analysis the authors concluded that the university sector could be attributed with 24% of the total output (30). We see a similar picture, but in reverse in relation to research into neglected disease. In the latest G-Finder Survey covering 2009, the proportion made up by private pharmaceutical company funding of total funding for neglected disease R&D had increased by 12% over 2007, now constituting 13% of total funding (31).

Analysis of the IMS database shows that there is no apparent difference between the overall patterns seen in R&D activity as described earlier and that attributed to academic or not-for-profit organizations within the database. Tables 1.10 and 1.11 serve to illustrate this below. There is a similar preponderance towards noncommunicable conditions and within these conditions, malignant neoplasms and neuropsychiatric conditions predominate.

The similarity between the academic community and industry is not surprising. Since the 1980s in the USA, universities were permitted to take out patents based on inventions arising from publicly funded research and as the Commission on Intellectual Property Rights, Innovation and Public Health concluded in 2006, "The great majority of health research funded by the public sector, takes place in developed countries, and its priorities principally reflect their own disease burden, resource position and social and economic circumstances." (2) If, however, the public sector has moved towards collaboration with the private sector, there has also been a movement in the other direction. The challenges to the industry's current R&D business model have driven contacts between industry and academia with even now further moves towards "open innovation" being mooted (32,33), this being where new product ideas from outside the organization are welcomed and where intellectual property is permitted to be used by others.

### 1.2.4

#### The location of pharmaceutical development

The percentage of R&D revenues being spent by PhMRA member companies outside of the USA has remained relatively constant since 1980 (34). There have, however, been dramatic changes in the location of clinical research.

TABLE 1.9

**High-level distribution of indications being investigated, by academic or not-for-profit involvement, as of August 2009 (n=966 molecules, 1454 indications)**

	% All <sup>a</sup>	% Academic <sup>b</sup> only	% Any academic in JV	% Any academic involvement (alone or JV):
1. Communicable maternal perinatal and nutritional conditions	15%	17%	15%	16%
2. Noncommunicable conditions	85%	83%	84%	83%

Source: IMS Health

<sup>a</sup> % All = commercial alone, academic alone, academic + commercial<sup>b</sup> Academic includes Not for Profit

TABLE 1.10

**Noncommunicable conditions, by academic or not-for-profit involvement, as of August 2009 (n=966 molecules, 1454 indications)**

	% All <sup>a</sup>	% Academic <sup>b</sup> only	% Any academic in JV	% Any academic involvement (alone or JV):
<b>Noncommunicable conditions</b>				
Malignant neoplasm	35%	45%	55%	50%
Other neoplasms	5%	5%	5%	5%
Diabetes mellitus	4%	3%	3%	3%
Endocrine disorders	7%	5%	5%	5%
Neuropsychiatric disorders	16%	15%	11%	13%
Sense organ disorders	3%	3%	2%	2%
Cardiovascular diseases	8%	7%	5%	6%
Respiratory diseases	5%	3%	1%	3%
Digestive diseases	4%	2%	3%	2%
Diseases of the genitourinary system	2%	1%	1%	1%
Skin diseases	3%	2%	2%	2%
Musculoskeletal diseases	7%	7%	5%	6%
Congenital abnormalities	1%	1%	1%	1%
Oral diseases	0%	0%	0%	0%

Source: IMS Health

<sup>a</sup> % All = commercial alone, academic alone, academic + commercial<sup>b</sup> Academic includes Not for Profit

The European Medicines Agency found that around a quarter of all patients recruited for pivotal trials filed between 2005 and 2008 were enrolled in Latin America, Asia, the Commonwealth of Independent States and Africa (35). In a global ranking of overall country effectiveness for clinical trials, based on an analysis of patient pool, cost efficiency, regulatory conditions, relevant experience, infrastructure and environment, the UK and the Czech Republic rank sixth, with the USA, China, India, Russia and Brazil all featuring higher in the league table (36).

The increasing involvement of lower- and middle-income countries in pharmaceutical R&D has not necessarily led to a greater focus in these countries on the diseases that predominantly affect them. One study found that in the five years between 1997/1998 and 2003/2004, for example, while overall investment in pharmaceutical R&D surged in India, “it has become less targeted towards the health needs of the developing world.” The authors of the study proposed that the incentives provided by local patents in their own markets were more than outweighed by the “push towards global products created by growing numbers of research relationships with multinational firms.” (37)

The quality (good clinical practice, methodology and ethics) of trials should, of course, be independent of wherever the study is conducted. It is clear that the trend of changing locations of clinical development will continue to pose challenging questions for national policy-makers.

### 1.3

### FUTURE CHALLENGES AND ISSUES

Civil society has questioned the pricing and marketing practices of industry and its focus on blockbuster markets, often for valid reasons. Industry has responded, not perhaps sufficiently in the eyes of some, with an increasing number of compounds for neglected diseases, and particular initiatives, such as patent pools and technology transfers (36,38). Public sector funders have also responded, for example, by allocating an increasing amount of funds to tropical diseases (4).

In spite of these measures it remains true that R&D in both the public and private sectors has failed to generate sufficient innovations to meet the pharmaceutical demands of the developing world. The challenge faced by the industry’s R&D business model, described above, in terms of productivity demands that new initiatives be developed. With productivity stable or declining, escalating costs are making commercial and public sector developments increasingly unaffordable for many more diseases affecting both low- and middle-income countries.

In 2006, the Commission on Intellectual Property Rights, Innovation and Public Health concluded that... “In the longer term, the development of innovative capacity for health research in developing countries will be the most important determinant of their ability to address their own need for appropriate health-care technologies.” This led to a “global strategy and plan of action.” The plan has eight elements:

- an assessment of health needs in developing countries and identification of R&D priorities;
- promotion of R&D on diseases which substantially or overwhelmingly affect people in developing countries, and also diseases which affect rich and poor countries with large numbers of vulnerable populations in both;
- exploration and implementation, where appropriate, of possible incentive schemes for R&D;
- improvement of R&D capacity in developing countries;
- improvement, promotion and acceleration of technology transfer;
- improvement of access to all health commodities by effectively overcoming barriers to access;
- sustainable financing for R&D in developing countries; and

- develop mechanisms to monitor and evaluate the implementation of the strategy and plan of action, including reporting systems (6).

As this, and other initiatives to streamline and accelerate the drug development process, take hold, care needs to be taken to exploit the opportunities in ways that are appropriate to the economic and social circumstances and technological capabilities of each country (4). Only relatively few low-income countries have the capability of developing a genuinely innovative capacity (4,39). Other countries may find it more appropriate to focus on other areas, such as public health and the incremental development of existing technologies to resource-poor settings. This latter point may be particularly relevant to the application of medicines used to treat the so-called Type 1 diseases, diseases that occur commonly in both rich and poor countries. Much is talked about neglected diseases and Type III disease, diseases that are overwhelmingly or exclusively incident in the developing countries, but there remain considerable hurdles in applying technologies designed for the developed world, particularly in the area of Type 1 disease.

As innovative capacity grows, care also needs to be taken to ensure that the attractions of developed world markets do not swamp the needs of the developing world. This is clearly a difficult area but we may be able to take some comfort from both recently announced technology transfer agreements (40) and the recent proposals as to how universities in the developed world can ensure minimum levels of research into global health issues (41). The agreement between GlaxoSmithKline and the State-owned Oswaldo Cruz Foundation in Brazil gives access to one of the most complex vaccine technologies in the world and at a discounted price. The not-for-profit venture between Merck and the Wellcome Trust in India is built on a business model that once a vaccine has been developed to proof of concept stage, an Indian biotechnology firm will take over its further development, on the understanding that the vaccine will be sold at an affordable price. In the USA, six universities, the National Institutes for Health and the United States Centers for Disease Control have recently announced a “plan to facilitate access to university innovations with a clause ensuring global access to low-cost products by manufacturers for treatment of infectious diseases.” To ensure that careers in global health research are attractive there is also a call that neglected disease research should be included in a set of new metrics for faculty appointments.

The fact that lower- and middle-income countries are taking an increasingly large share of clinical trials also needs to be taken into account. It is important that policy-makers ensure that such trials are, and can be seen to be, carried out according to the appropriate scientific and ethical standards. Some anecdotal reports relating to the conduct of some clinical trials make uncomfortable reading (42,43). It is clear that if low- and middle-income countries are to derive long-term benefit from the globalization of R&D, sufficient resources will need to be put in place by both the countries themselves and the regulators in the developed world. Several initiatives are already under way. They include the European and Developing Countries Clinical Trials Partnership, the Supporting Strategic Initiatives for Developing Capacity in Ethical Review, the Developing Country Vaccine Regulatory Network and the guidance issued by the European Medicines Agency for the acceptance of clinical trials conducted in third countries (29,44,45). Hopefully countries in the developing world can build on these.



## REFERENCES

1. Commission on Health Research for Development. *Health research. Essential link to equity in development*. New York, Oxford University Press, 1990.
2. Kaplan W, Laing R. *Priority medicines for Europe and the world*. Geneva, World Health Organization, 2004. Available at:  
<http://archives.who.int/prioritymeds/report/index.htm>
3. Hay Burgess D, Wasserman J, Dahl CA. Global health diagnostics in determining the global health impact of improved diagnostic technologies for the developing world, *Nature* S1, 2006:1-2.
4. Commission on Intellectual Property Rights, Innovation and Public Health, 2006. Web site:  
<http://www.who.int/intellectualproperty/en>
5. Paul SM et al. How to improve R&D productivity: the pharmaceutical industry's grand challenge. *Nature Reviews, Drug Discovery*, 2011, 10:328-329. Available at:  
<http://www.nature.com/nrd/journal/v9/n3/full/nrd3078.html>doi:10.1038/nrd3078
6. Munos B. Lessons from 60 years of pharmaceutical innovation. *Nature Reviews, Drug Discovery*, 2009, 8:959-968.
7. Analysis of products in development 2006-2008. *R&D Focus, IMS Health*.
8. Hughes B. News and analysis. 2009 FDA drug approvals. *Nature Reviews, Drug Discovery*, 2010, 9:89-92. Available at:  
<http://www.nature.com/nrd/journal/v9/n2/full/nrd3101.html>
9. Rawlins MD. Cutting the costs of drug development. *Nature Reviews, Drug Discovery*, 2004, 3:360-364
10. Geursen RG, ed. *The Innovative Medicines Initiative*. Brussels, European Federation of Pharmaceutical Industries and Associations, 2007. Available at:  
[http://www.medicinesformankind.eu/upload/pdf/IMI\\_EN.pdf](http://www.medicinesformankind.eu/upload/pdf/IMI_EN.pdf)
11. *Critical Path Initiative*. U.S. Food and Drug Administration. Available at:  
<http://www.fda.gov/ScienceResearch/SpecialTopics/CriticalPathInitiative/ucm077015.htm>
12. Eichler H-G et al. Balancing early market access to new drugs with the need for benefit/risk data: a mounting dilemma. *Nature Reviews, Drug Discovery*, 2008, 7:818-826.
13. The Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property, World Health Organization. Web site:  
[http://www.who.int/phi/implementation/phi\\_globstat\\_action/en/index.html](http://www.who.int/phi/implementation/phi_globstat_action/en/index.html)
14. Report of the World Health Organization Expert Working Group on Research and Development Financing, January 2010. Available at:  
[http://www.who.int/phi/documents/ewg\\_report/en/index.html](http://www.who.int/phi/documents/ewg_report/en/index.html)
15. Trial watch: Phase II failures: 2008-10. *Nature Reviews, Drug Discovery*, 2011,10:1.
16. News and analysis. Trial watch: Phase III and submission failures: 2007-10. *Nature Reviews, Drug Discovery*, 2011, 10:87.
17. A stronger role for science. Editorial. *Nature Reviews, Drug Discovery*, 2011, 10:159. doi:10.1038/nrd3387.

