Manpower distribution

Alfonso Mejia, Thomas L. Hall & Erica Royston

One of the central problems facing manpower planners in most countries today is the uneven coverage of health services owing to geographical, occupational, and functional imbalances in health manpower distribution. This chapter seeks to provide a deeper understanding of the underlying causes of such maldistribution and to suggest ways in which to reduce it and minimize its adverse effects.

Distribution Problems: An Overview

Except perhaps among primitive societies at subsistence level, unequal distribution of resources is universal and neither new nor unique to the health sector. It is not limited to certain kinds of political or economic system and it is just as pronounced between nations as within them. Indeed, as long as wide variations in level of development and life style continue, the resultant differences in economic and political power will result in inequalities in the access to goods and services, including health services.

The unfeasibility of achieving total equality in health service distribution, however, provides no justification for the enormous gap that now exists in access to primary care between the urban and rural sectors and, within the urban sector, between the rich and the poor. The persistence of this gap is an affront to social justice, a brake on development and, in an era of rapid communications and rising expectations, a major threat to political stability. Moreover, with the relatively small urban sectors of many countries continuing to capture a hugely disproportionate share of the annual growth in health sector resources, the gap is in fact growing.

Conceptual framework and underlying causes

The central problem of distribution is that of health care, not of health manpower per se. For all practical purposes health care means primary
health care, since high cost and technical complexity serve to limit most specialty care to urban areas. This chapter therefore pays most attention to the manpower aspects of the distribution of primary care, that is, to the manpower needed to provide the preventive and curative services essential to the maintenance of satisfactory standards of health and well-being.

The tendency in many countries has been to view manpower distribution problems largely from a geographical perspective, so that they emphasize policies either of redistributing existing manpower or of inducing a larger proportion of health professionals to go to underserved geographical areas. In fact, the geographical aspect is only one, and among the least tractable, of the major aspects of the resource distribution problem. As more and more countries have come to realize that the traditional patterns of health services delivery are incapable of meeting the primary care needs of their large rural sectors, they are coming to accept that the major solutions do not lie simply in the geographical redistribution of physicians and other high-level manpower but rather in changing the ways available resources are used. The several interrelated aspects of resource distribution listed below provide a more complete framework than geographical distribution for viewing the problems to be discussed in this chapter. The manpower planner concerned with health care distribution should consider the problem from the standpoint of:

- **Geography**—certain communities have more resources than others.

- **Access**—certain segments of a community have more resources available to them than others.

- **Institutions**—beds and support facilities may be unevenly distributed within the population, or institutional types (specialized hospitals, general hospitals, etc.) may be inappropriate to the communities they serve.

- **Functions**—the priority given to different health care functions such as preventive, curative, and rehabilitative or to different forms of care such as inpatient, ambulatory, convalescent, and home services may be inappropriate to community needs.

- **Occupations**—there may be an inappropriate balance between the supply of high, intermediate, and auxiliary level manpower or, within a given manpower category, an inappropriate distribution of the various specialty skills (medicine, paediatrics, surgery, etc.).

- **Policy**—policy-makers, administrators, and planners may pay unequal attention to the health care needs of different segments of the population.

The underlying causes of inequalities in the availability of health care are for the most part self-evident. Many are linked with the wide and
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Growing differences between urban and rural living standards that are both antecedent to and consequent upon migration from the rural areas to the towns. Although the relative importance of the numerous causes varies from situation to situation, the basic list is predictably similar among countries. Among the major factors are the better and more varied opportunities open to urban residents for education, health care, housing, transport, cultural and recreational activities, jobs, and income. Cities, with their concentration of people and resources, also exert a strong political dominance over the whole country. Most health professionals come from urban middle-class or upper-class backgrounds and are educated in and work in urban institutions organized largely according to the standards of developed countries. It is little wonder, therefore, that health professionals tend to favour the way of life they know best and thus contribute to the overall problem.

Magnitude of the problem

Both quantitatively and qualitatively, the problems of manpower maldistribution are vast. Not only is there a world insufficiency of professional health manpower, but its distribution is also so unequal that it has been estimated that 40% of the world’s population and 85% of the developing world’s rural population have no access to health care. In Latin America alone there are more than 100 million people, or one third of the total population, with no access whatever to health care.

The maldistribution of professional health manpower between different countries and regions of the world has attracted considerable attention in recent years and is considered in some detail in Chapter 10. Suffice it to note here that, according to WHO statistics for the world’s 2,500,000 physicians, one third are in Europe and North America, which together account for only one fifth of the world’s population. In Europe and North America there are some 650 persons per physician, while in some countries in Africa there are more than 85,000. The less developed countries account for three quarters of the world’s population. Their birth rate is over twice as high as in the developed areas, their death rate is almost double. The waste of human life this implies is enormous.

Of even greater concern is the maldistribution of health manpower within countries, which in many cases presents extremes equal to or in excess

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of those observed between countries. As the data in Table 11 show, the availability of physicians tends to be 10-20 times greater in the large cities than in the countryside in the developing countries and the difference is quite considerable even in the developed countries.

**TABLE 11. DISTRIBUTION OF PHYSICIANS IN SELECTED COUNTRIES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Capital city</th>
<th>Other areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1969</td>
<td>61.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Canada</td>
<td>1970</td>
<td>98.9</td>
<td>9.1</td>
</tr>
<tr>
<td>Chile</td>
<td>1970</td>
<td>7.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Eritrea</td>
<td>1970</td>
<td>1.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1972</td>
<td>2.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Iran</td>
<td>1973</td>
<td>11.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Kenya</td>
<td>1973</td>
<td>7.5</td>
<td>0.2</td>
</tr>
<tr>
<td>Mali</td>
<td>1973</td>
<td>4.5</td>
<td>0.9</td>
</tr>
<tr>
<td>Poland</td>
<td>1974</td>
<td>41.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Sweden</td>
<td>1976</td>
<td>25.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Thailand</td>
<td>1976</td>
<td>8.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Yemen</td>
<td>1976</td>
<td>8.9</td>
<td>0.2</td>
</tr>
</tbody>
</table>


The inequalities in the distribution of physicians would not be so gross if other resources were more evenly distributed. This is usually not the case, however, since nurses, dentists, technicians, and other intermediate and high-level health manpower tend to be even more concentrated in the cities than physicians are. Moreover, although the physician/population ratios observed in the big cities of the developing countries compare favourably with those found in many developed countries, the urban poor continue to suffer from grossly inadequate access to health care. Thus the problem is not only geographical maldistribution between the urban and rural sectors but also malutilization of physicians and other health workers within the urban sector.

**Past approaches to reducing maldistribution**

The problem of health services and manpower maldistribution and the resulting inequalities of health care have occupied national and international health agencies for many years. During these years it has become more acute, and the futility of looking for solutions along old paths has become more evident.

The concern is not new. What is new is the turning away from piecemeal solutions to an attempt to deal with the problems over a broad front, integrating all aspects of health care, linking health development with overall development, and looking beyond curing illness in the individual to
promoting health in the community. In terms of manpower, this has meant the gradual turning away from the idea of increasing the numbers within the traditional manpower categories of physicians, nurses, and dentists to the idea of the integrated health team, using for each of its components the type of manpower most suited for the task to be performed. Among international agencies this change in approach has accompanied, or perhaps has evolved from, other broad policy changes. During much of the 1950s the emphasis in many of the least developed countries was on attacking one or several priority disease problems by means of a vertically oriented and centrally directed health programme. This involved sending into the field specialized health teams which, once the job was completed, were withdrawn (or occasionally left to continue a maintenance programme, usually without a mandate to spread sideways into other broader fields of health care).

Towards the end of this period and in the early 1960s a number of countries concentrated on developing comprehensive “health demonstration areas”, with the intention, as experience accumulated and organizational refinements were made, of extending them regionally and eventually nationally. In the majority of these experiments the health services were organized along conventional lines in regard to the use of manpower, hence they depended inordinately upon the availability of physicians and nurses. This dependence later impeded their extension to other areas because of the cost and the reluctance of professionals to serve in the rural areas.

With time the emphasis tended to shift towards increasing the production of all levels of health manpower, especially professionals, in the hope that, as the national manpower/population ratio improved, so would the availability of health workers in underserved areas. Although this approach has had some effect on improving the ratio, it is now becoming evident that the cost in relation to the benefits obtained is exorbitant. Even countries with very large graduating classes of health professionals are finding that new graduates for the most part prefer to emigrate or to stay in the overcrowded cities, often at considerable financial sacrifice, rather than move to the areas where they are most needed.

With the failure of this and other piecemeal approaches in getting health workers to move to underserved areas, countries now seem to be moving into a fourth phase, which might be termed “functional.” In this phase, while the countries continue to recognize the validity of many of the concepts underlying previous attempts to improve the distribution of care, the emphasis is now on the feasibility of implementation. The current phase gives greater recognition to the constraints prevailing within the health system on resources and managerial capacity to implement programmes and, most importantly, to the constraints imposed by the political realities of the time and the place.
During the current phase many developing countries, alone or with external assistance, have adopted a wide variety of approaches to distributional problems, many of which will be referred to below. Dominant approaches have included regionalization, administrative decentralization, greater priority for prevention, increased use of intermediate and auxiliary level manpower, and a diversity of schemes to increase the availability and effectiveness of physicians in the health sector, growing reliance being placed on village health workers with a minimum level of training. These approaches have taken place within different sociopolitical systems, the characteristics of which have, rightly or wrongly, been used to explain both the successes and the failures that have been observed. While the relative merits of alternative political systems in improving health care distribution may still be debatable, there are certain prerequisites to success in all countries. These are considered below.

Planning Considerations and Strategies

Assessing the distribution problem

Various indicators, most of which are well known to the planner, have been used to assess the adequacy of the health care available to a defined population. He can choose between a wide variety of health input and output indicators such as: health workers available, by type; health facilities available, by type and capacity; services provided, by type; mortality rate, by cause; morbidity distribution, usually limited to those receiving care; and health expenditure. Naturally, the more the planner can use utilization rates or other indicators of services provided or, optimally, of health status, the better—though in most situations the statistics available limit him to the availability of resources. It should be stressed that the supply of physicians may be a very poor and rather an outdated indicator of the availability of primary care, as the crux of the problem lies as much in manpower use as in total numbers.

On the other hand there is the population to be served, which may be the total number of persons per administrative or political unit, the persons residing in communities within a given population size or density range, the persons at risk of certain diseases or conditions (pregnancy, occupational hazards, etc.), or the persons eligible to receive care according to social security or other criteria. The population is not static; it is continuously increasing and changing its characteristics. The last thirty years have brought about dramatic increases in the proportion of the population in the younger age groups in virtually all the developing countries, owing to a continued high fertility level and a significant decline in infant and child mortality. In most cases these population composition shifts have been
most pronounced among rural inhabitants and the poor, thus further exacerbating the problem of health care maldistribution. Moreover, the problem could well be self-perpetuating, in that improved health brings higher survival rates, which then create new pressures on already impoverished communities. The rural poor migrating to cities create peri-urban slums, which themselves constitute one of the major underprivileged sectors.

The physician/population ratio has been used extensively as an indicator of health service distribution. Ratios of this kind, however, have only limited value and may be particularly misleading in developing countries where the responsibility for health care delivery falls in large part on non-professional health workers. Their value can be to some extent increased if all levels of health worker are included in the service coverage indicators.

A further problem is the geographical unit chosen for measurement. If it is small, a ratio would not reflect a situation where there was considerable movement across areas in seeking health care. If it is large, the ratio may mask major inequalities between the urban and the rural sectors or between geographical regions, as shown in Table 11. In any case, simple head counts and ratios created from such counts do not indicate the coverage of services, which is a function of utilization patterns, personnel productivity, and accessibility to care.

In deciding which indices of maldistribution to develop, the planner should keep in mind the two dimensions of coverage: geographical and functional. While the former is easier to measure (through the use of manpower/population ratios, for example) and hence is more frequently used, the latter is of far greater importance. For planning purposes these two terms have been defined as follows: 1

1 Geographical coverage is the ratio between the number of health institutions or practitioners per administrative unit and the population and area sizes of the unit. This is a theoretical coverage which corresponds to the institutions' or practitioners' zones of responsibility.

2 Functional coverage is characterized by the service areas of the health institutions, which in turn are defined in terms of their use by the population (passive coverage) or of the population that health providers contact and serve (active coverage). This is a practical coverage that corresponds to the institutions' and practitioners' zones of effective activity.

Coverage thus described is quantitative. Qualitative coverage depends on the level of health technology offered to the population, defined in terms of equipment and personnel ability.

Two other issues to which the planner must address himself are related to the determination of the rural and urban populations at greatest need. The first is the lack of a standard definition of rurality. It is difficult to include in a single term all the social, economic, demographic, and administrative characteristics that typify rural communities in the different regions of the world; each group concerned tends to have its own definition to meet its own needs. Rural areas tend to have most or all of the following common features that make it difficult and expensive to provide them with health care:

1. **Population dispersion** (though it should be noted there are some extremely high-density rural areas, as in Bangladesh and India).

2. **Isolation**, with bad communications and a slow flow of information that make it difficult to promote changes in attitudes and the participation of rural people in decision-making.

3. **A low standard of living**, as shown by a per capita disposable income that is substantially lower than the national average and far below that of urban areas.

4. **Low health status**, owing to the high prevalence of communicable, parasitic, and nutritional diseases.

5. **Severe communication and transport constraints.**

All those features contribute to the low productivity of health work in rural areas and to the high per capita cost of providing care.

The lack of disaggregated data on the characteristics of rural areas usually obliges the planner to accept a much more restricted definition of rurality. The national census can probably provide an adequate operational definition for the lowest category of rural communities, such as "below 1000," and then the planner can select from the available census data intermediate categories to reflect the probable unequal distribution of health facilities or health manpower of defined characteristics. For example, manpower studies conducted in several Latin American countries showed a sharp drop in the availability of organized care or resources in communities with a population of below 5000.

In his assessment of distributional problems the planner should not overlook the large number of urban poor who in fact have limited access to primary care. Although the distance between the slum areas and health facilities may be short, inadequate public transport, clinic timetables that do not fit in with transport or working times and, most important, the often grossly inadequate capacity of urban primary care facilities to serve the population within their jurisdiction leave a high proportion of the urban poor without care. As a result, incipient or mild illnesses are not attended to in time and patients seek care only when their problems become severe enough to require emergency treatment or possibly hospitalization. Whether
by disaggregating the urban population according to districts or by some other device establishing a gradient of primary care access and use within the city, the planner should seek to make allowance for this situation in his analysis of the distribution of care.

Once distributional inequalities have been quantified, the planner needs to determine to what extent the structure and organization of the existing health care system enable it to extend primary care nationwide. In other words, irrespective of the inequalities that may exist between different levels of the system or different geographical areas, can maldistribution be corrected in large measure by working through the existing health care system or must major changes be made first? Several questions should be asked:

(1) Does the system make maximum use for services at the periphery of a simple health care technology that has been repeatedly shown to be adequate for most of the health care needs of the populations in the developing world?
(2) Does the system deal with each health problem at the lowest level at which it can be dealt with efficiently and safely?
(3) Is administrative responsibility for programme planning and administration decentralized and preferably regionalized to the greatest extent possible so that decisions affecting local problems are taken locally?
(4) Does sufficient control exist over the allocation of new resources to ensure that, once the decision is made to increase the resources allocated to the rural sector, it will in fact be carried out?

The answers to these questions will often be negative, especially if the planner looks at the health system as a whole and not just at particular parts of it. For this reason it is important to start with the larger picture focusing on specific problems and potential solutions. Moreover, in his diagnosis of inequalities of access to primary care—both quantitative and qualitative—the planner needs to stress to those responsible for decision-making that real progress will depend on many measures and not on one or other single measure, however dramatic. Once completed, the diagnosis will become the basis for a national commitment to reduce maldistribution.

A prerequisite to success: national commitment

In 1974 WHO and UNICEF completed a major joint study on alternative approaches to meeting basic health needs of populations in developing countries. This study, well documented with examples, is an important

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contribution on the diverse ways in which the health needs of underprivileged populations can be met at a cost within the resources of even the least developed countries. It reveals that, before substantial progress can be made, it is absolutely essential that there should be a firm national policy for the provision of primary care to the rural sector. It adds:

A firm national policy of providing health care for the underprivileged will involve a virtual revolution in most health service systems. It will bring about changes in the distribution of power, in the pattern of political decision-making, in the attitude and commitment of the health professionals and administrators in ministries of health and universities, and in people’s awareness of what they are entitled to. To achieve such far-reaching changes, political leaders will have to shoulder the responsibility of overcoming the inertia or opposition of the health professions and other well-entrenched vested interests.

Fundamental changes in health care of this kind in the developing countries will require correspondingly far-reaching changes in the organizational structure and management practices of the health services... 3

Navarro has made another powerful statement on health resources distribution in developing countries in general and in Latin America in particular. He considers that the present maldistribution of health resources is brought about by the same causes as are responsible for the general underdevelopment of countries, that is, (1) the cultural, technological and economic dependency of developing countries and (2) the economic and political control of the resources by certain special interests and social groups. He shows that the uneven distribution of human resources by type of health care, region, social class, and subsector (private, public, and social security) is explained by these same causes. It is unrealistic, he argues, to assume that a more equitable distribution of resources will occur within the health sector without fundamental changes in the mechanisms of economic and political control. Whereas the WHO statement confines itself to measures relating to the health system, Navarro goes further in seeing social change as essential for a more equitable resource distribution.2

Even though the majority of planners and others concerned with distributional problems find themselves obliged to work in situations where a commitment to fundamental change is lacking, they should never lose sight of its central importance to the success of their efforts. Though their daily activities may of necessity have the rather modest objective of using selectively some of the approaches to redistribution described on succeeding pages, they should continue to encourage discussion and seek the eventual adoption of the more comprehensive commitment that must be their ultimate objective.

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The primary health care delivery system

It has become evident in recent years that the rural sector economy in most developing countries is inadequate to support a primary health care system based on professional health manpower. In the past the use of non-professional manpower to provide primary care was considered a merely temporary solution, but more recent thinking stresses the permanent advantages of this approach. Experience from a number of successful projects has led WHO to list a number of principles that should guide the design of a primary care system.

- It should be shaped around and be responsive to the life patterns of the population served.
- It should form an integral part of the national health system, the higher levels of the system being designed to support the peripheral levels.
- It should be integrated with other sectors involved in community development.
- It should encourage the active involvement of the local population in the formulation and implementation of health care activities.
- It should place the maximum possible reliance on local community resources and ensure that the overall cost is held to a level at which coverage can be provided nationwide.
- It should resolve the greatest possible number of health problems at the peripheral level so as to avoid overburdening the more expensive facilities at higher levels of the system.

Conscientious application of these principles would lead to a pyramid-shaped health care system with a broad primary care base. Each level of the system would be functionally linked with the others, presumably regionally, for the referral of patients up and down the system as well as for training, supervision, and logistic support. The top priority would be given to establishing the system nationwide in both the urban and the rural areas before an elaborate development of higher-level facilities was begun. Fig. 11 and 12 show the framework and the approximate population served at each level of the system in Cuba and Iran. In designing this system or, for most countries, in modifying their existing system to incorporate these principles, the question of access to services merits special attention.

Access. Experience has shown that in primary health care there is a close correlation between proximity to a health facility (as measured in distance or time)\(^1\) and the care received. For example, King’s studies

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\(^{1}\) The main focus in this section is on distance. A study in the United States suggests that, at least where there is well developed transport, the time spent in travelling to a health facility is more important than the geographical distance. In the absolute sense time is probably the determining factor, not distance, but since most rural residents have no option but to go on foot distance is the conventional unit of measurement. See SHANNON, E. W. et al.: Time and distance: the journey for medical care. *International Journal of Health Services*, 3 (2):337-344 (1973).
in Africa (Fig. 13) show that the frequency of visits in ambulatory care varies inversely with the distance between the place of residence and the facility. In the Danfa Rural Health Centre project in Ghana the percentage of the population visiting the centre at least once in 1973 varied from 80% for those living within two kilometres to slightly more than 30% for those living six kilometres away. In Tanzania 50% of the outpatients travelled less than eight kilometres and an additional 30% up to 15 kilometres, the conclusion being that a rural health centre has an effective catchment area of 15 kilometres. The same figure has been quoted for Kenya, and roughly comparable results have been obtained in Asian, Indian, and Latin American studies.

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3 World Health Organisation Regional Office for Africa. Methods of increasing health services coverage in rural areas. Brazzaville, 1974.


FIG. 12. PROPOSED ORGANIZATION OF HEALTH SERVICES
IN WEST AZERBAIJAN, IRAN

HEALTH POST
(kushnakh behindah)
new sub-level of primary care
(auxiliaries)

behyar
mama
nishat
(5000-10,000
population)

behyar
mama
nishat
(4.5 km radius)

POPULATION
2000-4000 per
behyar mama nishat
(15-25 km radius)

HEALTH CENTRE
integrated services,
stronger stable units

HEALTH CENTRE
(2 doctors,
1 auxiliary)

20,000-50,000
(15-25 km radius)

DISTRICT
integrated services,
training of auxiliaries,
special programmes

DISTRICT
HEALTH CENTRE
(specialist in
primary care)

100,000-200,000
(30-50 km radius)

PROVINCE
organization, management
support services

PROVINCE
HEALTH CENTRE

REGIONAL
HOSPITAL
(400 beds)

1,000,000


Full geographical coverage is therefore an absolute requisite for effective primary care, especially in rural areas. When resources are limited, the cost-effectiveness of thinly spread simple facilities is far greater than that of centralized units, and this has obvious implications for the numbers and kinds of manpower required. It should be noted, however, that the catchment area of larger facilities can be extended by building roads, often through the use of local resources; in the Ivanjica project in Yugoslavia a network of village outposts was successfully linked to a central hospital in this way.3

An alternative approach to improving access is to use mobile units. In the Jamkhed project in India,4 mobile health teams consisting of a nurse supervisor, an auxiliary nurse midwife, and leprosy and laboratory technicians regularly visit villages and provide health care. In some circumstances

3 Dukandov, D. & Mach, ed., op. cit.

4 Dukandov, D. & Mach, ed., op. cit.
mobile teams are the only solution, for example for nomadic peoples or for large-scale public health projects.

In assessing the effectiveness of mobile units it is important to distinguish between the different ways in which they are used. Such units include: (1) the mobile clinic that serves both to transport personnel and as a self-contained health facility for examining and treating patients; (2) the vehicle that transports staff to a fixed post and is used by the health team for their work during their visit; or (3) the vehicle that transports staff to a fixed post with a resident auxiliary health worker who maintains the continuity of the health programme between visits. Except in the case of control or eradication campaigns for a single disease, experience with (1), the self-contained mobile unit, has been rather discouraging owing to high equipment and maintenance costs. Both (2) and (3) have been used extensively in Central America, the latter being definitely preferable since, without any means of maintaining the continuity of the programme, the attendance is apt to be low and the follow-up irregular.

Where there is public transport, bringing the patient to a distant facility is feasible. The Yugoslav national insurance scheme, for example, indemnifies workers for fares plus board and lodging if these are necessary.
to secure health care not available locally. Another approach used successfully in at least some parts of Latin America is that the district health facility arranges with a bus operator to provide round-trip transport for patients coming from outlying communities within its service area. This is usually on a rotating basis so that, depending on the demand, residents in each community have one or more fixed days per week or fortnight on which they have easy access to the health facility. If bus and clinic timetables are well harmonized, this service can meet the needs of those receiving preventive and follow-up care as well as occasionally those booked for hospital admission.

Matching technology to local conditions. The concept presented earlier of a health care pyramid with progressively smaller layers of specialized institutions resting on a broad base of primary care facilities often works out quite differently in practice. For many reasons health system development in many countries has tended to start at the top and then gradually proceed downwards, frequently with the result that, when the larger facilities towards the top of the pyramid have been constructed, equipped, and staffed, there are not enough resources left to continue to the bottom. The primary care, or base, layer of the system is thus left with inadequate geographical coverage and the facilities that do exist are not fully staffed and equipped. Development of this kind can create major problems preventing manpower from being used efficiently.

The first problem is that a higher level of technology is applied than the bulk of the health problems require. Developed countries use technologies that are capital-intensive, whereas developing countries are usually short of capital but have large labour resources. An appropriate technology for a developing country is thus highly labour-intensive. Ideally each country should develop a health technology based on its own needs and resources, and characteristically such a technology is an intermediate technology in the sense that it is based neither completely on capital nor completely on labour. Since in many developing countries most of the health system resources are tied up in hospitals or relatively costly ambulatory facilities in the larger urban centres, many simple health problems either go untreated until they become more serious and require hospitalization, or they are handled in more expensive facilities than are required. Even when hospitalization is necessary, the average length of stay and the cost per day of care tend to rise faster from the periphery

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5 Health technology has been defined as the systematic application of scientific or other organized knowledge in health and related sciences for promotional, preventive, curative, and rehabilitative action. It includes health products such as drugs, vaccines, equipment, prophylactics, diagnostic, and therapeutic substances, and other tools, combined in a harmonious way to achieve an objective.

9 One of these is misguided foreign aid, much of it for medical education. In some countries the construction or expansion of medical schools modeled after patterns in use in the donor country has created a major continuing burden on the health budget and a source of resistance to decentralization of the health care system.
towards the centre. This may be owing in part to the greater severity of the illnesses treated in larger facilities, but the more complex the facility the greater its overhead costs. The "hotel costs" (food, laundry, etc.) of hospital care are also substantially higher in large facilities than in smaller ones, and they are costs that have little bearing on the patient's recovery.

Another problem is the greater average distance between a patient's residence and a large hospital as compared with a small hospital. As a result, elective-admission patients treated in the former are likely to receive their pre-treatment examination as inpatients rather than as outpatients. Also, once the patient is ready for discharge, the difficulty involved in notifying the family and arranging for his travel may oblige the patient to remain in hospital longer than necessary.

Treatment in larger facilities also tends to favour curative at the expense of preventive services. Most professional-level personnel, by virtue of their training and predilection, tend to adopt the curative approach to the immediate problem they see rather than the preventive approach in the community, with which they have no contact. This is still so despite the many studies carried out in developing countries showing that the leading causes of morbidity and mortality are best tackled by a preventive and public health approach and that the cost-effectiveness of such an approach is far greater than that of curative services.¹

A phenomenon known as "by-passing" tends to accentuate even more the inherent tendency in most health systems to become overdeveloped in the upper levels at the expense of the lower ones. This is the practice of many patients who, perhaps because they receive inadequate care at the local level, by-pass local and even intermediate facilities in favour of more glamorous centralized ones. Though the proportion of persons involved in by-passing may not be large, it can contribute significantly to the often observed phenomenon of underuse of facilities at the periphery, even though, according to all the conventional indices, the capacity of the primary care facilities appears to be grossly inadequate to meet community needs. With by-passing contributing to making the higher-level facilities even more congested, health and political authorities frequently find themselves obliged to build even more of such facilities, and a vicious circle is established.

If patients are to be attended to at the lowest level of the system appropriate to their needs, not only must a good network of primary care facilities exist but so also must an established route for referrals. This route may

be simple to define but to compel people to use it can be difficult. People by-pass facilities because they find them unattractive or lack faith in the services they dispense. A major objective will therefore be to establish a good relationship between primary care providers and their prospective patients. All the case studies examined by the UNICEF/WHO team\textsuperscript{1} show that the one essential ingredient needed for this is community involvement. If the facility is felt to belong to the community, its members are much more likely to use it.

Nevertheless, there will always be those who regard the distant, complex, expensive facility as more attractive, and they must be discouraged or prevented from having access at too high a level to the health delivery system. To force them to use the lower levels is not always a feasible solution, and it has been suggested that a system of differential payments may be effective. Under such a system the by-passer is penalized by having to pay much higher charges for the same treatment than are paid by the patient who arrives along the referral line.

**Intervention in the manpower production and utilization process**

So far this chapter has focused on ways in which the health care system can be modified sufficiently to make it possible to provide the entire population with primary care at a cost within the nation’s resources. For most developing countries the basic element of the system will be small health units linked into a regionalized referral and support system and staffed by non-professionals trained to apply simple technology to cope with the main health problems encountered in the community they serve. The figures given in Table 12 provide full financial justification for such an approach; they are expressed as relative units so as to obviate the disadvantage of using monetary values that quickly become obsolete.

These figures show the opportunity costs involved in manpower production and illustrate how, when resources are scarce, planning decisions involve a choice between definable alternatives. The contribution of indigenous healers to the solution of the problem of manpower distribution should not be overlooked; where possible they should be incorporated into the rural health care system, as the traditional birth attendant has been in many countries.\textsuperscript{5}

Improved utilization of such non-professional personnel by no means eliminates the need to improve the distribution and effectiveness of health professionals. At a certain level the size and characteristics of the community justify the use of professionals to meet local health needs and to

\textsuperscript{1} DIJKANOVIC & MACA, ed., op. cit.

receive referrals from and provide supervision for lower levels of the system. There has in the past been a tendency to place this level too low in the referral system; hence the long list of rural physician posts vacant in most developing countries. It has been shown, however, that a large proportion of the diseases needing treatment in those countries can be satisfactorily managed using simple techniques.

Fig. 14 shows that a little training at the beginning achieves a more than proportional increase in effectiveness. At a certain point, however, training becomes subject to diminishing returns and thereafter it is more cost-effective to establish a system able to deal with difficult cases than it is to maintain staff with the requisite skills in small communities.

If the optimum use is to be made of physicians' skills they should only be used in the system at a referral stage and seldom at the primary entry point. One of the decisions to be made in designing a referral system is to determine at what stage a physician really becomes necessary. Three questions need to be answered:

1. At what level in the health care structure can decisions be made by a professional only?
2. At what point do the epidemiological circumstances and the population size of the geographical area justify professionals?
3. How much personnel supervision at each level is purely managerial and could be carried out by an administrator and how much is medical?

Centres outside the major urban areas where health professionals are neither available nor economically justified are likely to remain man-
power deficit areas for years to come. Depending on the level of economic and health system development, these centres in some countries may be towns of only a few thousand population plus surrounding rural areas, while in other countries they may even be towns with a population of over 25,000. To improve the supply of professional manpower at this level three major approaches have been used: incentives, coercion, and facilitating. Before reviewing the experiences of countries with each approach, several general observations may be made on the basis of the findings of numerous studies that have been carried out, largely in the developed countries.1

One of the basic problems facing manpower planners is how to ensure adequate staffing at this level and this requires understanding of why individual physicians settle in any given location. Numerous studies have been carried out, mostly in developed countries, on what is termed “the

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location decision". They show that place of upbringing and place of professional education are positively correlated with where health professionals choose to establish themselves, and that medical students from rural backgrounds are more likely to go into general practice and establish themselves in small communities than are those from urban backgrounds.\(^1\) In relation to the correlation with the place of education, it has been recommended that new medical and other health professional schools should be located in the smallest provincial cities where professional education can be supported. Professional manpower mobility has also been associated with personal attributes such as age, sex, and marital status. For example, female doctors are less inclined to go to rural and to slum areas than male doctors, and when they do they usually remain for shorter periods. Single doctors may leave small communities if they anticipate that their marriage prospects are slim, and married doctors may leave when their children reach school age. A factor often noted, of particular importance to specialists, is the availability of an adequately equipped and adequately staffed health facility within which to work.

A number of these findings can be modified by a policy either of changing certain aspects of the communities for which professionals are being sought or of selectively choosing professionals with characteristics that make them likely candidates for service in small communities.\(^8\) There are other factors that are difficult or impossible to change, including climate, scenic and recreational characteristics, general level of social and economic development, distance from larger urban areas, preferences of the spouse, sanitary conditions, and physical safety.

Since only a limited number of factors can be modified by a deliberate policy favouring the redistribution of professionals, the planner should concentrate on them and spend less time on the rest. Measures that can be taken to induce professionals to move to underserved areas are basically of two types—incentives and coercion.

**Incentives.** A number of countries have offered incentives to health workers to establish themselves in underserved areas. WHO recently carried out a survey of such measures, which demonstrated quite clearly that experience of incentives is limited. A few examples may be cited to illustrate possible lines of approach.