18. Magazzini L et al. *Who's doing what in pharmaceutical R&D?* Paper prepared for presentation at the Comparative Analysis of Enterprise Data (CAED) Conference, Budapest, 22–24 May 2008. Available at:  
[http://www.dime-eu.org/files/active/0/Jena-2007-10\\_MagazziniPammolliRiccaboni.pdf](http://www.dime-eu.org/files/active/0/Jena-2007-10_MagazziniPammolliRiccaboni.pdf)
19. Hughes B. Large drugs outdo small. *Nature Biotechnology*, 2011, 29:296.
20. Trusheim MR, Aitken ML, Berndt ER. Characterizing markets for biopharmaceutical innovations: Do biologics differ from small molecules? *Forum for Health Economics & Policy*, 2010, 13(1), Article 4.
21. Mullard A. 2010 FDA drug approvals. *Nature Reviews, Drug Discovery*, 2011, 10:82–85. Available at:  
<http://www.nature.com/nrd/journal/v10/n2/full/nrd3370.html>
22. DiMasia JA, Grabowski HG. The cost of biopharmaceutical R&D: Is biotech different? *Managerial and Decision Economics*, 2007, 28:469–479.
23. *The global burden of disease: 2004 update*. Geneva, World Health Organization, 2008. Available at:  
<http://www.who.int/evidence/bod>
24. ECDC/EMA Joint Technical Report *The bacterial challenge: time to react*. Available at:  
[http://www.ecdc.europa.eu/en/publications/Publications/0909\\_TER\\_The\\_Bacterial\\_Challenge\\_Time\\_to\\_React.pdf](http://www.ecdc.europa.eu/en/publications/Publications/0909_TER_The_Bacterial_Challenge_Time_to_React.pdf)
25. Mossialos E et al. *Policies and incentives for promoting innovation in antibiotic research*. Geneva, World Health Organization on behalf of the European Observatory on Health Systems and Policies, 2010. Available at:  
[http://www.se2009.eu/polopoly\\_fs/1.16814!menu/standard/file/LSE-ABI%20F-Final.pdf](http://www.se2009.eu/polopoly_fs/1.16814!menu/standard/file/LSE-ABI%20F-Final.pdf)
26. Written Statement of CMC Churches' Action for Health at the WHO Intergovernmental Working Group on Public Health, Innovation and Intellectual Property. Appendix. 5 December 2006. Available at:  
<http://www.cptech.org/ip/health/who/cmc-churches.doc>
27. Urdea M et al. Global health diagnostics in determining the global health impact of improved diagnostic technologies for the developing world. *Nature S1*, 2006:73–79. Available at:  
<http://www.nature.com/nature/journal/v444/ns1/full/nature05448.html>
28. Key trends in drug-diagnostic co-development: identifying collaborative opportunities and navigating regulatory challenges. *Business Insights*, August 2009. Cited in:  
<http://www.reuters.com/article/pressRelease/idUS185880+20-Aug-2009+BW20090820>
29. *Global health diagnostics: research, development and regulation*. Workshop report. London, The Academy of Medical Sciences, 2009. Available at:  
<http://www.acmedsci.ac.uk/p47prid65.html>
30. Public sector drug discovery. News in brief. *Nature Reviews, Drug Discovery*, 2011, 10:165.
31. Moran M. *G-Finder Year 3*. Available at:  
[http://www.policycures.org/downloads/G-FINDER\\_launch\\_presentation\\_2010.pdf](http://www.policycures.org/downloads/G-FINDER_launch_presentation_2010.pdf)

32. Hunter J, Stephens S. Is open innovation the way forward for big pharma? *Nature Reviews, Drug Discovery*, 2010, 9:87–88.
33. Cressey D. Traditional drug-discovery model ripe for reform. *Nature*, 2011, 471:17–18.
34. *Pharmaceutical industry profile, 2009*. Pharmaceutical Manufacturers and Research Association of America. Available at:  
[http:// www.phrma.org/files/PhRMA%202009%20Profile%20FINAL.pdf](http://www.phrma.org/files/PhRMA%202009%20Profile%20FINAL.pdf)
35. *Acceptance of clinical trials conducted in third countries, for evaluation in marketing authorisation applications*. Strategy paper. London, European Medicines Agency, 5th December 2008. Available at:  
<http://www.emea.europa.eu/Inspections/docs/22806708en.pdf>
36. State of the clinical trials industry: A sourcebook of charts and statistics. Centerwatch, 2008:448. Cited in: Royal College of Physicians. *Innovating for health: patients, physicians, the pharmaceutical industry and the NHS. Report of a Working Party*. London, Royal College of Physicians, 2009.
37. Lanjouw JO, Macleod M. Pharmaceutical R&D for low-income countries. Global trends and participation by Indian firms. *Economic and Political Weekly*, 2005:4232–4242.
38. Hunter J, Stephens S, op cit.
39. Commission on Intellectual Property Rights, Innovation and Public Health, 2006.
40. Neto RB, Killugudi Jayaraman K. Brazil and India access pharma vaccine know-how. *Nature Biotechnology*, 2009, 27(12):1063–1064. Available at:  
<http://www.nature.com/nbt/journal/v27/n12/full/nbt1209-1063.html>
41. Kishore SP et al. The global health crisis and our nation's research universities. *PLoS Neglected Tropical Diseases*, 2010, 4(2):e635. Available at:  
<http://www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0000635> doi:10.1371/journal.pntd.0000635
42. Loewenberg S. Drug company trials come under increasing scrutiny. *Lancet*, 2008, 371:191–192.
43. Hundley K. Drugs are expensive. Life is cheap. *St Petersburg Times*. 11 December 2008. Available at:  
<http://www.tampabay.com/news/business/article934677.ece> <http://tech.groups.yahoo.com/group/Bioethics/message/11369>
44. WHO activities to implement the global strategy and plan of action on public health, innovation and intellectual property, including the quick start programme. More information available at:  
[http://www.who.int/phi/GS\\_implementQS.pdf](http://www.who.int/phi/GS_implementQS.pdf)
45. Dolgin E. African networks launch to boost clinical trial capacity. *Nature Medicine*, 2010, 16(1):8. Available at:  
<http://www.nature.com/nm/journal/v16/n1/full/nm0110-8a.html>

**ABBREVIATIONS**

COPD	chronic obstructive pulmonary disease
DALY	Disability adjusted life year
ECDC	European Centre for Disease Prevention and Control
FDA	Food and Drug Authority (USA)
HIV	Human immunodeficiency virus
ICD	International classification of diseases
LMIC	Low- and middle-income countries
NME	New molecular entity
R&D	Research and development
RDT	Rapid diagnostic test
TB	Tuberculosis



# THE WORLD MEDICINES SITUATION 2011

## PHARMACEUTICAL HUMAN RESOURCES

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## **The World Medicines Situation 2011**

### **3rd Edition**

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## SUMMARY

- Pharmacy workforce shortages constitute a major capacity limitation to the provision of pharmaceutical services and access to medicines.
- Pharmacy workforce demand is likely to increase in the future. Pharmacy human resources are required to enable functionality of all aspects of the pharmaceutical sector and medicines use process, including research and development, manufacturing, distribution, procurement, regulation, supply, pharmacovigilance, rational use and adherence.
- There is a linear relationship between the size of the pharmacy workforce and medicines consumption, which is correlated to economic development. Wealthier countries tend to consume more medicines per capita and have more pharmacists per capita to manage pharmaceuticals.
- Pharmacy workforce planning should be considered when developing medicines policies and pharmaceutical services and integrated into broader human resources for health strategic plans.
- Interventions are required to build pharmacy education capacity to meet needs and improve workforce retention and distribution, develop comprehensive national human resource strategic plans and strengthen human resource information systems to inform planning.

## 1.1

## INTRODUCTION

*In many countries, shortages of pharmaceutical staff are often more pronounced than those of other health workers and are increasingly recognized as a barrier to the delivery of pharmaceutical services and access to medicines.*

In 2006, WHO estimated a global shortage of 4.3 million health workers (1). Improving human resources for health has become a priority issue, especially for the 57 “crisis countries”<sup>1</sup> that currently lack an adequate workforce to provide basic health services (1). Yet despite increasing demand for health services, investment in human resources, particularly in the public sector, has stagnated or declined over recent decades (1,2). Recruitment freezes due to budget constraints in many countries, but particularly those in sub-Saharan Africa, have meant that employment conditions and workforce levels may be worse now than they were 30 years ago in many low-income countries. After nurses and doctors, pharmacists represent the third largest single health-care professional group. Pharmaceutical human resources include all cadres that provide pharmaceutical services, such as pharmacists, pharmacy technicians, assistants and aids, among others. In many countries, shortages of pharmaceutical staff are often more pronounced than those of other health workers and are increasingly recognized as a barrier to the delivery of pharmaceutical services and access to medicines (3).

The issue of pharmaceutical human resources cannot be disengaged from that of pharmaceutical service provision. Pharmacy workforce planning and development should be linked to specific aspects of pharmaceutical service delivery. Available literature describes the impact of pharmacists on improving health outcomes, preventing hospital admissions, reducing medicines-related adverse events, ensuring the rational use of medicines and increasing access to medicines (4-13). Several studies have correlated clinical pharmacist staffing in hospitals with reduced mortality (14,15).

This chapter focuses on the pharmaceutical workforce, and describes current trends in its size and distribution, its relationship with medicines consumption, the links between pharmaceutical services and workforce planning, and the interventions required to address the current shortages. Issues relating to other health workforce cadres, such as physicians, nurses and community health workers, are outside the scope of this chapter but are described in depth in the literature. However, there are various commonalities (e.g. issues of poor workforce planning, shortages, high turnover etc.), as well as some key differences, between the pharmaceutical workforce and other cadres, which are important to note. They include the greater diversity of the labour market for pharmaceutical cadres, and lower workforce supply due to relatively fewer pre-service training institutions.

Until 2006, very little work had been done to examine the international pharmaceutical human resources situation, with policy and labour market analysis limited to select high-income countries. The recent work of the International Pharmaceutical Federation (FIP) sought to address this information gap, with the first Global Pharmacy Workforce Report published in 2006, and updates published in 2009 and 2012 (16,17,18). The 2009 and 2012 reports include country case studies that describe strategies to address priority human resource issues. Surveys from the 2009 Global Pharmacy Workforce Report form the basis of the analysis described in this chapter.

<sup>1</sup> Defined as countries with fewer than 2.5 health workers (physicians, nurses and midwives) per 1000 population.

## 1.2

## PRESENT SITUATION: WORLDWIDE SHORTAGES IN THE PHARMACY WORKFORCE

### 1.2.1

### The composition of the pharmaceutical workforce

The pharmaceutical workforce is primarily responsible for the delivery of pharmaceutical services and is usually described as comprising three cadre levels:

- pharmacists
- pharmaceutical technicians and assistants
- pharmacy aids.

In some countries, other health cadres and the informal sector (unregulated private sector) providers also offer pharmaceutical services. Pharmaceutical scientists, who are responsible for conducting research and adopting regulatory and strategic roles in pharmaceutical industries, academia and regulatory agencies, represent a relatively small component of the global pharmaceutical workforce.

*In practice, pharmaceutical cadre titles and scopes of practice for each cadre vary significantly and not all levels exist in every country.*

In practice, pharmaceutical cadre titles and scopes of practice for each cadre vary significantly and not all levels exist in every country. Nevertheless, most countries classify their workforce into high-, mid- and low-level cadres in a manner that is consistent with the classification of other health-care cadres and accords with the three categories listed above, which are in the International Labour Organization (ILO) International Standard Classification of Occupations (19). Box 1.1 provides a more detailed description of each level.

### 1.2.2

### The global pharmacy workforce

Despite growing demand for information to facilitate health workforce planning, there is very little published data on the status of the global pharmacy workforce (16). In recent years, a handful of countries, such as Australia, Canada, the UK and the USA, have embarked on projects and programmes to redress this gap, greatly raising the profile of the issues and the need to integrate pharmacy workforce planning into broader health workforce planning. The only source of comparable country data and statistics on numbers of pharmacists and pharmacy technicians, their employment sector, education and regulation remains that produced by FIP, which to date has conducted 3 pharmacy workforce surveys, in 2005, 2009 and 2012 (16,17,18).

*The only source of comparable country data and statistics on numbers of pharmacists and pharmacy technicians, their employment sector, education and regulation remains that produced by FIP, which to date has conducted 3 pharmacy workforce surveys, in 2005, 2009 and 2012.*

The 2009 FIP Global Pharmacy Workforce Report, at the time of this Chapter's development, provided a comprehensive analysis of the pharmaceutical workforce. The chapter draws heavily from this evidence base, a compilation of survey responses from 56 participating countries, representing all world regions and income levels. Findings from the 2012 report support the same conclusions and recommendations as the 2009 report. The FIP report also examines the relationship between the pharmaceutical workforce and medicines consumption, in a bid to identify key challenges that may affect the delivery of pharmaceutical services in the future (17).

### Size and distribution of the pharmacy workforce

There is a serious imbalance in the distribution of the pharmacy workforce worldwide. Human resources in sub-Saharan Africa in particular are grossly inadequate, despite the region shouldering 25% of the global disease burden. The density of pharmacists varies greatly between the countries surveyed. The lowest density was recorded in Chad (0.04 pharmacists per 10 000 population), the highest in Malta (18.88 pharmacists per 10 000 population).

## BOX 1.1

**Definition of the pharmaceutical workforce**

**Pharmacists:** Store, preserve, compound, test and dispense medicinal products and counsel on the proper use and adverse effects of drugs and medicines following prescriptions. They contribute to researching, preparing, prescribing and monitoring medicinal therapies (including pharmacovigilance) for optimizing human health (20).

**Pharmaceutical technicians and assistants:** Perform a variety of tasks associated with dispensing medicinal products under the guidance of a pharmacist, or other health professional. This level also includes pharmaceutical technologists and dispensing assistants (20).

**Pharmacy aids:** Perform simple and routine tasks such as labelling drugs, chemicals and other pharmaceutical preparations and replenishing stock on shelves (20).