(1) **Upgrading general practice.** General medicine is being taught as a postgraduate specialty at Zagreb University in Yugoslavia, in an attempt to upgrade the status of general practitioners. A study carried out in the United Kingdom showed that, while the choice of most medical

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1. For example, it was found in Yugoslavia that farmers' and workers' children accounted for 35% of those going into general medicine, while they represented only 25% of entering students. [Simonsen, L. Maldistribution of physicians in Yugoslavia. *Journal of Medical Education, 49* (2):182–187 (1974).]

specialties was a positive decision, general practice was a “residual choice”, made, on the whole, by the less able students.¹

(2) Improving transport. Transport and communication facilities are essential for patient referral and for supervision as well as for avoiding the physical and intellectual isolation of the health professional. Various countries provide facilities aimed at improving communication with colleagues and at the same time expanding the geographical coverage of the health services. For example, transport facilities have been provided for rural health workers in the Bahamas, Bahrain, Botswana, Chile, Egypt, Ethiopia, Guinea, Lebanon, Lesotho, Libyan Arab Jamahiriya, Madagascar, Malaysia, Mexico, Upper Volta, and Yemen, as well as in some developed countries. Vehicles are provided more frequently in Africa than in Asia. Elsewhere, staff are given a mileage allowance—in Greece, Hong Kong, Kuwait, New Zealand, and the United Kingdom, for example. This method seems to be more frequently used in developed countries.

(3) Reducing professional isolation. To reduce the feeling of isolation of those working in remote areas, physicians have been assigned in pairs or even in teams with other professionals, instead of singly. Chile, Iran, and Turkey, for instance, have experimented with assigning two or more physicians to the same health post.

(4) Housing facilities or living accommodation. Selected categories of rural health workers are supplied with these in the Libyan Arab Jamahiriya, Peru, Syrian Arab Republic, Thailand, Tunisia, Uganda, and Venezuela. Other countries have introduced a system of reduced rents (Iraq, Israel, Saudi Arabia, and Sudan). In many cases the living accommodation is part of the physical equipment of the hospital or health centre.

(5) Allowing the use of government facilities in rural areas for private practice. If part-time private practice is to be allowed at all, a good case can be made for physicians using government facilities. In this way they are potentially more productive, especially if government policies allow them to use local auxiliary personnel. Also, for specialties like radiology and dentistry, which require expensive equipment, it would hardly make sense to oblige practitioners to purchase their own equipment for private practice while government equipment stands idle. However, experience with this form of incentive has shown that in some situations the private practice component takes up an inordinate share of the practitioner’s time.

(6) Providing financial incentives. These include a salary bonus for rural service in Chile, Nigeria, and Sierra Leone, a hardship allowance in Argentina, tax exemption combined with accelerated promotion in

Israel, and a cost-of-living adjustment in Japan. A number of states in the United States have experimented with loan forgiveness; medical students receive low-interest loans during their training and no payback is expected if they later work in an approved underserved area. In most of the United States programmes evaluated so far it has been found that this mechanism is not very effective because earnings in urban areas are so high that physicians would rather pay back the loan during the first few years of practice than go to an underserved area.

(7) Other inducements. These include accelerated promotion or other fringe benefits for services in rural areas. The case of Israel has already been mentioned. In Chile, doctors serving three years in a rural area acquired the equivalent of five years of seniority in the civil service, which meant that their salaries were automatically increased and they were in a better position to compete for government jobs. Other fringe benefits include increased opportunities and support for attending professional meetings, longer vacations, assured entry into specialty training residencies, and public recognition for rural service.

Despite the extensive literature on incentives, as yet little evaluation has been done. One of the rare exceptions is in Chile. A scheme designed to improve the rural health coverage was started in 1955 within the National Health Service. It consisted of a voluntary system under which a number of incentives were offered to newly graduated physicians, providing not only substantial economic rewards, housing facilities, etc. but also the chance to receive a three-year specialization fellowship on completion of rural service, accelerated promotion, and eventual eligibility for government employment in the cities. Public recognition of rural service was given by Chile’s Medical College, the national medical association to which all physicians belong. The College annually solicited papers on the experiences of physicians serving in rural areas and after a selection process, a number of authors were brought to Santiago to read their papers; then prizes were awarded and the prize-winning papers published. Entry into the service was preceded by a period of specialized training. The number of graduates entering the scheme increased annually to reach 59% of all new graduates in 1972. The effect of the programme on the physician/population ratio in Chile is shown in Table 13. While the distribution of physicians improved over the 15-year period and mortality rates in the rural areas declined more rapidly than in the urban areas (36% as compared with 29%), it is noteworthy that the changes were relatively modest despite the many incentives provided for rural practice. However, the true impact of the changes may be masked by the lack of disaggregated data showing the extent to which physician availability increased in small

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towns—the intended objective of the incentive programme—as compared with the larger provincial cities.

The UNICEF/WHO study mentioned above\(^1\) found that in fact very few countries offer real incentives to their health workers to live in rural areas, and it concluded that pecuniary incentives may have less effect than other advantages such as better chances of promotion or the possibility of further training. On the basis of the findings it proposed that ministries of health should attempt to provide:

- Adequate provision for services, i.e., adequate premises, equipment, drugs, instruction manuals, etc.
- Adequate means of communication and transport for all categories of staff. Even when the road network is poor the government can do much to improve it through the promotion of self-help rural development programmes. Adequate per diem allowances and insurance should also be offered to all categories of health workers when on tour.
- Adequate housing for all categories of personnel not from the area, with a good water supply and other facilities (furniture, electricity, gas and, in cases of extreme remoteness, food supplies).
- An adequate supervision and referral system.
- A time limit on the assignment (2–5 years, according to the hardship or isolation of the posting), security and permanence of employment on expiration of stay, and equal or even better opportunities for promotion.
- To compensate for the feeling of intellectual deprivation, the institution of a system of distribution of medical journals and publications, with assured access to libraries. Another measure would be to group the health worker, the agricultural worker, the schoolteacher, etc. as far as possible in the same rural area.
- As a reward for several years of service in rural areas, the grant of priority for further training (postgraduate or specialist) within the country or abroad, as well as for in-service training.

\(^1\) Đukanović & Maci, ed., op. cit.
Coercion. A large number of countries, developed and developing alike, have tried various degrees of coercion. Such a policy is fully possible only in a centrally planned society, though in the United States the conscription of doctors ensured medical care in some underprivileged areas (Navajo Indians). Manpower can also be directed to rural areas by means of loans; in Queensland, Australia, for example, doctors are bound for one year to a rural post for each year of financial assistance they receive while studying. In Yugoslavia the commune chooses and finances medical students on condition that they return to it when qualified.

The ideal approach is a combined one and, given the realities of most developing countries, it will often require at least some type of coercive intervention. It is hardly useful to use coercion alone, however, and end up with frustrated, angry, and uncooperative professional workers anxious to return to the cities as soon as their compulsory service is completed. It has to be admitted that in many countries living and working conditions in the smaller communities are so deficient that, without exorbitant and perhaps counterproductive incentives, not many professionals will live in them. The Chilean experience provides a good example of a balanced policy which, while neither totally effective nor replicable in many countries, does suggest a way in which health professionals can be encouraged to move towards the periphery.

The combined approach. It is evident that the problem of primary health care for rural areas cannot be solved by using traditional manpower categories only; nor is such a solution either feasible or desirable. Even if it were possible to persuade health professionals by suitable incentives to move to remote rural areas, the cost would be astronomical and beyond the resources of most developing countries. Cost apart, current thinking in health service planning rejects the idea of a health care system in developing countries based on the use of physicians for primary health care in the rural areas. The solution is seen to be much more along the lines currently being tried out in several countries: an integrated health team using village health workers from the community who have had the minimum amount of training they need for the tasks they have to perform; a well-defined referral system ensuring professional treatment for more complicated cases; a system of direct supervision and support, not necessarily by a physician; and a social, economic, and health infrastructure for their support.

To be successful, this combined approach has to be multisectoral and multidisciplinary and utilize a variety of resources. Planning for such an approach to primary health care can be very complicated. Most current health manpower plans do not go beyond estimating the requirements, i.e., the projected numbers, and the cost of health workers, and
they do not specify what the worker is going to do or, more realistically, will be able to do under the conditions prevailing in his future working environment.

The health care package

To ensure that all these and other factors are taken into account in the planning of health services and manpower at the local level, WHO is experimenting with the development of the "health care package".\(^1\) This assembles the interconnected and interdependent elements of health technology related to the entire planning for and operation of health services in a particular area into an integrated set of components containing everything that is technically needed and feasible for the adequate performance of predetermined activities. The activities are related to the optimal functioning of a given health services area or "work module", the latter being defined as a self-contained area of work that includes the services to be delivered, the level of care provided, and the geographical situation. For analytical and operational purposes it is assigned artificial boundaries. Functionally the health package:

1. identifies a given work module or service area;
2. analyses in detail every intervention or action to be taken within it;
3. specifies in detail the methods and procedures to be applied in the actual performance of the intervention or action;
4. prepares job descriptions and converts them into educational objectives that are expressed in terms of performance;
5. fixes the curriculum content, teaching aids, and examinations for the trainee worker, methods for measuring his subsequent performance in service, and procedures for recording and reporting as well as guidance for routine administration; and
6. sets out the administrative steps needed to introduce the package for the first time.

Health packages are certainly not a panacea for bad services but they may greatly contribute to improving the quality of health care at the periphery in developing countries, especially in relation to health auxiliaries. They may be looked upon as a desirable complement to health manpower plans and be instrumental in minimizing important constraints and facilitating the replication of basic knowledge at the lowest level, as well as providing a logical framework for educational technology.

Target-setting and evaluation

How rapidly can primary care be extended to the rural sector and what specific targets should be established? While the answers to these questions will differ widely in countries, certain observations are generally relevant.

First, what are the alternative resources available for strengthening rural health care? In declining order of magnitude and difficulty of implementation, the main options are:

1) To shift existing resources from the urban to the rural sector.
2) To freeze growth for a few years in the urban areas and allocate all or most increases in public health resources to the rural areas.
3) To allocate annual increases in public health resources to urban and rural areas in proportion to their respective populations.
4) To continue present differentials (as most countries do) in the per capita amount allocated annually to urban and rural areas for programme expansion but to rationalize the distribution and utilization of inputs to the rural sector and improve the responsiveness of urban health facilities to the specialty care needs of the rural sector.

In the absence of a strong national policy for promoting rural health care, the first alternative and perhaps even the second would be difficult to adopt. However, if significant progress is to be made, the planner should seek at least adoption of the third alternative, while aiming at slow growth in the urban sector and making every effort to improve the use of resources.

Past experience and cost estimates both provide important guidance on the speed with which implementation should proceed. The lessons from the past are useful but should rarely determine the action to be taken. In his diagnosis of the situation the planner assesses the quantitative distribution of health resources and services. If possible this assessment should be developed historically, containing at least three or four observations regarding the distribution of resources between the urban and rural sectors over the previous 10-15 years. In this series of observations it is especially important to include any period during which major efforts were made to increase the services to the rural sector. From this information trend lines can be developed that show, under known past conditions, how much was accomplished. The planning of targets should be as a minimum above what was achieved in the past and, if the current political commitment to the rural sector is substantially stronger, the targets can be raised accordingly. By this means past experience can be used to ensure that the targets are ambitious but within realistic bounds. The programme cost in money, manpower, and time for each of the major alternatives under consideration must also be estimated and matched against the likely resources (this topic
is discussed more fully in Chapter 11). To estimate the probable resources, the hypothetical example given below may be useful. Assume that a developing country has the following characteristics and that the resources for further rural sector development come from annual increases rather than from a major redistribution of the existing resources. It has a population of 10 million, 2 million of whom are urban dwellers and 8 million rural. The real growth in the national product is 5%; in the public sector 7%; and in the public health sector 8%. (In most countries the public sector tends to grow faster than the national product and the “services” component of public sector expenditures tends to grow faster than other components.) The national product is US $1000 million; the per capita product $100; the per capita public sector health expenditure $3 ($30 million total); the per capita public sector urban health expenditure $9 ($18 million total), the rural health expenditure $1.50 ($12 million total); and the annual public health sector increase $2.4 million (8%).

Using these figures the planner can, as shown below, calculate what funds would be available for each of the last three alternatives. The large differences in the amount available to the rural sector in the three alternatives are clearly demonstrated, and a variety of intermediate alternatives could be postulated. The essential points are that a definite target should be set for allocating future, and perhaps existing, resources to the rural sector, that the target should be incorporated into the budgetary process at the earliest possible stage and its implementation closely monitored, and that special precautions should be taken to ensure that the rural allocation is not subjected to the inroads of urban health programmes.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Annual increase in funds available to each sector according to each of the three alternatives</th>
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<tbody>
<tr>
<td>Urban</td>
<td>Allocation by population</td>
</tr>
<tr>
<td>Rural</td>
<td>$2,400,000</td>
</tr>
<tr>
<td>Urban</td>
<td>0</td>
</tr>
</tbody>
</table>

The actual amounts available are likely to be substantially less since these estimates do not take into account real increases in salaries and other costs. Since most personnel expenditure is for persons working in the urban sector, even without increasing the number of urban employees a substantial portion of the annual increase in funds will go to the urban health system. It should also be pointed out that the above figures relate primarily to the operating budget; the capital needed to construct new rural health facilities would probably have to come from other sources.
The importance of monitoring the expenditure on and indeed the implementation of the entire rural programme cannot be overemphasized. Urban health programmes are close to the sources of money and political power and usually better able to absorb funds quickly than the rural sector. Hence strict procedures should be adopted to ensure that the rural component of the health programme, because of the inevitable delay in committing and expending funds, does not later find its accounts so depleted that it cannot implement its plans.

The monitoring system also has to be broad in scope so as to include all the interrelated activities that form part of an effort to reduce mal-distribution, some of which are not necessarily health sector activities. Changes in one or another specific indicator, such as the supply of physicians, no more suffice to measure progress towards the implementation of the programme than they would if used in the initial diagnostic review of mal-distribution. For each of the various indicators, ratios or coefficients should be developed that contrast the urban and rural sectors in relation to the availability of resources, the utilization of health services and, ultimately, health status. Present distribution patterns provide baseline data against which to assess future achievements.

Finally, during the early stages of implementation of the programme, planners should be as concerned with the direction of movement as with the actual attainment of targets. Even though early progress in a given programme may be substantially less than hoped for, a reversal of the trend towards an even greater concentration of resources in the urban sector or the acceleration of a previously slow improvement in the rural health sector should have priority. Later, as experience accumulates, numerical targets can be revised as necessary.

**SUMMARY**

Urban-rural distribution problems are not peculiar to health care, but what makes the problem of inequality in health care particularly acute is that, with improved communications and awakening consciousness of social injustice, the rural poor now see health care as a fundamental human right. Nationally and internationally, social and political awareness of inequalities in health care has been growing in recent years. With this awareness has come the realization that health manpower problems associated with distribution problems—at least in developing countries—cannot be solved along conventional lines but will to a large extent involve the use of new categories of manpower and possibly a new structure of health care delivery.

The most appropriate health care technology—and the most appropriate manpower policy—are those specially designed to meet a country's needs. Typically they involve the use of village health workers from the community, given simple training and supported by a regionalized referral system, adequate supervision, manuals, logistical arrangements, and the necessary infrastructure. The professional health worker is needed to staff the specialty care facilities and the referral points. The location of professional man-
power in rural areas presents a number of problems, only some of which can be overcome by an appropriate policy of incentives.

The success of any system depends first and foremost on a national will for change and an explicit policy decision. It is helped by the development of health care as a part of overall rural development, the use of standardized technology by health workers drawn from the community which they serve and given simple training, and the early involvement of the community itself in planning, implementation, and evaluation.
Primary health care by non-physicians

The trend towards using non-physicians to provide primary health care, and even some aspects of specialty care, is both widespread and gaining in momentum. The reasons for the trend are compelling and likely to become more so as time passes. This chapter considers the forces promoting this development, the functions, limitations, and training of such personnel, and strategies for their introduction and utilization. The focus is on intermediate-level practitioners, especially those generally known as medical assistants—why they are used, their characteristics, functions, and training requirements. A shorter section deals with aide-level workers, often called village or community health workers. Although much of the discussion on medical assistants applies also to aide personnel, the final section outlines some of the differences between them in scope of work, supervision, and training.

The Medical Assistant

Many different personnel categories have had assigned to them, either on a temporary or on a permanent basis, health care functions formerly discharged only by physicians. Although the term generally used in this chapter is "medical assistant", the specific terminology varies widely from country to country. According to a WHO consultant group, the medical assistant is neither physician nor nurse. His duties may vary from one country to another, but basically he is a health worker with eight or nine years of basic general education followed by two or three years of technical training which should enable him to recognize the most common diseases, to care for the simpler ones, to refer more complicated problems and cases to the nearest health centre or hospital, to carry out preventive measures, and to promote health. Further defining characteristics of the medical assistant are:

— He works under a physician’s supervision.
— He works in a variety of settings such as in an outlying post, as a member of a health team functioning in a health centre or other facility, or as a direct assistant to a physician.

1 Chief Medical Officer for Health Team Development, Division of Health Manpower Development, WHO, Geneva.
— He is discouraged from using his post as a stepping-stone to full medical education (though this possibility should not be completely barred to medical assistants whose qualifications suggest they could benefit from it).

— He is trained and used to meet the circumstances found in a particular country and not according to some international standard.

The definition above in fact covers only the central and dominant portion of a spectrum that in practice is considerably broader. At the lower end of the spectrum is a category better designated as “medical auxiliaries,” which includes persons with primary education and a few months of practical training only, while the upper end includes those with part or complete university education plus several years of sophisticated technical training.

Occupational titles

To give them a clear occupational identity and avoid misunderstandings, it is important that medical assistants should have an appropriate title. A few of the various titles that have been used around the world are: medical assistant,feldsher, assistant medical officer, Medex (or physician extender), physician assistant or associate, health extension officer, adjoint médical de santé publique, and nurse practitioner or clinician. Some of these titles are used only in certain developed countries (e.g. physician assistant in the United States) and thus receive only limited attention in this chapter.

Many of the terms have been criticized for one reason or another; for example, the term “medical” is considered too restrictive, “assistant” pejorative, or “health” too broad and in conflict with persons involved in environmental programmes. The essential points in selecting a title are that (1) it should be relevant to the medical assistant’s primary functions and (2) it should not conflict with titles used by other health manpower categories in the country.

Why the Medical Assistant? 1

The physician shortage in many, if not most, countries of the world provided the initial impetus for the creation of the medical assistant category. The shortage has been especially acute in the developing countries, where a low doctor/population ratio is further aggravated by the tendency of most physicians to establish themselves in cities while most of the population live in small towns and rural settlements. However, it is attribut-

able not only to the lack of physicians in many developing countries but also to the high degree of population dispersion. During the 1960s in Niger, for example, there were over 1800 villages with less than 100 inhabitants and over 3500 villages with 100 to 300 inhabitants. Thus, a quarter of Niger's total population lived in communities of less than 300 inhabitants, making the deployment of physicians to such areas both very expensive and, in the almost certain absence of either the minimum facilities to use their skills or a substantial volume of patients, largely ineffectual.

Given the impossibility of using physicians under such circumstances, health authorities must choose between leaving small communities totally deprived of organized health care or providing them with basic preventive, curative, and promotional services under the supervision of medical assistants and other members of a primary health care team. With only two such alternatives, the alleged danger of using non-physicians to provide primary health care is a hollow argument indeed in defense of the status quo.

The extreme population dispersion and extreme physician shortage encountered in some developing countries are not the only reasons for creating the medical assistant category. Even in countries with an apparently adequate national physician/population ratio, physician maldistribution and, perhaps of greater long-range importance, physician malutilization argue in favor of using medical assistants.

The problem of physician malutilization deserves further comment. As the developed and developing countries alike have grappled with the shortage of medical manpower, they have increasingly come to realize that much of the problem is attributable to the inefficient use of physician time. Detailed studies in various countries of how physicians allocate their time show consistently that at the primary care level a substantial proportion of their activities (e.g., taking blood pressures, giving injections, or recording medical histories) could be adequately performed by personnel with lesser qualifications and the conditions they treat dealt with by such personnel. Accordingly, in a moderate but growing number of situations the physician is no longer regarded as a self-contained unit but rather as the leader of a health team in which each member has distinct but complementary functions. In health services or medical practices based on this principle, the physician is able to delegate his simpler routine work to staff members trained to assist him, with the result that his special skills are more fully utilized and the overall productivity, including the quality of care, is increased.

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There are other reasons for considering the use of medical assistants which, though ultimately related to the two reasons just cited, warrant specific mention.

**Rural orientation.** Medical assistants assigned to rural locations are likely to become better adjusted than professionals who have been long exposed to urban life. Medical assistants know the customs and understand the problems, inhibitions, and needs of the population. Also, by virtue of not having been confronted during their studies with an urban lifestyle totally different from anything they have known before, they are generally less apt to have ambitious social, material, and status aims. With appropriate training and supervision medical assistants can communicate more effectively with patients than can professional personnel.

**Larger applicant pool.** In some countries the number of students who have completed 12 years of basic general education and are eligible for university training is still limited; this is an obstacle to increasing the number of medical personnel. Since nine or fewer years of basic general education are considered sufficient for medical assistants, the pool of potential applicants is much greater, thus enabling governments to expand their health services without undue delay.

**Lower operational costs.** The cost of placing and maintaining a medical assistant in the field for a year is far below that required for a physician. Not only is his salary usually much lower than that of a physician, but the equipment, facilities, and other support costs are also much lower.

**Lack of international credentials.** Medical assistants have so far been trained to meet national needs and standards, hence they are not likely to emigrate to other countries.

**Low training costs.** Most medical schools are large institutions requiring numerous staff members and expensive facilities, quite in contrast to the modest requirements of schools for training medical assistants. In some countries medical assistant training is undertaken in separate schools, while in others several schools may be combined in one institution. The medical assistant approach offers the prospect of savings in faculty, capital, and operating expenditure, and combined schools facilitate the development of integrated training for several categories of auxiliary personnel. Medical assistant training lasts from one to three years compared with six or more for doctors. Moreover, the training is generally of the apprenticeship type, less costly and more practical than academic training. The fact that the medical assistant schools are smaller and simpler also facilitates the decentralization of this type of training, thus further contributing to the adaptation of training to service needs.

For the above reasons it is evident that medical assistants can be deployed throughout a country more rapidly and economically than can
physicians or other health professionals. The Soviet experience with
feldshers gives ample proof of the speed with which this can be accomplished
even in large and populous countries.

The use of medical assistants, functioning within the bounds set by
their training and job description, need not imply a lessening of the quality
of care compared with that provided by the average physician performing
the same services. For example, a recent United States study\(^1\) compared
the diagnoses made in approximately 150 cases in which children were
examined both by physician assistants and by paediatricians. The findings
showed that the examiners agreed in 93% of the cases; in approximately
3% the physician assistant made diagnoses that were not made by the
paediatrician, and in 3% the paediatrician made diagnoses missed by the
physician assistant. In no instance was the difference significant. Indeed,
in regard to quality, although the number of careful comparative studies
is still too limited to draw firm conclusions, some researchers believe that
health care provided by medical assistants or other comparable manpower
categories with limited clinical functions may actually be superior to that
provided by physicians. If so, this could be due to the high degree of
proficiency such personnel develop through experience and their greater
tendency to adhere to standing orders and not to become bored with
their work.

Planning Considerations

Medical assistants are a reality in a significant number of countries
and information about their use is spreading rapidly. Nevertheless, their
introduction for the first time in a country's health system, or even a major
expansion of their use in a country where they are already employed
on a limited basis, requires careful planning in order to avoid the problems
of, for example, acceptance and role conflict.

Roles and functions

The roles and functions of medical assistants should be determined
only after such factors as local health problems, the perceived needs and
attitudes of the population, the structure and constraints of the health
system, and the functions being fulfilled by existing members of the health
team have been taken into consideration. Only when this information
has been assembled, perhaps in part by special studies, will it be possible
to specify in the requisite detail what is expected of medical assistants

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\(^1\) Silver, H. K. Nurse practitioner, child health associate and primary-care medical practitioner.
In: Precaust, D. M., & Flawsatt, D., eds. The medical assistant: an intermediate level of health care personnel,
Geneva, World Health Organization, 1974 (Public Health Papers, No. 60).
and what is their relation to other members of the health team. As an example, the roles and functions fulfilled by medical assistants in Sudan are as follows:

- First aid in medical and surgical emergencies.
- Diagnosis and outpatient treatment of common diseases and minor surgery in dispensaries and health centres.
- Referral of emergencies and other cases requiring hospitalization to the nearest hospital.
- Public health functions:
  (a) all the functions required of the public health services if no public health officer or sanitary overseer is in the area,
  (b) liaison and cooperation with the public health officer or public health authorities in the area,
  (c) liaison and cooperation with the licensed midwife in the area,
  (d) immediate initiation of epidemic control measures.
- School health and related activities and health education.
- Registration of births and deaths and the issue of certificates.
- Vaccination and preventive measures for communicable diseases.
- Simple administration, record-keeping, care and management of equipment and stores, public health laws, vital statistics.
- Environmental sanitation, including housing and latrines, disposal of sewage and of refuse, and safe water supply; food hygiene, including meat and milk inspection and sampling; industrial hygiene (the medical assistant is regarded as the first line of attack against diseases arising from environmental sanitation defects).
- Nutrition and dietetics.
- Dental care.
- The preparation of simple medicolegal reports for the local administration.
- Visits to the villages of the area.

Although the most frequent role of medical assistants in developing countries is that of team leader or, occasionally, sole practitioner in a rural health centre, they may also assist clinical specialists (ophthalmology, paediatrics, emergency care, etc.) in clinical or administrative work in various types of health facility and serve as instructors for field supervisors once they have acquired sufficient experience and seniority. With the introduction of any new kind of health worker, conflicts may arise if there is a redistribution of health functions and responsibilities among established members of the health team. A clear definition of what
TABLE 14. DUTIES AND SKILLS REQUIRED OF A RURAL MEDICAL ASSISTANT IN ORGANIZING AND CONDUCTING FAMILY PLANNING CLINICS AS PART OF A MATERNAL AND CHILD HEALTH PROGRAMME, PAKISTAN, 1975

<table>
<thead>
<tr>
<th>Duties</th>
<th>Must be able:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To educate and motivate clients for family planning</td>
<td>(a) To use motivational techniques&lt;br&gt;(b) To hold group meetings&lt;br&gt;(c) To use audiovisual aids and flash cards</td>
</tr>
<tr>
<td>2. To provide family planning services</td>
<td>(a) To make pelvic examinations&lt;br&gt;(b) To insert IUDs&lt;br&gt;(c) To identify contraindications&lt;br&gt;(d) To make urine, blood, weight, blood pressure, and breast examinations</td>
</tr>
<tr>
<td>3. To treat any side effects of family planning methods</td>
<td>(a) To administer drugs for minor complaints</td>
</tr>
<tr>
<td>4. To refer cases she cannot manage herself</td>
<td>(a) To identify problem cases&lt;br&gt;(b) To complete files and keep them up to date</td>
</tr>
<tr>
<td>5. To maintain records</td>
<td></td>
</tr>
</tbody>
</table>

Medical assistants are to do should therefore exist from the very beginning of the planning process, and physicians should be prime contributors to the delimitation of their roles and functions. Table 14 gives an example, drawn from Pakistan, of how such specifications might be set forth.

The first experience with medical assistants was in the USSR where, under the name of fieldshers, more than 600,000 are still working in the health services. This experience has been well described in a review that provides a full account of their use in urban sanitation and epidemiological centres and in the rural medical service. In the USSR, a major share of the health care extended to the urban and rural population is provided by fieldshers, both as assistants to medical specialists and, to a lesser extent, as independent health workers under direct or periodic medical supervision. In this way the contact of physicians with the population is facilitated while at the same time they can devote proportionately more time to complex medical and leadership functions. It is noteworthy that the Soviet Union has chosen to continue to use large numbers of fieldshers and midwives although it has an impressive supply of physicians. Some observers have wondered at what point the quality, safety, and acceptability of fieldsher services would be compromised if the number of doctors was fewer—a possibility that might have to be faced if the fieldsher system was adopted without modification by other countries with a much smaller supply of physicians.

Use of a new or of an existing manpower category

The provision of primary care by non-physicians does not automatically imply that a new manpower category such as the medical assistant must be created. Planners should consider carefully the advantages and disadvantages of creating a new category as compared with those of using an existing manpower category or categories for the same functions. Depending on circumstances specific to each country, the argument may favour one or the other alternative. The following considerations are relevant.

(1) Medical assistants are recruited and trained expressly for primary care functions, whereas other health workers may have attributes or attitudes that are irrelevant or even antagonistic to these functions.

(2) Medical assistants have a clear professional identity and a clear path for career advancement, which might not be the case with an established category assuming new functions.

(3) Introducing a new medical assistant category may result in resistance from existing categories and require their re-education and a substantial redefinition of manpower roles. These problems might be avoided or minimized if an already established manpower category was used.

(4) It takes less time and money to train a person to carry out medical-assistant-type functions than to train him first for another career and then later give him additional training for the new functions. However, discounting the training costs and time for the initial career, it is obviously preferable to provide an experienced health worker with a few additional months' training for the new functions than to start with someone who has no previous health qualifications. A major factor in choosing between these two alternatives is the extent to which the supply of, say, nurses or the potential capacity of the nursing school is adequate to meet both the need for nurses and the need for persons to receive additional training in primary care.

Occupational status: permanent or temporary

When medical assistants are first introduced into the health system, the question should be asked whether they are a temporary expedient, to be replaced by physicians as soon as feasible, or a permanent addition to the health team. This question should be taken seriously, as the answer may either facilitate or impede the further development of the medical assistant programme. In this regard it may be useful to recall that feldshers were originally introduced in the USSR to compensate for the severe shortage of physicians but, with an adequate physician supply now available, they are still being widely used. Since their introduction their responsibility has shifted progressively from that of physician substitutes in rural areas to that of physician assistants; and through the reorientation of their training
and functions they have now become a permanent feature of the health system. Viewed as personnel whose primary role is to increase the physician’s productivity and effectiveness—a role that is relevant irrespective of the supply of physicians—medical assistants should in most cases be a permanent category right from the start. This is not to deny that it may occasionally be expedient to delay a final decision on this point if delay would reduce the potential resistance to the programme.

Acceptance by the professions and the public

Even with well-trained medical assistants and a general agreement that major changes are necessary in the health system, the introduction of medical assistants may encounter difficulties. Not infrequently the medical profession itself opposes medical assistants as potential competitors in its heretofore exclusive role in diagnosis and treatment. Sometimes the major concern is economic in origin, the fear being that the medical assistants may enter private practice. Even more important, however, may be the unvoiced and perhaps even unconscious apprehension lest, if a non-physician is effective in providing primary health care, the role and mystique of the physician may be diminished. These concerns merit the planner’s serious consideration and every effort should be made to encourage discussion and disseminate information among physicians. The points requiring stress include: the health needs of the rural sector; the unfeasibility of meeting them with physicians, in large part because of their unwillingness to serve in that sector; the safeguards to be employed to keep medical assistants from engaging in unauthorized practice; and, perhaps most important, the value of the medical assistant in increasing the physician’s coverage and effectiveness, an objective that should help make the physician’s job more satisfying professionally.

Opposition may also develop from sections of the nursing profession owing to concern about salary differentials, job competition, and permanent changes in nursing roles and responsibilities. Moreover, if the possibility of training nurses to assume primary care functions is under consideration, there may be further questions regarding professional identity, job titles, and career prospects for those who receive such training. It will be especially important to stress that, even though nurses may have frequently been called upon in the past to perform medical assistance functions without benefit of special training, the functions are quite different from those for which the nurse was trained; the functions of the two professions—one emphasizing diagnosis and treatment, the other emphasizing nursing care—have much in common but are by no means identical.

The planner must also consider the public reaction to medical assistants. While the public may not clearly perceive the differences between a physician
and a medical assistant, it generally responds favourably to the medical assistant's comparatively greater availability and accessibility. This is so much so that the medical assistant is often referred to by the same title as is used for the physician, and in some countries communities have built special facilities and provided other support for the medical assistants who serve them.

**Monovalent and polyvalent medical assistants**

As used for auxiliaries, the term “monovalent” means those who perform only one function while “polyvalent” means those who perform multiple functions. The distinction, with rare exceptions, is not useful in the case of medical assistants. For certain repetitive and simple tasks not requiring judgement, monovalent auxiliaries represent an almost unlimited source of manpower, since the educational requirements are low or even nil and the training is of the in-service type requiring little expenditure. However, medical assistants almost always require substantial general and health-related education, thus making it wasteful to employ them in limited tasks only.