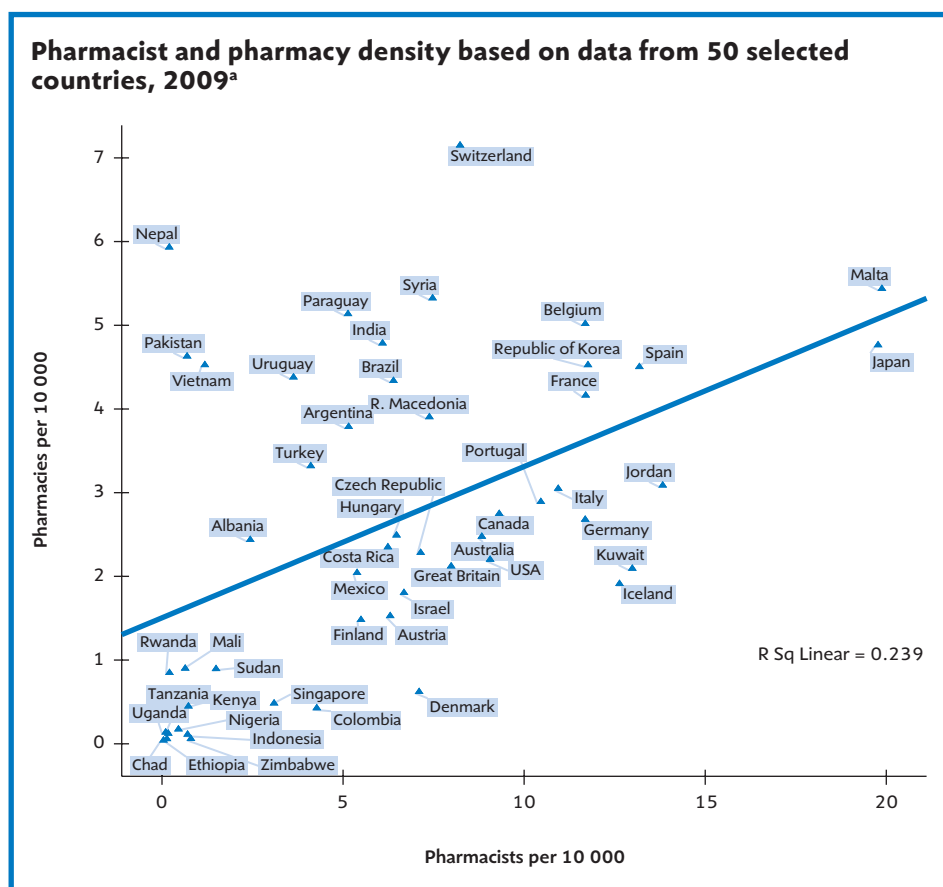
Pharmacists undergo 4–6 years of higher education in addition to an internship of anything between 3 months and 1 year before qualifying to practice. They are employed by the public sector (e.g. by hospitals, supply systems, regulatory agencies), the private sector (e.g. by retail community pharmacies, private hospitals, wholesalers, the pharmaceutical industry) and in academia (e.g. training pharmacists and other pharmaceutical cadres) for diverse roles. These roles include: research and development, quality control in pharmaceutical manufacturing, procurement, supply chain management, formulary management, clinical biology, pharmacovigilance and medicines information, education, health promotion and public health, dispensing and pharmaceutical care (e.g. medicines use review, patient counselling and prescribing).

Within the middle- (pharmaceutical technicians and assistants) and lower-level pharmaceutical cadres (pharmacy aids) there is considerable variation in title, level of education, competence and roles. This sector of the workforce may not be formally regulated and often work under pharmacist supervision. In several countries, such as Brazil, Japan and the Republic of Korea, these cadres are non-existent. The level of competency ranges from pharmacy aids, pharmacy/pharmacists' assistants and dispensers who may have little or no formal training, to pharmacy technicians and technologists who undertake certificate, diploma or degree level programmes of up to 2–3 years. Some countries have fairly advanced mid-level cadres, for example, China, Province of Taiwan, has 'associate pharmacists', Zambia has 'pharmacy technologists' (3-year diploma), and Denmark has 'pharmacoconomists' (3-year training). These advanced mid-level personnel in the pharmacy workforce may be able to independently manage inventories and dispense and advise on medicines, and generally have undertaken a formal training programme.

Countries with the highest densities of pharmacists tended to have the highest densities of pharmacies. The correlation between the density of pharmacies and pharmacists is shown in Figure 1.1. Outliers can be seen where there are substantially more pharmacies than pharmacists (i.e. Nepal, Pakistan, Viet Nam) flagging the issue of appropriate supervision of pharmaceutical services

The 2009 FIP survey sought information on both the total number of pharmacists and the number of actively practising pharmacists, in recognition of the fact that the former may not be a true reflection of the size of the active workforce. It should be noted that not all countries made the distinction when reporting their data. Although over half of the participating countries had a high proportion of active pharmacists (i.e. over 80% were actively practising), a handful of countries had a significant proportion of non-practising pharmacists in their workforce. In three countries the proportion of active pharmacists was below 60%, and in one case, Nepal, this proportion was just 46%. This finding may have significant implications for workforce planning.

FIGURE 1.1



Source: FIP, 2009 (17).

<sup>a</sup> Number per 10 000 population, based on data from 50 countries surveyed between September 2008 and April 2009.

### Composition of the pharmacy workforce

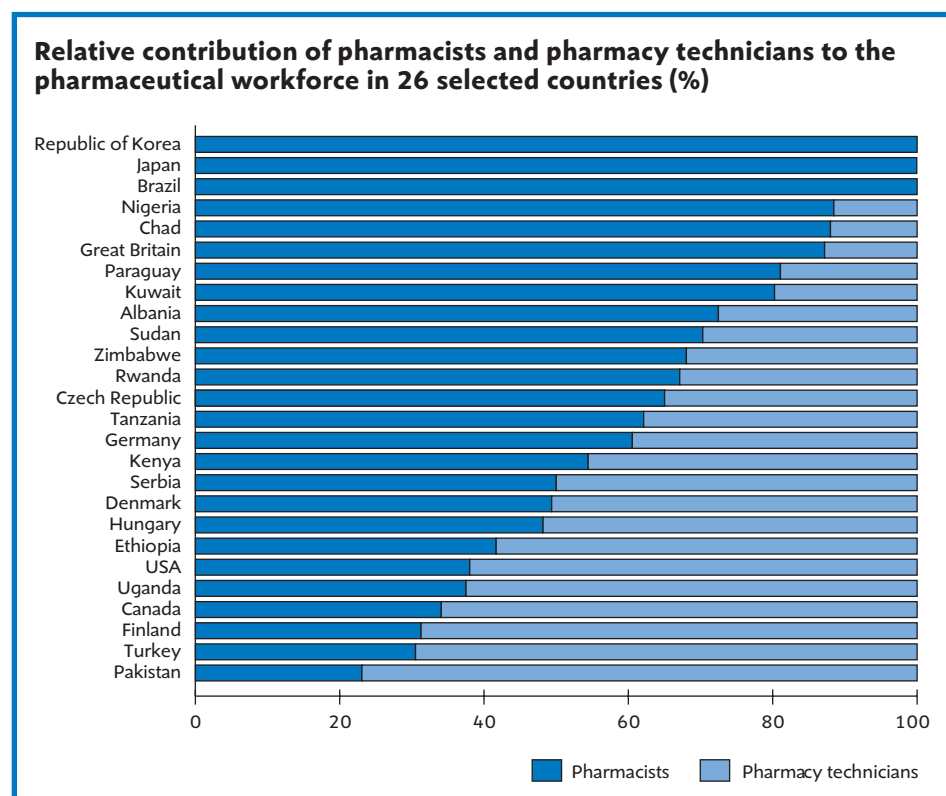
Among the countries for which data are available, there is a large variation in composition of the pharmacy workforce, in terms of the skills mix. Several countries, such as Brazil, Japan and the Republic of Korea, do not have any pharmacy technicians or equivalent mid-level cadres (Figure 1.2). Elsewhere, pharmacy technicians or mid-level equivalents are an important part of the pharmaceutical workforce. In Pakistan, for example, pharmacy technicians account for nearly 75% of the workforce (Figure 1.2). The density of pharmacy technicians (number per 10 000 population) ranges from 0.005 in Chad to 9.4 in Turkey.

Analysis of the 2009 survey data also revealed marked variations in the gender mix of the pharmacy workforce, with the proportion of females varying from as high as 80% in the Czech Republic to only 20% in Uganda. In recent years, many countries have experienced a gradual feminization of their pharmaceutical workforce, a trend that has been attributed, at least in part, to the changing role of pharmacists (see Section 1.3). There has been a move away from a purely distributive function towards a more patient-focused, caring role for pharmacists and pharmacy technicians, a shift that is likely to make the occupation more appealing to women. The greater flexibility for part-time work is also likely to be a contributory factor to this pattern (17).

The 2009 FIP survey confirmed that the majority of pharmacies operate within the retail community pharmacy sector, with only a relatively small percentage located in hospitals (up to 10%). It is not surprising therefore that the majority of the pharmacy workforce is

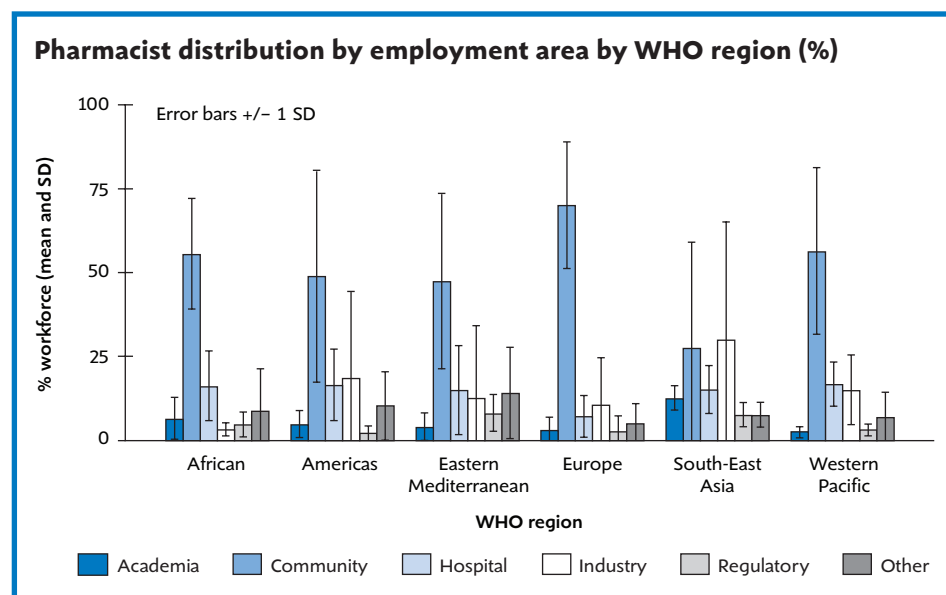
*It is not surprising therefore that the majority of the pharmacy workforce is employed by the retail community pharmacy sector; on average, 58% of all pharmacists work in retail community pharmacies, 12% in hospitals, 12% in industry, 4% in research and academia, and 4% in regulation.*

FIGURE 1.2



Source: FIP 2009 (17).

FIGURE 1.3



Source: 2009 FIP 2009 (17).

Note: error bars represent 1 standard deviation from the mean.



employed by the retail community pharmacy sector; on average, 58% of all pharmacists work in retail community pharmacies, 12% in hospitals, 12% in industry, 4% in research and academia, and 4% in regulation. Relative to these averages, fewer pharmacists are employed by the pharmaceutical industry in African countries (less than 5%), whereas in the South-East Asian region the pharmaceutical industry employs up to 55% of the pharmacist workforce. The pharmaceutical industry is a predominant employer in South-East Asia given the larger scale of pharmaceutical manufacturing and wholesaling companies compared with other regions (17).

### 1.2.3

### Pharmacy workforce and medicines consumption

This section explores the relationship between the pharmacy workforce and the consumption of medicines by volume. Previous analyses of this type have relied on/used medicines expenditure as a measure of consumption (see the Chapters on Consumption and Expenditure). The use of medicines consumption measured by volume, in the form of standard units (each standard unit being equivalent to a single dose) as the comparator offers a number of advantages, not least a more accurate understanding of actual medicines use and of trends in medicines use between countries. However, there are certain caveats. For example, volume units may not always be equivalent between countries, data are incomplete for some countries and consumption may not reflect actual medicine taking.

The positive correlation between the Gross National Income (GNI) of countries and medicines consumption per capita provides context to this analysis, as both medicines consumption and human resources can be seen as a function of the economic status of countries (Figures 1.4 and 1.5).

Figure 1.5 shows the positive correlation between medicines consumption and density of pharmacists, indicating that countries with the highest levels of medicines consumption also have higher pharmacist densities per 10 000 population. This indicates that the relationship between the pharmacist workforce and population is dynamic rather than static in nature, and is associated with the level of medicines consumption per capita. A fixed recommended global ratio of workforce to population would not be appropriate given the variations in per capita medicines consumption. The latter can in some cases be incorrectly used as a proxy indicator of workload. Medicines consumption per capita, and thus the volume of medicines to be managed through the pharmaceutical system and associated workload varies between countries. Furthermore, workforce models used to provide pharmaceutical services are hugely diverse and thus it would not be appropriate to set standard generic pharmacist or pharmacy assistant to population ratios. However, national ratios informed by national data and context may be of value.

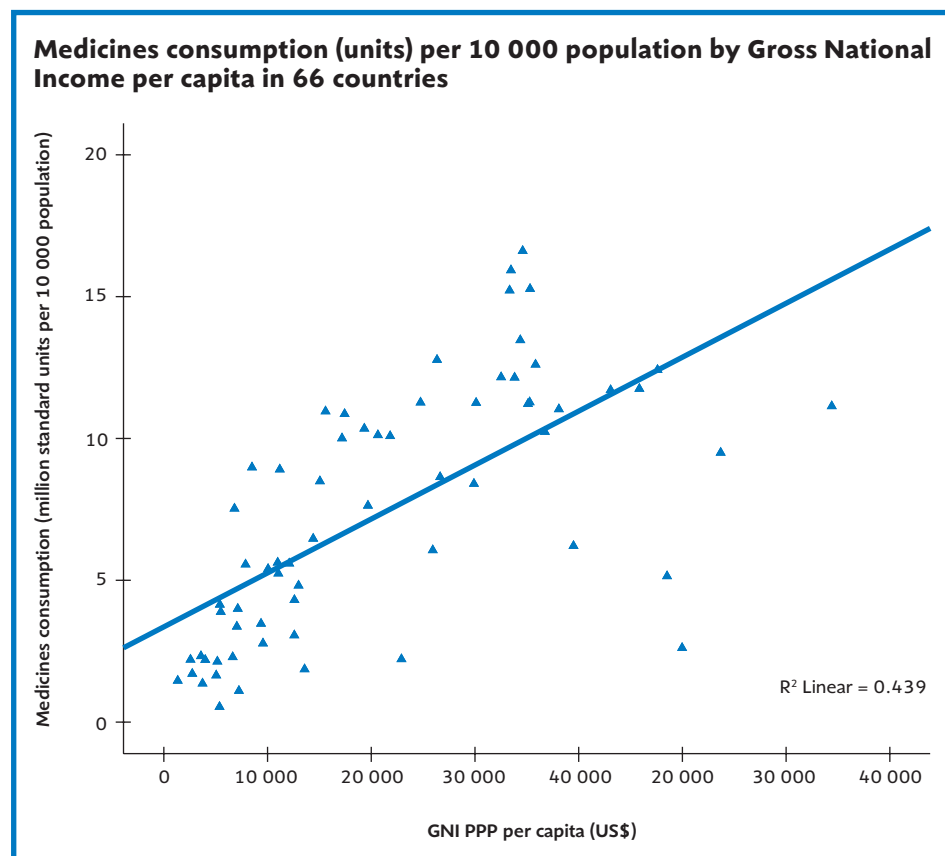
Jordan and Kuwait appear to be unique given their relatively lower levels of medicines consumption yet high workforce density. Australia and Canada have 30% higher medicines consumption than the USA, though all countries have similar workforce densities. Japan has the highest level of medicines consumption and the highest pharmacist workforce density, almost double that of Australia, England/Scotland/Wales and Canada.

As countries move up the economic status ladder, they are likely to require a larger pharmacist workforce, due to the increased demand for medicines and associated pharmaceutical services. This demand may manifest as a consequence of the increased purchasing power of the population, and very possibly also as a consequence of an ageing population and increased chronic disease burden. This in turn is likely to further exacerbate the problem of workforce shortages.

*The positive correlation between the Gross National Income (GNI) of countries and medicines consumption per capita provides context to this analysis, as both medicines consumption and human resources can be seen as a function of the economic status of countries.*

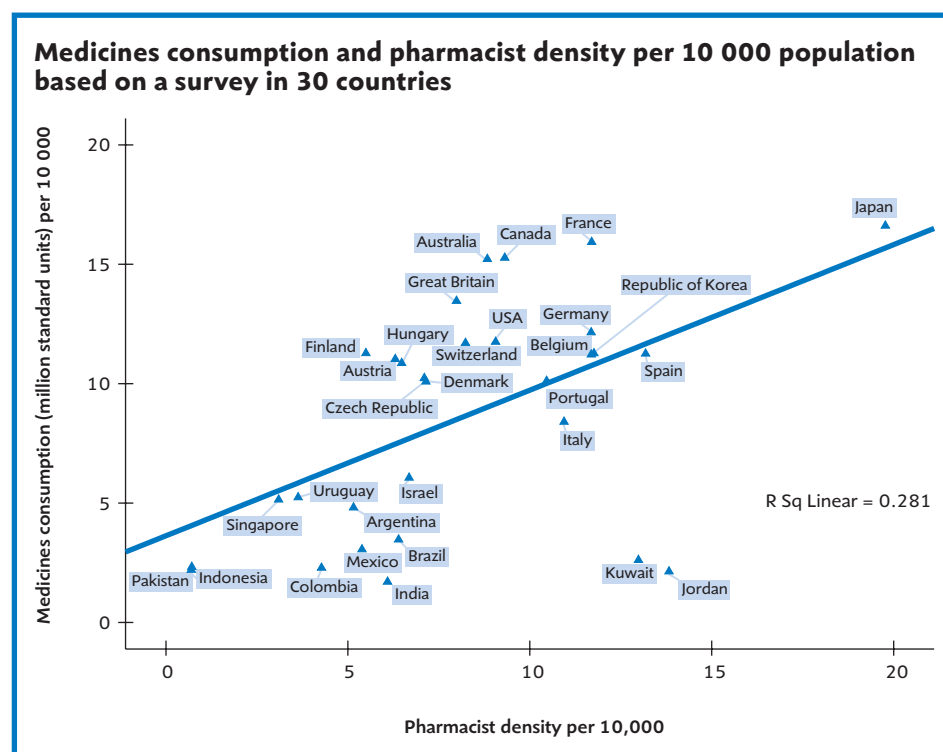
*Furthermore, workforce models used to provide pharmaceutical services are hugely diverse and thus it would not be appropriate to set standard generic pharmacist or pharmacy assistant to population ratios.*

FIGURE 1.4



Sources: IMS Health 2008, World Bank 2007.  
Gross national income (GNI) adjusted for purchasing power parity (PPP) in US\$.

FIGURE 1.5



Source: FIP 2009 (17), and IMS Health statistics 2008.

## 1.3

### 1.3.1

## RECENT CHANGES IN THE PHARMACY WORKFORCE

### Size of the workforce

It is generally recognized that in some countries the pharmacy workforce is stretched and unable to provide basic pharmaceutical services (17). Global health initiatives have stumbled across capacity constraints in the roll out of HIV/AIDS, TB and malaria services, and point to the necessity of investment in workforce development (21).

Broadly speaking, two strategies are available to countries to expand their pharmacy workforce:

- **Increase domestic workforce supply** (through measures such as increasing exposure to undergraduates in hospital pharmacy, encouraging rural students to study pharmacy, supporting 're-entry' into practice;
- **Active foreign pharmacist recruitment** (through bilateral agreements, sponsorship for immigration and licensure processes, casual, temporary and permanent contracts).

### Pharmacy education

The balance of evidence, albeit somewhat limited, suggests that recent years have indeed witnessed a steady growth in the size of the pharmacy workforce in response to increasing demand for services (22). This has been accompanied by a parallel rise in pharmacy education that has increased domestic workforce supply.

Many countries have successfully increased their pharmacy workforce over recent years through measures to scale up pharmacy education (see Box 1.2). This is reflected in the rapid growth in the number of students and training institutions in many countries, including several sub-Saharan African countries (17). There has also been a tendency for pre-service pharmacy education to increase in duration (from four to five or six years at tertiary education level). A growing number of low- and middle-income countries (LMIC) have established formal continuing education programmes and systems for on-going professional development.

### Foreign recruitment

Elsewhere, active foreign recruitment is still a major strategy, typically among some wealthier countries such as Australia, Canada, Kuwait, Qatar, Namibia, New Zealand, Singapore, Saudi Arabia and the United Arab Emirates. Such an approach does not lead to self-sufficiency and inevitably will have an impact on the workforce situation in source countries. High levels of demand for academics internationally may also increase attrition rates in source countries; the USA alone has an estimated need for 1200 additional academics over the next 10 years and active foreign recruitment continues to be a key recruitment strategy (23).

Pharmacist migration between less- and more-developed countries has been highlighted as a major concern, with an increase in mobility observed over 1995–2005. Over this period, there has been an increase in the number of foreign pharmacist registrations in Canada (Figure 1.10) and Australia (Figure 1.11) (16). However, in recent years a decline in migration of pharmacists outside of the European Union has been observed in the UK due to the implementation of new immigration and professional recognition policies, and significant expansion of domestic workforce supply.

## BOX 1.2

In Ghana, there has been a 40% increase in the pharmacist workforce overall and an 80% increase in the number of public sector pharmacists over the period 2001–2005 (16). This increase is attributed to the expansion in pharmacy student numbers at the school of pharmacy. However, workforce levels have since stabilized and have not increased significantly beyond the level in 2005 due to workforce exit (attrition) matching workforce entry. Two new schools of pharmacy have been recently established in Ghana, which has doubled the annual pharmacy student intake from 120 to 240.

In Kenya, public sector vacancies were mostly filled by 2008 with an increase in the public sector pharmacy workforce by 40% from 2005 (17). Between 2002 and 2008, the pharmacist workforce increased by 50% from 1866 to 2775 and the pharmacy technologist workforce increased by 66% from 1399 (2002) to 2324 (2009). Much of this growth is due to the expansion of pharmacist (one to three schools) and pharmacy technologist (one to 18 colleges) education over the last five years.

Over the last 10 years, the pharmacist workforce in Sudan has more than doubled to 5890 (24). Twenty students formed the first graduating cohort in 1968, now there are 13 pharmacy schools graduating around 900 pharmacists per year.

Five new schools of pharmacy opened in Viet Nam in provincial areas, with significant Government investment in pharmacy education to scale up pharmaceutical human resources (25). With a target density of 1 pharmacist per 10 000 population, schools of pharmacy have been set higher quotas for training, such that most institutions more than doubled their output in 2009 (2130 graduates) compared with 2007 (817 graduates). As in a number of other countries, Viet Nam has instituted new pharmaceutical policies and legislation over the past 10 years, such as the Drug Law and Good Pharmacy Practice. These sought to accompany capacity increases with improvements in the quality of pharmaceutical services.

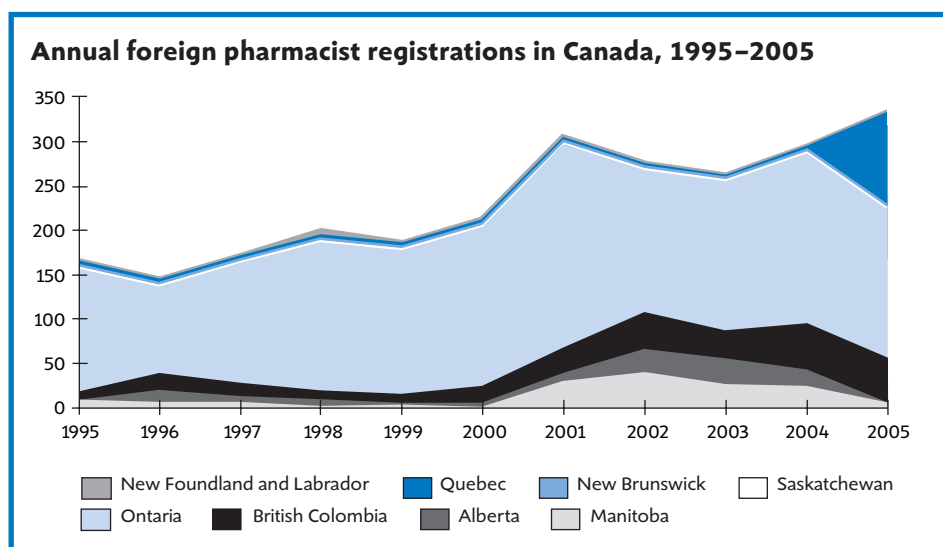
Mid-level cadre expansion has taken place in several countries, following the development and expansion of training programmes. Examples include pharmacy assistants in Namibia, pharmaceutical technologists in Kenya and pharmacy assistants and technicians in South Africa (16,17,26). Kenya has also recently established degree programmes that enable pharmacy technologists to further train as pharmacists (17). The professional body of pharmacists (AQFU) in Uruguay implemented the first formal system of training for pharmaceutical assistants in 1994.