**Male and female medical assistants**

There is no reason why medical assistant training should not be open to both sexes, though some activities may be more appropriately carried out by one or the other sex; for example, maternal and child care may be more suitable for female medical assistants, service in remote hardship posts more suitable for males. Planners need to take such factors into account when estimating the potential applicant pool for training, as well as the possible effects on other training programmes such as nursing.

**Legalizing functions**

In most countries current administrative customs and practices govern the introduction of new health workers and legislative changes are made some time later. This has been the case in the United States, where legislation lagged considerably behind the introduction of physician assistants; as late as 1975 only about 80% of the states had made changes in the relevant laws. Some states simply amended their medical practice act to indicate that the delegation of functions by a physician to a physician assistant or nurse practitioner no longer violates the act. By avoiding rigid task definitions in a rapidly evolving pattern of practice, this approach provides physicians with great flexibility in responding to new needs. Several states have passed laws that give authority to physician assistants to practise medicine under the supervision and control of physicians.
This means that not only is the physician assistant responsible for his acts but the physician is also, a concept that is accepted in many countries where physicians have long been responsible for the care provided by the various health workers who work with or for them.

While it is important to ensure that the public has legal protection against malpractice, such a justifiable concern should not be used as an excuse to protect the vested interests of the professions. If medical assistants accept the delegation of functions from physicians and work under their supervision and control, there should be no problem in providing them and the public with proper legal protection enabling them to perform their work satisfactorily.1

Private practice

In some countries there is a risk that medical assistants will engage in unauthorized private practice. This can occur in the absence of any nearby physician and in response to local demands for home care or for care provided outside working hours. Given the low salaries often paid to medical assistants in developing countries, it is understandable that the temptation to charge for such services can arise.

Although close supervision and strong punitive measures against occasional instances of accepting a fee for minor services seem ill-advised, private practice should not be encouraged lest the door be opened to abuse. In Iran, for example, as in a number of other countries, medical assistants are limited to the public sector and are not allowed to engage in private practice; ample experience with physicians has demonstrated that, if some private practice is allowed alongside their public practice, private patients soon take up most of their time, to the detriment of their regular functions. Moreover, in the absence of supervision and of constraints built into the job, the medical assistant may find himself tempted to perform services beyond his level of competence, thus endangering the patients' health as well as the reputation of the health services and his profession. To minimize the risk of their engaging in private practice, legislation should specify the limits within which medical assistants can practise and the limits should be made known to all concerned.

Supervision

The less training a health worker receives, the more supervision he requires. Even though medical assistants may have up to three years of

1 Snider, L. Jr. et al. *The Physician’s assistant: today and tomorrow.* New Haven, Yale University Press, 1972, p. 131. Although this book deals with the situation in the United States, it provides information and highlights problems likely to be relevant in other parts of the world.
training, they should, because of the important responsibilities and wide
variety of skills expected of them, receive substantial supervision. Accord-
ingly, before introducing medical assistants, planners need to consider the
potential effect of such supervision on the physician's work. With some
notable exceptions physicians have traditionally tended to be ill-prepared
to provide supervision; they give it low priority, and they are so busy as to
have little time available for it. To keep the medical assistant programme
from foundering for lack of adequate supervision, planners need to ensure
that medical educators and administrators take the necessary action to
minimize this hazard.

Implementation by pilot or national programmes

The decision whether to implement a medical assistant programme
nationally or first in one or several regions, extending it gradually thereafter,
is not always an easy one. The pilot programme approach offers the ad-
vantange that the eventual programme design should benefit from the early
phase and significant health profession resistance should be less likely.
If the survey and administrative capabilities of the country are adequate,
it may even be advantageous to test several alternative approaches simul-
taneously, as Algeria did. Three different ways of training and using
adjoints médicaux de santé publique were tried out in as many regions, and
although this delayed the implementation of the national programme the
delay was more than compensated for by the greater acceptance of the
programme and a closer matching of training to needs.

The pilot programme approach is not always advantageous. When
political and other factors at the national level favour prompt implementa-
tion of a nationwide programme, the opportunity should be fully used. Even
when they do not, a pilot programme can easily become so costly or
artificial as to make a national programme seem unfeasible, this in turn
leading to opposition and further delay and perhaps even jeopardizing the
adoption of a national policy.

Responsibility for programme development

Once the decision is made to use medical assistants, the primary respon-
sibility for implementation of the programme should be assigned to a single
body or individual such as the health manpower unit described in Chapter 2,
or if this does not exist a high official or unit within the health ministry, or
perhaps a training institution. Responsibility can, of course, be delegated
for specific activities, but without a proper centre it will be diluted and
the authority will be weak, so endangering the implementation of the
programme.
Career opportunities

While career prospects for medical assistants vary widely among countries, it may be useful to trace a typical career as described in a WHO periodical.1

Admitted at the age of 17 to the medical assistant school, the student graduates three years later with the qualification of Junior Medical Assistant. For two years he serves as subordinate to a more experienced colleague in charge of a health centre before being himself entrusted with a centre in an outlying rural area. At the age of 25, the Junior Medical Assistant is promoted to Medical Assistant and may be considered for the direction of a health centre in a less remote area. At the age of 40 he may be promoted a Senior Medical Assistant and may then take over a larger centre in a suburban or urban area. At 50, if his record and his attributes justify further promotion, he may become Chief Medical Assistant and he will remain at this level until the age of retirement.

Within this framework provision may be made for the most able medical assistants, preferably after a few years of service, to enter a medical school. The maximum number of places reserved for persons entering by this route should probably not exceed 10%. In countries such as Ethiopia and Iran, strong political pressures have obliged governments to accept the upgrading of medical assistants to physicians. The emergency situation that prevailed in Zaire in the early days of its independence also led to the conversion of medical assistants into physicians. This has happened in many other African countries with, as a common result, the desertion of rural areas by qualified and well-adapted technicians and the creation of a gap in health care. Medical assistants have an important role to play; if they are to remain in the post for a long time, they must have career prospects attractive enough to keep them contented and give them professional satisfaction.

It is important to provide the great majority who do not enter medical school with the opportunity to receive specialized training in accordance with national needs in such fields as teaching, health administration, tuberculosis control, rehabilitation, or emergency care. Medical assistants should also receive regular salary increments throughout their career; in many countries a higher-grade medical assistant should normally earn more than a young physician.

Coordinated programming

The planning considerations above are incomplete without coordination of the introduction of medical assistants with action on related manpower

categories. A country's capacity to absorb personnel categories is limited, and inadequate planning for one type may adversely affect other types and be detrimental to the health sector as a whole. If too many medical assistants are trained and employed, the supply of applicants for other training programmes will suffer and employment opportunities be jeopardized. If medical assistant salary levels are set too high in relation to other comparable jobs it will be difficult to revise them downwards, and much interprofessional friction may be caused. Inadequate education of doctors, nurses, and others about the role and responsibilities of medical assistants will reduce the efficiency of the health team. It is important to ensure that the place of the medical assistant in the health manpower structure is recognized from the earliest planning stage in order to avoid difficulties during his subsequent employment.

**Design and Implementation of the Training Programme**

Chapter 6 outlines the general principles regarding the design and implementation of training programmes. This section covers only those aspects especially relevant to medical assistants.

**Training school location**

The location of a training school needs consideration from the administrative and the geographical aspect. With regard to the former, several different approaches have been used. In the United States most new physician assistant training programmes have been developed in universities, either in close proximity to or under the actual direction of a medical school. In the USSR dental training is the responsibility of the Ministry of Health and takes place in technical schools, mostly independently from medical schools. In most developing countries with medical assistant programmes, training has been a ministry or department of health responsibility, as in Ethiopia, Togo, and Zaire.

The merits and demerits of a university location for training should be considered with care. Although for the most part universities have been used to train doctoral-level health professionals only and, in some cases, nursing and midwifery personnel, the idea of applying their relatively greater resources and expertise to the training of other categories of health manpower such as medical assistants is attractive. Moreover, in countries where physicians and medical assistants are likely to be working in close proximity to each other, it makes sense to arrange for part of their practical and at least some of their theoretical training together. These advantages, however, have to be carefully weighed against the disadvantages of a university location: (1) the potential irrelevance of certain aspects of a
university-based training; (2) the risk that exposure to a sophisticated educational system, urban life, and medical students and medical education will give the future medical assistant tastes and aspirations that are incompatible with the kind of work he is expected to perform; and (3) the difficulties that universities may have in attracting the kind of full-time staff with the practical orientation and dedication to rural service that medical assistant training requires. Despite the advantage of having at least parts of the training of medical assistants and physicians overlap, the majority of developing countries will find it preferable to locate medical assistant training outside the university.

Some countries such as Algeria, with its institut de technologie, have developed training institutions responsible for preparing several different categories of middle-level health personnel. Important economies can be made in this way through the sharing of staff and other resources, and eventual team relationships can be fostered through joint training in areas where the curricula of several disciplines overlap.

Irrespective of where the training programme is located, it should be mostly practical rather than scientific, with abundant opportunities for field work and apprenticeship training. All course material not directly relevant to the medical assistant's eventual functions should be excluded and as much as possible of the practical training set in health centres and similar locations where the medical assistant will eventually be employed.

Obviously, training programmes should be geographically located in such a way as to maximize the student's opportunities for practical training in communities similar to the one he will be working in. If medical assistants are to work primarily in remote rural locations, the training should be carried out in the smallest towns in which the training programme can be organized. If circumstances necessitate locating the training programme in a large city, it may be desirable to move students to rural areas or small towns for their practical training as soon as their basic studies are complete.

Curriculum design

The roles and functions of the medical assistant must take into account not only the health needs of the people he is to serve but also the way in which tasks are to be divided among the different members of the health team. On this basis will be decided what educational and other entrance requirements should be established and what the actual curriculum is to be. As is stressed in Chapter 6, those responsible for the curriculum should specify educational objectives for each of its component parts. This facilitates student evaluation as well as ensuring that students receive an education relevant to the tasks they will be called upon to perform. In preparing
the curriculum, educational planners may find it useful to review the curricula already developed in Algeria, Guatemala, Kenya, Rwanda, Sudan, Thailand, the USSR, and the United States, among other countries, which have well-established medical assistant programmes.

Since medical assistants will often be responsible for a rural health centre, they will have to possess the elements of management in addition to technical skills and be prepared to train and supervise village health workers and other types of health personnel. Training in these important areas, including practical experience, should be a part of their total educational programme.

The teaching faculty

The quality of the teaching faculty is a major determinant of the eventual success of the medical assistant programme. Unfortunately, many institutions still consider that the selection and training of personnel for teaching middle-level or auxiliary manpower is not as important as for university-level programmes. In reality, quite the reverse may be true. The teaching faculty for medical assistants must be careful not to provide the students with more training than their prospective job requires. Overtraining medical assistants may confuse them, induce them to undertake tasks they should not perform, or make them dissatisfied with their status, functions, and remuneration. Whenever possible, teachers of medical assistants should also work periodically as supervisors of medical assistants; this will improve the efficiency of the medical assistants as well as provide the teachers with an educational feedback and practical field experience. Most schools will have both full-time and part-time teachers. The full-time teachers should have received training in educational methods, should have had extensive field experience in situations analogous to those for which their students are being trained, and should have the requisite personal qualities of human understanding and tolerance. They may either have professional status or, in some cases, be former medical assistants with advanced training. Part-time teachers will provide students with exposure to a greater variety of skills and experiences, including the specialized skills that need not be taught on a full-time basis.

Student selection

In addition to educational and age requirements, in the selection of students account may have to be taken of such factors as geographical distribution, ethnic origin, sex, language and, in some cases, previous working experience. Most developing countries with medical assistant programmes have found that students with 7-9 years of basic education have sufficient preparation to assimilate further technical training. This
educational level also helps to maintain a clear distinction between the educational and other qualifications of physicians and medical assistants, thus helping to avoid the frustrations that may arise if the two manpower categories are closer together. In developed countries, however, where the average educational attainment is much higher and medical assistants are generally expected to work directly under medical supervision on what are often quite complex tasks, students entering medical assistant programmes should usually have completed secondary school. Finally, it is sometimes desirable at the beginning of a new training programme to seek exceptionally well qualified candidates in order to foster a positive attitude among the public and the professions towards the new manpower category. This was done, for example, in Micronesia, where the first students for medical assistant training (referred to locally as Medex) were drawn primarily from among experienced nurses.

Teaching materials

Whereas in some of the more established professions teaching materials developed in one country may have considerable applicability in other similar countries, this is less likely to be the case with regard to medical assistants, since local needs and circumstances are the main determinants of the educational programme for them. Didactic materials have been developed recently in a few countries (especially Algeria, Kenya, and the United States) that may provide useful points of departure for faculties seeking to design educational materials appropriate for their own situation. Using materials specifically prepared for medical assistant training may also encourage the creation of a separate professional identity for this manpower category. Besides basic training materials, medical assistants should have a comprehensive reference book or field manual containing the detailed procedures, standing orders, and background information likely to help them in the absence of the physician. Such manuals should be updated periodically and may be distributed as part of a continuing education programme. Modern teaching techniques such as programmed learning, audiovisual aids, and self-instructional materials are being increasingly used in training programmes, both to improve the efficiency of the educational process and to encourage students to develop the habits and skills necessary for lifelong continuing education.

Degrees and diplomas

On graduation a medical assistant should receive a diploma or degree recognized by the ministry of health. This will be a tangible symbol of his fulfilment of the educational requirements and other criteria for authority to practise. The diploma or degree should meet the legal and other require-
ments that must be fulfilled before the medical assistant can enter into employment.

Continuing education

From the very start those responsible for designing training for medical assistants should provide for a programme of continuing education. Appropriate activities include refresher courses, opportunities for later specialization, the distribution of newsletters or journals to which medical assistants are encouraged to contribute, periodic revision and expansion of the basic field manual, and meetings at regional centres to exchange information and experience. The cost of these and other activities is likely to be modest and will be repaid many times over, not only by the additional technical skills imparted but also because of the reinforcement of the sense of professional identity and commitment that plays such a vital role in manpower productivity.

Village Health Workers

Although this chapter has focused primarily on intermediate-level health practitioners, a lower level of manpower, known in many countries as village health workers, is also an important non-physician category delivering primary care. Much of what has been said about the medical assistant category applies equally well to the village health worker—in relation, for example, to the justification for their use, training, employment, and supervision. This section indicates briefly some of the differences between the two groups and the implications they have for the planner.

A key element of the village health worker concept is that persons indigenous to a given area should be used to provide primary care at the most peripheral level of the organized health system. A number of different approaches have been taken in putting this concept to the test. In some countries traditional practitioners have been given basic training and supervision so as to standardize and upgrade the care they provide. In others new cadres of workers have been recruited, trained, and assigned to the villages from which they came. A prime example of this latter approach is the development of barefoot doctors in China, where more than one and a half million workers have been trained to provide basic health care to their home communes in rural areas. The focus of their work is on preventive services, including environ-

1 Although the term "village health worker" is used throughout this section, a number of titles have been given to the category, including community health worker, auxiliary health worker, health aide, and primary health worker.

mental hygiene, health education, and referral to other health services where appropriate.

Approaches undertaken in one country are not necessarily acceptable to another one, but certain elements can usually be adapted and it seems possible to draw up a profile of the person dealing with health problems at the community level.

Profile of a village health worker

The village health worker is a man or woman able to read and write, chosen by the village community or with its agreement, and trained to deal with specified individual community health problems. He is responsible both to the village authorities and to a supervisor working with the country's official health services. He is paid in kind or in cash by the local community for the health activities he performs either full-time or part-time. He follows his supervisor's instructions and works with him as a member of the health team at the peripheral level.

Tasks, duties, and skills

The village health worker undertakes both health and community development tasks. His preventive and curative activities are limited to those for which he is trained. He obviously cannot solve all the problems with which he is confronted but he can contribute to the solution of the most urgent and common ones. His aim in community development is to stimulate the initiative and interest of the community in activities likely to improve the life of the people by means of self-help and the use of local resources at the lowest possible cost.

WHO has developed the following job description for village health workers.

(1) He should care for the health of the villagers and look after community hygiene, the emphasis being on preventive measures.

(2) He should give care and advice to any villager who consults him, in accordance with the instructions in the manual or of his supervisor.

(3) He should send patients to the nearest health centre or hospital in any case in which the manual instructs him to do so (evacuation or referral) and in any case not covered by the manual. He should therefore confine his care and treatment to those cases, conditions, and situations described in the manual.

(4) With the authorization of the village authorities, he should visit all the dwellings and give the inhabitants advice on how to prevent disease and acquire good habits of hygiene.

(5) He should make regular reports to the village authorities on the villagers’ health and on village hygiene, and get the village authorities and villagers to give him the help and support he needs for his work.

(6) He should keep in the closest possible contact with his superior in order to give of his best in his work and to obtain the equipment and medical supplies he needs.

(7) He should promote community development activities and play an active part in them.

Table 15 presents more than 30 problem areas that WHO has identified as appropriate for attention by village health workers.

**TABLE 15. PRIORITY COMMUNITY HEALTH PROBLEMS * COMMONLY MET BY VILLAGE HEALTH WORKERS**

<table>
<thead>
<tr>
<th>Communicable diseases</th>
<th>Maternal care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinations</td>
<td>Prenatal care</td>
</tr>
<tr>
<td>Diarrhoeas</td>
<td>Delivery care</td>
</tr>
<tr>
<td>Respiratory Infections</td>
<td>Postnatal care</td>
</tr>
<tr>
<td>Fever</td>
<td>Birth spacing</td>
</tr>
<tr>
<td>Epidemics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child health</td>
</tr>
<tr>
<td>****** Accidents **</td>
<td>Infant feeding</td>
</tr>
<tr>
<td>Scurf</td>
<td>Malnutrition</td>
</tr>
<tr>
<td>Wounds</td>
<td></td>
</tr>
<tr>
<td>Fractures</td>
<td>Other common problems</td>
</tr>
<tr>
<td>Bites</td>
<td>Skin diseases</td>
</tr>
<tr>
<td></td>
<td>Eye diseases</td>
</tr>
<tr>
<td>Village and home sanitation</td>
<td>Headache</td>
</tr>
<tr>
<td>Water supply</td>
<td>Stomach aches</td>
</tr>
<tr>
<td>Excreta disposal</td>
<td>Painful joints</td>
</tr>
<tr>
<td>Waste disposal</td>
<td>Anaemia</td>
</tr>
<tr>
<td>Food protection</td>
<td>Mouth and throat ailments</td>
</tr>
<tr>
<td></td>
<td>Swellings</td>
</tr>
<tr>
<td>Community development</td>
<td>Psychological conditions</td>
</tr>
<tr>
<td>Food selection and production</td>
<td>Venereal diseases</td>
</tr>
<tr>
<td>Transport and communications development</td>
<td>Mental diseases</td>
</tr>
</tbody>
</table>

* In the selection of these problems the following criteria have been applied (except for community development): frequency of disease, demand from the public, danger to the individual, danger to the community, technical feasibility, and economic consequences of the problem.

The job description and Table 15 should be considered only as models for adaptation to the specific conditions of a given country. Given the broad range of work expected from a village health worker, in many instances the training and employment of several workers will be necessary, usually with a female in charge of maternal and child health tasks and a male in charge of sanitation.
Training

The training of village health workers should be conducted by trainers selected from health personnel working at the intermediate level of health services, such as medical assistants in charge of rural health centres. Once they have been trained, village health workers should ideally work under the direct supervision and guidance of their trainers, who already know them and are in the best position to assist and help them. Personal contacts should have been created during the training period and should remain thereafter, facilitating communication, understanding, and the work.

A three-level training programme can be envisaged:

(1) Once a government has decided to train or retrain village health workers, it would first designate one or two groups, including physicians, nurses, medical assistants, and sanitation personnel, and request them to review the health needs of the community to be served, identify the priority problems to be dealt with by the village health workers, list simply the tasks they will have to perform (in a graphic form, if possible, in order to present them with a choice of alternatives, as in Fig. 15), define the training objectives (see Table 16 as an example), and prepare a training manual on the basis of existing models. These trainers of trainers would thus know what work is to be expected from the village health workers.

(2) Members of the above group would then prepare a second level of trainers, such as medical assistants working at the intermediate level of the health services. This training could also be at the provincial or district level, and medical assistants would learn about the type of training to be received by their trainees, be introduced to the training manual, and be trained in elementary teaching techniques. For (1) and (2) a workshop lasting several weeks would probably be required.

(3) Using the training manual, the second level of trainers would then be ready to train the village health workers for the villages placed under their responsibility. The length of this training would depend on local conditions, although no more than a few months should be required.

Use and supervision of village health workers

Village health workers should be subjected to close supervision. They should function as part of a health team of which they are the spearhead. It must be emphasized that how they are to be used should be planned, their place in the health system should be defined, and guidance and follow-up should be made a major responsibility of the health services.
FIG. 15. DEALING WITH SOMEONE WHO HAS BEEN BITTEN BY A DOG OR SNAKE

OUTLINE OF THE PROBLEM

\[ \text{Someone has been bitten} \]

\[ \text{By a dog} \]
- Wash the place
- Disinfect
- Dress

\[ \text{By a snake} \]
- Put on a tourniquet
- Cut the place
- Suck
- Dress

\[ \text{The dog is known} \]
- Keep an eye on the dog for 10 days

\[ \text{The dog is not known} \]
- Evacuate the person

\[ \text{The behaviour of the dog changes} \]
- Have the dog killed

\[ \text{The dog remains as usual} \]
- Everything will be all right

\[ \text{Refer} \]

TABLE 16. EXAMPLE OF EDUCATIONAL OBJECTIVES FOR VILLAGE HEALTH WORKERS

Educational objectives for dog and snake bites

At the end of his training period, the student should be able to:

1. treat the wound caused by a dog bite
2. find out whether the dog that bit the patient is known or not
3. decide whether the behaviour of the dog that bit him has changed
4. decide when a person bitten by a dog should be sent to the hospital or health centre
5. treat a person who has been bitten by a snake.

Teaching methods

To teach these educational objectives, the following methods are suggested:

1. show on a classmate’s leg how to treat a dog bite
2. ask the people living locally whether the dog belongs to any of them
3. ask the owner of the dog whether the dog continues to eat, drink, and move around normally
4. describe and discuss the two cases in which a person bitten by a dog must be sent to the hospital or health centre
5. show, on a classmate’s leg, the three actions that must be taken when someone is being treated for snake bites.
Experience has proved that village health workers who remain isolated quickly become little more than traditional healers, which is quite contrary to what is expected of them.

SUMMARY

In rural areas far from large centres of population where the villages are small and scattered, transport facilities poor, communications not easy, and living and working conditions difficult, the use of physicians for primary health care is neither possible nor desirable. Even in some cities physicians may be so overworked that they are unable to devote enough time to their patients and the communities where they live. Medical assistants and other non-physician personnel are a means of bringing health services to populations hitherto deprived of them and of improving limited services.

Physicians and medical assistants must not work in isolation from each other but must collaborate closely in a relationship that includes both the delegation of responsibility and supervision. This link between the physician and the medical assistant is the very essence of the team concept. The medical assistant needs the advice, guidance, and supervision of the physician, to whom he will refer cases beyond his competence. Village health workers similarly are in direct contact with superiors at the medical assistant level.

The idea behind the medical assistant is not to train him to become a mini-doctor but to give him the necessary competence to undertake a number of specific tasks that do not require the skill and knowledge of a fully qualified physician. Certain tasks will not be performed by medical assistants and some patients will, as before, either be referred to the physician or left without satisfactory care, but medical assistants should bring about an improvement of the existing situation.

When a country decides to employ and train medical assistants and similar personnel, it should make the decision in the context of the national health plan. The training programme should be developed to meet the needs of a given population and be in keeping with the tasks expected of the medical assistant and the other members of the health team. The medical assistant is a high-level multipurpose health auxiliary. He will often be in charge of a rural health centre, assisted by nursing and midwifery personnel, sanitarians and, when possible, dental and laboratory technicians. His supervisor will be the physician functioning at the rural hospital level. The medical assistant will have to train and supervise village health workers, who are the advanced elements of his team, delivering health care at the most peripheral level.

By virtue of his position in the front line of the health services, his responsibility for the promotion of health, and his privileged place in the community, the medical assistant is an instrument not only for health service development but also for community development. His role is therefore a crucial one.
Planning aspects
of selected manpower categories

I. Nursing personnel
Rebecca BERGMAN

Nurses are the largest occupational group in the health sector and will probably become even larger as they take on additional functions in primary health care and in specialized units. They provide individuals, families, and groups—sick and well—with care in a wide variety of services and settings for 24 hours a day seven days a week. Several levels of workers are involved, so that close intra-occupational coordination, cooperation with other disciplines, and the development of leadership skills related to programme planning, problem solving, administration, and evaluation are required.

Because of the scope and complexity of nursing manpower it is essential to give sufficient attention to the recruitment, preparation, utilization, and maintenance of this group. Planning for nursing manpower should be comprehensive in approach, based on valid measures and reliable data, flexible, and practicable in terms of time and cost.

This chapter will discuss selected aspects of planning for nursing manpower: classification, the proliferation of categories, new roles, overlapping with other disciplines, career mobility, the estimation of requirements, and personnel losses.

Nursing Categories

Classification

The variations in nursing education programmes and job levels within and between countries are extensive. However, it is generally agreed that there are three major categories of nursing personnel: professional, auxiliary, and aides. Indigenous healers and providers of care such as traditional birth attendants or bonesetters are sometimes considered an additional category to be integrated into the nursing personnel system.

1 Professor of Nursing, Department of Nursing, Tel-Aviv University, Israel.
In 1966 a WHO Expert Committee on Nursing described a nursing personnel system of three categories according to level of training and degree of responsibility assumed. In 1974 WHO sent a questionnaire on health occupations to Member nations, and the classification it made was similar to that of 1966 with the addition of a component for supervision. The three levels were described as follows:

1. *professional nurses* (high level), including all general and specialized personnel qualified and authorized to provide the most responsible and competent professional nursing service;

2. *assistant and auxiliary nurses* (middle level), who provide general care of a less complex nature in hospitals and other health services, in principle under the supervision of a professional nurse, and do not have the full education and training of a professional nurse; and

3. *nurse aides* (basic level), who perform specified non-technical tasks in institutions or community health facilities under nursing supervision. They usually have on-the-job or short training.

The International Council of Nurses has submitted a proposed description of categories of nurses to the International Labour Organisation to be used in the 1976 edition of the International Standard Classification of Occupations. That proposal also uses a three-level classification scheme, but differs somewhat from the others in that the professional nurse is the middle category. The nurse specialist, a category that includes specialized nurses as well as those whose primary role is teaching, research, or administration, is the highest of the categories. The auxiliary nurse is the lowest category and includes both the assistant or auxiliary nurse and the nurse aide.

Responses from 60 member countries to an International Council of Nurses questionnaire in 1973 showed that 3 countries had professional nurses only, 9 had professional and assistant nurses, 16 had professional nurses and aides, and 32 had all three categories. Regardless of the number of categories used, the following requirements should be met in developing a classification scheme for nursing personnel:

1. The categories taken together should form a complete personnel system for nursing care delivery.

2. The categories should be differentiated by the level of responsibility, the complexity of care, and the training.

3. General agreement should be obtained from those involved such as the government, nursing associations, employers, and patients.

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(4) The classification should be reviewed periodically and adapted to national goals, needs, and resources.

(5) Support for and legitimization of the classification system should be provided through legislation or otherwise.

**Proliferation of categories**

There is general agreement about the need for three major categories of nursing personnel: professional, auxiliary, and aide. New categories or subgroups within a category may be added, such as operation room technicians with auxiliary-level nursing education plus special training, or medical assistants and rural health workers with qualifications that may range from those of an aide to those of a professional nurse. Although such new categories may cause conflict, confusion, and overlapping, they should not be rejected without careful consideration; the short-term advantages of what they contribute and the savings made in training them may outweigh the problems of their future role definition. Creating these new categories within a master plan allowing for their movement into other categories reduces the hazards.

Multiple subgroups within a category present an equally serious problem. Several countries have as many as three different educational programmes culminating in the same registered nurse licensing examination—a two-year college or independent school, a three-year hospital school, and a four-year or five-year baccalaureate programme. Elsewhere single-purpose "registered" nurses are trained in three-year programmes (e.g. sick-children nurses, fever nurses, general nurses, and mental-retardation nurses). The latter pattern, which limits the effectiveness and mobility of nurses, has fallen into disfavour in recent years and is being replaced by more general programmes, which may include an optional subject.

Although the unplanned proliferation of categories may result in short-term and long-term personal, professional, legal, and organizational problems, an open dynamic system is of value. Planned experiment with and evaluation of new types of workers may lead to stable new categories or to a revision of traditional roles within existing categories.

**Nursing Roles and Mobility**

**New roles for nurses**

The past two decades have witnessed an increasing trend towards preparing nurses for and using them in new roles, particularly in primary health care and in intensive care units. The preparation is carried out in
a range of courses varying in length from several months to the duration of a master's level programme. Most programmes are conducted in centres for higher education and include theory as well as supervised clinical practice.

There are three major reasons why nurses are increasingly being used as primary care providers. First, it is recognized that there are inadequacies in the present system of meeting the health needs of special groups such as the rural population, the poor, the elderly, and the chronically ill. Second, professional nurses desire to play a more independent and comprehensive role and have shown their ability to do so. And third, there is a tendency to specialization among physicians, which limits their availability for primary care.

Mussalem, Leininger et al., and others have described the professional nurse as the major family health worker. Her functions include case-finding, emergency care, the assessment of health status, the performance of selected diagnostic and therapeutic procedures, the management of normal pregnancy, geriatrics, the continued care of patients with long-term illness within established limits, and referral to physicians and other health professionals as needed.

In addition to generalist roles, specialty roles such as that of paediatric nurse practitioner have been developed. The functions of this nurse, usually a graduate of a master's programme, include many of those of a community paediatrician integrated with those of traditional nursing.

A recent WHO Expert Committee on Community Health Nursing advocated an expanded role for professional nurses, to include the teaching of primary health workers (e.g. medical assistants, aides) to take over many of the functions traditionally performed by nurses and the giving of guidance to them in case-finding, patient and family care, health education, and curative work. The community nurse will also be called upon to fulfil many diagnostic and therapeutic roles usually assumed by medical general practitioners.

Nurses have also undertaken new roles as clinical nurse specialists in hospitals, where they cooperate with nurses and physicians in planning, providing, supervising, and evaluating care for individuals and groups of patients with complex nursing needs. The development of intensive care units has created a need for highly skilled nurses, who carry out func-

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tions previously performed by medical specialists. These and other roles that are emerging require planning for an increase in both the quality and the numbers of nurses as well as an appropriate status and appropriate rewards.

Overlapping with other disciplines

The expanding role of nurses and other health workers and the emergence of new types of worker sometimes cause overlapping and result in confusion, manpower waste, and conflict. Mullaney 1 found that social workers and nurses in hospitals claimed that overlapping functions were specific to their own disciplines. A study 2 of the opinions of nursing, medical, and social work students on nursing showed that, although students on entering into training accorded a comprehensive role to nursing, on graduating they perceived functions overlapping with their own (community planning, team coordination, guidance of patients, emotional support, etc.) as beyond the scope of the professional nurse.

Manpower planners must recognize the problems of overlapping and seek ways of preventing or diminishing them. It has been suggested that this can be achieved by interdisciplinary teaching and practice, health science schools, and the involvement of related professions in determining programmes and policy. 3

Career mobility

The multiplicity of new roles and new types of health worker has produced large numbers of nursing personnel in many parts of the world who are unable to develop and use their potentialities because of general educational limitations. In order to assure career progression and mobility, ways of developing an open system that will minimize repetition of studies are being sought. Entrance and graduation requirements may be met by waivers, equivalence documents or examinations. Such a system entails evaluating the individual's general education, nursing preparation, experience, and potential. Movement from one health profession to another is facilitated by health science schools with a common core of studies.

A joint meeting of representative committees of ILO and WHO supported the concept of mobility with the following statement:

“In circumstances where the educational background is limited, provision should be made for nursing students to supplement their general education whilst enrolled in the nursing programme ... Students entering the nursing education system at any level should become eligible to continue in their studies on the basis of educational attainment, demonstrated ability and proficiency.”