The reduction of hospital pharmacy vacancy rates in Australia between 2001 and 2003 may be partly due to the expansion of pharmacy education. One Australian state that had a four-fold increase in the number of pharmacist graduates observed a reduction in vacancies from 23% to 2% over this period (27).

While there has been limited systematic examination of the demand-side factors influencing the increase in the need for pharmacists in countries, the themes identified in an analysis of the pharmacist labour market in the UK over the past five years may be applicable in other middle- and high-income country contexts. The three main demand-side *drivers stimulating the increased need for human resources* in the UK have been identified as:

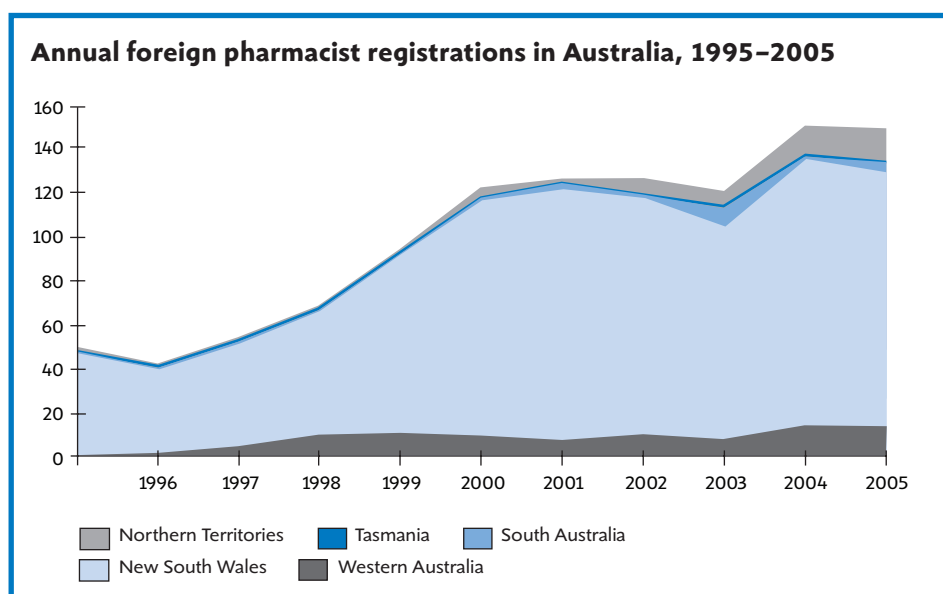
- health-care expansion with more services tailored to an ageing population and growth in therapies for previously untreatable conditions;
- changes in the organization of pharmaceutical services including a wider range of services and longer hours of service;
- professional quality assurance to satisfy patient safety imperatives (28).

FIGURE 1.6



Source: Chan and Wuliji, 2006 (16). Reproduced with permission.

FIGURE 1.7



Source: Chan and Wuliji, 2006 (16). Reproduced with permission.

### 1.3.2

#### Other emerging workforce trends/patterns

Recent years have seen a move away from a purely *distributive function towards a more patient-focused, caring role* for pharmacists and pharmacy technicians. Pharmacy education reform has been observed in many countries, with a shift in the focus of pharmaceutical services towards pharmaceutical care roles. In Uruguay, for example, pharmacy education recently underwent a major reform to reorient the curriculum from a traditional industrial content towards a health-care focus (29).

Expansion in the scope of practice of pharmacists to encompass roles such as medicines use review, health promotion, public health and prescribing was also observed, as well as that of mid-level cadres, such as pharmacy technicians, into dispensing, compounding and management roles (24).

*Recent years have seen a move away from a purely distributive function towards a more patient-focused, caring role for pharmacists and pharmacy technicians. Pharmacy education reform has been observed in many countries, with a shift in the focus of pharmaceutical services towards pharmaceutical care roles.*

The feminization of the workforce and associated rise in part-time employment has been observed in many countries, which raises the importance of gender sensitive human resource policies and planning (24).

*Inequitable distribution of the workforce within (rural versus urban) and between countries* has continued to manifest in many instances (24). Little progress has been made in the recruitment and deployment of the workforce in rural areas. In Uganda, it was estimated that public sector pharmacist availability in 2005 was only 30% of what was required, a shortage compounded by the significant distribution imbalance where three quarters of the population is only served by 10% of the pharmacist workforce (16). In 2005 in Ghana, around 60% of the pharmacist workforce in the public hospital sector were in regions that only serve a third of the population (16).

In South Africa, pharmacists from rural areas were more likely to work in rural areas and public sector hospitals than those from urban areas (30). Pharmacy students from rural areas were also found to be more likely to practice in a rural area with 70% of graduates in one rural pharmacy school in Australia commencing their career in rural or remote areas (31). Final year medical and nursing students in Ethiopia that were from richer families and with lesser motivation to serve the poor were less likely to work in rural areas (32).

Generally, an ageing population with higher levels of medicines consumption; the retirement of the 'baby boomer' generation; and growing feminization of the workforce with a tendency for women to work fewer hours; have in recent years affected workload and workforce levels and will continue to do so in the future (16,17).

### 1.3.3

### Pharmacy human resource development strategies

This section describes, in more detail, some of the strategies for human resource development that have been employed in different countries to increase their workforce supply and improve recruitment and retention of trained pharmacy staff.

#### Expanding workforce supply through pharmacy education and training

Pharmacy education is expanding rapidly worldwide to address workforce shortages (17). In sub-Saharan Africa, countries have shown growth in the number of students and training institutions. However, the shortage of academic capacity within the region threatens to curtail this growth and destabilize existing institutions, which not only lack human resources but also lack a conducive physical infrastructure and core educational resources. The Global Pharmacy Education Taskforce (see Box 1.3) was launched in 2008 with the aim of catalysing actions to develop pharmacy education, particularly in countries with the greatest workforce shortages (33-35,7,39,41).

In many settings, capacity building is necessary in order to maintain and develop workforce competencies and so improve performance across the sector. Although short courses have been funded and delivered by international organizations to address skills gaps in certain areas, for instance in the delivery of antiretroviral therapy (ART) and supply chain management, it has been recognized that sustainability in medicines supply can only be achieved by developing local in-country capacity (36). "Training the trainers" is often an effective strategy, particularly if conducted within the framework of a wider support network of pharmacists working across the community in collaboration with academia. Workplace-based learning programmes offer more practical modalities for training and competency development over traditional courses necessitating study leave.



## BOX 1.3

**FIP Education Initiatives: catalysing pharmacy education development**

*Author: Diane Gal, International Pharmaceutical Federation (FIP)*

Building on the actions and success of the Global Pharmacy Education Taskforce, supported by WHO and UNESCO (35), FIP Education Initiatives (FIPEd) was launched in 2011. FIPEd has a mission to bring together organizations and leaders who are working to improve health through advancing pharmacy and pharmaceutical sciences education. FIPEd is stimulating transformational change in pharmacy and pharmaceutical science education to advance and develop the pharmacy profession towards meeting present and future health care needs. FIPEd works under the premise that health care, service, workforce and thus education needs differ between countries and advocates for a needs-based approach to education and workforce development (37). At its core, FIPEd provides a global platform to share and identify good practice, which fosters innovation and policy development, and builds and disseminates evidence, tools and guidance for educational development. Recent tools and guidance include the Global Quality Assurance Framework, the Global Competency Framework, an online educational resources sharing platform (SABER) and the World List of Pharmacy Schools, with a Global Pharmacy Education Report to be published in 2013 (see FIPEd Initiatives resources web page: [http://www.fip.org/pe\\_resources](http://www.fip.org/pe_resources)). Country case studies in Ghana, Malawi, Namibia, Nigeria, The United Republic of Tanzania, Uganda and Zambia are fostering collaboration between schools of pharmacy, to share practices and experiences, and to develop and test tools that strengthen pharmacy education within the sub-Saharan African region. A Global Pharmacy Education Development Network has also been established through the UNESCO twinning programme (UNITWIN). For more information see: [www.fip.org/education](http://www.fip.org/education)

*The need for competency-based workforce development applies to all roles, from researchers (Box 1.4) to district pharmacists (Box 1.5). A strong pharmaceutical science background is also necessary in order for pharmacists to undertake roles in pharmaceutical regulation, manufacturing, quality assurance and policy.*

The need for competency-based workforce development applies to all roles, from researchers (Box 1.4) to district pharmacists (Box 1.5). A strong pharmaceutical science background is also necessary in order for pharmacists to undertake roles in pharmaceutical regulation, manufacturing, quality assurance and policy.

According to a recent European analysis, gaps in education and training are currently one of the key bottlenecks in the pharmaceutical R&D process (38,39). Areas in which skills shortages were considered to be especially acute include risk assessment/management, pharmacology, statistics, pharmaceutical medicine, imaging, bioinformatics and holistic systems approaches. Today's globalized and highly specialized field of pharmaceutical science places ever increasing demands on its workforce, requiring researchers to operate in a multidisciplinary, complex environment and interact with a wide variety of partners from different backgrounds. A growing multiplicity of scientific disciplines is involved in pharmaceutical R&D, from mathematicians for building pharmacokinetic and pharmacodynamic models right through to clinical practitioners. This makes integrated approaches in education and training (see Box 1.4) even more important and also indicates a clear need for generic skills such as communication, management and team work (40).

#### Improving workforce retention

Retention of the workforce, particularly in the public sector and in rural areas is a major concern. While some studies, such as a small study of pharmacists in Sudan, have found that the majority of public sector respondents planned to leave for the private sector, predominantly for economic reasons, non-economic factors are important such as the lack of recognition in the public sector cited in this particular study (42). Factors beyond economic reasons were also identified in a nine-country survey that found that pharmacists who plan to migrate long term (i.e. for more than 2 years) tend to have more negative attitudes towards the professional and sociopolitical environment of their home country and more positive attitudes towards the perceptions of opportunities abroad (43).

## BOX 1.4

**Building human resources for research and development**

*Authors: Daan Crommelin and Pieter Stolk, Top Institute (TI) Pharma, the Netherlands*

The most important input for the pharmaceutical research and development (R&D) process is a highly skilled workforce. Educating and training researchers requires least 7–10 years of training post-secondary school. In 2007, the R&D divisions of pharmaceutical companies employed about 115 000 persons across the European Union and 86 000 in the USA (44).

Two recently launched public–private initiatives for conducting innovative research in drug development explicitly address education and training needs as an essential success factor for their long-term R&D agenda. The Innovative Medicines Initiative is a collaboration between the European Commission and the European Federation of Pharmaceutical Industries and Associations. Its strategic research agenda recognizes the need for education and training in the broadest sense by recommending the establishment of a “European Medicines Research Academy (EMRA), and the implementation of multi-disciplinary programs to develop skills in integrating biology and medicine expertise” (38). The EMRA will be based on existing centres of excellence, with an estimated annual budget of Euros 14.5 million.

TI Pharma is a collaborative structure consisting of industrial and academic research teams, and is partly funded by the Dutch Government (45). In 2009, TI Pharma funded 550 researchers, from PhD students to senior staff, working in 44 public–private consortia with a total annual research budget of about 60 million Euros. In addition to offering a translational work environment, TI Pharma has an extensive education and training programme, which also addresses business and entrepreneurial skills, project management, understanding the whole drug discovery and development process, and issues surrounding intellectual property.

For countries such as China and India, addressing the talent shortage may be a crucial factor for pharmaceutical innovation (46). Developing countries may want to consider developing regional (public–private) and network building approaches to fill the gap in training high quality researchers (47). The recently launched African Network for Drugs and Diagnostics Innovation (2008) is an important development in this respect (47). Given the scale and complexity of the efforts to ensure a steady flow of talented professionals into the world of drug discovery and development, long-term commitment at a significant level and a coordinated approach between academia, government and industry are crucial.

*... available literature suggests that remuneration is not the only factor for retention, with other factors such as workforce levels and competency, management support for pharmacy practice, professional development opportunities and access to further training cited as incentives to stay.*

Some countries describe particular challenges in retaining the recently qualified workforce, such as a paper from Australia that found that pharmacists in Australia with two to five years of hospital experience were least represented in the workforce, possibly due to the lack of retention strategies targeted to newly-qualified pharmacists (27). One state in Australia improved the retention of younger pharmacists by increasing the pay scale of pharmacists at all levels (27).

However, as mentioned above, available literature suggests that remuneration is not the only factor for retention, with other factors such as workforce levels and competency, management support for pharmacy practice, professional development opportunities and access to further training cited as incentives to stay (48). Almost 80% of private sector pharmacists in a study in Sudan had considered moving into the public sector due to the perception of greater job satisfaction (42).