Nursing Manpower Projections

Estimating requirements

Requirements for nursing personnel cannot be estimated without full knowledge of the present supply of nurses. Chapter 4 deals at length with supply, including the uses of a manpower information system. Various sources of information specific to nurses may be of great utility to the manpower planner. For example, the American Nurses Association annually publishes Facts about nursing, which summarizes the findings of a comprehensive nursing data system. In the absence of a regular data system, studies of nursing resources may provide a basis for planning and projections. These studies may be part of a general health manpower study, included in a national survey of nursing resources, or concerned with a specific aspect such as education.

Before short-term planning can start, it is important to develop a comprehensive model of the nursing sector incorporating the characteristics of the country’s health system and the present and potential supply of nursing personnel. Fig. 16 shows three models of nursing personnel.

The adoption of a model may be a matter of choice or of necessity. A large metropolitan public health service selected model C of Fig. 16 on the assumption that professionals should provide patients with direct care and auxiliaries and aides carry out routine and non-nursing activities. On the other hand, statistical data from Latin America and the Caribbean suggested that model A is the only option available; with three doctors to every registered nurse, professional nurses must focus exclusively on

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tion, 1953.
6 Boletín de la Oficina Sanitaria Panamericana, 75:146–166 (1973) (La situación crítica de la enfermería en América Latina y el Caribe).
nursing. A ratio of 3.9 auxiliary nurses to each professional places registered nurses in a leadership role. The fact that the rural and small-town half of the population has only one professional nurse per 20,000 population makes it clear that large areas must be covered by traditional health workers or minimally trained aides. A WHO unpublished survey found that the total nursing personnel per 10,000 population in the world ranged from a high of 140 to a low of 0.28; radically different policies regarding manpower use are therefore required.

FIG. 16. MODELS OF THE NURSING SECTOR

(A) System based on traditional health workers and nurse aides, with front-line support of auxiliaries and leadership of professionals

(B) System based on trained auxiliaries with assistance of nurse aides and professional leadership

(C) System in which the professional nurse is the major health worker, assisted by auxiliaries and aides

1 = Professional
II = Auxiliary
III = Aides

Methods of estimating nursing personnel requirements range from crude ones based largely on observed or normative ratios to sophisticated techniques that rely on data obtained from detailed field studies and information banks. One of the first steps in establishing a data bank on nursing is to survey the development and present status of nursing manpower; it should include a historical review of the achievements and problems of the educational system, the role of nursing in meeting health needs, the legal status of the profession, and plans for the future.1 The planner should select one or more methods applicable to local conditions that will provide data of a level of precision and detail not greater than his country has the capacity to use.

Of the methods for estimating manpower requirements described in detail in Chapter 3, the manpower/population ratio and the budgeted job vacancies methods have been used especially often for nurses, but the

planner will need to take into account their substantial limitations. Several methods particularly appropriate for estimating nursing requirements are given below, followed by a discussion on which are most useful under particular conditions.

Models of good service

In this method the number and composition of nursing personnel found in well-functioning units in a country or region are used as a basis for planning the staffing of similar units. The method has the advantage of being based on realities. However, its success in one situation may be the result of personalities, relationships, or other factors that have nothing to do with numbers and cannot be easily transposed to other situations.

Standards and criteria

This method is based on standards and criteria for estimating personnel needs, which may in turn be based on: (1) nursing care for a specific population, e.g. the frequency of contacts with and the care given to pregnant women in a maternity service; (2) nursing personnel per unit of care, e.g. the number of maternity beds per nurse; or (3) the ratio between personnel categories, e.g. professional/auxiliary, supervisor/staff, or teacher/student. Since standards soon become outdated, they should be reviewed before being used in planning. When compared with present practice, the gap may be so great that a more realistic approach will be needed in computing personnel requirements for an interim period.

Standards taken from the professional literature can be very useful if based on a situation reasonably similar to that in which they will be applied. The American Nurses’ Association, among others, has published standards for nursing practice in the various clinical areas.¹ They must, of course, be used with great caution by developing countries. Standards may also be developed locally by eliciting opinions from experts who are knowledgeable about the local situation, from practising nurses, or from recipients of care. Workshops, conferences of experts, or ad hoc committees are among the methods used for this purpose.

Since the above two methods, along with the manpower/population ratio method, are relatively easy, quick, and reliable if used with caution, they appear to be the methods of choice for estimating requirements in countries with personnel and other resources too limited for the conduct of studies.

Personnel-focused analysis

Two kinds of studies are used to determine what the nurse does: (1) time studies, which count the time spent in various programmes (e.g. maternity, school, or public health nursing) or on specific tasks (e.g. medications, bed-making); and (2) activity or utilization studies which, in addition to the above, show whether nursing personnel are functioning at the level for which they have been prepared.

The findings can be used to redirect personnel to more suitable tasks. There are, however, several limitations to these methods including their failure to assess personnel relationships and the quality of care and their relatively high cost in skilled manpower and other resources. Many of these studies in the past decade have consistently reported that over one-third of nursing time is spent on inappropriate work—a situation that is demoralizing, wasteful, and potentially dangerous if the nurses are used beyond their level of competence. This situation may be assumed without any need to verify it each time, and planners should proceed directly with attempts to improve the utilization of the personnel.

A model for activity studies published in 1964¹ was adapted by Darbyshire to developing countries². Utilization studies are available for hospitals,³ public health, and outpatient departments.⁴

Patient-focused analysis

This method estimates staffing requirements on the basis of the patient's condition (consciousness, mobility, treatment) and characteristics (age, sex). Most of the studies recommend four major patient care classifications—intensive, moderate, minimal, and supportive. The hours of nursing care for patients in a specific unit are computed after analysing the needs for each patient classification and the average caseload of each group. Direct care, indirect care, administration, domestic tasks, and miscellaneous duties are all included in the required hours of care.

Some studies have developed the concept of a dependency chain for groups of patients—that is, the progression of patients from category to category. Dependency chain studies on a variety of units have been carried

out in New Zealand. Some projects also recommend different kinds of nursing personnel to meet a unit's needs.

In planning rural health programmes, staff requirements for community nursing services may be estimated on the basis of surveys of the needs of patients, the estimates being adjusted to the realities of the situation. For example, students in Malawi conducted a small study among a random sample of women in four villages and obtained much information relevant to planning and manpower development.

Quality of care

A major concern of the nursing service is the quality of the care provided. Attempts have been made to measure quality and determine personnel requirements for it. Roberts prepared a guide that shows the needs of individuals and groups, nursing care given to meet the needs, and outcomes in terms of patient welfare. New et al., Abdellah & Levine, and Sjoberg et al. measured patient welfare in hospitals with different combinations of personnel organizational patterns.

Reducing personnel losses

Personnel losses can be reduced by preventing student attrition during training and the loss of graduates from the labour force. Student attrition varies between and within countries and ranges from over 50% to as low as 5%. Most losses occur during the first year of study. The major reasons reported are academic failure, personal reasons, poor adjustment, and disappointment with nursing.

Two major variables influence student loss: the student and the environment. Selection methods have received considerable attention, and it has been concluded that, although testing may be used to predict academic achievement, it cannot yet anticipate success in practice. The student's

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1 New Zealand Department of Health, Research and Planning Unit. Patient-nurse dependency. Wellington, 1963-64 (No. 11-23)
3 USA, Public Health Service, Division of Nursing. How to study patient progress. Washington, 1964 (PHS Publication No. 1169)
5 Abdellah, F. Y. & Levine, S. Effect of nurse staffing on satisfaction with nursing care. Chicago American Hospital Association, 1958 (Hospital Monograph Series No. 4)
8 Taylor, C. W. et al. Selection and recruitment of nurses and nursing students: a review of research studies and practices. Salt Lake City, University of Utah Press, 1969.
environment includes the curriculum, the faculty, practitioner models, and conditions of practice, and studies have confirmed the effect of each aspect. The student is probably the key to the attrition problem, since a highly motivated and intelligent individual can overcome a multitude of environmental deficiencies. In order to reduce losses during training it is necessary to consider all the factors involved and endeavour to improve selection, the educational programme, and the realities of practice.

Attrition from the labour force has generally been accepted as a major cause of shortages. The literature frequently notes the short working life of nurses, citing figures of three, five, or ten years. This myth has recently been exploded by studies in several countries that have shown that nurses have a working life of well over 20 years. The profile shows a high percentage (over 80%) at work during the first five years after graduation and a lower percentage between the fifth and fifteenth years, followed by a subsequent rise to about 70%, where it remains fairly stable until retirement. Up to one-half of the nurses, usually mothers of young children and those in less challenging positions, are employed part-time. The main reason for leaving work is family circumstances; other reasons are the salary, working conditions, health problems, job dissatisfaction, continuing study, and retirement. In some countries attrition from emigration is as high as 32%. A study of emigration among Iranian nurses revealed that one-third of the graduates of the major school for registered nurses had emigrated to the United States. It suggested that recruiting candidates from rural areas and training them near their homes might reduce the emigration of graduates.

Studies indicate that assistance to mothers of young children such as home help, tax reliefs, day-care centres, housing facilities, and improved transport facilities might decrease losses. Other ways are by increasing satisfaction through good use of the nurses’ abilities, improved working relationships, career advancement, opportunities for study, and improved salaries and working conditions. In countries where emigration plays a role in attrition and is considered undesirable, reasons for and ways of reducing it need to be studied.

The work patterns of nurses have been studied by cohort analysis of active and inactive nurses at a specific time and by prospective and
retrospective studies. The data were drawn from five major sources, either separately or in combination: registers of nurses (government, licensing body, nursing association, etc.), employers, schools, classmates, and nurses themselves. Each source has its advantages and disadvantages, and the sources have been compared in a research project conducted on the working life of registered nurses in Israel.1

Keeping students during training and keeping graduates in full-time employment are ways of increasing the work force and reducing the considerable cost and stress of losses and an increased turnover. As the causes of attrition and ways of correcting them vary from situation to situation, local studies are needed as a basis for effective intervention.

Concluding observations

Nursing is one of the most important components of the health manpower system because of the broad scope of its services and the large number of workers. The past two decades have witnessed an awakening in nursing education, practice, and research and a rethinking of the philosophy, functions, and content of nursing. New roles, the proliferation of nursing categories, the overlap with other disciplines, and career mobility are but some of the important issues at present, and more will arise in the future. Nurses and manpower planners must give priority to broad, innovative approaches allied with thoughtful planning and evaluation in order to meet the challenge presented by those issues.

* * *

II. Midwifery personnel

Maria de Lourdes Verderese 2

The main causes of maternal morbidity and mortality are the toxaeasias of pregnancy, haemorrhage, sepsis, and abortion. Infant illnesses and deaths occur as a result of septicaemia or tetanus, respiratory infection, diarrhoea, and nutritional marasmus; and birth injury is a consequence of unskilled midwifery. Multiparity should also be included among the most important causes of the morbidity and mortality of both mothers and children.

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Maternal and infant deaths can be reduced by a carefully designed system of care that makes the optimum use of all the available resources and is reasonably distributed throughout the country. In much of the world, the midwife has played and continues to play a key role in providing women of reproductive age and their newborn children with such care. In many countries, particularly in the rural areas, virtually all the maternity care is provided by midwives ranging from traditional birth attendants to those with considerable formal training in modern medical care. The midwife thus has an excellent opportunity to educate the public in health matters and to detect and treat health problems at an early stage of development. This chapter defines and classifies midwifery as a profession, describes methods used in calculating requirements for midwives in a health system, and discusses several special issues of concern to midwifery and to the health planner.

Definition and classification

A WHO Expert Committee adopted the following definition of a midwife:

A midwife is a person who is qualified to practise midwifery. She is trained to give the necessary care and advice to women during pregnancy, labour and the postnatal period, to conduct normal deliveries on her own responsibility, and to care for the newly born infant. At all times she must be able to recognize the warning signs of abnormal or potentially abnormal conditions which necessitate referral to a doctor, and carry out emergency measures in the absence of medical help. She may practise in hospitals, health units or domiciliary services. In any one of these situations she has an important task in health education within the family and the community. In some countries, her work extends into the fields of gynaecology, family planning and child care.

There is considerable diversity in the patterns of midwifery education and practice in different parts of the world. Criteria used for classifying midwifery personnel include: (1) the functions performed (direct care services, administration, education, research); and (2) the level of skill required and the amount of independent judgement to be exercised.

Midwifery personnel obviously show wide variations according to these criteria. Those represented by the WHO definition above, for example, are classified as high-level personnel. In many countries, however, midwifery personnel are prepared for other levels of function, which may be classified as middle or intermediate level, aide level, and practitioners of traditional midwifery. Table 17 shows the different levels of midwifery

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### Table 17. Classification and Functions of Midwifery Personnel

<table>
<thead>
<tr>
<th>Level/Classification</th>
<th>Titles Used</th>
<th>Education/Training Required</th>
<th>Functions Performed and Independent Judgement Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Midwife</td>
<td>Midwife Fieldworker-midwife</td>
<td>Secondary education plus minimum of 3 years midwifery education.</td>
<td>Provides care and health education during pregnancy, labour, and postnatal period. Manages apparently normal labour without supervision. Cares for newborn infant. Identifies and refers abnormal conditions and clients at risk. Carries out gynaecological and family planning activities. The above activities can be exercised in the areas of teaching, administration (including supervision), and research.</td>
</tr>
<tr>
<td>Nurse-midwife</td>
<td>Nurse-midwife</td>
<td>Secondary education, recognized nursing education plus 6-12 months midwifery education; postbasic training in maternal and child health, advanced midwifery, community health nursing, neonatal nursing.</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>Auxiliary midwife</td>
<td>6-8 years general education plus 1-2 years midwifery training.</td>
<td>Provides care and health education and manages apparently normal labour, usually under direct professional supervision. May supervise lower-level midwives who may be trained to work independently where manpower is in short supply (e.g., in rural areas). May qualify to train for professional-level positions through acquiring the requisite level of general education to enter professional education programmes, special curricula, etc., befitting requirements specified by the country.</td>
</tr>
<tr>
<td>Auxiliary or assistant midwife</td>
<td>Auxiliary midwife</td>
<td>6-8 years general education and 1-2 years training as an auxiliary nurse, plus 1-2 years midwifery training or 3-4 years integrated nursing and midwifery training at auxiliary level.</td>
<td></td>
</tr>
<tr>
<td>Auxiliary or assistant nurse-midwife</td>
<td>Auxiliary nurse-midwife</td>
<td>6-8 years general education and 1-2 years training as an auxiliary nurse, plus 1-2 years midwifery training or 3-4 years integrated nursing and midwifery training at auxiliary level.</td>
<td></td>
</tr>
<tr>
<td>Non-professional Aide</td>
<td>Maternal and child health aide Midwife aide Trained traditional birth attendant</td>
<td>0-6 years general education plus on-the-job training in midwifery. On-the-job training in midwifery.</td>
<td>Carries out clearly specified tasks in the care of maternity patients and newborn infants, under direct supervision.</td>
</tr>
<tr>
<td>Traditional birth attendant</td>
<td>Numerous titles, varying from country to country</td>
<td>Training acquired through working with another traditional birth attendant in apprenticeship fashion.</td>
<td>Normally operates outside organized health system; assists mothers in deliveries; performs bulk of deliveries in rural areas of many countries, owing to inaccessibility of formally trained health manpower and community acceptance of traditional practitioners.</td>
</tr>
</tbody>
</table>
personnel according to the titles frequently used, the level of training required, and the functions normally performed.

**Estimating Midwifery Personnel Requirements**

In most countries more than 50% of the population are children or women of childbearing age. Estimating the personnel requirements to meet the health needs of this large segment of the population involves the following sequence of steps:

1. a situation analysis to determine the present needs of the target population and the services currently provided;
2. the establishment of priorities based on the concerns of the community and the frequency of maternal and child health problems, their effects, and their susceptibility to intervention;
3. the definition of broad programme goals to meet the established priorities;
4. the conversion of the goals into operational service targets based on some normative standard of care;
5. the conversion of the service targets into manpower requirements.

The following sections focus primarily on the first two steps. Among the four major methods of estimating manpower requirements, the normative or service targets approach seems the most appropriate for midwifery. Once targets are determined for the types of maternal and child health services a population needs, they are converted into manpower requirements on the basis of certain personnel ratios and productivity assumptions as described below.

**Setting standards for midwifery care**

For a given set of programme goals the planner must determine the standards for services that, in combination, will appropriately meet the needs of the target population. For midwifery personnel, the following services and programme characteristics seem essential for a high level of maternal and child health care.\(^1\)

**Antepartum contacts.** When estimating the number of contacts during pregnancy, the following should be considered:

1. whether there is good reason, from the history of the present and previous pregnancies, the medical history, and the examination, to anticipate

\[^1\] Much of the material presented is taken from: **Taylor, H. C. & Beeson, B. Comprehensive family planning based on maternal/child health services: a feasibility study for a world program.** New York, Population Council, 1971 (Guides in Family Planning 2 C).
a normal confinement (a healthy woman under 35 years of age, having her
second or third child, with a good obstetric history and no complications
could be expected to have a normal confinement);

(2) whether the patient is especially at risk, e.g. a grand multipara
or a woman with a serious medical disorder, a malpresentation, or a
previous Cæsarean section, or a woman over 35 years of age. Primi-
gravidae should be included in this group because their labour is unpre-
dictable and may be prolonged and difficult. Women with such conditions
should be booked for institutional delivery (in a hospital or health centre).

When a normal confinement is anticipated and health resources are
scarce, a minimum of three contacts is recommended for every pregnant
woman: (1) one early in pregnancy for history-taking and a full examination
to assess her health condition and provide health counselling; (2) one
about the middle of pregnancy to detect complications, if any; and (3) one
close to the onset of labour to look for cephalopelvic disproportion and
to decide where delivery should take place. The decision on delivery
should be based on its acceptability to the family and, most importantly,
on the patient's safety.

In developed countries, or where the resources are sufficient for the
health coverage of all pregnant women, it is possible to increase the frequency
of contacts. Baily ¹ bases her suggestions on English standards for ante-
natal care and recommends contact:
— every 4 weeks until the 28th week,
— every 2 weeks from the 28th week to the 36th week,
— every week from the 36th week to the onset of labour.

Although some developing countries such as India ² follow the English
standards, this number of contacts is rarely if ever possible in the rural
areas of developing countries.

For patients at greater risk, the frequency of contacts should be increased
in accordance with the individual's condition. It may be possible in some
communities to make arrangements for them to live close to the place
of delivery—the hospital or health centre—in so-called maternity villages
or maternity homes where they can be seen as frequently as their condition
requires.

Qualified delivery care. A trained attendant at delivery is also considered
an essential need for all women, to ensure the safety and wellbeing of both
the mother and the child. The attendant need not be a physician and,

¹ Baily, E., Midwifery, a text book for midwives. London, The English Language Book
Society and Bailiff Tindall, 1972.
² WHO Regional Office for South-East Asia. Notes for the practising midwife. New Delhi, 1964
3rd edition.
in fact, in many countries is likely to be a nurse-midwife, midwife, or trained auxiliary.

Postpartum contacts. Postpartum contacts may be made either through home visits or through the mother's attendance at a maternal and child health clinic. In order to watch over her recovery from childbirth and to provide neonatal care, at least two contacts are recommended: one during the first fortnight after delivery and the other 6-10 weeks after delivery. Subsequent visits to provide and teach infant care and give counselling on pregnancy spacing, immunization, nutrition, and health education should, whenever possible, be made:

- once a month until the sixth month,
- every two months from the sixth month to one year,
- when no illness is present, once every six months or at a minimum before every birthday of the child from one year to five years.

Every country should establish its own standards according to its health problems, family patterns, maternal education, and resources. It should also be recognized that many regions will not attain those standards owing to the inaccessibility of facilities or personnel. This places even more importance on the ensuring of adequate quality standards for the contacts made during both the antepartum and the postpartum periods.

Other prerequisites. To ensure good care a maternal and child health programme should also include: accessible inpatient and outpatient facilities, particularly for the complications of pregnancy and delivery; a system of detecting, recording, and reporting pregnancies, births, maternal deaths, and perinatal deaths; the acceptance and continuation of family planning or child spacing; active community participation in the programme; and the maximum use of community resources. With regard to the latter, a wide variety of skills may be found among village workers or traditional birth attendants, agriculture and home extension workers, environmental health personnel, teachers, and the community authorities.

Urban-rural differences. Since the maternal and child health services that can be developed in rural areas are likely to be different from those in urban communities, it may be appropriate in many countries to develop separate urban and rural manpower plans. Because most health resources are concentrated in the urban areas, the urban plan may be based on a system of hospital and home deliveries with the participation of physicians, professional midwives, and other highly trained health personnel. The rural plan may be based on a system of district hospitals and health centres. The health centres should have clinical facilities for maternal and child health services, including family planning, and perhaps a few beds for complicated obstetrical cases. Each health centre should be responsible for the administration of maternal and child health services for the popula-
tion in its area, including supervision of the health personnel located in subcentres and the village health workers and traditional birth attendants living in villages.

In some situations the professional midwife or nurse-midwife may have an expanded role that will include technical medical skills beyond those normally included in midwifery practice. She may also be cast in a supervisory and teaching role. She may function as the support and referral point for auxiliary personnel, traditional birth attendants, and others, with medical support and referral at the next tier in the system. The auxiliary personnel usually work from the subcentres on their assigned duties, assisted by village workers, traditional birth attendants, or other personnel participating in the programme. Various modifications of this plan are possible.

Converting service targets into manpower requirements

Once a decision has been taken on the organizational plan for urban and rural communities and on the essential needs to be met for improved maternal and child health care and related services, it is necessary to establish norms that will allow the conversion of the various services to be provided (teaching and supervision, antepartum and postpartum clinics, home and hospital deliveries, home visits, etc.) into the tasks, functions, and time required by midwifery personnel at different levels to produce these services. The following method is suggested.

(1) The projected number of urban births in the target year should be multiplied by the services (home visits, clinic visits, delivery care, etc.) required per delivery, and then by the time required to produce each kind of service. Downward adjustments may be necessary to take into account the planned coverage of public sector services (e.g. 80% of all urban deliveries) and the likely number of services to be delivered (e.g. 2.5 antenatal visits as compared with the standard 3.0 visits). A similar process should be used to estimate the total personnel hours needed in rural areas in the target year, taking into account the anticipated number of rural births and the characteristics of the rural setting that will affect service and staffing standards.

(2) The calculations in (1) provide estimates of the total number of midwife hours, auxiliary midwife hours, etc. required to produce the requisite number of services. These totals are then divided by the average annual hours that are actually worked (i.e., after deducting vacation time, sick and study leave, etc.) by each personnel category and this gives the number of persons required.

The above steps might result in a formula such as the following for estimating urban midwifery requirements for antenatal care:
100,000 × 0.80 × 0.95 × 2.7 × 25
__________________________
90,000
= 57 full-time equivalent midwives

Where

100,000 = projected total number of urban births
0.80 = 80% coverage factor for public sector services
0.95 = expectation that only 95% of eligible women will be served
2.7 = average number of antenatal visits per woman
25 = average number of minutes per visit, including travel time
90,000 = number of minutes worked annually per full-time equivalent midwife, assuming 1500 hours of effective service time (excluding sick leave, continuing education, supervision, vacation, time spent on personal matters, etc.).

As an example of standards that have been used in estimating midwifery personnel requirements in several countries, Taylor & Berelson used the following ratios for different levels of personnel to staff an integrated maternal and child health and family planning programme:

--- 3 nurse-midwives and 5 auxiliary nurse-midwives per 2000 urban deliveries,
--- 5 nurse-midwives, 25 auxiliary nurse-midwives, and 25 village assistants per 100,000 rural population.

Ratios should be used with caution since many factors—health problems, type and amount of resources available, geographical conditions, qualifications of midwifery personnel, functions they are expected to perform, etc.—must be taken into consideration when establishing standards for midwifery care. It is, however, generally accepted that, when the midwife’s functions in a community include care of the woman during the whole maternity cycle plus care of the infant, her workload should be established within a range of 50-100 clients per year. The less favourable ratios used by Taylor & Berelson possibly reflect their limitation of midwifery functions to the management of labour and family planning activities and a heavy reliance on auxiliary midwifery personnel.

Training facilities

The planner must next determine whether or not attainment of the projected requirements will necessitate quantitative or qualitative changes in the production of midwifery personnel. Chapter 4 discusses these aspects.

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1 Taylor, H. C. & Berelson, B. Comprehensive family planning based on maternal-child health services: a feasibility study for a world program. New York, Population Council, 1971 (Studies in Family Planning 2(2)).
of supply projection in some detail but, in the absence of sufficient data for using these techniques, the planner may find the method proposed by Taylor & Berelson useful. An example will help illustrate their method. Assume that the total supply of active midwives should be increased by 1000 during the next ten years. Then,

- double this number (to 2000) in order to compensate for an expected attrition of about 10% annually, a loss that must be made up in training output;¹

- divide the above number by 10 to derive the annual training output spread out over a 10-year period (2000/10 = 200);

- modify the existing training institution output accordingly to satisfy the projected manpower requirements.

When annual new personnel needs exceed the capacity of the existing training facilities, this should be taken into account in planning the allocation of resources for maternal and child health and related programmes. Several alternative plans may have to be considered—phase planning, the use of other personnel categories, retraining programmes for existing personnel, the use of traditional birth attendants, and so forth.

Planning Issues

The nurse-midwife and the midwife

The planner needs to decide whether the primary emphasis should be on training midwives or on training nurse-midwives to meet the maternal care needs of the country. Each alternative has advantages and disadvantages, and an inappropriate policy can cause considerable difficulty for the health system. In general, where maternal care services are provided through categories of health workers and there is relatively little integration with other programmes, where the obstetrical case load in the community or hospital is sufficiently large to warrant one or more professionals, or where nursing personnel are in short supply for nursing functions, the preparation of midwives solely for maternal care may be the preferred alternative. However, where trained manpower resources are limited and maternal and child care services are fully integrated, the nurse-midwife may be a more appropriate personnel category to use. By adding midwifery skills to her basic skills in nursing, the nurse-midwife

¹ An attrition rate of 10% per year may be high in some countries and should be used only if the loss rate is thought to be of that magnitude; a rate of 3-5% will in many cases be more appropriate. Also, the actual losses to be made up will depend on the size of the existing supply of midwives as well as on the number of new ones to be trained. For example, increasing the number in 10 years by 200 if the existing supply is 1000 will call for many less than if the existing supply is 5000, the annual losses in the latter (assuming similar attrition rates) being three times higher.
is able to expand her role to include the care of women throughout their reproductive years and the health care and development needs of the family as a whole.

As well as the choice between the midwife, a professional with relatively greater skills in a more limited area, and the nurse-midwife, one with greater breadth, other factors must be taken into account. For example, in areas with a low population density and a high proportion of mothers and children, a home-based delivery system may result in such a heavy workload as to justify single-purpose midwives, particularly if other members of the health team have no special competence in the routine care of mothers and children. The preference could be further justified if poor nutritional status increases the vulnerability of the target group.

The nurse-midwife tends to have more job opportunities than the midwife and hence may be less stable in her job within a maternal care programme. The training costs are also apt to be different, especially in view of the cost that can be attributed directly to maternal care functions; it is probably more expensive to train a nurse-midwife than a midwife. However, if a good selection is made of those who go on to midwifery training after completing their nursing studies (so that few nurse-midwives are lost to the profession), the extra cost of midwifery training represents a good investment for the additional capabilities obtained. Alternatively, if postgraduate midwifery training is given to nurses who have only the minimum of interest in the subject, much of the training may be subsequently unused.

Another consideration is job overlap and subsequent role conflict. Nursing is an established profession, and postgraduate training in midwifery raises no particular acceptability problems within the health team. Midwifery is also well established in many countries, but conflicts may develop in some owing to the overlap of midwifery and nursing responsibility for the care of the newborn and for family guidance during the child-rearing period. Some countries have attempted to minimize this problem by delimiting clearly in health legislation and curriculum design the functions of midwives and other professional health workers with whom they share responsibilities. Where the possibility of conflict exists, the planner may need to conduct special studies to establish the actual and perceived roles, functions, and tasks of the overlapping professions, as a basis for redefining their jobs.

To conclude, it may be said that the rationale for selecting either the midwife or the nurse-midwife to assume the primary responsibility for maternal care in a given country is often unclear, and in fact may be based more on historical or traditional considerations than on anything like a careful weighing of the relative merits of each alternative. Accordingly, the planner will need to leaven his judgements with a keen sense of reality.
and, should the chosen alternative present problems, take such action as is necessary to minimize its adverse effects.

**Traditional birth attendants**

For many women assistance at childbirth is provided only by traditional birth attendants. These persons may be illiterate and have no formal training in midwifery, but they are usually well versed in the folklore of maternal and infant care and are likely to be among the most highly respected members of their communities.

Despite the importance of the contribution of traditional birth attendants in many countries otherwise unable to meet their maternal care needs, what legislation is passed often has the effect of restricting their activities. In some of these countries health officials are now of the opinion that, rather than try to suppress traditional birth attendants, they should provide them with basic training and logistical support so that their contribution to maternal care can be increased.

Programmes are being developed to bring the traditional birth attendant into the cadre of the health services and give her training to improve her knowledge and performance. At the completion of her instruction she is provided with basic supplies and equipment to assist her in her work. She is further encouraged to bring her client to the health centre for delivery, especially when complications arise. The services she renders are based on humanitarian principles, though she may be paid in cash, kind, or not at all, depending on each family's resources.

The traditional birth attendant's work is usually limited to the confinement and the early postnatal period. However, because of her influence on families and the community she can, with additional preparation, participate in preventive health measures especially as they relate to infants and young children. Some countries have also successfully used traditional birth attendants for family planning services. Finally, despite the wide variations in the level of their literacy, they can be taught to keep simple records and thus contribute to the collection of vital statistics.

A recent publication on the traditional birth attendant provides detailed information on their historical role, their functions, their potential for integration into government health programmes, and the training necessary for their utilization. It also reports on a survey of 69 countries and reviews the various patterns of training and utilization of traditional birth attendants.

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III. Family planning personnel

WILLIAM L. BARTON

Although family planning programmes are relatively new in most countries, they have received increasing attention in recent years because of their importance as a component of comprehensive health care and because of the implications of population growth for economic development. Pending the development of a "perfect" contraceptive—still well in the future—family planning programmes must depend on trained personnel and an organized delivery system to make fertility control services readily available to those who need them. Critical though the manpower component is, little substantive work has been done in developing methods for estimating the manpower requirements for such programmes, and the methods that have been developed have had only limited applicability to the actual situation in countries. This section reviews some important family planning manpower issues the health planner should consider and presents some of the basic methods used to estimate requirements for this important type of health personnel.

Family planning services cover a wide range of activities, with considerable variation among the programmes designed to deliver such services. For the purpose of this section family planning includes the following services: (1) education and counselling on family planning and related subjects (e.g. marriage, sex, parenthood), (2) the provision of contraceptives, (3) sterilization, and (4) abortion.

The organization of family planning programmes has varied from country to country. Some have utilized full-time family planning workers, potential accepters being referred to governmental or private medical facilities for services; and some have integrated the activities of family planning totally into an existing infrastructure of health services. All the approaches have met with both successes and problems, and it is clear that there is no one organizational system that is best for all countries.

Whatever the organization, in estimating the human resources required for such a programme it must be remembered that family planning embraces the entire complex of relationships and organized arrangements through which the services are made available to the population. This complex has three major components, namely:

1 Programme Manager, Staff Development and Training, WHO, Geneva, Switzerland.
(1) The personal component—relating to the individuals and families who need and use the available services;

(2) The professional component—relating to those who, at all levels, provide the services; and

(3) the social component—relating to the public and private organizations in the community that perform various functions designed to make the services available to the population. Such functions include organizing and financing the delivery of the services, regulating standards of care, allocating resources, and planning and coordinating relationships.

The interactions and interrelationships among these components provide the structure for the family planning complex, giving it form and outlining its functions. The principal interaction is always between those who need the services and those who provide them, which may be direct as in a face-to-face consultation or indirect and somewhat impersonal as in a mass communication programme.

**Manpower Classification**

The major types of manpower involved in the delivery of family planning services may be classified into the following broad categories:

1. *Physicians*
   - General family physicians
   - Specialists (obstetrics/gynaecology, internal medicine, urology)

2. *Other health professionals*
   - Midwives
   - Nurses
   - Nurse-midwives

3. *Auxiliary personnel*
   - Auxiliary nurses and midwives
   - Aides
   - Assistants
   - Motivators

4. *Traditional workers*
   - Traditional birth attendants
   - Herbalists
   - Indigenous medical practitioners

5. *Other professionals*
   - Social workers
   - Health educators
Environmental sanitation workers
Agricultural extension workers
Journalists, media specialists.

The above list provides only a sample of the major titles used for personnel involved in providing family planning; a much longer list appears in a publication by Hall et al.¹ that catalogues the myriad titles used in various countries. That there are so many manpower categories is owing in part to the differences in the organization of health services among countries, but also to the different ways in which family planning programmes are in fact organized. Several important issues are involved in the planning process for family planning personnel.

**Manpower issues**

*Utilization of non-physicians.* Family planning programmes throughout the world have in recent years increasingly relied on non-physician personnel, from highly skilled nurse practitioners and physician assistants to auxiliaries and aides with relatively little training. The role of the non-physician has not yet been formalized or uniformly defined throughout the world, nor has the amount of training needed been established. Neither title nor education nor experience is a guide to an individual's tasks. Those who favour the use of non-physicians argue that such personnel: (1) free physicians from routine tasks, allowing them to devote their time to tasks that require their higher level of skill; (2) perform a designated task as well as or better than a non-specialized physician; (3) provide health manpower in areas where physicians are scarce and family planning services are otherwise unavailable; (4) provide services at a lower cost than physicians; and (5) are in many cases more acceptable to the people they serve than physicians are.

Legal and policy restrictions on the use of non-physicians in family planning vary considerably from one country to another. A recent survey with responses from 63 agencies in 41 countries indicated wide differences in the tasks taught to non-physicians, even within the same country.² Table 18 shows the total number of agencies offering training to non-physicians in the various family planning tasks. This table gives a far from complete list, since more than half of the 230 agencies contacted did not respond to the questionnaires. It is nevertheless indicative of the tasks that non-physicians are normally trained to provide in selected family planning programmes throughout the world.

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¹ Hall, T. L. et al. *Family planning manpower: problems and priorities.* Chapel Hill, North Carolina, Carolina Population Center, 1976 (Working Paper, No. 1). This includes a detailed review of the literature on family planning manpower and a selected list of more than 100 references.

² *Population Reports.* Washington, George Washington University Medical Center, September 1975 (Series 2, No. 6, Table 1, p. 1-94-95).
TABLE 18. NON-PHYSICIAN TRAINING BY Tasks—FAMILY PLANNING

<table>
<thead>
<tr>
<th>Tasks taught</th>
<th>Total agencies offering training</th>
<th>Total countries offering training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pill distribution</td>
<td>55</td>
<td>37</td>
</tr>
<tr>
<td>Condom distribution</td>
<td>53</td>
<td>36</td>
</tr>
<tr>
<td>IUD insertion</td>
<td>41</td>
<td>27</td>
</tr>
<tr>
<td>Diaphragm or cap fitting</td>
<td>34</td>
<td>25</td>
</tr>
<tr>
<td>Vasectomy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Abortion (uterine aspiration)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Tubal ligation</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

One exception to the increased use of non-physician providers in family planning is in relation to sterilization, a procedure that has become increasingly important in family planning in recent years. As Table 18 indicates, very few programmes use non-physician providers for sterilization owing to the surgical work involved, particularly for women. If sterilization continues to grow in popularity in coming years, as is expected, there will remain a need for a substantial number of physicians trained in the procedure. Although some countries may consider a move towards the greater utilization of medical manpower retrogressive after the years spent in trying to reduce the dependence of the programme on physicians, it can be justified as cost-effective since the single procedure of sterilization replaces years of conventional family planning services.

A second exception, where the cost-effectiveness issue is not so clear as with sterilization, is abortion services, which are being provided in some countries. When abortion is provided on request experience suggests that women may return two or more times a year and, even though the procedure is simple, quick, and safe, the resultant demand for medical and nursing personnel may be substantial. Planners need to take this factor into account when national policy allows abortions to be performed, and at some point they may wish to consider the merits of allowing non-medical personnel—under the close supervision of physicians—to perform procedures such as “menstrual regulation”, which involves the application of gentle suction to the uterine cavity during the first weeks following a missed menstruation. This and several other comparable procedures have been shown to be both safe and simple, and in a few early studies have been performed with satisfactory results by non-medical personnel under supervision.

Personnel distribution. A major issue when estimating requirements for family planning manpower is the geographical distribution of the personnel among the target population of a given area. For most countries this problem is manifested by gross shortages of manpower in rural areas.
The increased use of non-physician personnel in rural areas has been instrumental in alleviating this problem, since they can be attracted to outlying regions more readily than professionals, particularly when they are recruited from them. The manpower planner needs to take this issue into account in selecting and using one of the methods described below for estimating manpower requirements.

*Integration with health services.* Family planning is one of the many subsystems in the health system that fall within the still wider system of human welfare and economic development. It can be seen as an independent programme or as part of one to provide total family care, that is, as part of a fully integrated health system.

In health services development the tradition has frequently been to develop services as if they were independent programmes, separating, for instance, maternal and child health care, malaria and yaws eradication programmes, and environmental health and tuberculosis control programmes. The problem is how the integration of related activities should take place and what is involved. Integration involves a series of operations to bring together otherwise independent administrative structures, functions, and mental attitudes in such a way as to combine them into a whole.\(^1\)

It should go beyond the amalgamation of activities and above all be the concern of and reflected in the mental attitude of all the health personnel involved. In this connexion, it should be noted that the Twenty-first World Health Assembly adopted a resolution recommending that family planning be integrated within the basic health services. This resolution (WHA 21.43) derived from considerable WHO experience with single-purpose mass campaigns.

One of the major problems in the selection of staff for any new area of work such as family planning is the tendency to start with stereotypes derived from traditional personnel categories. However, by approaching the issue from the point of view of the functions to be performed it should be possible to avoid a preconceived allocation of duties and concentrate on the specific task involved. The categories of staff to be used for various tasks in an integrated programme depend on such questions as (1) whether additional duties will have to be placed on the existing staff; (2) whether additional staff will be available; and, if so, (3) how the tasks and responsibilities will be distributed.\(^2\)

*Multipurpose and single-purpose workers.* Where health service personnel have been in short supply, single-purpose family planning workers have often been trained in the expectation that they would be more pro-

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\(^1\) WHO Technical Report Series, No. 294, 1965 (*Integration of mass campaigns against specific diseases into general health services: report of a WHO Study Group*).

TABLE 19. MULTIPURPOSE AND SINGLE-PURPOSE WORKERS

<table>
<thead>
<tr>
<th>Type of worker</th>
<th>Single-purpose</th>
<th>Multipurpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population at risk</td>
<td>Well-defined population</td>
<td>May be several differing population groups</td>
</tr>
<tr>
<td>Tasks</td>
<td>Specific, related strictly to family planning</td>
<td>Tasks in various areas (e.g., maternal and child health, tuberculosis, family planning)</td>
</tr>
<tr>
<td>Educational background</td>
<td>Less required</td>
<td>More required</td>
</tr>
<tr>
<td>Training programme</td>
<td>Task-oriented, shorter</td>
<td>Programme-oriented, longer, more general</td>
</tr>
<tr>
<td>Supervision</td>
<td>Close supervision as a rule</td>
<td>Close supervision often lacking</td>
</tr>
<tr>
<td>Level of judgement and independence</td>
<td>Tends to be less</td>
<td>Tends to be more</td>
</tr>
<tr>
<td>Acceptance by population served</td>
<td>Depends on attitude towards family planning</td>
<td>Generally high acceptance owing to variety of health services offered</td>
</tr>
</tbody>
</table>

ductive and at the same time easier to train and supervise. Those who have favoured an integrated approach to family planning, however, have pointed out that the services are more acceptable if they are delivered by workers who are trained to deal with several interrelated health problems. The manpower implications of the two approaches are shown in Table 19.

Incentives. One of the more controversial manpower issues is the use of incentives to increase the productivity of personnel in delivering family planning services. Those who oppose incentives point to their potentially negative aspects, suggesting: that targets set for field workers or other personnel may become a ceiling rather than a floor for expected effort; that falsification of reporting may be inadvertently encouraged to increase totals; that the emphasis is placed on competition for clients rather than on serving their needs; that intrastaff and interprogramme rivalries may arise because of the selective use of incentive schemes; that services to continuing clients may be neglected; and, particularly if multipurpose workers are involved, that they may ignore the other services they are expected to provide if those services are not part of the incentive scheme.

Those who favour incentives feel on the other hand that the associated problems can be overcome. For example, in the Republic of Korea and in China (Province of Taiwan) workers are given incentives for continuing users as well as for new accepters, and receive bonuses for exceeding target levels. A recent study of motivator performance in the Philippines found that the level of misreporting was no greater for workers paid on an incentive
basis than for those on a straight salary. The same study also found that, in several payment schemes tested, the performance was highest when staff were paid per acceptor as opposed to a quota system or straight salary.

Estimating manpower requirements

Methods used to estimate requirements for family planning personnel are similar to those discussed in Chapter 3. The nature of family planning, however, with its relation to population growth and economic development, has led to the development of certain specialized techniques. This section summarizes the major methods used to date.

Ratio approach. Because of its ease of application, the ratio method is the one most used for estimating family planning manpower requirements. In several countries where family planning services were added to the existing health structure (India, Pakistan, Republic of Korea), the staffing requirements were determined by applying a given ratio of family planning personnel to the basic health centres and other facilities in the system. Where the family planning programme is developed as a separate system, the manpower/population ratio can be used to determine the numbers of the different personnel categories required, the base being either the total population or, more appropriately, the number of married women of reproductive age.

Needs approach. This approach has been applied to family planning programmes in several countries. In illustrating this approach, Taylor & Berelson proposed an integrated maternal and child health and family planning programme based on meeting six essential needs for the provision of safe maternal care. The needs are those of individuals and not of the community or nation and may therefore have little bearing on natural demographic objectives. These needs are:

1. two antepartum contacts with a trained worker (the standard that Taylor & Berelson propose is less than the three contacts proposed in Chapter 9-II for midwifery personnel and represents the likely average of care that can be provided to those living in small towns and rural areas);
2. a trained attendant at delivery;
3. at least three postpartum contacts, either at home or in a regional centre;
4. accessible medical facilities in the event of complications;

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2. TAYLOR, H. C. and BERelson, R. Comprehensive family planning based on maternal child health services: a feasibility study for a world program. New York, Population Council, 1971 (Studies in Family Planning 2 (2)).
(5) a system of records for administrative support; and
(6) organized assistance to the programme for each village.

On the basis of these standards urban and rural organization models were developed to serve given population levels. Staffing standards were then applied using ratios to determine the requirements for personnel, physical facilities, training facilities, and support functions appropriate to the level of health services development.

Fertility decline approach. This is a relatively new method still under development by various researchers. To date it has been applied in only a few countries, its point of departure being the established national or regional targets of fertility decline. The method proceeds through the following general steps: 1

(1) a demographic target is established in quantitative terms (e.g. a specified decline in the birth rate, or simply a specified number of accepters);
(2) the portion of the decline that will be the responsibility of the family planning programme is specified;
(3) the number of contraceptive users needed to meet the target is calculated, taking into account the planned mix of the different contraceptive methods (IUDs, the pill, sterilization, etc.) and the effectiveness of each method in the field;
(4) the types of manpower to be used according to programme and manpower mixes are selected;
(5) the productivity per manpower category is estimated (e.g. the number of IUDs inserted per nurse-midwife per day);
(6) the total numbers of personnel by type needed to serve the estimated total of contraceptive users are calculated.

The major advantage of this method is that demographic goals are systematically related to programme capabilities and manpower estimates. Such a quantitative method should make a more systematic evaluation of the manpower planning process possible at some future point since it quantifies the relationships between numerous input and output variables affecting administrative, service, and training components of the programme.

Although the method offers a number of advantages to some countries with established demographic targets, it also presents a number of methodological problems in relation to the many assumptions that must be made.

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1 For a detailed description of this method see: LACKEY, A. & TAYLOR, M. Manpower and manpower training estimates for national family planning programs. United States Agency for International Development, December 1979. An unpublished dissertation by Gromley, M. E. (A model for planning the motivation and service manpower and training dimensions of family planning programs. Baltimore, Johns Hopkins School of Public Health and Hygiene, 1972) also provides a detailed model of the use of this approach and calculates requirements for three developing areas in Africa and Asia, using relevant field data and reasonable assumptions about the performance attainable.
<table>
<thead>
<tr>
<th>Manpower category</th>
<th>Staffing standard</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>(a) 1 physician per 2000 urban deliveries</td>
<td>(a) to deliver integrated MCH and family planning services (developing country)</td>
</tr>
<tr>
<td></td>
<td>(b) 1 physician per 100,000 rural population</td>
<td>(b) to deliver general family planning services (United States)</td>
</tr>
<tr>
<td></td>
<td>(c) 1 gynaecologist per 3000 abortions per year</td>
<td>(c) based on assumption of approximately 36 minutes of physician time per abortion, 1000 hours worked per year (United States)</td>
</tr>
<tr>
<td>Nurses</td>
<td>(a) 1 nurse per 1700 women of reproductive age</td>
<td>(a) to deliver general family planning services (United States)</td>
</tr>
<tr>
<td>Midwives</td>
<td>(a) 3 nurse-midwives per 2000 urban deliveries</td>
<td>(a) to deliver integrated MCH and family planning services (developing country)</td>
</tr>
<tr>
<td>Auxiliary personnel</td>
<td>(a) 5 auxiliary nurse-midwives per 2000 urban deliveries</td>
<td>(a) to deliver integrated MCH and family planning services (developing country)</td>
</tr>
<tr>
<td></td>
<td>(b) 2 field workers to recruit 1000 IUD acceptors per year</td>
<td>(b) In China (Province of Taiwan) during period 1964-68, assuming full-time worker</td>
</tr>
<tr>
<td></td>
<td>(c) 3.6 field workers to recruit 1000 tubectomy acceptors per year in urban areas</td>
<td>(c) In Republic of Korea during period 1972-75, assuming full-time worker</td>
</tr>
<tr>
<td></td>
<td>1.5 field workers to recruit 1000 vasectomy acceptors in urban areas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 field workers to recruit 1000 IUD, pill, or condom acceptors per year in urban areas</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>(a) 1 social worker per 2000 women of reproductive age</td>
<td>(a) to deliver general family planning services (United States)</td>
</tr>
</tbody>
</table>

1 Taylor, H. C. & Berelson, B. Comprehensive family planning based on maternal/child health services: a feasibility study for a world program. New York, Population Council 1971 (Studies in Family Planning, 2 (3)).

Note: In some cases the proposed standards have been rounded off to the nearest 100.
regarding, for example, contraceptive effectiveness in the field, manpower productivity, and programme acceptance, which must for the most part be made in the absence of reliable statistical data. However, this situation could change quickly with the publication of the findings of studies now in progress in a number of countries, and by the 1980s planners may expect to make good use of this approach in estimating family planning manpower requirements.

Staffing standards. For any of the methods staffing standards must be selected that will furnish family planning manpower estimates befitting local circumstances and providing a normative basis for further planning and programme development. Table 20 presents a sample of staffing standards that have been used in several different studies of family planning personnel and show the wide range of patterns in different countries. The planner should not adopt any particular set of standards used elsewhere without carefully considering such factors as: the differences and similarities between the situations in the two countries; the present supply of manpower in a given category; the ability of the educational sector to produce the needed manpower; and the degree to which the government plays an active role in effecting changes in the supply of health manpower.

* * *

IV. Dental personnel

David E. BARMES 1

The terminology for the different categories of dental health personnel has undergone considerable change in recent years. Definitions developed at a 1967 WHO seminar 2 have become widely used to the point that they are now accepted throughout the dental profession. In achieving this acceptance, the International Dental Federation has collaborated closely with WHO. These definitions are:

- **Professional.** A university or dental college graduate who is registered to practise dentistry independently. He may have in addition special training and experience in a recognized branch of dentistry.

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2 WHO four-Regional Seminar on the Training and Utilization of Dental Personnel in Developing Countries, New Delhi, 2-11 December 1967.
DENTAL PERSONNEL

- **Operating auxiliary.** A person who, not being a professional, is permitted to carry out certain treatment procedures in the mouth under the direction and supervision of a professional.

- **Non-operating auxiliary:**

  **Clinical.** A person who assists the professional in his clinical work but does not carry out any independent procedures in the oral cavity.

  **Laboratory.** A person who assists the professional by carrying out certain technical laboratory procedures.

As with any other health manpower sector, difficulties remain, particularly in the auxiliary categories, with respect to the great variety of names used to refer to certain sets of functions. For example, there are two main types of operating dental auxiliary, the dental nurse (often now termed dental therapist) and the dental hygienist, and two main types of non-operating dental auxiliaries, the dental technician and the dental assistant.

The dental nurse is a type of operating auxiliary developed in New Zealand in the 1920s especially for employment in an incremental school dental service. As originally envisaged, this category was to be exclusively female, employed only in a public health programme and under regular supervision, with skills in amalgam and silicate restorative procedures, simple extractions, prophylaxis, simple preventive procedures, and health education. Usually these auxiliaries worked in clinics where there were no dentists and therefore their supervision, though regular, could be termed indirect. Although this pattern still exists virtually unchanged in New Zealand and a number of other countries, there have been modifications elsewhere such as opening the category to males, giving it greater or less scope for operations, extending the services beyond the schoolchild group to other target groups, and including the provision of emergency care or other services supervised by a dentist. Because of the growing number and range of these modifications, made particularly to suit the needs of developing countries, it is preferable to use the title dental therapist as a more general category covering a wider variety of functions than was originally envisaged for the dental nurse.

The dental hygienist is also a type of operating auxiliary, developed in the United States in the 1920s. In contrast to the dental nurse of that era, the hygienist was mainly employed in private practice under a dentist’s supervision. Hygienist skills were limited to prophylaxis, simple preventive procedures, and health education. Originally this category was exclusively female but, while it has remained predominantly so, there are now many countries where it is also open to males. Only minor changes

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have occurred in this occupation both in the United States and in the other countries that have adopted this manpower category.

The dental technician is usually a non-operating auxiliary restricted to performing the laboratory skills associated with dental prosthesis. However, a few countries are now training technicians to perform at least some of the clinical work required in certain types of prosthesis, making it possible for them to be classified in the operating auxiliary category. Names such as prosthetic therapist and denturist have been used in these cases. The situation indicates the usefulness of and need for an overall classification into two large auxiliary categories, operating and non-operating, which can then be further subdivided into different subtypes according to specific combinations of duties.

The dental assistant is also usually a non-operating auxiliary restricted to duties such as preparing restorative and impression materials, sterilizing, record-keeping, and receiving patients, and he or she serves as an assistant to the dentist or, in some cases, to the operating auxiliary. Occasionally the assistant, too, may enter the operating category when trained to perform such intra-oral procedures as placing restorations, fitting matrix bands, and taking X-rays.

The names used for the categories described above reflect the predominant usage but are by no means universal. The failure to standardize the terminology in relation to the operating and non-operating categories is especially confusing, since in some countries operating auxiliaries or dental therapists are referred to as dental assistants, while in others the title of dental nurse is given to the non-operating dental assistant type of personnel. Moreover, it would seem logical to assume that medical and dental assistants are similar types of auxiliaries, but in practice they are not. These are but a few examples of the naming dilemma, which can only be resolved by categorizing according to combinations of functions.

The professional category—the dentist or stomatologist—is less troubled by these problems but by no means immune from them. Some countries (e.g. India, Malaysia, Singapore) have dentists labelled as Class I and II or A and B and some (e.g. Austria) have even regarded dentistry as a postgraduate course following qualification as a physician.

Issues directly concerned with manpower recruitment, training, and licence to practise are considered in other chapters. It is worth noting here, however, that the many variations in educational and training needs within each manpower category argue in favour of the fundamental value of the three-category classification of dental personnel.
Estimating Dental Manpower Requirements

The most important factors in determining the manpower requirements for a given population are the demand for and the use of dental services. Studies in various countries have shown that there is a tremendous variation in dental services utilization patterns among different population subgroups. Table 21 illustrates this point, using data derived from a 1968 national health survey in Chile. There were significant differences in utilization rates, unmet demand, and expenditure for dental care by residence, income level, sex, and age. The table shows that the reasons for seeking care also varied widely by population group. For example, rural residents, males, and those of lower economic status sought care much more often for extractions, while urban residents, women, and those in higher income groups were more likely to seek preventive or routine services such as fillings, prosthesis, and cleaning.

The manpower planner must consider these wide variations in utilization rates when planning for a specific type of programme (e.g. preventive), for one directed at a defined population segment (e.g. school-age children),

<table>
<thead>
<tr>
<th>Population characteristics</th>
<th>Per capita dental visits</th>
<th>Per capita expenditure (or dental care (excludes *)</th>
<th>Reason for seeking dental care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Received</td>
<td>Desired but not obtained</td>
<td>Extraction (%)</td>
</tr>
<tr>
<td>Residence:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>1.1</td>
<td>2.0</td>
<td>31</td>
</tr>
<tr>
<td>Other urban</td>
<td>1.6</td>
<td>2.6</td>
<td>55</td>
</tr>
<tr>
<td>Rural</td>
<td>1.1</td>
<td>2.0</td>
<td>33</td>
</tr>
<tr>
<td>Income level:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>2.5</td>
<td>1.9</td>
<td>100</td>
</tr>
<tr>
<td>Medium</td>
<td>1.3</td>
<td>2.5</td>
<td>48</td>
</tr>
<tr>
<td>Low</td>
<td>0.6</td>
<td>1.7</td>
<td>4</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-14</td>
<td>1.2</td>
<td>1.4</td>
<td>13</td>
</tr>
<tr>
<td>15-49</td>
<td>1.5</td>
<td>2.9</td>
<td>51</td>
</tr>
<tr>
<td>50+</td>
<td>0.7</td>
<td>2.1</td>
<td>29</td>
</tr>
<tr>
<td>Sex:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.9</td>
<td>—</td>
<td>91</td>
</tr>
<tr>
<td>Female</td>
<td>1.3</td>
<td>—</td>
<td>40</td>
</tr>
</tbody>
</table>


* One escudo equalled approximately US$ 0.10 in 1968.

* Includes prosthesis, cleaning, fluoride.
or for a comprehensive country programme. Whatever the programme under consideration, the planner is likely to find the usual contrasts between the available and the needed resources and the actual and the desired patterns of training, and differences in the utilization of services. Moreover, a great variety of environmental factors, many of them related to national or regional development and hence beyond the direct control of the health sector, will affect manpower productivity; and this in turn will influence the projected requirements.

Although this section focuses primarily on the estimation of requirements for dental manpower, it must not be forgotten that other health and non-health personnel may have an extensive role to play in oral health services. They may, particularly in emergency care and preventive services, be responsible in some countries for the major effort and must therefore be included in manpower estimates for oral health.

In spite of these difficulties, dental manpower estimates can probably attain a much higher precision than those for most other health sectors. The main reason for this precision is the availability of precise measurements of oral health status and the treatment needs related to those measurements. This relationship provides a firm data base, at least in systematic programmes, for estimates related to measurable oral health goals.

Usually an integrated countrywide oral health programme consists of three direct service components and two indirect or supportive service components. The direct services are:

1. prevention, including health education;
2. emergency and demand services; and
3. systematic services to target groups.

The indirect or supportive services are:
1. manpower production; and
2. research and evaluation.

**Prevention, including health education**

It is universally accepted that prevention is the first priority in any comprehensive oral health service programme. Unhappily it is a priority that is seldom met in practice, though there are signs that the gap between intention and action is narrowing. At least in the planning stages the first priority can and should be given to a preventive programme that spreads beyond its own confines to become an integral part of other programmes.

The usual elements of a preventive and health education programme for oral health are caries-preventive action involving the use of fluorides
and an oral hygiene subprogramme specially for the prevention and control of periodontal disease. The selection of a method of fluoride application or use depends on numerous factors including the extent of the caries problem, the technical feasibility and the population’s acceptance of fluoridation of public water supplies, and patterns of living, particularly as they affect the school and home life of children. Where the fluoridation of public or of school water supplies is the method used, the manpower requirements are almost entirely limited to the non-health staff responsible for the installation, maintenance, and surveillance of the fluoridation equipment.

Where the choice is a method based on individual action involving either the topical application or ingestion of a fluoride compound, the manpower requirements are for health education personnel only. However, where individual action is part of an organized group procedure (e.g. supervised tablet administration or topical paste application in schools), the manpower must be estimated on the basis of the time required per single group action. There can be substantial differences in manpower costs according to the type and frequency of action. If tablet administration in schools is the method used, there must be a daily time allotment for classroom teachers and time allotted for such administrative functions as monitoring and replenishing supplies, personnel supervision, field visits, and programme evaluation.

Each of these commitments will vary according to the type of organization and the frequency of administration and supervision, though the actual administration of the tablets will usually account for all but a small percentage of the manpower requirements. For example, if it were estimated that tablet administration required three minutes per day per class of 30 students, this activity would entail 30 minutes of teacher time per day in a school of 300. For a school year of 200 days this would represent 100 hours of teacher time or about 7% of a full-time teacher (teacher-year equivalent). By contrast, a system providing for twice-yearly application in schools of a high fluoride-bearing paste would require supervision by dental personnel, auxiliary or professional, at the rate of one day per year per school of 300. In addition, a certain amount of time would need to be allotted for administration, though probably less than for the daily programme.

Table 22 summarizes the manpower requirements and their implications for each of the three programmes described above. In terms of manpower costs, the water fluoridation programme is the cheapest and the daily ingestion of fluoride the dearest. If the system depends

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1 See, for example, as an illustration of the extensive literature on the efficacy of fluoridation, Denny, G.C. & Holman, M. J. The effect of fluoridation on a dental public health programme. *New Zealand Dental Journal*, 82(12-14) (1966).
<table>
<thead>
<tr>
<th>Methods</th>
<th>Fluoridation of water supply (community)</th>
<th>Injection of fluoride tablets (daily)</th>
<th>Application of fluoride paste (topical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>Teacher</td>
<td>Dental auxiliary</td>
<td>School auxiliary</td>
</tr>
<tr>
<td>(a) 3 hours per application for</td>
<td>(b) 31 hours per calendar week per teacher per 10% of school teacher per classroom per classroom.</td>
<td>(c) 1 hour per calendar week per 10% of school teacher per classroom.</td>
<td>(d) 0.5% of full day of dental auxiliary</td>
</tr>
<tr>
<td>minimal school</td>
<td>7% of school teacher per classroom.</td>
<td>7% of school teacher per classroom.</td>
<td>7% of school teacher per classroom.</td>
</tr>
<tr>
<td>high school</td>
<td>3% of school teacher per classroom.</td>
<td>3% of school teacher per classroom.</td>
<td>3% of school teacher per classroom.</td>
</tr>
<tr>
<td>Efficiency of treatment</td>
<td>Reduce cavities by 30% and reduce the risk of other oral health problems by 50%.</td>
<td>Reduce cavities by 30% and reduce the risk of other oral health problems by 50%.</td>
<td>Reduce cavities by 30% and reduce the risk of other oral health problems by 50%.</td>
</tr>
<tr>
<td>Potential for education in dental care</td>
<td>Very low</td>
<td>Moderate</td>
<td>High</td>
</tr>
</tbody>
</table>

Table 2.1: MANPOWER IMPLICATIONS OF THREE CENTRAL PREVENTION PROGRAMMES IN A TYPICAL SCHOOL OF 200 STUDENTS WITH 30 PER CLASSROOM.
on the application of the fluorides by dental health workers rather than on mere supervision of the programme, the manpower costs tend to be much higher. However, in calculating the actual cost of each alternative it is important to take into account all the variables such as the classroom size, the frequency and duration of manpower involvement, and the relative salaries of each type of health worker. Furthermore, in estimating the probable benefits it is essential to remember that the percentage ranges given for caries in the table apply only to populations with a high to very high prevalence of the disease; there are insufficient data for an estimation of the levels achieved when the prevalence is moderate or low. Where it is low or very low, the objective is not the reduction of the prevalence of caries but the prevention of the increases that usually occur in such populations as they migrate to the cities, change their dietary regimens, or both. However, the percentages given provide an indication of what could happen if the preventive measures were not instituted.

Manpower estimates for an oral hygiene subprogramme vary according to whether there is a purely health education input or also provision for group action. In the latter case the most obvious activity is oral hygiene drill, usually tooth brushing, in schools, and this will vary with the form of organization and the use of school break periods. Usually the manpower involved is schoolteachers, and at 6 minutes per day per class of 30 a school of 300 will take up 13% of one teacher-year equivalent for this activity.

Where there is a health education input only, the estimates for all oral health education can be combined, whether for oral hygiene, the use of fluorides, guidance on food habits related to oral health, or any other area. The estimates should be made on the basis of the hours of health education per year per population group, with an additional allowance for administration and the preparation of materials; and on the figures obtained the actual manpower numbers can be calculated. The activities should be integrated with health education in general so that the manpower involved may be non-health, dental health, or other health categories. The actual percentage of health education time devoted to oral health will vary widely from country to country and should be directly related to established objectives.

The objective is the key to the planning of the whole preventive and health education programme. It is fundamental that all manpower estimates should be related to measurable targets or objectives, but it is most often in prevention and especially in health education that this basic principle is neglected. Particular emphasis should therefore be placed on formulating well-defined objectives in those areas—objectives measurable not only in terms of the population covered but also in the preventive effects and changes in behaviour sought in the target groups. The objectives
will have both a direct effect on the manpower estimates and an indirect effect through their influence on the programme methods chosen. They will also have far-reaching effects on manpower estimates in other programmes, because disease prevention with specific targets should be built into virtually all health care programmes.

**Emergency and demand services**

Estimating manpower is least precise for emergency and demand services, in oral health as in other health areas. Planning data are obtained from clinical records, utilization statistics, and professional and public opinion. Projections of future service use will usually need to take into account different levels of demand according to such variables as residence, income, and age and the likely effects of programmes to increase awareness of oral health and of the value of oral health services.

Estimates of service demand are based on assumed average utilization rates and treatment time per person seeking care. By way of illustration, take a population 80% rural and 20% urban, in which 10% of the rural population and 30% of the urban population sought oral health services in the most recent year for which data are available. Assume that the health education subprogramme has as its five-year objective a 50% increase in these percentages, and that the average annual service time required per rural resident is 30 minutes, per urban resident 20 minutes, the difference in time being in recognition of the different blend of emergency, preventive, restorative, and comprehensive care received by populations in rural and in urban areas. A total population of 5000 (1000 urban and 4000 rural) would require 100 hours of care for the urban sector and 200 hours for the rural sector in the first year of the plan, rising to 150 and 300 hours respectively in the fifth year. On the basis of 1750 hours per working year for health personnel, these totals of 300 and 450 hours for the first and fifth years of the plan represent an estimate of 17% and 26%, respectively, of a dental health worker for a population unit of 5000 not otherwise served by a targeted service such as a systematic school dental care programme.

From these figures it is a simple calculation to estimate the total manpower requirements for emergency and demand services. At this point sectoral estimates must be made for the proportion of these services that will be provided by public health or private facilities and by professional or operating auxiliary dental staff or non-dental health staff such as medical assistants or nurses. Estimates for non-dental manpower can be made

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1 These illustrative time estimates include no provision for personal time not in contact with patients, which in most cases is substantial; in actual practice at least 20% and often considerably more of a dentist’s time is not spent in direct contact with patients. The estimates also make no provision for auxiliary or other supporting personnel.
in the same way and related to existing and projected dental resources, but it should be borne in mind that the smallest time allotment per patient will be for non-dental staff dealing only with emergency care and the highest where comprehensive conservation and restorative care are predominant. Estimates for non-operating auxiliary personnel will be based on the ratio of this personnel to professional and operating auxiliary personnel and not on the ratio to patients.

Improvement in the precision of these estimates can be expected where the records systems are comprehensive and particularly where they are readily retrievable and in a format that easily yields the information vital to the estimates.

Systematic services to target groups

Planners may wish to estimate the manpower requirements for programmes to meet the oral health needs of specified target groups, which may be defined by age, sex, income, occupation, place of residence, institutionalization, or other variables. The most usual and best developed programmes of this general type are for schoolchildren. Whenever target group programmes merely provide for lowering the cost and other barriers to the receipt of care by beneficiaries, the planner will use the same methods of manpower estimation as for emergency and demand services. However, if the programme seeks to provide beneficiaries with a blend of services for the prevention or alleviation of specified oral health problems, other planning techniques will be of use.