Organizational climate, culture and conditions of work are also important determinants of retention. Half of the USA pharmacists who intended to stay in their positions indicated flexible schedules as a key factor with the most common reasons for retention including good salary and relationships with colleagues (49). Similar reasons were given by pharmacy

## BOX 1.5

**Roles and competencies of district pharmacists: case study from Cape Town, South Africa**

*Author: Hazel Bradley, University of Western Cape, South Africa*

In 1994, South Africa's first democratic government introduced major health reforms, favouring a shift towards a primary health-care approach based on a district health system. This shift had implications for human resource development as district pharmacists were appointed to manage district-wide pharmaceutical services. While the new role of district pharmacist provided pharmacists with opportunities to be part of the primary health-care team, it also proved challenging and somewhat frustrating, with a lack of clarity of roles and gaps in skills and capacity to deliver services. In response to this, research was initiated to identify roles and competencies of district pharmacists in Cape Town, an urban metropolitan city in South Africa with a population of about 3.8 million.

During 2008, consultations with eight opinion leaders, from Cape Town and two other provinces in South Africa, triangulated with the published and grey literature, identified the following key roles for district pharmacists:

- Planning, management, coordination and monitoring of:
  - medicines (*selection; supply, distribution and storage; rational prescribing and use*)
  - pharmacy human resources (management and development)
  - pharmaceutical budget;
- advice and support on professional, legal and technical aspects of pharmaceuticals to: health managers, health workers, health programmes, nongovernmental organizations (NGOs), private providers and consumers;
- participation in quality assurance and clinical governance of pharmaceutical services;
- participation in research activities related to medicines and pharmaceuticals services.

The **competencies** identified to perform these roles were classified into four competency clusters:

- management competencies (*planning; organizing, leadership, financial, human resources*);
- health system/public health competencies (*health systems, health programmes, information systems*);
- professional pharmacy practice competencies (*legal and regulatory pharmaceutical care, technical pharmaceutical skills*);
- personal and interpersonal competencies (*problem solving, time management, relationship building, networking, teamwork, communication, adaptability, assertiveness, computer literacy*).

This information could assist South Africa, and countries with similar health systems, to elucidate the roles of district pharmacists in delivering pharmaceutical services and to identify the training and development needs of pharmacists to perform these functions optimally.

technicians in the USA who intended to leave their positions, citing poor salary, lack of advancement opportunity and insufficient staffing as reasons for their intention to leave (50).

A well staffed department, ability to take leave and support for the pharmacist's role within the hospital and professional development opportunities were found to be important retention factors for pharmacists in Australian hospitals (51).

The following strategies have been used by countries to improve pharmaceutical workforce retention:

- **financial incentives:** remuneration, bonuses, allowances, housing, pay parity with other sectors/comparable cadres;
- **non-financial incentives:** professional development, mentoring, support network, career structure, recognition, performance appraisal and feedback, access to information, advocacy;
- **conditions of work:** flexible hours, rotations, shared-staffing, staff support, workload, work environment.

Studies suggest that all strategies influence retention and may be most effective when used in combination (48,52–54).

### Addressing rural workforce shortages

The negative perception of rural pharmacy practice and rural lifestyle has been identified as a barrier to the recruitment and retention of pharmacy staff in developed and developing countries alike (see also Section 1.3.2). To counteract this perception, further opportunities for exposure of students to the potential benefits of rural practice is recommended (55). Pharmacists working in rural areas of Australia have reported experiencing enhanced job satisfaction, despite negative perceptions, due to community linkages with patients, inter-professional relationships and undertaking extended roles (55).

Australia has instigated a successful rural pharmacy programme, targeting recruitment of pharmacists to rural areas (scholarships, allowance), retention of pharmacists (emergency locum service, continuing education allowance) and expansion of access to pharmaceutical services in rural communities and hospitals (pharmacy start-up allowance, rural pharmacist and assistant scholarships) (54). This approach seeks to address the economic, professional, educational and family disincentives (Table 1.1).

TABLE 1.1 **Australian rural pharmacy workforce programme**

Examples of strategies	Disincentive addressed			
	Economic	Professional	Educational	Family
Scholarships and allowances	X	X	X	
Emergency locum support	X	X		X
Rural newsletter		X		
Commissioned rural research projects		X	X	

Source: FIP 2009 (54).

*A review of interventions to improve the density of the health workforce in rural and remote areas found supportive evidence for selection and education strategies but limited evidence of long-term benefit of more coercive strategies (e.g. mandatory service) despite their short-term benefits.*

A review of interventions to improve the density of the health workforce in rural and remote areas found supportive evidence for selection and education strategies but limited evidence of long-term benefit of more coercive strategies (e.g. mandatory service) despite their short-term benefits (56). Sharing pharmacist posts between rural hospitals is another way of maintaining a level of service in cases of national workforce shortages, though this may

be impractical in very remote and widely dispersed rural areas (57). In Sudan, significant urban–rural distribution imbalances persist, despite growing unemployment levels among trained pharmacists. This has been attributed to the lack of available positions despite the need (24). More generally, the lack of career opportunities for family members and schools for children may also be a major barrier to recruitment and retention in rural areas.

### Automating dispensing

Automating dispensing may improve the efficiency, quality and safety of care and is a strategy that has been used in some countries to good effect. For instance, centralized automated dispensing has been used in Cape Town, South Africa, to minimize the workload associated with dispensing chronic care medicines in selected townships (58,59). However, it has been argued that a critical level of workforce is needed to manage such technologies and that the technologies themselves cannot supplant the need for a trained pharmacy workforce, only enhance the performance of the pharmacy services (60). Moreover, the capital and maintenance costs of such technologies are likely to be significant. A comparative study of pre- and post-implementation of a robotic prescription-filling system in a hospital pharmacy in the USA indicated that although overall prescription-filling times were reduced, use of the robotic system necessitated a greater proportion of pharmacy technician time, implying that effects on skill mix would need to be taken into account (61).

## BOX 1.6

### Formalizing informal sector providers

*Author: Ogori Taylor, WHO Country Office Nigeria*

In order to bridge the gap resulting from an inadequate number of pharmacists and pharmacy technicians, some countries authorize informal providers to supply pharmaceutical services. In some regions, particularly in sub-Saharan Africa, the informal sector is often the main supplier of medicines, with informal providers far outnumbering the formally-recognized pharmaceutical cadres. The poor and remote rural populations in particular rely heavily on informal drug sellers for primary care due to their accessibility, responsiveness to customer needs, convenient opening times, and favourable credit facilities (62–67).

The informal sector providers comprise a heterogeneous group, ranging from trained nurses to those with no formal schooling or training (1,68–71). They typically sell medicines in grocery stores, or from kiosks, commercial vehicles or market stalls. Authorized sellers are usually required to obtain annual permits to sell over-the-counter (OTC) medicines in their original packaging from the manufacturer. In many countries, however, a significant proportion of the informal sector providers are unauthorized, operating beyond the law and selling “prescription-only” medicines dispensed from bulk packages (72–74).

In many cases, the health information provided by informal sellers may be inaccurate or misleading (71,75–79). The medicine management skills of some are deficient as they store and handle medicines under poor conditions (66,72,73,80) and label medicines inadequately (66,71). Sometimes they have been found to sell substandard or even counterfeit medicines (73,81–84).

Acceptance of these informal medicine sellers in the provision of medicines has been controversial. Proponents argue for the opportunities their numbers, geographical spread, and acceptance by poor populations offer in improving access to management of common illnesses (85–88). Opponents believe that they encourage the misuse of medicines with the development of resistance to antimicrobials among other problems (89).

*Continued*

## BOX 1.6 continued

Recent years have seen various attempts to improve the knowledge, skills and competencies of providers in the informal sector in order to enhance the quality and safety of pharmaceutical services they offer. However, interventions based on capacity building, demand generation and quality assurance/accreditation are generally considered to be unsustainable as they are either donor- or research-driven (74,85–88,90,91). Licensing requirements are deemed to be unable to assure the quality of services and utility of the medicine sellers (69).

Although attempts to introduce a degree of regulatory control in the informal sector have so far been largely unsuccessful, the reality is that informal providers cannot be ignored and strategies to formalize their contribution need to be devised. One way to achieve this is to require providers to undergo pharmacy technician or assistant training and so formally incorporate them into the pharmacy workforce. Other options include defining required competencies, training structures and supervisory roles for pharmacists.

## 1.4

## FUTURE CHALLENGES AND PRIORITIES

*Workforce shortages and distribution imbalances are likely to persist unless policy action is taken to implement strategies to develop the workforce.*

The global demand for pharmacy human resources is likely to increase in the future as countries improve their economic status and consumers gain greater purchasing power, resulting in higher levels of medicines consumption and increasing demand for more labour intensive pharmaceutical services to support rational use of medicines and adherence. Thus workforce shortages and distribution imbalances are likely to persist unless policy action is taken to implement strategies to develop the workforce.

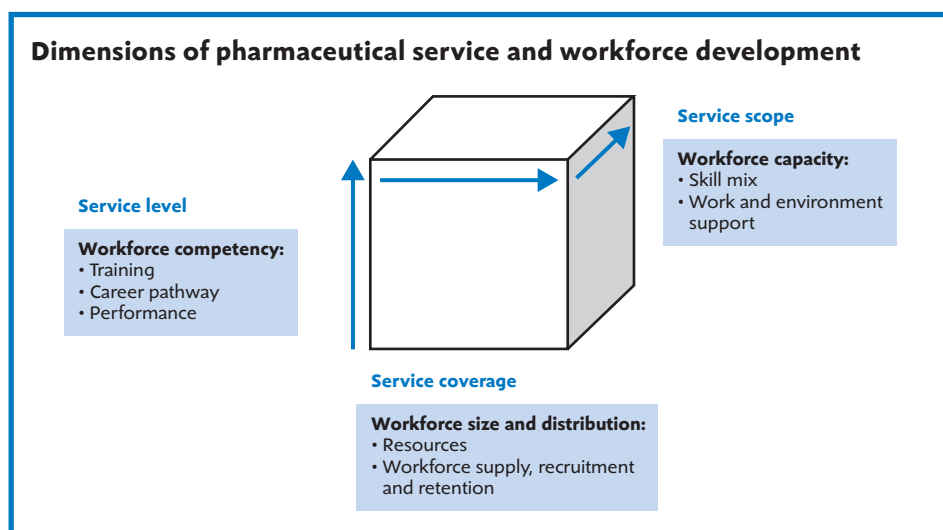
Current trends in sub-Saharan African countries are of particular concern. Here the low density of both pharmacies and pharmacy workforce constitutes a barrier to access to medicines, particularly in rural areas. Investment is urgently needed in order to strengthen both pharmacy education capacity and retention levels, ideally within a strategic pharmaceutical human resource framework.

Few countries have attempted to project future national workforce needs and even fewer have national pharmacy workforce strategic plans. Many countries express a growing need for pharmacists, although the composition of this need varies depending on the specificities of the national labour markets and pharmaceutical service needs. The UK estimates that it will require 38% more pharmacists by 2013, with the greatest need in retail community pharmacy and academia (92). In contrast to the projections for the USA, the requirement for pharmacists in tertiary care (i.e. the National Health Service) was projected to be met by future workforce supply trends, indicating greater self-sufficiency in generating domestic workforce supply for pharmacists in tertiary care than in the USA (28).

A 2002 conference suggested that the absolute pharmacist workforce in the USA needed to increase by 75%, from 240 000 by 2020 (93). Although it was considered that fewer pharmacists would be required for dispensing, as many as five times as many pharmacists (relative to 2001 levels) would be required to provide cognitive services in primary, secondary and tertiary care (94). However, only modest increases would be required for tertiary care if the workforce was focused towards provision of core pharmaceutical services with proven impacts on health outcomes, such as in-service education, drug information, adverse drug reaction management, drug protocol management, medical rounds and admission drug histories (95). The growing prevalence of chronic diseases, which often necessitates increasing medicines consumption, more complex therapies, monitoring and management, may also factor into the growing demand for human resources; a trend of particular significance in LMICs.



FIGURE 1.8



Source: Wuliji T. (96)

There is a need to connect the human resources and the pharmaceutical services *development* agendas through the *development* of national pharmaceutical human resource policies that are integrated into broader human resources for health plans (see Figure 1.8).

### Pharmacy workforce planning

In planning pharmaceutical service development, corresponding attention to the relevant dimensions of workforce planning is necessary. The development mechanism should be context-specific but should take into account these common considerations. A conceptual framework for pharmacy workforce planning and development describes three dimensions that are linked to specific aspects of pharmaceutical service delivery (Figure 1.8) (96). The service level, the technical level at which services are provided, is determined by workforce competency. The service coverage (hours, facilities) is linked to the workforce size and distribution. The service scope (range of specialized services) is dependent on workforce capacity (skill mix, supervision, working environment).

The goal of equitable provision of pharmaceutical services (and thus access to medicines) cannot be pursued without redressing the significant pharmaceutical human resource challenges that manifest in most countries. Appropriately distributed adequate numbers of pharmaceutical human resources with the necessary mix of competencies are vital to the functionality of any pharmaceutical system.