Any systematic care programme needs to provide the target population with periodic follow-up services in order to preserve its dentition intact during the time it is eligible for care and to ensure its freedom from oral disease at the time it leaves the target group. The frequency of follow-up will depend on the incidence of oral disease and on the available resources. Table 23 summarizes the principal characteristics as well as the general manpower implications of four of the various types of programmes in use. Services provided in any of these programmes may be subject to many local variations in the type and in the number of staff available. For example, there may be limitations on the type of restorative materials, on the range of restorations prepared by auxiliaries and, as noted in the table, on the treatment of the primary dentition. Preventive procedures should be fully integrated into the school service subprogrammes, though except when the resources are abundant there is likely to be a complete, or at least a substantial, restriction on orthodontic care.

Table 24 gives an example of how to estimate manpower requirements for a programme of services to schoolchildren. The precise amount of time required for various treatments will vary greatly, depending on
<table>
<thead>
<tr>
<th>Type of Care Programme</th>
<th>Incremental Services</th>
<th>Selective Care</th>
<th>Basic Systematic Care</th>
<th>Modified Basic Systematic Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Situation where programme indicated</td>
<td>Where caries incidence is moderate to very high</td>
<td>Where caries incidence is low to moderate</td>
<td>Where caries incidence is low to moderate</td>
<td>Where caries incidence is very low</td>
</tr>
<tr>
<td>Point of Initial Care</td>
<td>At entrance to target group (first year of school)</td>
<td>At entrance to target group</td>
<td>At entrance to target group</td>
<td>None specified</td>
</tr>
<tr>
<td>Continuing Care Arrangement</td>
<td>At specific time intervals (e.g., every 6 months, 1 year, or 5 years) depending on incidence</td>
<td>At ages where likelihood of caries determined to be greatest</td>
<td>At exit from target group, with treatment on demand in the interim for tooth-threatening lesions</td>
<td>At exit from target group, with only contingency care provided up to that time</td>
</tr>
<tr>
<td>Observations</td>
<td>Provides most systematic monitoring of dental health for all children in target group</td>
<td>Seeks to maximize resources through planning</td>
<td>Relies on children (or their parents) in target group to determine need for care during intervening years or to react quickly to warning signs</td>
<td>Relies on children (or their parents) in target group to determine need for care during entire period or to react quickly to warning signs</td>
</tr>
<tr>
<td>Manpower Implications</td>
<td>Requires greatest manpower input, and is thus most expensive to implement</td>
<td>Requires less manpower input than incremental services approach, and is thus less costly</td>
<td>Less manpower input, and thus less costly than previous two programmes</td>
<td>Least input of manpower required, and thus least costly.</td>
</tr>
</tbody>
</table>

* Any of these systems may treat both dentitions conservatively, or limit emergency care to the primary dentition only.

* Contingency care is treatment on demand to relieve pain or to treat, conservatively if possible, any lesion that threatens the loss of a permanent tooth.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Initial treatment group</th>
<th>Time in minutes and explanatory remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Prophylaxis</td>
<td>15 = 1 prophylaxis per 2 children at 30 minutes per prophylaxis</td>
<td></td>
</tr>
<tr>
<td>Restoration</td>
<td>21 = 0.7 DMF teeth per child at 30 minutes per restoration</td>
<td></td>
</tr>
<tr>
<td>Extraction or emergency session</td>
<td>9 = one-fifth of 0.5 DM teeth at 6 years at 15 minutes per extraction</td>
<td></td>
</tr>
<tr>
<td>Other procedures</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>90 minutes per child</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Recall treatment group</th>
<th>Time in minutes and explanatory remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Prophylaxis</td>
<td>15 = 1 prophylaxis per 2 children at 30 minutes per prophylaxis</td>
<td></td>
</tr>
<tr>
<td>New restoration</td>
<td>11 = annual increment of 0.56 DMF teeth at 30 minutes per restoration</td>
<td></td>
</tr>
<tr>
<td>Repeat restoration</td>
<td>5 = one-half annual increment for new restorations</td>
<td></td>
</tr>
<tr>
<td>Extraction or emergency session</td>
<td>1 = one-sixth initial requirement</td>
<td></td>
</tr>
<tr>
<td>Other procedures</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40 minutes per child</td>
<td></td>
</tr>
</tbody>
</table>

Manpower required:
- Initial: 7000 children × 1.5 hours = 10,500 hours ÷ 1750-hour working year = 6 operators
- Recall: 7000 children × 1.0 hour = 7000 hours ÷ 1750-hour working year = 4 operators for each of next 5 years

Since in a given year there will be one cohort of children requiring initial care and 5 cohorts requiring recall care, manpower requirements will be for 26 operators (i.e., 6 × 4 × 5 = 26) for 40,000 children, or one operator per 1510 children.

* Assumptions:
1. Primary caries mean of 3.00 decayed and filled teeth (DF) at 6 years of age
2. Permanent caries mean of 0.7 decayed, missing, and filled (DMF) teeth at 8 years of age
3. Permanent caries mean of 0.5 decayed, missing, and filled teeth (DMF) at 12 years of age
4. Total of 7000 schoolchildren in each year
5. Annual treatment up to age of 12.
the equipment, clinic organization, administrative and records requirements, and extraneous factors such as other personnel duties and transport. The general allowances used in Table 24 illustrate the time required in difficult practice situations and should not be regarded as the usual time requirements.

The planner will need to determine both the total number of personnel required to produce a given level of service and the specific types of manpower to use. There are many examples of ostensibly similar dental programmes staffed by very different blends of dentists, operating auxiliaries, and non-operating auxiliaries. In this regard, it is especially important that the planner should make provision for an adequate number of non-operating auxiliaries to ensure that operating personnel are well utilized according to the prevailing standards.

In contrast to the 1:1615 ratio derived in Table 24, and to illustrate part of the variation in manpower needs, the New Zealand School Dental Service has been reported\(^1\) to use a ratio of 1:690 in fluoridated areas. The recall period for this service was six months and the DMF teeth average at 12 was approximately 9.2.

**Manpower production**

In the past in many countries training programmes were poorly or not at all linked to service needs, and decisions will have been made about their size, location, and curricula that can prove very difficult to modify when dental care is primarily in the private sector. Even if the training institutions accept the projected requirements for personnel, the planner is almost certain to find that substantial curriculum restructuring and staff retraining will be required. The total manpower needs include instructors for training dental personnel and staff for research and evaluation. The requirements for the former should be estimated by using the ratio of teaching staff to students, which is in turn related to the teaching load. Although standards vary widely, a ratio of 1:5 in dental schools and 1:10 in auxiliary schools is not unusual. It should be noted, however, that not all the teaching staff will come from dental manpower.

**Research and evaluation**

Research on and evaluation of dental care usually require only a very small number of health workers, some of whom will not need special training in dentistry. The significance of this cadre of high-level professionals for the satisfactory functioning of the dental programme will,

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however, go far beyond the actual numbers of persons involved. Mainly
central in their functions, staff members working in research and evaluation
will probably be related to the actual subprojects in operation. For
example, in a country with about 2000 dental personnel, a recommendation
was made for an evaluation centre employing six professional staff members
(two non-dental) plus appropriate assisting staff.

Probably the main activity of a service-related research centre would be
to evaluate existing care and prevention programmes and test alternative
systems. Any more basic research should be related to problems of particu-
lar significance to the local situation. Research would also form some
part of dental school activities.

* * *

V. Environmental health personnel

GÉRARD ETIENNE ¹

Environmental sanitation was initially equated with the sanitary disposal
of human excreta, but the term has evolved and given rise to the concept
of environmental health. A WHO Expert Committee convened in Geneva
in June 1969 viewed environmental health as "the ecological balance that
must exist between man and his environment in order to ensure his well-
being." ² In June 1972 the United Nations Conference on the Human
Environment added new dimensions to the concept, which now encompasses
man in his total relation to his physical, biological, socioeconomic, and
sociocultural environment. The degree to which the environmental health
field has expanded in scope may be illustrated by comparing those concepts
with a 1954 statement by a WHO Expert Committee on Environmental
Sanitation:

"The basic sanitary need of a community is the elimination of the gross
causes of communicable disease, which are usually an insanitary water
supply, contamination from human excreta, and insect vectors of disease." ³

¹ Formerly, Chief, Manpower in Environmental Health, Division of Health Manpower Development,
WHO, Geneva.
planning, organization and administration: report of a WHO Expert Committee).
³ WHO Technical Report Series, No. 77, 1954 (Third report of the WHO Expert Committee on Environ-
mental Sanitation).
That concept stands in contrast to today’s much broader outlook on environmental health, which covers such diverse problems as those of radiation, noise, occupational hazards, air pollution, human settlements, and the environment in general. As one group of specialists recognized, “the environment has always been a determinant of the presence and quality of life—human and non-human.”

It is clear that almost all the traditional branches of learning are involved to some degree in environmental health. Its promotion therefore requires an understanding of the natural sciences as well as of all the interrelationships concerned. This has influenced the education of environmental manpower, who should be trained to deal with environmental health problems in the world of today and at the same time be capable of addressing themselves to the needs of the world of tomorrow.

Environmental health manpower has nevertheless tended to be forgotten, or at best has been given relatively low priority, by persons outside the health field. The manpower involved in providing personal health services are much more visible and their effects seem more direct. Thus doctors, nurses, and other care-providing personnel have received most attention, even though it has long been recognized that a safe water supply, vector control, safe food handling, and sanitary wastes disposal can do more to ensure a population’s sound health than an army of curative health workers. It is particularly important, therefore, that the manpower planner should pay due attention to this critical segment of the health system.

Classification of environmental health manpower

A WHO Expert Committee called for three basic types of environmental health manpower:

1. **Professional workers**: public health physicians; sanitary, public health, and other related engineers; basic chemical and life scientists; public health inspectors;

2. **Subprofessional and skilled workers**: health assistants, technicians, operators, workshop and office staff corresponding to the various professional groups;

3. **Semi-skilled and unskilled workers**: health aides, drivers, plant operators, storekeepers, labourers, orderlies.

Such a general classification provides little guidance to the manpower planner, particularly in terms of the level of effort or appropriate mix of the

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various types of personnel. It does, however, provide guidelines for the broad array of personnel involved in what is admittedly an emerging health field, and matches fairly well with the actual breakdown of personnel in countries with extensive environmental health programmes.

In the USSR, for example, the sanitary physician is the key environmental health professional, having specialized in sanitation and hygiene during a six-year medical school training course. Approximately 1700 sanitary physicians graduate each year. Other professional categories in the sanitary and epidemiological services of the USSR are engineers, physicists, chemists, biologists, and other specialists. The chief intermediate-level personnel employed are sanitary physician’s assistants and epidemiologist’s assistants, with fielder sanitarians and laboratory technicians filling the next level in the system.

In the United States environmental health manpower is also normally classified in three broad categories. Environmental engineers, scientists, and technologists comprise the professional group, all having completed at least university level training and most having done some specialized graduate work in environmental health. The intermediate-level workers include technicians and assistants with an education at the sub-university level and some specialization in environmental health. Aides fill the third category and normally receive vocational training or its equivalent in on-the-job training.

Most other countries use similar personnel classifications. The public health inspector (formerly sanitary inspector) is the key professional group in the United Kingdom and in many Commonwealth countries, while the sanitary engineer is in a number of developing countries, including Iran, Morocco, Pakistan, and Turkey.

Whatever the country, the work of the environmental health professional in today’s society involves him in a number of complex roles. Depending on his background and specialization, he plans, administers, and coordinates environmental health programmes carried out by health and other government departments, public bodies, and private organizations and enterprises. He is responsible for the conception, design, operation, and surveillance of the specialized programmes and facilities necessary for control of the quality of air, land, and water and of man’s personal and working environment, and he evaluates the execution of the programmes. In collaboration with health officers and scientists, he assesses environmental conditions, organizes and supervises programmes for the monitoring and surveillance of the quality

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of man's environment, and participates in the assessment of the expected environmental effect of development programmes. He conducts research, and assists in setting standards in physical and urban planning and in evaluating the adequacy and effectiveness of control programmes and measures for the protection of man's health and wellbeing. Finally, he organizes studies on the economic, financial, managerial, and legal feasibility of such programmes.

No one individual has the education and experience to carry out all those functions adequately. Environmental health programmes require the participation of various types of engineer, public health officer, and scientist, all of whom should work as a team and have, by their education and training, a common understanding of the ultimate objectives to be achieved.

**Manpower planning in environmental health: basic considerations**

The concept of environmental health manpower planning is relatively new. Indeed, no manpower planning for a country-wide total environmental health programme has ever been undertaken. A clear definition of the roles and functions of the many disciplines engaged in preventing and controlling environmental hazards has not yet been framed; nor has the number of people required for each of the environmental manpower categories been determined.

Few meaningful data and little information are available for the basic environmental disciplines. Beyond mentioning the general need to plan for environmental manpower, the literature until very recently suggested few planning methods or methodological approaches appropriate to this field. Furthermore, no programmes or studies define explicitly all the components of a total environmental health services system. Admittedly, numerous studies have been promoted and programmes executed in such fields as community water supply, wastewater disposal, and—in more recent years—air and water pollution control. In most of them, however, it is quite evident that the manpower component, whenever it was considered, did not extend much beyond the categories of sanitary engineer, sanitarian, or public health inspector.

**Estimating Manpower Requirements for Environmental Health**

As the discussion above implies, few of the planning methods described in the WHO report on the development of studies in health manpower have been applied in a systematic fashion to the environmental health field.

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Still, a number of attempts have been made in recent years to assess more systematically the manpower situation for some categories of environmental personnel. The methods employed to date and future prospects in this field are discussed below.

**General estimates**

Several efforts in the past to determine manpower requirements for environmental health personnel have involved simply convening groups of public health experts to establish very general targets for manpower needed either at present or at some point in the future. In many cases these estimates have been a secondary issue for those groups, the primary mandate being an environmental programme evaluation, a personnel training programme review, or the like. These groups have evolved certain procedures, including: economic evaluation of completed programmes in relation to the qualitative characteristics of the staff involved; regular reassessment of the priority activities of sanitation personnel; and critical review of the academic and technical training programmes for different personnel categories. Concurrently, some of the criteria applied in determining sanitation manpower requirements are: population size, density, and geographical distribution; size and nature of the administrative services needing to be staffed; characteristics of target groups that can be served by the “average” staff in each category of sanitation work; and financial resources available. These early procedures and criteria still have some validity today, but much additional thought and effort are needed, particularly in the developing countries.

**Ratio method**

The ratio method provides a somewhat more systematic approach to estimating manpower requirements, though it has a number of limitations (described in Chapter 3). The requirements are determined on the basis of the manpower/population ratio, the standards often being established by panels of experts or following those of another country or region judged to have an acceptable manpower situation. Several environmental health studies have used this method to estimate personnel requirements. In most cases the requirements were derived from studies of a given area’s existing manpower supply as a ratio to the population. If the staffing levels were judged inadequate, manpower targets raising the manpower/population ratio to an acceptable level were established.

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A variation of this method is to establish the requirements for a given type of manpower on the basis of its ratio to another manpower category treated as the standard. For example, in the USSR, when the requirements for sanitary physicians have been established for a given area, the requirements for other manpower categories that work closely with them are calculated through the ratio method. For fielders sanitarians the ratio is three to one physician.1

Service targets

The service targets method is to set targets for the production and delivery of environmental services, the targets then being converted into manpower requirements on the basis of staffing and productivity standards. The advantage of this method is that environmental health activities can be disaggregated and dealt with separately by the planner. The method, which is described in detail in Chapter 3, assumes that the public sector will play a very active role in policy formulation and programme implementation; since it has done so in very few countries in the area of environmental health, the method has been little used. The USSR, however, has used the method in its comprehensive planning of the health sector.

Recent illustrative manpower studies

Interest in establishing the requirements for environmental health manpower has increased in recent years and a number of publications have appeared, among them Guide class specifications for air pollution control positions in state and local programs by the United States Environmental Protection Agency (EPA); mention should also be made of the reports by Cutinella2 and by Landauer (op. cit.) on studies undertaken on behalf of the Pan American Health Organization. Of particular interest is the instructional material contained in a manual prepared for the Office of Water Programs of the United States Environmental Protection Agency.3

CENTO Conference.4 In preparation for this 1964 conference sponsored by the Central Treaty Organization and financed by the United States, a team of experts surveyed sanitary engineering personnel needs in Iran, Pakistan, and Turkey in September and October 1963. Their findings

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1 Edelov, N. F. Control of air pollution in the USSR. Geneva, World Health Organization, 1973 (Public Health Papers, No. 54).
served as a basis for the conference agenda when it took place in Istanbul a year later. The report of the conference stated that there was general agreement that present estimates of manpower needs were unsatisfactory. Participants emphasized that each region and country must decide what place its environmental sanitation programme should occupy within its public health programme. Only then would it be in a position to arrive at a realistic estimate of its sanitation manpower needs. The report proposed methods for projecting those needs.

An environmental health inventory. Dr Landauer's consultant assignment (op. cit.) covered 11 countries of the British Commonwealth Caribbean and his report provided: (1) a detailed listing of all environmental health personnel employed by health departments and the staff of potable water supply systems, including in some instances the engineering staff of public works departments; and (2) a description of all the facilities existing in the region for the institutional training of public health inspectors and the technical staff of water supply systems.

Starting with a manpower census as the basis of his study, Dr Landauer found 688 sanitary inspectors active in the 11 countries of the British Commonwealth Caribbean for which data were available; they served a total population of 3.9 million and the sanitary inspector/population ratio was 1:5690. He observed that in the United States 15,000 people per inspector would be considered adequate and concluded that the requirements were probably being met.

WHO study on manpower for environmental health.1 As a sequel to a study initiated in 1973 by the WHO Regional Office for Europe, four pilot surveys have been completed in the Federal Republic of Germany, Poland, Sweden, and the United Kingdom. These surveys, covering a total population of nearly four million, have shown that, in spite of the great diversity among the countries surveyed, the number of professional and subprofessional staff employed in environmental health work lies within the narrow range of 1870 to 2225 persons per million inhabitants; 1% of the gross national product is spent on this staff in three out of the four pilot areas; and the overall manpower mix is one professional per four to six auxiliaries.

Manpower requirements for wastewater collection systems in small cities and towns.2 EPA has prepared a manpower manual to meet the increasing need for manpower information in the water pollution control field. It deals with the complex problem of determining the manpower requirements for the operation and maintenance of wastewater collection

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systems in cities and towns of less than 150 000 population. It considers the most important variables involved and converts them into working figures, assessing the manpower requirements in terms of the types and sizes of crews required to fulfill predetermined functions and responsibilities. Although the original EPA study dealt with one specific category of environmental personnel, it led to the preparation of the manual, which provides a general framework of practical use for manpower planning.

The data and information produced by these studies are not comparable, and no study has attempted to establish an internationally accepted methodology for determining manpower requirements for environmental health. These studies and experience elsewhere, however, provide a basis for the development of informed estimates of manpower requirements, particularly in developing countries.

**Manpower Standards for Environmental Health**

The approaches of the past and the more recent ones cover only a few specific categories of environmental manpower. Few are based on established facts and field observations from which appropriate standards can be prepared.

WHO has made an attempt at developing staffing standards in this area. In preparing programme proposals in 1960 for the development of environmental services in developing countries, it suggested that there should be four sanitary engineers per million population and one sanitary inspector per 8000, these ratios being based on the situation in the United Kingdom and the United States. These figures were suggested as targets that a developing country with no environmental sanitation infrastructure should aim at achieving during the decade 1960-70. When a Sanitary Engineering Centre was established in Rabat, Morocco, in 1969, it was suggested that Morocco needed 13 sanitary engineers for the immediate promotion of its environmental health. By the end of the academic year 1973-74 there were 29 Moroccans trained in sanitary engineering, all of whom were taken into the government’s environmental services. In view of the industrial and tourist development of Morocco and its strong interest in environmental health, the demand for trained sanitary engineers is likely to increase in the near future. Conservative estimates suggest that Morocco will soon need 52 sanitary engineers to work in the public and private sectors.

Although the initial work was done in 1960, these ratios are intelligent guesses that, for lack of more refined bases for estimation, have some validity today. The target of one sanitary engineer per 250 000 and one sanitary inspector per 8000 population is what a developing country
might aim at achieving in the first instance in order to develop a basic environmental sanitation infrastructure. From then on, manpower requirements could be determined in the light of the major variables mentioned earlier in this chapter.

For some years to come the manpower/population ratio, for all its limitations, is likely to be used in determining or forecasting manpower requirements. In order to obviate its major deficiencies, the technique should be based on extensive field studies. Several such studies are being carried out in different parts of the world and are expected to provide data, indices, and parameters that will facilitate the quantitative and qualitative determination of the manpower requirements for efficient environmental health services.
CHAPTER 10

International migration of professional health manpower
Alfonso MeJIA

The international migration of professional health manpower is part of the selective migration of highly trained and highly skilled manpower commonly referred to as the "brain drain". This phenomenon has had a profound effect on the health delivery systems of many countries and is thus of considerable importance to the manpower planner.

Mankind has been moving round the earth since before recorded history, and even such selective movements as the brain drain are not new. In ancient times learned men—scientists, philosophers, mathematicians, and physicians—flocked to Athens and later to Alexandria. Men like Aristotle were able to realize their full potential only by moving to a congenial intellectual environment and, at a time when centres of learning were few and opportunities for learning outside them non-existent, the brain drain was a fruitful and healthy phenomenon. Today the international exchange of scientific knowledge that results from international mobility is highly desirable. However, when such movements become so vast and so selective as to have detrimental effects on either donor or recipient countries or both, it is no longer a matter of fruitful exchange but rather of the international misuse of scarce resources.

The particular migratory flow of concern here is that of highly skilled professional health manpower from deprived countries to privileged countries, a flow that accentuates the maldistribution of health care throughout the world. The migratory pattern is complex and multidimensional, and intervention based on an insufficient understanding of it may do more harm than good or, at best, be only partially effective. The essence of the problem that faces health policy-makers and planners is how to reduce the flow without having to adopt the extreme measure of denying to the individual the right to leave his own country just because he happens to possess certain occupational skills. This chapter brings together the information available on the causes and effects of manpower migration and uses it to suggest certain measures likely to modify the flow.

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1 Chief Medical Officer, Health Manpower Systems, Division of Health Manpower Development, WHO, Geneva.
The Migration Problem

Social and political awareness

Just as the number of physicians and nurses migrating has swelled to enormous proportions, so has social and political awareness of the problems created. Along with this awareness have come changes in international relationships that have made it easier for the countries concerned to deal with the phenomenon and its consequences.

In the international scene it was the voices of the donors that gave most publicity to the problem. The increased awareness of it is reflected in the various recommendations and resolutions of a number of official bodies, including the United Nations, several of its specialized agencies, the World Health Assembly, and the regional committees of the World Health Organization. Since 1965 the United Nations General Assembly alone has adopted six resolutions concerning the outflow of highly trained manpower from developing to developed countries.

Until recently recipient countries were largely concerned with the migratory flow for domestic reasons, such as the possible impact of the influx of foreign-trained health workers on the availability of jobs for nationals or on health care standards. Now, however, there is a growing recognition that the problems that donor countries experience may be of far more significance than those experienced by the recipients.

As the magnitude and implications of manpower migration have become recognized there has been an unprecedented growth in the literature on the subject. The great amount written, however, cannot hide the paucity of solid information; most of the literature tends to be descriptive, anecdotal, or largely speculative. Estimates of the number of migrants involved vary substantially, and official data are on the whole restricted to only a few of the wealthiest recipient countries. As a result most attention has been given to countries with the best data—the Federal Republic of Germany, the United Kingdom, and the United States—thus making it appear that those countries are the chief cause of the problem, smaller but still important flows elsewhere having gone undocumented.

Trends of flow

The migration phenomenon is far from simple. It involves the movement between countries of many different streams of peoples in patterns that are continuously changing over time. The migrants themselves are not a homogeneous group; some are true migrants seeking to change their place of professional activity permanently, while others are students who may later become true migrants but may also return home. Some
movements are direct, others indirect, migrants using intermediate stages to reach their ultimate goal; some are disillusioned migrants or students returning home. Most of the data available make no distinction between these different migrants, and not all flows are recorded, even into countries that publish data. Moreover, most studies to date have suffered from imprecise definitions that make international comparisons difficult and open to various interpretations. Words that have been especially troublesome include “migrant” (permanent, temporary, or student), “foreign” (foreign-born, foreign national, or foreign graduate), and “counts” of physicians and nurses (active or total numbers, including inactive professionals).

Although close examination of the available data reveals many exceptions, the dominant migratory flow is from countries at a relatively lower stage of economic development to those at a higher stage. Substantial numbers of health professionals nevertheless migrate between countries at approximately the same level of development, regardless of what that level may be. It is also notable how few are the donor and recipient countries that account for the great majority of the migrants.

The dimensions of the migration problem are impressive. In 1972 WHO estimated that there were at least 140,000 expatriate physicians and about the same number of expatriate nurses in the world. The total number of physicians migrating in 1970 equaled one-eighth of the world medical school output exclusive of China, and each year about 60,000 new medical graduates become potential migrants. Over half the recorded migrants go to the United States. In 1973 there were 71,335 foreign medical graduates (FMGs) known to be in the United States plus an estimated 10,000 more who had not been formally identified as such. FMGs account for 20% of all physicians in the United States and the number entering annually increased from 1,000 in 1954 to 12,000 in 1973, the latter number exceeding the number of medical graduates in the United States in the same year. FMGs now fill more than one-third of all internships and residency positions.1

It is noteworthy that some 6000 of the FMGs were American-born; they had presumably been forced by the shortage of medical school places in the United States to seek their education abroad, and they represent a substantial importation of medical education. In fact, 53% of the graduates of US medical schools in the USA in 1970 were born in the United States; the proportion being 42% for Italian schools and 41% for Belgian schools. For the Netherlands, Spain and the United Kingdom the proportions were all over 25%.

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The countries of origin of physicians migrating to the United States have changed over time (Table 25). During the 1940s proportionately more came from Europe, whereas in 1973 two-thirds came from Asia. Currently the largest numbers come from the Philippines (8846), India (6300), the Federal Republic of Germany (3500), and the Republic of Korea (3000).1

<table>
<thead>
<tr>
<th>Years</th>
<th>Total numbers</th>
<th>Europe</th>
<th>Canada</th>
<th>Mexico, Cuba, and South America</th>
<th>Asia</th>
<th>Other countries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1957</td>
<td>1990</td>
<td>44</td>
<td>13</td>
<td>26</td>
<td>8</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>1962</td>
<td>1797</td>
<td>28</td>
<td>16</td>
<td>27</td>
<td>15</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>1967</td>
<td>3256</td>
<td>24</td>
<td>14</td>
<td>18</td>
<td>35</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>1972</td>
<td>7143</td>
<td>13</td>
<td>6</td>
<td>5</td>
<td>70</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Similar changes in the migratory flow have occurred with regard to nurses. From 1960 to 1972 the number of foreign nurses licensed in the United States rose from 2100 to 9100, the percentage from Asia rising from 7 to 63 while the percentage from Canada and from Europe dropped from 51 to 9 and 33 to 17 respectively.2

Net manpower flows can be determined by comparing the total supply of foreign graduates found in a country over time. The distinction between net and gross flows is especially important in countries such as the United Kingdom where the number of foreign-born physicians (19000) has remained relatively constant despite considerable immigration and emigration—a situation that can create special problems for the recipient country because of the high turnover of medical manpower but that does somewhat alleviate the loss to the donor.

The United Kingdom's experience also shows the significance of past colonial and language ties, since most immigrants to the United Kingdom come from Commonwealth countries and about half of them from the Indian subcontinent. In 1970 the countries of birth of 18 700 immigrant physicians in the United Kingdom—who together accounted for one-fourth of all practising physicians—were as follows:3

INTERNATIONAL MIGRATION OF HEALTH MANPOWER

Asia 9000
Republic of Ireland 2500
Rest of Europe 3200
Africa 1500
Australia & New Zealand 1300
Canada 300
West Indies 200
Other regions 700

The United Kingdom is both a recipient and a donor country, a sizeable number of physicians and nurses emigrating, mainly to Australia, Canada, and the United States. Fig. 17 shows the situation in 1973–74 for physicians.

FIG. 17. IMMIGRANT AND EMIGRANT DOCTORS IN GREAT BRITAIN


Canada is also both a donor and a recipient in addition to being an intermediate stage for migration into the United States (Table 26). The total number of FMGs in Canada is still increasing—9400 in 1971, 11,200 in 1973. More than one in four physicians in Canada is an FMG.1

The third major donor and recipient country is the Federal Republic of Germany, where a heavy one-way traffic to the United States is more than compensated for by the inflow of physicians and nurses from other countries. In 1971 there were 5605 foreign physicians in the Federal Re-

TABLE 26. PHYSICIAN MIGRATION INTO CANADA
AND FROM CANADA INTO THE USA

<table>
<thead>
<tr>
<th>Years</th>
<th>Immigrants into Canada</th>
<th>Immigrants into USA who gave Canada as:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>country of birth</td>
<td>last residence</td>
</tr>
<tr>
<td>1964-45</td>
<td>1 460</td>
<td>403</td>
</tr>
<tr>
<td>1965-67</td>
<td>2 208</td>
<td>276</td>
</tr>
<tr>
<td>1966-69</td>
<td>2 024</td>
<td>199</td>
</tr>
<tr>
<td>1970-71</td>
<td>0 100</td>
<td>112</td>
</tr>
<tr>
<td>1972-73</td>
<td>2 158</td>
<td>198</td>
</tr>
</tbody>
</table>

Source: Canadian Health Manpower Inventory.

The public of Germany, including 1800 from the rest of Europe and 2200 from the Middle East (especially Iran). Of the physicians in the country 5% were foreign nationals.

The same four countries also appear to be the major recipients of nurses. For example, during the period 1967-72 the numbers of foreign nurses licensed for the first time in Canada and the United States respectively were over 17 000 and over 38 000. In England and Wales over 4000 nurses trained elsewhere were registered during 1973-74. In the Federal Republic of Germany there were nearly 8000 foreign nurses in 1971. At least 28 000 nurses crossed national borders in 1971 alone. As an example of the effect, the case of nurses emigrating from the Philippines may be taken: in 1967 nearly as many Filipino nurses registered in Canada and the United States as in the Philippines, and in 1968 and 1970 more Filipino nurses registered in those two countries than in their own.

Substantial numbers have also crossed national borders in order to study nursing. For example, in 1970 Jamaica, Malaysia, Mauritius, and Trinidad and Tobago each had about 2000 students studying nursing abroad. In the United Kingdom the number of overseas nursing students in 1970 represented 26% of the total number of nursing students in that country in that year. Among these the number from Mauritius, for example, was equivalent to two and a half times the number of nurses working in government service in Mauritius. The question therefore arises to what extent Mauritius, or any other country in a similar situation, could absorb such a number if they returned as professional nurses. The return rates are unknown but are thought to be very low.

As with physicians, the countries most heavily involved as donors of nurses can most readily be seen from data provided by the major recipient countries. Thus, of the foreign nurses newly registered in the United States in 1972, over 49% were from the Philippines, over 21% from Canada
and the United Kingdom together, and over 14% from India, the Republic of Korea, Thailand, and the West Indies together.¹

The flow of manpower out of Africa is slowing down, most migrating Africans going to other African states. A number of African states are recipients because they are not yet able to produce their own physicians and nurses in sufficient numbers, and in some cases there are bilateral agreements between countries whereby nationals of countries without medical schools receive training abroad and then return to their home country after graduation. There is also a flow of physicians and nurses into Middle East countries with a high gross national product, notably Kuwait and Saudi Arabia.

Impact of Migration

In absolute monetary terms migration affects the donor and recipient country in opposite ways. The permanent migration of a physician from one country to another is equivalent to the transfer of the cost of training that physician, and this is lost to the donor country. During the transfer, however, there may be a loss of a portion of the cost if the physician’s skills and attitudes are less appropriate to the recipient than to the donor country.

In relative terms the losses and gains do not balance, but depend on the situation at both ends of the exchange. If the migration is from a less developed to a more developed country, the relative loss tends to be greater for the donor country since the cost of training one physician there tends to represent a higher percentage of the available resources than the comparable cost for the recipient country.

The financial gain from migration in the recipient country is equal to the cost of building and maintaining sufficient professional schools to produce the number of foreign graduates entering the country. In the case of physicians, for example, the United States would have had to operate 57 more medical schools² during the period 1970–1973 in order to produce the physician manpower derived from immigration. The dollar value of this foreign aid to the United States was already in 1967 equal to the total cost of all the health care assistance provided by the nation, publicly and privately, to foreign nations.³

The financial loss to the donor, assuming that the emigrating physicians are both needed and employable, must include both the direct and the indirect contributions of the migrants to the future national income.