*A coordinated and cohesive approach with clearly defined roles for each stakeholder is necessary to the long-term success of any pharmaceutical workforce policy.*

Demand-side drivers (e.g. growing medicines consumption and expanding pharmaceutical sector markets) have promoted an increase in the pharmaceutical human resource requirements in many countries. This is particularly significant in low-income countries where the capacity to increase workforce supply is the most limited yet medicine consumption (and thus pharmaceutical service need) is likely to increase in the future. The result will be an inadequate response to labour market needs in the pharmaceutical sector unless deliberate investments into pharmaceutical human resource planning and development are made.

Key stakeholders in the workforce planning process include government departments (ministries of health, education, and finance), training institutions, professional and regulatory bodies, consumer groups and employers (private and public sector). A coordinated and cohesive approach with clearly defined roles for each stakeholder is necessary to the long-term success of any pharmaceutical workforce policy. The incentives and barriers for the

## BOX 1.7

**Workforce competency (service level)** to ensure the performance of a workforce in providing services at every competency level

- Competency frameworks define and describe the required knowledge, attitudes, values and behaviours and delineate levels of competence associated with a core set of pharmaceutical services. These can be used in planning curriculum and scopes of practice for each cadre and at a human resource management level to guide continuing education and performance assessment.
- Pharmacy education should be needs-based and oriented to support the development of required competencies, should be assessed and reviewed on a regular basis.
- The development of a clear career pathway should be linked to different levels of competency with the possibility of progression between levels aids in motivating performance and retention.
- Performance management is an important mechanism for ensuring professional quality assurance and the appropriate translation of competencies into daily practice. The development of policies for performance management and guidance for performance appraisals are key to ensure equity, transparency and fairness.

**Workforce size and distribution (service coverage)** to provide adequate human capacity to support equitable access to pharmaceutical services

- Adequate and sustainable financing over the mid to long term (5–10 years) to support adequate training infrastructure, the extension of payroll and institute measures to improve retention. The commitment of ministries of finance is key. Dependence on donor funds to support salaries should be avoided unless mid- to long-term commitments can be assured.
- Workforce supply may be increased by scaling up the domestic production of human resources or introducing policies to attract foreign workers (often not sustainable). National human resource policies should avoid dependence on foreign workers where possible, particularly those from countries with existing workforce shortages. Expansion in enrolments in training institutions should be phased with the level of training capacity. Establishment or expansion of private sector training institutions, including investment to expand post-graduate education for lecturers and teacher training, (e.g. work-place based or distance education, resource sharing with other training institutions or research facilities). The rate of expansion should take into account the labour market dynamics and absorption of new graduates.
- Pharmaceutical human resource needs have not been well defined outside urban areas. A rural recruitment strategy should be developed which provides a package of incentives to attract the workforce into under-served areas avoiding lengthy and bureaucratic recruitment processes. One example is the use of an external agency to expedite recruitment.
- Retention strategies, which include a package of both financial and non-financial incentives, including performance management strategies, and flexible workforce policies that are gender sensitive, can have an impact on improving retention. Attrition should be examined through local research in order to inform an effective retention policy.

**Workforce capacity (service scope)** to ensure appropriate workforce capacity to provide the required scope of services

- The skill mix of pharmaceutical human resources should be appropriate to needs to optimize performance. A competency framework to aid planning and effective supervisory systems can both help in redressing skill mix imbalances.
- The working environment should be conducive to the provision of safe and quality pharmaceutical services. Basic infrastructure and equipment may also be required in order to adequately provide a service (e.g. chemotherapy, compounding and anticoagulant therapy). Good Pharmacy Practice policies may provide guidelines for basic requirements including support and supervision, and risk and environment assessment, given the potential impact of errors on patient safety.

participation of each stakeholder in the policy process should be analysed in each country context in order to identify suitable strategies for implementation.

Several policy considerations are briefly described here under each dimension of human resource development (Box 1.6). These provide an introduction to policy considerations that should be taken into account in the development of a national human resources policy and plan.

### Evidence-based human resource planning

Several countries have embarked on or are in the process of developing an evidence base (workforce situational analysis, workforce studies) to inform national pharmacy human resource planning (17). Great Britain (England, Scotland and Wales) has completed a series of workforce census studies and has developed an evidence-based pharmacy workforce model to project future needs (28). Canada recently undertook comprehensive studies of the pharmacy technician and pharmacist workforce and is developing a national pharmacy human resource information system (97).

Human resources information systems are important not only for strategic planning purposes but also for service development in terms of human resource management and for the purposes of understanding the distribution of human capacity to deliver pharmaceutical services. The starting point for the development of a human resources policy should be a reliable and recent situational analysis of pharmaceutical human resources within a country. Ideally, the analysis would include an assessment of domestic training capacity and an evaluation of human resource management. In addition, any initiative to strengthen pharmaceutical human resources should be supported by human resource information systems, which provide a means of monitoring the development of trends and of assessing progress, and are invaluable for informing future planning.

Pilot assessments of pharmaceutical human resources were conducted in 2009 by WHO in the African Region (e.g. Nigeria, Ghana, Sudan and the United Republic of Tanzania), with a view to informing pharmaceutical human resource strategic plans. Generic tools for situational analysis have been developed by WHO and were published in July 2011 ([http://www.who.int/medicines/areas/coordination/hrp\\_tool.pdf](http://www.who.int/medicines/areas/coordination/hrp_tool.pdf)) (20).

To date, research in the area of pharmaceutical human resources development has been limited and further empirical efforts are required to examine and evaluate the success of strategies implemented across different contexts. In order to identify key issues, workforce modelling to project future requirements should take into account data on supply and attrition, and identify key demand- and supply-side issues.

In conclusion, pharmacy workforce supply, recruitment and equitable deployment and retention remain serious challenges to pharmaceutical systems development in any context. Interventions to address these challenges should focus on building pharmacy education capacity, improving workforce retention and distribution, developing comprehensive national human resource strategic plans (that are gender sensitive) and strengthening human resource information systems to inform planning.

*Human resources information systems are important not only for strategic planning purposes but also for service development in terms of human resource management and for the purposes of understanding the distribution of human capacity to deliver pharmaceutical services.*

## REFERENCES

1. *The world health report 2006: Working together for health*. Geneva, World Health Organization, 2006. Available at: [http://www.who.int/whr/2006/whr06\\_en.pdf](http://www.who.int/whr/2006/whr06_en.pdf)
2. *Pharmaceutical industry profile 2009*. Washington D.C., Pharmaceutical Research and Manufacturers of America (PhRMA), 2009.
3. *Prescription for healthy development: increasing access to medicines*. Report of the Task Force on HIV/AIDS, Malaria, TB and Access to Essential Medicines. UN Millennium Project. Sterling, VA, Earthscan, 2005. Available at: <http://www.unmillenniumproject.org/documents/TF5-medicines-Complete.pdf>
4. Bond CA, Raehl CL, Patry R. Evidence-based core clinical pharmacy services in United States hospitals in 2020: Services and staffing. *Pharmacotherapy*, 2004, 24(4):427-440.
5. Bond CA, Raehl CL, Franke T. Clinical pharmacy services, pharmacy staffing, and the total cost of care in United States hospitals. *Pharmacotherapy*, 2000, 20(6):609-621.
6. Bond CA, Raehl CL, Franke T. Clinical pharmacy services, pharmacist staffing, and drug costs in United States hospitals. *Pharmacotherapy*, 1999, 19(12):1354-1362.
7. Howard RL et al. Investigation into the reasons for preventable drug related admissions to a medical admissions unit: observational study. *Quality and Safety in Health Care*, 2003, 12:280-285. Available at: <http://qualitysafety.bmj.com/content/12/4/280.full>
8. Hourihan F, Krass I, Chen T. Rural community pharmacy: a feasible site for a health promotion and screening service for cardiovascular risk factors. *Australian Journal of Rural Health*, 2003, 11(1):28-35.
9. Blenkinsopp A, Anderson C, Armstrong M. Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviours and risk factors for coronary heart disease. *Journal of Public Health Medicine*, 2003, 25:144-153.
10. Kritikos V et al. Innovative asthma health promotion by rural community pharmacists: a feasibility study. *Health Promotion Journal Australia*, 2005, 16(1):69-73.
11. Ritzenthaler R. *Delivering antiretroviral therapy in resource-constrained settings: Lessons from Ghana, Kenya and Rwanda*. Research Triangle Park, North Carolina, Family Health International, 2005. Available at: <http://www.fhi.org/NR/rdonlyres/ej5r3pyybpgeqtqtinm6qlso4lhve7bvc eqlqvwxjldycjhlhu5bg7z2ur73q2rczwt5tfqw7tp/ARTLessonsLearned083106.pdf>
12. Mayhew S et al. Pharmacists' role in managing sexually transmitted infections: Policy issues and options for Ghana. *Health Policy and Planning*, 2001, 16(2):152-160.
13. Ward K et al. Provision of syndromic treatment of sexually transmitted infections by community pharmacists: a potentially underutilized HIV prevention strategy. *Sexually Transmitted Diseases*, 2003, 30(8):609-613.
14. Borja-Lopetegi A et al. Association between clinical medicines management services, pharmacy workforce and patient outcomes. *Pharmacy World & Science*, 2008, 30(4):418-420. Available at: [http://www.codeg.org/fileadmin/codeg/pdf/glf/Borja-Lopetegi\\_2008.PDF](http://www.codeg.org/fileadmin/codeg/pdf/glf/Borja-Lopetegi_2008.PDF)
15. Bond CA, Raehl CL. Clinical pharmacy services, pharmacy staffing, and hospital mortality rates. *Pharmacotherapy*, 2007; 27(4):481-493.

16. Chan XH, Wuliji T. *Global pharmacy workforce and migration report*. The Hague, International Pharmaceutical Federation (FIP), 2006. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
17. 2009 FIP global pharmacy workforce report. The Hague, International Pharmaceutical Federation (FIP), 2009. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
18. 2012 FIP global pharmacy workforce report. The Hague, International Pharmaceutical Federation (FIP), 2012. Available at:  
<http://www.fip.org/www/index.php?page=humanresources>
19. *International Standard Classification of Occupations (ISCO-08)*. Group definitions: Occupations in health. Geneva, International Labour Organization, 2009. Apr.
20. Tata H, Wuliji T, Cinnella E. *Pharmaceutical human resources assessment tools*. Geneva, World Health Organization, 2011. Available at:  
<http://apps.who.int/medicinedocs/en/cl/CL5.23.35/clmd,50.html>
21. World Health Organization maximizing positive synergies collaborative group. An assessment of interactions between global health initiatives and country health systems. *Lancet*, 2009, 373:2137–2169.
22. Mandour ME, Salih N. Country case study: Sudan. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation (FIP), 2009. p. 54–61. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
23. Beardsley R et al. Factors influencing the pharmacy faculty workforce. *American Journal of Pharmaceutical Education*, 2008, 72(2).
24. Hawthorne N, Anderson C. The global pharmacy workforce: a systematic review of the literature. *Human Resources for Health*, 2009, Jun, 7(48). Available at:  
<http://www.human-resources-health.com/content/pdf/1478-4491-7-48.pdf>
25. Nguyen XH. Country case study: Vietnam. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation, (FIP), 2009. p. 69–74. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
26. *The new approach to the training of pharmacist's assistants in South Africa*. Pretoria, South African Pharmacy Council, 2003.
27. O'Leary KM, Allison YM. Snapshot of the Australian public hospital pharmacy workforce in 2003. *Journal of Pharmacy Practice and Research*, 2004, 34(2):104–108.
28. Guest D, Budjanovanin A, Oakley P. Country case study: Great Britain. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation; 2009. p. 40–48. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)

29. Savio E, Fernandez G, Etcheverry S. Country case study: Uruguay. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation (FIP), 2009. p. 62–65. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
30. Dambisya YM, Modipa IS, Legodi MG. Factors influencing the distribution of pharmacy graduates of the University of the North, South Africa. *East African Medical Journal*, 2007 Oct, 84(10):481–488. Available at:  
<http://www.ajol.info/index.php/eamj/article/view/9566/31021>
31. Allan J et al. 'It's all part of the package' in rural allied health work: A pilot study of rewards and barriers in rural pharmacy and social work. *The Internet Journal of Allied Health Sciences and Practice* 2007, 5(3). Available at:  
<http://ijahsp.nova.edu/articles/vol5num3/allan.pdf>
32. Serneels P et al. For public service or money: understanding geographical imbalances in the health workforce. *Health Policy and Planning*, 2006, Dec, 22:128–138.
33. International Pharmaceutical Federation (FIP) Global Pharmacy Education Taskforce. FIPed web site: <http://www.fip.org/education>
34. Anderson C. Academic and institutional capacity: a global issue. *American Journal of Pharmaceutical Education*, 2008, 72(5).
35. Anderson C et al. The WHO/UNESCO/FIP Pharmacy Education Taskforce. *Human Resources for Health Journal*, 2009, 7(45). Available at:  
<http://www.human-resources-health.com/content/7/1/45>
36. Matowe L et al. A strategy to improve skills in pharmaceutical supply management in East Africa: the Regional Technical Resource Collaboration for Pharmaceutical Management. *Human Resources for Health*, 2008, 6:30. Available at:  
<http://www.human-resources-health.com/content/6/1/30>
37. Anderson C et al. Needs-based education in the context of globalization. *American Journal of Pharmaceutical Education*, 2012, Vol.76(4).Article 56:1–3. Available at:  
<http://www.ajpe.org/doi/pdf/10.5688/ajpe76456>
38. *The innovative medicines initiative strategic research agenda: Creating biomedical R&D leadership for Europe to benefit patients and society*. Brussels, Innovative Medicines Initiative (IMI), 2006. Available at:  
<http://www.imi.europa.eu/content/history>
39. Anderson C et al. Action! Update on the Global Pharmacy Education Consultation. *International Pharmacy Journal*, 2007, 22(2).
40. Breimer D. Future training needs in the pharmaceutical sciences: Academia – industry. *European Journal of Pharmaceutical Sciences*, 2001, 12:347–352.
41. Anderson C et al. The Pharmacy Education Taskforce: FIP and WHO move forward in developing pharmacy education. *International Pharmacy Journal*, 2007, 22(1):3–5.
42. Mohamed Ali GK. A prescription for improvement: A short survey to identify reasons behind public sector pharmacists' migration. *World Health & Population*, 2006, Jan 15:1–24.
43. Wuliji T, Carter S, Bates I. Migration as a form of workforce attrition: a nine-country study of pharmacists. *Human Resources for Health*, 2009, 7.



44. *The pharmaceutical industry in figures: 2009 update*. Brussels, European Federation of Pharmaceutical Industries and Associations (EFPIA), 2009.
45. TI Pharma, 21-June-2009.
46. Farrell D, Grant A. China's looming talent shortage. *McKinsey Quarterly*, 2005. Report No.4.
47. Mboya-Okeyo T, Ridley R, Nwaka S. The African network for drugs and diagnostics innovation. *Lancet*, 2009, 373:1507-1508.
48. Kainey S. *Hospital pharmacy in rural Victoria*. Melbourne, The Society of Hospital Pharmacists of Australia, 2003. Available at:  
[www.shpa.org.au/lib/pdf/whatsnew/hosp\\_pharm\\_rural\\_vic.pdf](http://www.shpa.org.au/lib/pdf/whatsnew/hosp_pharm_rural_vic.pdf)
49. Gaither CA et al. Should I stay or should I go? The influence of individual and organizational factors on pharmacists' future work plans. *Journal of the American Pharmacists Association*, 2003, 47(2):165-173.
50. Desselle SP. Job turnover intentions among certified pharmacy technicians. *Journal of the American Pharmacists Association*, 2005, 45(6):676-683.
51. *Strategies to improve the retention and recruitment of Australia's hospital pharmacy workforce as part of the National Workforce Action Plan*. Melbourne, Society of Hospital Pharmacists of Australia (SHPA), 2007 Feb.
52. Vujicic M et al. The role of wages in the migration of health care professionals from developing countries. *Human Resources for Health*, 2004, 2(1):3. Available at:  
<http://www.biomedcentral.com/content/pdf/1478-4491-2-3.pdf>
53. Mathauer I, Imhoff I. Health worker motivation in Africa: the role of non-financial incentives and human resource management tools. *Human Resources for Health*, 2006, 4(1):24. Available at: <http://www.human-resources-health.com/content/4/1/24/>
54. Mitchell F, Quester M. Pharmacy workforce planning and development: Country case study - Australia. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation (FIP), 2009. p. 25-32. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)
55. Harding A et al. Factors affecting the recruitment and retention of pharmacists to practice sites in rural and remote areas of New South Wales: a qualitative study. *Australian Journal of Rural Health*, 2006, 14(5):214-218.
56. Wilson N et al. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. *Rural and Remote Health*, 2009, 9(1060).
57. Casey MM, Moscovice IS, Davidson G. Pharmacist staffing, technology use and implementation of medication safety practices in rural hospital. *The Journal of Rural Health*, 2006, 22(4):321-330.
58. Du Plessis J. The chronic dispensing unit. *South African Pharmaceutical Journal*, 2008, 75(9):46-47.
59. Du Toit J, Dames S, Boshoff R. Centralised dispensing - An affordable solution. *South African Pharmaceutical Journal*, 2008, 75(10):18-20.

60. Barcia SM. Staff shortages. Can pharmacy computer systems bridge the gap? *Health Management Technology*, 2000, 21(11):26, 28.
61. Lin AC, Huang Y-C, Punches G, Chen Y. Effect of a robotic prescription-filing system on pharmacy staff activities and prescription-filling time. *American Journal of Health-System Pharmacy*, 2007, Sep 1, 64:1832-1839.
62. Snow R, Peshu N, Forster D, Mwensi H, Marsh K. The role of shops in the treatment and prevention of childhood malaria on the coast of Kenya. *Transcript of the Royal Society of Tropical Medicine and Hygiene*, 1992, 86:237-239.
63. McCombie S. Treatment seeking for malaria: A review of recent research. *Social Science and Medicine*, 1996, 43:933-945.
64. Lindblade K et al. Treatment for clinical malaria is sought promptly during an epidemic in a highland region of Uganda. *Tropical Medicine and International Health*, 2000, 5:865-875.
65. Molyneux S et al. Intra-household relations and treatment decision-making for childhood illness: A Kenyan case study. *Journal of Biosocial Science*, 2002, 34:109-131.
66. Battersby A et al. *Improving the supply, distribution and use of antimalarial drugs by the private sector in Tanzania*. London, Malaria Consortium, 2003. Available at:  
[http://www.malariaconsortium.org/search.php?cx=000287379876554161564%3Avva\\_3lh6wnq&cof=FORID%3A10&ie=ISO-8859-1&q=battersby](http://www.malariaconsortium.org/search.php?cx=000287379876554161564%3Avva_3lh6wnq&cof=FORID%3A10&ie=ISO-8859-1&q=battersby)
67. Uplekar M et al. Tuberculosis patients and practitioners in private clinics in India. *International Journal Tuberculosis and Lung Disease*, 1998, 2:324-329.
68. Adikwu M. Sales practices of patent medicine sellers in Nigeria. *Health Policy and Planning*, 1996, 11:202-205.
69. Kumaranayake L et al. Coping with private health markets – regulatory (in) effectiveness in sub-Saharan Africa. In: Soderlund N, Mendoza-Arana P, Goudge J, eds. *The new public/private mix in health: Exploring the changing landscape*. Geneva, Alliance for Health Policy and Systems Research, 2003. p. 47-59.
70. Brieger W et al. Interactions between patent medicine vendors and customers in urban and rural Nigeria. *Health Policy and Planning* 2004, 19(3):177-182.
71. Okeke T, Uzochukwu B, Okafor H. An in-depth study of patent medicine sellers' perspectives on malaria in a rural Nigerian community. *Malaria Journal*, 2006, 5(97).
72. van der Geest S. The articulation of formal and informal medicine distribution in south Cameroon. In: van der Geest S, Whyte S, eds. *The context of medicines in developing countries*. Dordrecht, the Netherlands, Kluwer Academic Publishers, 1998. p. 131-148.
73. Geissler P et al. Children and medicines: self-treatment of common illnesses amongst Luo schoolchildren in western Kenya. *Social Science and Medicine*, 2000, 50:1771-1783.
74. Goodman C et al. Drug shop regulation and malaria treatment in Tanzania – why do shops break the rules, and does it matter? *Health Policy and Planning*, 2007, 22:393-403.
75. Okoro B, Jones I. Pattern of drug therapy in home management of diarrhoea in rural communities of Nigeria. *Journal of Diarrhoeal Diseases Research*, 1995, 13:151-154.
76. Twebaze D. *A literature review of care-seeking practices for major childhood illnesses in Uganda*. Arlington, VA, BASICS II for the United States Agency for International Development, 2001.

77. Nshakira N et al. Appropriate treatment of malaria? Use of antimalarial drugs for children's fevers in district medical units, drug shops and homes in eastern Uganda. *Tropical Medicine and International Health*, 2002, 7:309–316.
78. Hetzel M et al. Malaria treatment in the retail sector: Knowledge and practices of drug sellers in rural Tanzania. *BMC Public Health*, 2008, 8:157. Available at: <http://www.novartisfoundation.org/platform/apps/Publication/getfmfile.asp?id=613&el=2452&se=1800744&doc=179&dse=4>
79. Newton P et al. Characterization of “Yaa Chud” medicine on the Thailand-Myanmar border: Selecting for drug-resistant malaria and threatening public health. *American Journal of Tropical Medicine and Hygiene*, 2008, 79(5):662–669.
80. Goodman C et al. Retail supply of malaria-related drugs in rural Tanzania: risks and opportunities. *Tropical Medicine and International Health*, 2004, 9:655–663.
81. Basco L. Molecular epidemiology of malaria in Cameroon. XIX. Quality of antimalarial drugs used for self-medication. *American Journal of Tropical Medicine and Hygiene*, 2004, 70:245–250.
82. Oladepo O et al. *Malaria treatment and policy in three regions in Nigeria: The role of patent medicine vendors*. Future Health Systems Working Paper 1, Nigeria Series, 2009. Available at: <http://www.futurehealthsystems.org/storage/publications/working-papers/wp1.pdf>
83. Muula AS et al. Human resources requirements for highly active antiretroviral therapy scale-up in Malawi. *BMC Health Services Research*, 2007, 7. Available at: <http://www.biomedcentral.com/1472-6963/7/208>
84. Waako P et al. Existing capacity to manage pharmaceuticals and related commodities in East Africa: an assessment with specific reference to antiretroviral therapy. *Human Resources for Health*, 2009, 7(1):21. Available at: <http://www.human-resources-health.com/content/7/1/21>
85. Amin A et al. The use of formal and informal curative services in the management of paediatric fevers in four districts in Kenya. *Tropical Medicine and International Health*, 2003, 8:1143–1152.
86. Pagnoni F et al. Artemisinin-based combination treatment in home-based management of malaria. *Tropical Medicine and International Health*, 2005, 10:621–622.
87. *Targeting improved access to essential medicines*. Proceedings of the Conference. Accra, Strategies for Enhancing Access to Medicines (SEAM), 2005. Available at: <http://www.msh.org/seam/conference2005/>
88. *The Roll Back Malaria strategy for improving access to treatment through home management of malaria*. Geneva, World Health Organization, 2005. Available at: [http://www.who.int/malaria/publications/atoz/who\\_htm\\_mal\\_2005\\_1101/en/index.html](http://www.who.int/malaria/publications/atoz/who_htm_mal_2005_1101/en/index.html)
89. Okeke IN et al. Antimicrobial resistance in developing countries. Part II: Strategies for containment. *Lancet Infectious Diseases*, 2005, 5(9):568–580.
90. Abuya T et al. Impact of Ministry of Health interventions on private medicine retailer knowledge and practices on anti-malarial treatment in Kenya. *American Journal of Tropical Medicine and Hygiene*, 2009, 80(6):905–913.

91. Smith L et al. Review: Provider practice and user behaviour interventions to improve prompt and effective treatment of malaria: Do we know what works? *American Journal of Tropical Medicine and Hygiene*, 2009, 80(3):326–335.
92. Guest D, Battersby S, Oakley P. *Future pharmacy workforce requirements: Workforce modelling and policy recommendations*. London, Royal Pharmaceutical Society of Great Britain, 2005.
93. Knapp DA. Professionally determined need for pharmacy services in 2020. *American Journal of Pharmacy Education*, 2002, 66:421–429.
94. Johnson TJ. Pharmacist work force in 2020: Implications of requiring residency training for practice. *American Journal of Health-System Pharmacy*, 2008, 65(2):166–170.
95. Bond CA, Raehl CL, Patry R. The feasibility of implementing an evidence-based core set of clinical pharmacy services in 2020: Manpower, marketplace factors, and pharmacy leadership. *Pharmacotherapy*, 2004, 24(4):441–452.
96. Wuliji T. Current status of human resources and training in hospital pharmacy. *American Journal of Health-System Pharmacy*, 2009, 66(5):S56–S60.
97. Cooper J et al. Country case study: Canada. In: Wuliji T, ed. *2009 FIP global pharmacy workforce report*. The Hague, International Pharmaceutical Federation, 2009. p. 33–39. Available at:  
[http://www.fip.org/www/index.php?page=programmesandprojects\\_pharmacyeducationtaskforce\\_humanresources](http://www.fip.org/www/index.php?page=programmesandprojects_pharmacyeducationtaskforce_humanresources)

## ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral therapy
EMRA	European Medicines Research Academy
FIP	International Pharmaceutical Federation
GNI	Gross National Income
HIV	human acquired immunodeficiency syndrome
ILO	International Labour Organization
LMIC	Low- and middle-income countries
NGO	Nongovernmental organization
PPP	Purchasing power parity
R&D	Research and development
TB	Tuberculosis
UNESCO	United Nations Education, Scientific and Cultural Organization
WHO	World Health Organization