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² The difference between the number of FGMCs in the United States in 1970 and 1973 was 14,118, the annual average being 4700; divided by 62 (the average graduating class of United States medical schools in 1970), this gives 57.
### Table 27. Selected indicators of the impact of emigrant physicians on donor countries

<table>
<thead>
<tr>
<th>Countries</th>
<th>Emigrant Physicians</th>
<th>Annual government health budgets (millions of US$)</th>
<th>Cost of * training (in millions of US$)</th>
<th>Replacement time in years (based on estimated 1970 graduates)</th>
<th>Number (estimate for 1971)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haiti</td>
<td>400</td>
<td></td>
<td></td>
<td>4</td>
<td>5.5</td>
</tr>
<tr>
<td>India</td>
<td>14,000</td>
<td></td>
<td></td>
<td>140</td>
<td>1.5</td>
</tr>
<tr>
<td>Iran</td>
<td>3,200</td>
<td></td>
<td></td>
<td>32</td>
<td>5.0</td>
</tr>
<tr>
<td>Lebanon</td>
<td>800</td>
<td></td>
<td></td>
<td>8</td>
<td>9.0</td>
</tr>
<tr>
<td>Paraguay</td>
<td>400</td>
<td></td>
<td></td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>9,000</td>
<td></td>
<td></td>
<td>90</td>
<td>8.0</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>3,000</td>
<td></td>
<td></td>
<td>20</td>
<td>4.5</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>800</td>
<td></td>
<td></td>
<td>9</td>
<td>3.5</td>
</tr>
<tr>
<td>Syrian Arab Republic</td>
<td>750</td>
<td></td>
<td></td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>1,200</td>
<td></td>
<td></td>
<td>13</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Sources: WHO multinational study of the international migration of physicians and nurses.
* A rough estimate based on the conservative figure of US$ 10,000 as the cost of training a physician.

The less common case, where there are no jobs at home and emigration is more in the nature of an “overflow”, may appear beneficial in that emigration removes the burden of out-of-work physicians, but this is not to be countenanced as advisable policy, since over the long term it makes much more sense to reduce the number of physicians produced.

For many countries the number of their physicians abroad is equal to several years’ output from their medical schools. For example, at the rate of production of physicians in 1970-71, it would take Haiti, Iran, Lebanon, Paraguay, and the Philippines, at least five years each to replace the number of their physicians abroad in 1970-71 (Table 27). Conversely, it would take Canada, the United Kingdom, and the United States at least seven years each to replace the immigrant physicians by physicians trained at home.

The donor country is often the one with the greatest need for health care, having a low physician/population ratio and a low total supply of physicians. The loss of one physician, for example, has a much greater impact on health care in Haiti than in Switzerland. To assess more fully the relative effect of migration on donor countries, both relative need—in terms of the adequacy of health care coverage—and relative loss—the relationship between the numbers lost and the total supply—must be taken into account. Planners will be most concerned when both manpower needs and loss rates are high, less so when only one of the two is high. Fig. 18 shows this graphically.
FIG. 18. IMPACT OF PHYSICIAN MIGRATION

1 Australia. 2 Austria. 3 Brazil. 4 Canada. 5 Colombia. 6 Egypt. 7 Ethiopia. 8 Germany. Fed. Rep. 9 Gabon. 10 Greece. 11 Haiti. 12 India. 13 Indonesia. 14 Iran. 15 Ireland. 16 Israel. 17 Jamaica. 18 Japan. 19 Lebanon. 20 Mauritius. 21 New Zealand. 22 Nigeria. 23 Philippines. 24 Pakistan and Bangladesh. 25 Portugal. 26 Republic of Korea. 27 Romania. 28 Saudi Arabia. 29 Sri Lanka. 30 Sweden. 31 Sudan. 32 Thailand. 33 United Kingdom. 34 United Republic of Cameroon. 35 USA. 36 Uruguay. 37 Venezuela. 38 Yemen. 39 Yugoslavia.
Data from the United States indicate that a disproportionate number of FMGs go into teaching and research. This suggests that the flow is selective and that the donor countries may be losing their future educators, not only in the medical schools but also at the level of schools for teaching primary health workers. This occurs even though some FMGs go into research only until they pass the Educational Council for Foreign Medical Graduates (ECFMG) examination and are then able to work in direct patient care.

When migration is only temporary the migrant physician or nurse comes home with new skills. But what is a personal benefit for the migrant may not be a social benefit for the country. It is questionable whether postgraduate training in a technologically advanced country with highly specialized, capital-intensive medicine is of much benefit to the donor country. On the contrary, it may well mean that the returning migrant is unsuited to the tasks that are most needed. If he works in the public sector his foreign experience may lead him to divert health care resources into activities, equipment, and facilities ill-suited to local conditions; or he may end up choosing to work in an already overcrowded private sector in a large city.

Recipient countries may also suffer from the discrepancy between manpower skills and health care needs. Recipient countries appear to receive foreign-trained health professionals at virtually no cost to themselves. Most of them impose certain entrance requirements, however, such as the ECFMG examination and the state licensure examination in the United States, and there is some evidence that the professional qualifications of many immigrants at the time they take such examinations are lower than those trained in the country they are seeking to enter.1 (The standards set of course are those of the host country and comparisons may be invalid in absolute terms). On the state licensure examinations, for example, FMGs had a pass rate of 64% compared with a pass rate of 94% for United States graduates for the period 1962-72.2

There are also language and cultural barriers, which can cause serious communication problems, both between physician and patient and between physician and colleague. In some fields, such as psychiatry, this can be of critical importance. For the most part FMGs fill the less desirable posts, which often means that already deprived social and ethnic groups get a lower standard of health care. The language problem is particularly acute in countries such as the United Kingdom where there is a rapid turnover in the pool of foreign medical graduates.

Attitudes Towards Migration

The attitudes taken by countries involved in the international flow of health manpower are varied and often contradictory. The dominant reaction in donor countries is to oppose the outward flow of migrants, but it is by no means a unanimous reaction, either among donor countries or within a given country. Some observers within donor countries see migration as a social safety valve for unemployed high-level manpower. Others comment with pride on the emigration, citing it as evidence that the donor country has brains and talents to export or that national training standards are comparable with those of the major industrial nations of the world and acceptable to them. In a few donor countries professional health manpower is seen as just another marketable commodity that earns foreign currency; government policy encourages the active recruitment of health professionals by countries needing them and bilateral agreements exist as, for example, between the Republic of Korea and the Federal Republic of Germany and between Austria and the Philippines.

The attitudes in recipient countries are also mixed, but over the past few years they have tended to become increasingly opposed to the massive migratory flows that are now taking place. A 1975 symposium on public policy towards FMGs in the United States health system, by far the largest recipient. The symposium concluded that:

1) it is unwise for the United States to follow an immigration policy with regard to FMGs that drains highly qualified personnel from developing countries, where they are sorely needed;

2) the quality of medical education received by FMGs is different from and often inferior to that offered by United States medical schools;

3) it is objectionable that FMGs—some of whom are unlicensed—should be the main providers of health care for the poor, the ethnic minorities in inner cities, and patients in mental hospitals;

4) it is unfair for the country to rely so heavily on FMGs when there are many capable young persons who desire to attend medical school but are denied entry owing to a shortage of vacancies.

A medical profession study committee in the United Kingdom came to similar conclusions for that country.2 While acknowledging the heavy dependence of the National Health Service on doctors trained overseas and the contribution they have made to health care in Britain, the Committee


pointed to the lower range of standards allowed for foreign physicians and the problems most have of becoming successfully integrated into the health system. The Committee therefore recommended that only overstrained doctors who meet the minimum standards required of a medical graduate of the United Kingdom should be registered. It also called for further study of the training programmes for overseas doctors and of the possibility of granting specialist status to such doctors on the basis of education and experience obtained overseas.

Factors Fostering Migration

Migration is conditioned by a combination of forces, “push” factors at the source and “pull” factors at the destination of the flow. These two sets of forces determine the direction the flow is likely to take, while its magnitude is conditioned by regulating forces that impede or facilitate migration. The regulating forces—emigration and immigration policies—may operate in one or both of the countries between which the manpower flow occurs.

Each of the three types of force—push, pull, and regulating—has both exogenous and endogenous characteristics. Exogenous factors are those that arise outside the health system; they are related to a country’s social structure as a whole. Among them are political institutions and processes, immigration policies, the political climate, and linguistic and other cultural factors. Most of these factors cannot be manipulated by health policymakers, but they may have an important influence on the direction and magnitude of migratory flows.

Endogenous factors are those inherent in a country’s health system. The various component parts of the health system interact to determine at any given time the balance between the supply and the demand. Either shortages or surpluses may arise in the market for services, manpower, and education and create job vacancies or unemployment or lead to corrective migratory flows. Among the endogenous factors are: (1) unemployment, underemployment, and inappropriate employment of health manpower and their possible relationship to faulty health manpower or education planning; (2) the infrastructure (organization, administration, facilities, and equipment) of the health delivery system; and (3) manpower management such as salary scales, licensure and certification, opportunities for professional advancement, and other professional and personal benefits.

The role of economic development

When individuals decide to migrate they are responding to push forces drawing them away from their poor environment towards the pull forces
Fig. 18. MIGRATION OF PHYSICIANS IN COUNTRIES HAVING MEDICAL SCHOOLS.

Per capita gross domestic product (1970) plotted against physician migration relative to stock.

1 Argentina, 2 Austria, 3 Bangladesh and Pakistan, 4 Belgium, 5 Bolivia, 7 Brazil, 8 Canada, 9 Chile, 10 Colombia, 11 Costa Rica, 12 Denmark, 13 Dominican Republic, 14 Ecuador, 15 Egypt, 16 El Salvador, 17 Finland, 18 France, 19 Germany, Fed. Rep., 20 Greece, 21 Guatemala, 22 Haiti, 23 Hong Kong, 24 India, 25 Indonesia, 26 Iran, 27 Iraq, 28 Ireland, 29 Israel, 30 Italy, 31 Jamaica, 32 Japan, 33 Lebanon, 34 Mexico, 35 Morocco, 36 Netherlands, 37 New Zealand, 38 Nicaragua, 39 Nigeria, 40 Norway, 41 Pakistan, 42 Peru, 43 Philippines, 45 Portugal, 46 Republic of Korea, 47 Romania, 48 Singapore, 49 Southern Rhodesia, 50 Spain, 51 Sri Lanka, 52 Sudan, 53 Sweden, 54 Switzerland, 55 Syrian Arab Republic, 56 Thailand, 57 Turkey, 58 Uganda, 59 United Kingdom, 60 USA, 61 Uruguay, 62 Venezuela, 63 Yugoslavia, 64 Zaïre.
in the rich environment. Fig. 19 illustrates how the relative strengths of the push-pull forces depend on the relative poverty or affluence of the countries at each end of the flow. It shows countries plotted according to their per capita gross domestic product (GDP) with their net physician migration losses or gains measured against physician supply. The funnel-shaped distribution of countries indicates that:

1. Among countries with a 1970 per capita GDP of less than US$ 800 there are quite a number with emigration rates exceeding 10% and some with as much as 60% or more. The push factor is very strong in these countries.

2. From countries with a per capita GDP between US$ 800 and US$ 2000 there is some emigration, though usually not more than 10%. These countries may be subject either to weak push or to weak pull forces.

3. Once a country attains a per capita GDP of US$ 2000 it tends to exert a net pull for physicians; only a few countries at this level or higher have net emigration.

4. There are a few low-income countries that are net recipients, but they tend to be former colonies that do not yet have sufficient physicians to replace foreigners or perhaps sufficient educational capacity to produce adequate numbers of physicians on their own.

In sum, to the extent that the per capita GDP is correlated with development, until countries reach the US$ 800 level they are liable to experience large outflows of physicians, and when they reach the US$ 2000 level they tend to experience large inflows.

The paradox of demand and supply

The international migration of health professionals presents a curious paradox, in that the developing countries are producing manpower they desperately need but cannot readily utilize, while certain developed countries seem to have a virtually unlimited capacity to absorb manpower from abroad. In the recipient countries the domestic production of professional health manpower appears inadequate to meet the demand, and the influx has little effect on the availability or quality of health care. Despite seeming differences in the situation faced by donor and recipient countries, the underlying problem is usually quite similar in both, that is, the market forces regulate health care needs and demands inadequately.

As described in Chapter 3, need becomes demand only when it is backed by the resources to pay for services, and in most developing countries an effective demand exists only in the private sector. In these countries the public sector is neither sufficiently developed nor sufficiently financed to create an effective demand for physicians at the prevailing prices, which
themselves have been artificially boosted in many cases by the alternative employment available to physicians in more affluent countries. As a result, a crucial need for manpower exists simultaneously with unemployment for physicians and other health professionals.

The production of manpower for which there is no market is a symptom of a larger phenomenon which, it has been suggested, is one of the root causes of the problem of migration: a basic disequilibrium in development. The various components of the socioeconomic system are developing at different speeds and the economic base is not enough developed to create employment for the products of the educational system, with the result that highly trained manpower seek employment elsewhere.

For some recipient countries the problem may simply be that of the inadequate domestic production of professional health manpower to meet a reasonable level of demand. More often, however, the health care market seems to be so poorly attuned to considerations of manpower efficiency, effectiveness, and equitable distribution that, on the one hand, the affluent private sector produces more and more services and, on the other, the health of the population as a whole is little affected.

The rapidly increasing demand for physicians in many countries of the world has led to a parallel expansion in the medical schools. Of the approximately 1000 medical schools now in existence almost half have been established since 1950. On superficial comparison the fact that the expansion has been most rapid in the developing countries suggests that the developed countries have responded inadequately to their domestic need for physicians. Such a conclusion requires modification, however, because for the most part they already have a well developed medical education system, smaller relative deficits of medical manpower, and slower rates of population growth than the developing countries. It is therefore reasonable to expect a slower rate of medical school expansion in them than in the developing world.

In short, the main factor influencing migration, within and outside the health systems of both the donor and the recipient countries, is the international problem of unequal economic and social development. In the major donor countries this is manifested by low economic demand (even though the need is high). In the major recipient countries it is manifested by the existence of a shortage of physicians and nurses relative to a heavy demand, particularly in the more affluent strata of the population. Both the shortages in the recipient countries and the surpluses in the donor countries reflect, among other things, the lack of coordination within the health manpower system and between that system and the health service system. The result of this lack of coordination is that health manpower plans are either deficient or non-existent, resulting in: (1) education
courses that are irrelevant to a country's health problems; (2) overproduction and/or overtraining of certain categories of health personnel; and (3) inefficient management of the health manpower available.

**Countermeasures**

This section presents a conceptual framework for policies designed to change the situation and then describes alternative approaches for dealing with the problem of reducing migratory flows.

**Points of intervention**

Measures to deal with international migration are of three types:

1. Preventive, aiming at the causes of migration rather than at the migrants themselves. The basic goal of preventive measures is to promote conditions within society in general and the health system in particular that motivate individuals to remain in their own country.

2. Restorative, aiming at correcting the adverse effects of migration.

3. Restrictive, aiming at arresting the flow of migrants rather than eliminating the causes. These measures are usually short-term, and over longer periods of time may prove difficult to enforce.

Although many efforts have been made in the past to stem the international flow of health professionals, few systematic evaluations of the efforts have been attempted and for the most part they tend to document failures rather than successes.

Because it is an international phenomenon, countries should seek to cope with the migration of high-level manpower through bilateral and multilateral arrangements as well as through action at the national level. International bodies such as the United Nations, ILO, UNESCO, WHO, UNCTAD, and UNITAR are currently studying the problem in the hope that they can help countries to formulate appropriate measures. Multilateral action is being taken on a regional scale in some areas, notably among the Andean Pact countries in South America and in the British Commonwealth, though for the most part it tends to be regulatory (facilitating, for example, exchanges for study and the mutual recognition of professional qualifications) rather than an attempt at reducing or redirecting migration. In other situations where the migratory flow is well established between two countries (such as the Philippines and the United States) bilateral action would seem to be the most appropriate form, although to date bilateral agreements have tended to concentrate more on facilitating or even increasing the migratory flow than on its reduction.
Nevertheless, migration problems tend to be specific to countries. While it is possible to generalize about causes and circumstances, there is a specific set of factors at play in any given country and no prescription can possibly be universally valid. The dimensions of the problem show fundamental differences between countries and groups of countries, as do the local resources and possibilities available for solving it and the approaches required in each case. These differences must be taken into consideration in the formulation of policies.  

_Preventive measures_ may be taken both by donor and by recipient countries. Donors will aim at accelerating the rate of socioeconomic development and improving working conditions in the health sector. For the most part these measures will be long-term and not infrequently beyond the powers of the health manpower planner. Measures that do fall within the jurisdiction of the health sector and have been discussed at greater length in other chapters of this book include:

1. Bringing the quantitative production of professional manpower more into line with the capacity of the sector to remunerate it adequately and utilize it effectively.

2. Modifying professional health education so as to steer it away from international norms and more towards national needs. For example, Tanzania redesigned its medical and nursing education programmes so as to prepare graduates for work in the restructured health care delivery system described in an earlier chapter and at the same time make them less suitable for service in potential recipient countries. Since such policies may meet with great resistance from professional associations and health training institutions in donor countries, a compromise approach might be to maintain traditional educational standards and award internationally recognized degrees but spread the training over a longer period of time, interweaving it with periods of practical work in deprived areas. Such an arrangement would, it is to be hoped, sensitize students to the real needs of their country, and they would at the same time be rendering service as a form of payment for their education and be unable to migrate because they had not yet received their professional degree. Such a proposal runs counter to the current policy of such bodies as UNESCO and WHO which are working toward the mutual recognition of health degrees and diplomas. There is a basic inconsistency in deploring the loss of highly trained manpower from developing countries and at the same time advocating international recognition of their qualifications, which would enhance their opportunities for migration.

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1 United Nations Institute for Training and Research. The brain drain from five developing countries—Cameroon, Colombia, Lebanon, the Philippines, Trinidad and Tobago. New York, United Nations Institute for Training and Research, 1971.

(3) Reducing the dependence on high-level professionals for the provision of care in the rural areas and smaller towns. This approach is discussed fully in Chapters 7 and 8.

(4) Carefully monitoring the fellowship programme so that awards are made for foreign postgraduate study only in those areas for which there is a demonstrable need at home and national training is not available. An alternative is to bring teachers to the country rather than send students abroad, since there is always the risk that they will not return. An extension of this approach is to establish centres of learning and research in donor countries, possibly with multinational funding. Some agencies (e.g. the Instituto Colombiano de Educación Técnica en el Exterior—ICETEX—in Colombia) seek to minimize losses abroad by providing trainees with financial support, a substantial portion of their supervision, and continuing information on job opportunities in their own countries.

(5) Improving salaries, working conditions, career development schemes, promotion opportunities, and fringe benefits so as to reduce the gap between donor and recipient countries. While this is undoubtedly important in a number of countries and nominally feasible as an act of policy, the gap that exists between many donors and recipients is so great as to be virtually unbridgeable. In any given country salaries can be adjusted only to a limited extent if inequality is to be avoided; the scales must always remain consistent with those paid to professionals working in other fields as well as to those paid to other members of the health team. Moreover, salary differentials are probably overrated as causes of migration; working and living conditions generally are of greater importance. Bringing conditions more into line with those in the developed countries would be inordinately expensive and it would take a long time; the experiences of such countries as China, Cuba, and Tanzania, however, indicate the degree to which health workers can be motivated to serve people even in the absence of special inducements.

For recipient countries the most important single preventive measure is to reduce or eliminate the demand for foreign-trained health manpower. This can be done either by increasing the domestic production of health professionals or by improving the operation of the health sector so that the demand for services can be satisfied without continually increasing the number of health workers. As in the case of measures in donor countries, these recommendations are far easier to propose than to implement. In the United States there would be major political and major financial obstacles to increasing the production of American physicians to a level comparable with the influx of FMGs but, more importantly,

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there is little evidence that such a measure would saturate the market for physicians sufficiently to make immigration unattractive for those trained abroad. For countries that are both donors and recipients it is not always a question of insufficient manpower production but rather of emigration of their own nationals. In these countries the logical approach is to concentrate on reducing the emigration of their own nationals rather than to prohibit FMGs from entering the country, though each alternative presents serious difficulties in practice.

Restorative measures. Some attempts have been made by donor countries to induce migrants to return from abroad. For example, Argentina and Colombia have granted at least partial exemption from import duties on major items purchased while abroad; and countries such as India, Iran, and Turkey have attempted to contact some of their nationals in other countries to offer them assured jobs with attractive salaries. Unfortunately, there is insufficient information to determine whether these measures have been effective or not.

A study by UNCTAD suggested that, as the migration of highly trained manpower represents a transfer of productive resources, a system of international compensatory payments should be introduced. This could take the form of a new type of international accounting recording the transfer of such resources in financial terms. As an alternative, the donor government might be empowered to tax the income of its expatriate nationals.

Restrictive measures. Restrictions on migration may be imposed at either the donor or recipient end of the migratory flow. Among the various restrictions by donor countries that have been introduced, usually with only limited success, are: refusal to issue passports and/or foreign currency to prospective migrants (Sri Lanka); compulsory military or health sector service prior to emigration (Iran, Mexico, and the Philippines); and a ban on the ECFMG examination for physicians interested in emigration to the United States (India). A more promising restriction involves placing persons applying for study abroad under bond, since it has been shown that sponsored students or fellows are more likely to return home than those without such a formal tie. Some countries have successfully retained their health workers through a combination of measures, which include the reorientation of education, career development schemes, and restrictive measures on travel abroad for study or other purposes. Although

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these measures have been effective in regulating the flow, they have been
criticized for restricting the freedom of the individual. The countries
concerned, however, claim that, to reconcile the rights of society with the
rights of the individual, some personal freedoms need to be restricted.

Restrictive policies exercised by recipient countries can be much more
effective than those exercised by donors. This was demonstrated in
reverse when, in 1965, the United States removed the national quota
requirement from the immigration laws, thereby initiating a sharp increase
in the immigration of health professionals. Various donor countries have
urged recipient countries to make their immigration laws more restrictive,
but this has for the most part been resisted up to the present since it runs
counter to the principle that there should be freedom of movement for
individuals irrespective of their profession. It is true that such policies
bring the rights of the individual and the rights of the community into
conflict but some immigration laws, as in the United States, now specify
preferences for certain occupations, including the health professions,
and it would seem that the elimination of such preferences could be made
without curtail the broader rights of individuals.

Restrictive measures currently in force in some countries, notably
France, where the right to practise is essentially restricted to French nationals
who have a French diplôme d'état, may need to be rethought as new inter-
national agreements come into force. The mutual recognition of degrees
and hence the mutual granting of the right to practise within countries of
the European Economic Community now established will render restrictive
practices impossible.

Canada 1 introduced measures in 1975 to restrict the immigration of
foreign physicians to those agreeing to a term of service in underserved
areas or with job contracts approved by provincial control agencies.
In 1970 New Zealand 2 introduced stricter regulations for the registration
of foreign physicians and in 1975 the United Kingdom introduced qualify-
ing examinations for Indian physicians wishing to practise in the United
Kingdom.

WHO multinational study

The multinational study of the international migration of physicians
and nurses currently being carried out by WHO was designed in response
to the Twenty-fifth World Health Assembly’s resolution WHA25.42
calling for a comprehensive analysis of the phenomenon.

1 KERCHER, M. Canada’s provinces to control entry of foreign physicians. American Medical News.
24 March 1975.
(1971).
The objectives of the study are:

- To determine the dimensions and directions of the international migration of physicians and nurses.
- To develop a profile of migrant physicians and nurses in terms of scientific, economic, and other types of personal motivation, level of education, specialty, demographic and social characteristics, and employment history, and to ascertain the population most likely to emigrate.
- To identify in each country the social and economic factors associated with the migration and the non-migration of physicians and nurses.
- To identify in each country the consequences of and the population affected by the migration of physicians and nurses, and to define a set of patterns for such migration and propose intervention options with respect to each pattern of migration.

On completion of the study it is proposed to develop a plan for monitoring the movement of physicians and nurses into and out of Member States in order to strengthen the information base for planning the supply, distribution, utilization, and productivity of health manpower. The primary object will be to assist each Member State that requests it to draw up and to implement through the health system a programme of action to modify the pattern of physician and nurse migration in the way desired.

SUMMARY

The migration of physicians and nurses from certain developing countries to developed countries is a matter of international concern. The number of those migrating appears to be increasing, though the migration is poorly documented and the data available are incomplete and frequently inaccurate. The pattern of migration and its characteristics, causes, and consequences vary from country to country, but some common features exist.

Excessive migration reflects important differences in levels of social and economic development. In both donor and recipient countries the capacity of the health system to retain its manpower is determined primarily by identifiable elements of the system within the broader context of the country's political, social, and economic framework. When health professionals fail to obtain what they expect of their job, in economic or other terms, a proportion of them will seek employment abroad, in the health or in other fields. Excessive migration generates problems within the health systems of the countries involved; imbalances between the supply of and the demand for health manpower result in its non-use or misuse. A country may produce more manpower than it can readily employ, but it may still have a deficit in relation to the actual need for it.

Education and training programmes that are irrelevant to local health problems predispose graduates either to going abroad in search of employment in the health field or to seeking employment outside the health field. The motivation to migrate is complex and highly personal, it varies from one category of manpower to another as well as between countries, and it can only partially be expressed in quantitative terms.
The effect of migration in both donor and recipient countries is very difficult to assess, partly because the data are not available but also because much of it is intangible; nor is there any tested methodology for measuring it. However, the monetary loss and gain are great, and for several donor countries the loss largely exceeds their national health budget. For example, it would take eight selected donor countries at least five years each to replace the number of their physicians abroad in 1970-71. Conversely, it would take major recipient countries at least seven years to replace the immigrant physicians with their own nationals.

WHO is currently studying migration patterns and is proposing to establish a system for monitoring and data collection that should provide a more reliable data base for action in individual countries to curb migration and to facilitate bilateral and multilateral agreements among the countries involved.
Economics is likely to be overlooked as a tool for manpower planning. Economic questions and concepts, however, are central to development planning and not less central to health and health manpower planning; health manpower planning cannot be divorced from larger national development goals, and in no circumstance should it be divorced from a country’s health policy goals. A nation’s underlying political and social dynamic affects its health goals, as a result either of national leadership or of pressure generated by the people, and this too is a legitimate concern for planners. Manpower planning must also take the most comprehensive view possible of the health sector and all the forces that affect people’s health. Health systems in developing countries are always subject to change as the health sector itself changes, and manpower planners must be sensitive to change and not draw up manpower plans based on a situation unlikely to survive as the development of a country proceeds.

Health is an important part of socioeconomic development. Development planning is primarily conducted within an economic framework and uses economic concepts because decisions and choices are made about how resources are to be used. If health planners, especially manpower planners, do not know enough about the central economic concepts used in development planning, this will limit the role of health in the country’s development and the health sector will be unlikely to receive a fair share of resources. Equally important, if the health aspects are not fully taken into account from the start in development planning, the development of the country may be fragmented. Economics is a system for defining choices, and the challenge is to define choices that are attainable in the sense that they are compatible with national goals and maximize the social benefits at any given social and economic cost level.

Manpower planning as it has been carried out up to the present has not been very effective. It is often represented as a process whereby projections of future requirements and supply are made and any imbalances are rectified by appropriate action. The central element in the process has been the forecasting of future manpower requirements, and progressively

1 Scientist, Health Manpower Planning, Division of Health Manpower Development, WHO, Geneva.
2 Professor of Economics, University of Wisconsin, Madison, WI, USA.
more sophisticated tools have been used for this purpose. In spite of
much work in the 1960s, nearly all the manpower forecasting—whether
in developing or developed countries, restricted sectorally or covering
all occupations—has proved to be a failure both conceptually and as
judged by the test of time. Health manpower planning has not escaped
unscathed in this indictment, even when based on sophisticated models.
The question then arises: where has health manpower planning failed
and how can it be made to succeed?

The main topics considered in manpower planning are:

- the forecasting of manpower requirements, in numbers and in
characteristics;
- manpower production;
- qualitative aspects of training;
- manpower productivity and use;
- the financial resources available;
- intrasectoral and extrasectoral relationships.

These topics are usually studied over a period of time and a manpower
plan based on past trends is produced. In many such plans inordinate
emphasis is given to the numerical aspects of manpower supply and demand,
even though the validity of the projections is often doubtful and large
surpluses can easily be converted to large deficits by small alterations in
the assumptions. In the United States, six different projections of physician
requirements and supplies for 1975 yielded estimates ranging from a
deficit of 65 000 to a surplus of 21 700. It may be asked how a policy-
maker is going to make sense out of such varying estimates.

The importance of giving adequate attention to the forces acting upon
the health sector, and hence upon manpower supply and demand, cannot be
overemphasized. Previous chapters have considered in some detail
the many pitfalls that await the planner. Suffice it to recall here the follow-
ing few points that are especially applicable to those concerned with the
economic aspects of health manpower planning.

1 Trend analysis and international comparison. In a rapidly changing
world past trends are often not a reliable basis for deciding on future

requirements. This is especially true in developing countries, where the conditions, aspirations, and directions of development are changing rapidly. Moreover, the planner may make serious errors if he uncritically bases projections in his own country on experience in somewhat more developed countries with ostensibly similar economic, social, and cultural characteristics. For every case of parallel development one can be found in which apparently similar countries have followed quite different developmental patterns. International comparisons are useful up to a point, but the planner must always bear in mind that the development process is essentially specific to each country and hence the manpower requirements will also be specific.

A successful development programme can alter the income distribution in the population by widening or narrowing it and thus substantially affect one of the principal determinants of private and public demand for health care services. Thus a manpower plan based on an income distribution no longer in existence is likely to be off the mark.

(2) The importance of policy and politics. Any process of development, whether social or economic, entails choosing specific alternatives from among the many available. Choice is a political act and changes over time, thus necessitating frequent adjustments to plans. The planner must give careful consideration to the policies and policy constraints within which services are provided. All too often planners become over-involved in the mere measurement of utilization, manpower supply, and so forth and hence lose sight of the larger policy background that will shape health sector development in future years.

While choice in the health sector is basically political, it has economic implications as well. The priority given to health care has resource implications, since it means that some other sector will get fewer resources; that is, it has opportunity costs.

(3) Microanalysis of manpower variables. Another tendency evident in recent manpower planning is to conduct detailed studies on selected aspects of the manpower process, on the assumption that careful study of a few aspects will lead to a better prediction of what the whole process will achieve. However, a microscopic examination of selected aspects of a complex situation can hardly be expected to yield useful results if the examiner is looking at the wrong aspects or through the wrong microscope. Intricate models for predicting manpower requirements are no improvement over simpler ones if they include the wrong parameters. In particular, the absence of a well-defined relationship between health outcomes and health services exposes manpower planning to the possibility of much error. Infant mortality rates, for example, can be reduced with traditional services or through other means.
(4) The private sector. The private sector of the health care industry is very susceptible to market forces that the planner must take into account. Besides the usual economic considerations in relation to the supply of private practitioners and the prices of services, planners must also recognize that the demand for health care differs from the demand for most other goods in that consumers make decisions based on very imperfect knowledge and are influenced to an inordinate extent by the opinions of the suppliers. The share of health care provided by the private sector varies from country to country but is always significant except in some socialist countries. The private sector covers not only the modern medical care provided by physicians but also the care given by traditional healers, who are often the only source of care in the rural areas of the developing world.

For the reasons detailed, the bases of manpower forecasting have been shaky. If the central problem is the poor use of skilled manpower, it can only be solved by improving the use. If it is community needs, the community must be involved in expressing its needs, but the planner must realize that they cannot be identified with exactitude. If it is demand, changes in supply will change the demand. If it is manpower substitutions or new categories of manpower, the past is unlikely to be a good guide to the future. In view of the shortcomings of the available methodology, it is important for the planner to avoid becoming so excessively committed to one or another specific technique that he loses sight of the overall health manpower process. Moreover, he needs to make sure that his plans are sufficiently flexible for them to be adapted over the years to a continually changing situation.

This chapter sets out some of the central concepts of economics and their implications for manpower planning, and discusses some aspects of financing manpower.

Relevant Concepts

Supply and demand

The supply of and demand for health manpower are intimately linked with the supply of and demand for health care and indeed all other related goods and services. The concepts of supply and demand are built upon the notion of scarcity—of time, personnel, raw materials, or whatever. In economic terms, the supply of a commodity is the amount of the commodity that producers are willing to supply at a given market price. Producers will only be willing to supply it if the market price is not less than the production cost (or, in the case of labour, the wage offered for the job). Demand is the quantity demanded of a commodity at a given market price and it depends on people’s taste and income and the prices
of other goods. In a centrally planned economy where norms are used to fix the total output, accounting prices would be used rather than market prices to equate the supply and demand.

With most goods the supply and demand can usually be determined by looking at their monetary value. In the health sector the situation is more complex. The usual distinction between health and health services illustrates the problem; individuals can modify their own health independently of the provision of services. Thus the demand for health services depends only partially on the price of the services; it also depends on the choices individuals make on how to deal with their health problems and on what the provider (mainly the physician) tells the consumer about the amount and kind of health service he should consume in order to get the best care for his particular health problem. Compared with the demand for most other goods and services, therefore, the demand for health services has the distinctive attribute of being heavily influenced by the suppliers of those services. Unlike most markets, the health services market is not amenable to the usual allocative role played by prices. An increase in the price of services does not necessarily mean a reduction in the amount consumed; alternatively, a substantial rise in the price of health service resources does not automatically ensure that more resources will be supplied.

In manpower planning, therefore, it becomes fundamental to know in much more detail the structure of the demand for health services in the nation and the organization of the health services. For certain diseases and episodes of illness individuals often substitute their own resources (education, family diagnosis and treatment, etc.) for those they would otherwise have consumed from the health service system. On the other hand, the demand that physicians generate may exceed what consumers would otherwise have wanted; consumers are ignorant about the kind and effectiveness of the services needed, and physicians make decisions not on the basis of price but on the basis of quality of care. If the demand for services continually exceeds the supply the price rises, and in the health services market restrictions on entry and the lengthy training time for physicians reduce the speed at which the supply of resources can be augmented to catch up with the demand.

In developing countries where the organized health services system is almost wholly in the public sector and the money cost to the consumer for such services is nil or nearly so, the discontinuities in supply and demand noted above prevail. If the government decides to extend the health services to rural areas through the use of auxiliary workers, this will ultimately affect the demand for the services of physicians. The exact extent will depend on the structure of the referral network and the hierarchy of the hospital services.
Opportunity cost

Opportunity cost is what pursuing one programme will cost in terms of another. It can be measured in terms of money, alternative uses of personnel, or other programmes that have been abandoned or curtailed. Opportunity cost is not limited to the health sector; it can be measured in a change in agricultural or industrial combinations, in other government-sponsored programmes, and so on. For example, if the population or national leaders demand higher standards of nutrition, the demand will be the concern of the health sector, agriculture, industry, and perhaps, if agriculture fails, the importing sector. The opportunity cost of this new demand may be the resources diverted from producing industrial goods to producing more foodstuffs or, alternatively, the personnel needed to handle the nutrition programme that have been diverted from a vaccination programme or from factory work.

Opportunity cost is perhaps the most central concept for planning and decision-making. Developing countries are always faced with choices that all seem equally essential in improving the material welfare of the people. Some choices will be made irrespective of the opportunity cost, for political or other reasons. Nevertheless, it is always desirable to know what is being given up. For example, a national health policy laying down some standard of access to physicians for the rural population would mean foregoing some other policy, for example one providing for primary health care workers in rural areas without access to physicians. Health manpower planning that does not take into consideration the opportunity cost of different ways of meeting the demand for health services will produce bad decisions that cannot be defended before national development planners.

Discount rate

The discount rate is that rate of interest which equates money tomorrow with money today. If the local bank offers a 10% annual rate of interest on savings, 10 money units placed in that bank today equal 11 units one year from today. While the interest rate tells us how much $x$ units now will be worth $n$ years hence, the discount rate does the opposite—it tells us how much $x$ units in $n$ years' time are worth today. However, the interest rate and the discount rate are the same in magnitude. The formula is:

$$\text{present value} (1 + \text{interest rate})^{\text{no. of years}} = \text{future value}.$$

The importance of such a concept arises at any time it is necessary to compare today's money with tomorrow's money. If it is known what a certain plan will yield in the future, the discount rate can be used to
put the future yield in terms of today. It is important to choose a proper discount rate for health manpower planning.

Countries, like individuals, have different perceptions of how future value compares with present value. If the present is valued only slightly more than the future the rate of discount will be low, while if the present has a much higher value than the future it will be high. If society makes no difference between 100 million money units today and 106 million units next year, the social discount rate is 6%. In making a choice between alternative investment projects, say in manpower programmes, how society evaluates the expected benefits in the future will largely determine which projects it chooses. In general terms, the lower the discount rate the more a society is willing to invest in programmes whose benefits will be a relatively long time in coming, and vice versa. It is commonly assumed for social projects that the correct discount rate to use is the one that reflects society’s rate of time preference (6% in the above example). But if it is 10% or 20% the choice of project will be different because the value of the expected future benefits in terms of today will be different.

Cost-benefit and cost-effectiveness

The calculation of opportunity cost does not complete the decision-making process for manpower planning; the relative benefit or effectiveness of different strategies must also be considered. Cost-benefit analysis involves a comparison of total benefits with total costs. Although this sounds straightforward, the procedure is complicated by the fact that costs and benefits do not occur simultaneously and may not be expressed in the same units. In cost-benefit analysis, present and future values are converted to present values alone by a discounting procedure as follows:

First, discount the benefits to their present value.

\[ B = b_0 + \frac{b_1}{(1 + r)^1} + \frac{b_2}{(1 + r)^2} \text{ where} \]

- \( B = \) total benefits in present value terms
- \( b_0, b_1, b_2 = \) benefits in initial year, after one year, and after two years, respectively, on the assumption that no more benefits are received (in this case) after two years
- \( r = \) interest rate

In general the formula is

\[ B = b_0 + \frac{b_1}{(1 + r)^1} + \cdots + \frac{b_t}{(1 + r)^t} \]

where \( t = \) lifetime of the project.
Costs are discounted in the same way. If costs occur for two years:

\[ C = c_0 + \frac{c_1}{(1 + r)^1} + \frac{c_2}{(1 + r)^2} \]

where \( c_0, c_1, c_2 \) = costs in initial year, after one year, and after two years.

In this way the cost-benefit ratio can be calculated. There is no magic connected with either this or the similarly calculated cost-effectiveness ratio, but they provide a useful means of comparing alternative courses of action in relation to their costs and expected benefits or effects.

As was pointed out earlier, the interest rate plays the crucial role. If a given plan costs 15 million units today and is expected to yield 2 million units a year for the next 10 years in benefits, the discount rate will determine whether this investment is yielding a higher return than alternative programmes. If benefits cannot be readily quantified, as is often the case in health, planners may limit their review to a comparison of the costs of alternative ways of achieving a desired set of results, or of the effectiveness of alternative ways at a given cost. This technique is known as cost-effectiveness analysis.

The advantage of these analyses is that they provide an impartial tool for decision-making and permit health manpower planning to compete on the same conceptual terms as development planning.

Social benefits

Few if any manpower plans could be drawn up wholly in cost-benefit terms; that would be exceedingly difficult for the reasons mentioned below. Rather, it is here suggested that if the manpower planner thinks in terms of opportunity cost—of what would be foregone if something is done in one way as opposed to another—he needs to discriminate among his alternatives by indicating the cost-benefit of different alternatives; the opportunity cost may be high for one alternative, but the benefit may also be high.

The cost-benefit analysis described above suffers from one major difficulty—that of converting health programme benefits into monetary terms. Numerous techniques have been tried for converting health benefits into monetary terms, including calculations for: (1) working days gained owing to reduced periods of illness; (2) lives saved by disease prevention and treatment; and (3) the addition to the gross national product as a result of a healthier labour force. In spite of these attempts it remains extraordinarily difficult in most cases to place monetary values on the benefits of different courses of action. Even so, the ability to weigh the costs and benefits of alternative actions should form part of the technical skills of manpower planners.
ECONOMIC ASPECTS

One unaccounted benefit of health programmes related to society as a whole is called an externality. For example, an immunization programme directly benefits those who receive the vaccine, and the benefits can be calculated roughly. But the programme also benefits indirectly those who do not receive the vaccine; they are better protected against the disease if those around them are vaccinated than if they are not. This benefit is most difficult to calculate in any terms. An externality arises when the action of one person provides benefits for more persons than himself. Thus the vaccination programme yields more benefits than are accounted for in calculating its direct benefits to those vaccinated. Externalities, therefore, give cause for some scepticism about strict financial accounting or cost-benefit criteria in the final appraisal of programmes. In some cases they may be a major part of a project’s total benefits. The inability to reflect them accurately in monetary terms could cause misallocation of funds. It should also be mentioned that some externalities may produce the opposite of benefits, for instance a rapid population growth as a consequence of health programmes in already densely populated rural areas.

Applied Economic Concepts

Substitution

In strict economic terms, substitution means replacing a more expensive resource or activity with a cheaper alternative whenever possible. In the health sector there are two possibilities for substitution—both of which have been touched upon to some extent in previous chapters. The first and most obvious is direct substitution of cheaper alternatives. For example, the cost of a doctor is very high in terms of his education, the years of work foregone because of his training, and the incentives needed to keep him in the home country instead of emigrating. Many of his usual functions could be taken over by a non-physician whose training is less expensive and takes fewer years, whose salary is less, and who is little likely to emigrate to other countries.

In this connexion, the more specialized the personnel and the more extensive their training, the more difficult it is for them to change jobs. It is more difficult for a specialist immunologist to adapt himself to a change in programme emphasis from vaccination to nutrition than it is for less specialized personnel. Indeed, if persons could easily change jobs both the economic and the political cost of changing health programmes would be greatly reduced. The cost of retraining less specialized personnel is far less than for highly specialized persons, and highly specialized persons demand higher salaries. Thus the more the specialized immunologists hired, the more commitment there is to a programme of disease prevention based on immunological techniques because (1) there is a large investment
in specialized personnel, and (2) altering the programme would necessitate hiring new personnel because immunologists cannot readily work outside their own specific field. This principle applies to all specialized medical manpower.

**Elasticity**

In economic terms, the *elasticity* of demand for a commodity is defined as the change in demand for that commodity brought about by a change in its price. We have the simple formula:

$$
elasticity = \frac{\text{percentage change in demand}}{\text{percentage change in price}}$$

If this ratio is between zero and one, the demand is defined as inelastic; if equal to one, as unitary elastic; and if greater than one, as elastic. Although these are economic terms, they provide a convenient grouping: inelastic goods are usually necessities, elastic goods are usually luxuries. For example, if a person contracts malaria, the drugs needed will be demanded almost irrespective of price, the only limitation being the resources available to the patient. On the other hand, fortified bread is an example of an elastic commodity—if the price rises substantially persons are less likely to buy it, but if the price drops more people are likely to buy it or people will buy more of it. People are unlikely to buy large quantities of a drug even if its price drops.

The concept of elasticity depends on the availability of substitutes for the commodity in question, how important the commodity is to the person, the price of substitutes (if they exist), and the time period under consideration. If the time period is long people are likely to adapt themselves to price changes—which may result in a reduced demand for bread (to use the example given), an increased demand for some substitute, or perhaps an eventual reduction in the price of bread through the development of a cheaper process for its production.

The concept of price elasticity is an important one for manpower planning. Any plan is bound to affect the relative prices of goods and services, thus setting up incentives and disincentives to consumers and producers. If a national health plan offers a reduction in the price of health services to consumers (say by publicly financed social insurance), this will change both the total demand for health services and the mix of those services. The amount by which the demand changes depends on what the price elasticity for the particular health services happens to be. The price elasticity for health care has been measured in rich countries but seldom in poor ones; yet as a planning tool it is just as useful to poor countries as to rich ones.
For example, price elasticity estimates for different kinds of health services would be useful to the manpower planner in estimating the demand for health services and the corresponding manpower requirements. If the government decides to decrease the price of a hospital bed-day by a certain amount, by how much will the demand for hospital bed-days increase? That will depend on the price elasticity. If antidiarrhoeal drugs are to be distributed to target group populations at a nominal price, how much will the demand rise, and is there enough manpower to distribute the drugs? That will depend on the elasticity of the demand.

*Income elasticity* looks at how demand for a commodity changes when income changes, assuming that the price of the commodity remains unchanged. Thus:

\[
\text{income elasticity} = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in income}}
\]

The categories defined for price elasticity apply here. It is usually thought that the amount of money spent on medical care increases with income but that the proportion of total income spent on medical care declines. However, as income increases tastes change and a higher standard of living may be adopted, so that a larger proportion of income may be spent on health. Therefore, as the income rises there may be a greater demand for health services because more can now be afforded or because standards of living have changed.

In manpower planning income elasticity is often used to determine the potential resources available for spending on health as income increases. This concept and, where possible, empirical estimates should be especially important in countries where development is proceeding well and is likely to produce future rises in *per capita* income. Examples of this approach were given in Chapter 3 with reference to manpower planning in Chile and China (Province of Taiwan).

The concept of income elasticity raises the question of the effect of income distribution on present health services. What population segment or segments is the health sector serving? Each socioeconomic class demands different services from the health sector and in fact causes it to interact differently with other sectors in the economy. If, for example, a country has a large, poor rural population the emphasis would be on: (1) nutrition programmes, which require inputs from the research, agricultural, and industrial sectors; (2) disease prevention programmes, which depend on research as well as on special facilities, equipment, communication, and personnel, and (3) information and training programmes. If on the other hand there is a large middle class, the emphasis would be on (1) dental care, (2) eye care, (3) information on child development patterns, and
(4) health care for the aged. These differences in emphasis have different implications for resource requirements.

Not only will a difference in income distribution affect the demand for services; it is also likely to affect the supply. The middle class gravitate more often towards a medical career than the lower classes—mainly because the latter can seldom afford the luxury of such an expensive education. Manpower plans must therefore be drawn up in full awareness of the possible impact of general development policies on income distribution.

**Productivity and production functions**

Chapter 5 discusses productivity and productivity measurement in some detail. It is nevertheless useful to recall here a few of the basic concepts as they relate to economics. An economic activity can be measured by the cost of inputs and the value of outputs; the relationship between the two is known as a production function. In health, however, there are no real measures of output. It becomes difficult, if not impossible, to specify the output of any combination of inputs, though in theory there is some production function for health. A series of production functions that were known to relate inputs to outputs accurately could be of great value for manpower planning. For the moment, the use of production functions in health planning is in its infancy, but further research may yet make their use possible.

The study of production functions emphasizes the substitutability of inputs, dealing with such questions as whether three nurses can be substituted for two doctors to achieve the same output. The concept of productivity, although similar to that of production function, has a different emphasis. Productivity measures the relationship between inputs and outputs, but the underlying emphasis is on how to increase the output by small changes in the inputs. For example, how many more patients can a team of two doctors examine if a nurse assists them than if they are unaided? The concept of productivity is important for the planner to understand, since by increasing the productivity of personnel the supply of services is also increased.

**Depreciation**

Depreciation is the allowance in bookkeeping for the decrease in value of property through wear, deterioration, or obsolescence. If a hospital has a useful life of 50 years and at the end of this time must be replaced, a sum should be set aside allowing for the decline in its value every year, i.e., it should be amortized. This same concept can be applied with considerably greater difficulty to human capital; a few industries have begun to prepare annual balance sheets that record the quantitative and
qualitative gains or losses in their labour force. The concept of depreciation is of relevance to health manpower planners for two reasons: (1) facilities and equipment used by manpower depreciate and hence their replacement costs must be incorporated in projections of the cost of keeping manpower efficiently utilized; and (2) apart from losses, the existing supply of manpower depreciates and manpower plans must take into account both the need for replacement and the need to improve the qualifications of the personnel.

Various accounting methods exist for calculating depreciation and much debate exists over the merits of specific formulae. One debate centres on the use of original cost or replacement cost for calculating depreciation. Both methods have their disadvantages: if the original cost of the hospital is used, the depreciation is almost certain to be less than the cost of replacing the hospital; if the replacement cost is used, planners must periodically recalculate the depreciation, especially where there is rapid inflation. The important point, however, is not which method of calculation is used but that planners should be sure to build into their cost projections the substantial resources needed to counteract the effects of capital depreciation, both human and physical.

Uncertainty

Since manpower planning deals with the future, the effect of uncertainty about the future requires mention. The future outcomes of any action are necessarily liable to uncertainty and forecasts should show this uncertainty in an explicit way, otherwise policy-makers often treat the forecasts as representing the true future and are disappointed when there are deviations. One plausible hypothesis is that the standard-error of a forecast increases as the square of time. Thus, if the margin of error in predicting the demand for manpower for 1976 is ± 3%, it will be ± (1.03² - 1) in 1977 and so on, amounting to 34% in 10 years. The forecast could then be shown as in Fig. 20.

On the basis of such a figure, policy-makers can observe the magnitude of the maximum surplus or maximum shortage and judge the implications of uncertainty.

Economics and Manpower Planning

Manpower projections

In contrast to some other approaches to projecting health manpower requirements, the economic or demand approach doubts the validity over time of fixed standards for the provision of services, including manpower standards. It therefore involves a continuing search for opportunities
for manpower substitution—a substitution that is acceptable, economists would argue, when it reduces the cost for any given output (at a constant quality). There are constraints on effective substitution, such as:

- the lack of qualified supervisory personnel
- narrow technical training that limits the potential for personnel transfer, at least in the absence of additional training
- the discontent felt by personnel in being transferred
- objections by professional associations
- the preferences of consumers.

**FIG. 20. PREDICTING MANPOWER**

![Graph showing manpower supply and demand across different years.]


In making manpower projections economists usually take into account many variables—demographic, the utilization of services, the rate of return, income, etc. If income is growing in a country, the demand for health care is likely to increase and its composition to change. In developing countries where public sector financing of the health services predominates, the elasticity of the demand for them is very difficult to calculate. To the extent that health planners can estimate that elasticity for the major categories of services produced by the sector they can improve their projections. With such information the government can also take timely action to anticipate and moderate the budgetary impact of changes in demand resulting from rising income.

**National planning and health planning**

The health sector does not usually produce its own demographic or economic projections but accepts those produced elsewhere in the govern-
ment, probably in the ministry concerned with planning. It is nevertheless important for health planners, especially manpower specialists, to know in a general way how the projections are made and what they mean for the health sector. Planners should also understand that few national plans provide an unambiguous prediction of the future. What the manpower planner hopes to learn from examining such plans is (1) what factors might influence and change the demand for health services and hence the manpower requirements, (2) what total resources the health sector is likely to have, and (3) what impact successful implementation of the plans will have on the present health manpower mix and supply. The manpower planner will then want to determine whether health sectoral goals and plans are consistent with those set for the nation as a whole. An illustrative example based on the situation in a hypothetical country will help clarify the above points. The tables that follow present estimates relating to the gross domestic product (GDP, or the value of the output produced solely within a country's own boundaries), health sector expenditures, and manpower requirements and supply.

The GDP is the usual measure of a country's total economic resources. In developing countries estimates of the GDP are often crude and arbitrary but still useful for planning purposes. In all the following tables based on a hypothetical country the GDP has been adjusted by a consumer price index to show all the figures in terms of the prices prevailing in 1975. Table 28 projects the GDP according to different growth rates.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>1975</td>
<td>10,710</td>
</tr>
<tr>
<td>1980</td>
<td>11,820</td>
</tr>
<tr>
<td>1985</td>
<td>13,060</td>
</tr>
<tr>
<td>1990</td>
<td>15,420</td>
</tr>
<tr>
<td>1995</td>
<td>17,980</td>
</tr>
<tr>
<td>2000</td>
<td>20,850</td>
</tr>
</tbody>
</table>

A country's health problems and how it can deal with them depend heavily on its economic structure. In this example only three components are assumed in the GDP: agriculture, industry (including transport), and services. Economic development almost invariably brings with it structural changes in the economy, which in turn affect disease patterns, the demand for health care and, ultimately, the demand for health care resources such as manpower. In the example given it is assumed that the relative impor-
tance of the three GDP components will so change that by the year 2000 they will be the same as in a neighbouring country with similar cultural and economic characteristics in 1975. It is further assumed that the structural changes in the GDP components will not radically alter the basically agricultural and rural structure of the hypothetical economy, though in reality transport services and urbanization would need to be taken into account if they increased.

The government health budget will depend on the total government budget, which in turn depends on the tax revenue (to keep the case simple). At present our hypothetical country collects as tax revenue 5% of the GDP; it is assumed that this will rise to 15% (the same as its neighbour) by 1990 and remain constant thereafter. It is further assumed that 7% of the total government budget is allotted to health. This yields the projection of government health expenditures given in Table 29.

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP growth rate 3%</th>
<th>GDP growth rate 4%</th>
<th>GDP growth rate 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>1980</td>
<td>41</td>
<td>48</td>
<td>50</td>
</tr>
<tr>
<td>1985</td>
<td>73</td>
<td>88</td>
<td>107</td>
</tr>
<tr>
<td>1990</td>
<td>111</td>
<td>140</td>
<td>200</td>
</tr>
<tr>
<td>1995</td>
<td>167</td>
<td>216</td>
<td>301</td>
</tr>
<tr>
<td>2000</td>
<td>185</td>
<td>300</td>
<td>403</td>
</tr>
</tbody>
</table>

To government health expenditure must be added private health expenditure. In most developing countries it is difficult to find out how much this is, though a few studies indicate that it is probably around 2% of the GDP. To make a projection of private health expenditure requires an estimate of the income elasticity of demand. In this example, and for simplicity, a single income elasticity value of 1.0 is assumed, i.e., each 1% increase in family income results in a 1% increase in private health expenditure by households.

If the total health expenditure (government and private) is now converted to a per capita basis, the population growth must be taken into account. The population growth in the future will depend on the fertility and the mortality. In the example given in Table 30, two projected population levels are considered: high and low, corresponding to different mortality and fertility predictions. For the low rate, it is assumed that population growth decreases from 3.0% in 1971 to 1.0% in 1995, while for the high
TABLE 30. PROJECTION OF POPULATION AND PER CAPITA HEALTH EXPENDITURE

<table>
<thead>
<tr>
<th>Population growth rate</th>
<th>Year</th>
<th>Population in millions</th>
<th>Per capita health expenditure according to GDP growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>Low</td>
<td>1975</td>
<td>12.0</td>
<td>20.9</td>
</tr>
<tr>
<td></td>
<td>1980</td>
<td>15.9</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>17.7</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>1990</td>
<td>17.4</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>18.7</td>
<td>28.0</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>18.7</td>
<td>27.2</td>
</tr>
<tr>
<td>High</td>
<td>1975</td>
<td>12.0</td>
<td>20.9</td>
</tr>
<tr>
<td></td>
<td>1980</td>
<td>15.9</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>16.1</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>1990</td>
<td>16.3</td>
<td>21.8</td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>20.9</td>
<td>23.8</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>22.6</td>
<td>23.5</td>
</tr>
</tbody>
</table>

rate it decreases to 2.0% in 1995. The projected per capita health expenditure is based on different rates of growth in the GDP and in the population.

These results lead to the conclusion that the health resources are critically dependent on the rate of growth of the GDP and the population. With a growth rate of 2% the prospects for health improvement would not be outstanding, and GDP growth rates of 4% or 6% are obviously better. A low population growth rate obviously means a higher per capita expenditure on health.

This is, of course, just an example, but health manpower planning that fails to take into account the larger picture of which it is part will be faulty. Planning always takes place in the context of budgetary constraints. Where there are both private and public components in the health sector, manpower planners need to weigh carefully the opportunity costs of alternative courses of action.

Financing health manpower

Apart from the underlying economic concepts in health manpower planning, it is important to consider the financing of health services and manpower development. Investing in and operating new health facilities call for resources such as manpower, money, and materials. Plans are often developed without due consideration being given to whether the resources are available and it is forgotten that facilities constructed today will continue to consume resources tomorrow; hospitals are built because money is available now and in the hope that the future will somehow take care of their running costs. This is also true for educational institutions, especially expensive ones such as medical schools. The usual reaction...
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical school</td>
<td>8</td>
<td>1</td>
<td>423</td>
<td>15</td>
<td>7 000 *</td>
<td>1 080</td>
<td>10 300</td>
<td>230</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>1</td>
<td>2</td>
<td>86</td>
<td>290</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nursing education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing school</td>
<td>5</td>
<td>5</td>
<td>34</td>
<td>2</td>
<td>700 *</td>
<td>215</td>
<td>620</td>
<td>2 300</td>
</tr>
<tr>
<td>Accelerated training programme for basic nurses *</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other health personnel</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwives</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>540</td>
<td>110</td>
<td>160</td>
<td>1 200</td>
</tr>
<tr>
<td>Accelerated programme for midwives *</td>
<td>51</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other personnel</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>200</td>
<td>2 300</td>
<td>200</td>
<td>300</td>
<td>3 600</td>
</tr>
<tr>
<td>Accelerated programme for other personnel *</td>
<td>2160</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hospitals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>10</td>
<td>1</td>
<td>113</td>
<td>23</td>
<td>3 500 beds</td>
<td>5 000 beds</td>
<td>7 500 beds</td>
<td>2 200 beds</td>
</tr>
<tr>
<td>City and district</td>
<td>51</td>
<td>15</td>
<td>546</td>
<td>200</td>
<td>2 000 beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special</td>
<td>35</td>
<td>8</td>
<td>123</td>
<td>230</td>
<td>970 beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rural health complexes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural health centres</td>
<td>100</td>
<td>190</td>
<td>508</td>
<td>47</td>
<td>8 900 beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-bed hospitals</td>
<td>250</td>
<td>576</td>
<td>508</td>
<td>47</td>
<td>8 900 beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcentres</td>
<td>668</td>
<td>961</td>
<td>508</td>
<td>47</td>
<td>8 900 beds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 439</td>
<td>3 439</td>
<td></td>
</tr>
</tbody>
</table>

* Of this total, 5000 doctors are in the private sector.
* Of this total, 300 nurses are in the private sector.
* A six-month course for training basic nurses to work under the supervision of trained nurses.
* Short intensive training for producing manpower for immediate needs. They will be retrained in the future.
when planners foresee a shortage of doctors is to create more medical schools without giving sufficient consideration to the long-term effect of these new schools and their graduates on the cost of the health sector. The tables that follow illustrate some of the ways in which the monetary requirements for implementing plans can be estimated.

Table 31 gives a summary of the cost of a five-year health plan for a hypothetical country. The level of detail presented in this table is a balance between the actual detailed budget categories and a summary sufficient for illustrative purposes. On the basis of some data analyses the resource requirements for various service items are calculated in Table 32. “Other”

<table>
<thead>
<tr>
<th>Services</th>
<th>Resources required for operation</th>
<th>Annual operating cost in units of thousand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital beds</td>
<td>Doctors 1 per 20 beds Nurses 1 per 10 beds Midwives 1 per 20 beds</td>
<td>Other 1 per 7 beds 20 per bed</td>
</tr>
<tr>
<td>Rural health centre including 25-bed hospital</td>
<td>2 4 5</td>
<td>8 700</td>
</tr>
<tr>
<td>Rural subcentre</td>
<td>3 5 3 100</td>
<td></td>
</tr>
<tr>
<td>Other (total)</td>
<td>500 400 500 1000 100 000</td>
<td></td>
</tr>
<tr>
<td>Cost of training one doctor, nurse, etc., in thousands of currency units</td>
<td>200 30 10 10</td>
<td></td>
</tr>
</tbody>
</table>

services include school health clinics, occupational and environmental health services, laboratory services, nutrition programmes, and various administrative functions of the ministry of health. “Other” health personnel include sanitary inspectors, pharmacists, and laboratory, radiography, and dental technicians. It is also assumed that, out of 10 200 doctors in 1980, approximately 6000 will be in the private sector and, out of 5000 nurses, 1000 will be in the private sector. The health budget is expected to grow from 500 million in 1975 to 900 million in 1980.

From Table 31 the projected government facilities in 1980 can be summarized as 14 780 hospital beds, excluding those in rural health centres, 356 rural health centres, including the 25-bed hospitals, and 698 rural health subcentres. Applying the resource requirements stated in Table 32 to these figures, there will be a need in 1980 for 1950 doctors, 4000 nurses, 5100 midwives, and 8000 other health personnel.
If these requirements are compared with the projected supply in 1980 shown in Table 31, there will be a surplus of doctors, an adequate supply of nurses, and large deficits of both midwives and other health personnel. If the operating costs of the health system are computed (Table 33), the total money requirements exceed the projected budget by approximately 50 million units and there will be no additional funds for further investment in the system.

This example is based on the situation in a real country and points to the need to consider the financial implications of manpower development plans. If medical education is expanded rapidly, medical school operating costs will consume 22.7% of the total operating costs in 1980, while those for other health personnel excluding nurses will amount to only 0.5% of the total. It is often true that the stated objectives in the health sector are in contradiction to the budgetary allocations. For example, the stated objective in the country taken as example was to emphasize the development of other health personnel than doctors, but in reality medical education takes an inordinate share of the total costs.

The financial implications of manpower planning go beyond the total investment in and operating costs of training institutions. The sources of financing are also important. While some countries have strong centralized health services planning and development, others have decentralized plan implementation. For example, in some developing countries the initial investment in the health services may be by the national authority, but the responsibility for operating and financing the services rests with provincial governments. In such cases it is often counterproductive to plan for a rapid growth of health services if insufficient attention is paid to the ability and willingness of local governments to pay the personnel and thus ensure the effective functioning of the services.

Although the example given postulates a given future level for the health services and converts it into manpower requirements so as to compute the

<table>
<thead>
<tr>
<th>Cost</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical education</td>
<td>216.0</td>
</tr>
<tr>
<td>Nursing education</td>
<td>18.6</td>
</tr>
<tr>
<td>Other health education</td>
<td>4.6</td>
</tr>
<tr>
<td>Hospitals</td>
<td>295.0</td>
</tr>
<tr>
<td>Rural health centres</td>
<td>249.2</td>
</tr>
<tr>
<td>Rural subcentres</td>
<td>14.8</td>
</tr>
<tr>
<td>Other</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>953.2</strong></td>
</tr>
</tbody>
</table>
costs, this is not the only way to examine the financing of manpower development. In some cases the manpower inputs have been examined directly without recourse to any intermediate unit of measurement such as services. The average income for each manpower category is multiplied by the number of personnel in that category to obtain the manpower costs.

In the Chile health manpower study planners used as a measure of manpower costs the probable percentage change in the nation’s total economic resources that would be required to satisfy a given manpower objective as compared with what was spent in the base year. First the proportion of the GNP of the base year spent on remuneration of public sector health manpower was estimated by multiplying the average gross hourly salary paid to each manpower category by the estimated number of hours worked in the public sector. Approximately 0.55% of the GNP in 1968 was spent on those public sector salaries. Then the hourly salaries in the base year were multiplied by projections of the GNP for the target year. The basic assumptions in this analysis were that the relative salary levels observed for different manpower groups would remain the same and that the average salaries would increase, in real terms, at the same rate as the per capita GNP. This obviates the necessity of estimating the public health sector income and hence also of estimating the probable rate of economic growth, tax policies, public sector priorities, and so on.

In the examples given above the private sector was for the most part not considered. In countries where the private sector is strong the remuneration of health workers will be dictated by the interplay of the forces of demand and supply between the public and private sectors, public sector agencies having to provide salaries and other inducements sufficient to attract and retain the personnel needed. Moreover, public and private sector remuneration may change substantially over time. For example, a high rate of inflation may have different effects on salary levels in the public and private sectors, effects the planner will need to consider as he updates his cost projections.

Although the use of average salary levels in the above examples makes it possible to develop rough estimates of manpower costs, the averages can mask significant variations that need to be taken into consideration, for instance in the fringe benefits available to different manpower categories, the cost of mid-career training programmes and periodic study leave, shifts occurring over time in the distribution within certain manpower categories according to personnel classification and salary grade, and the

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cost of special incentives such as for rural service. Accordingly, the planner will need to probe periodically behind the averages to make sure he is not overlooking factors that could lead to substantial errors in his calculations of the cost.

SUMMARY

This chapter has stressed the importance of sound planning concepts and has dwelt on some of the underlying economic aspects. Although the economics of health manpower planning is inextricably bound up with the economics of health care, the latter has been little touched on since a voluminous literature exists about it.

The economics of health care is also affected by the nature of the services provided. The demand from the population in the developing world is usually for curative services; when a person is ill or in pain he tends to seek health care, even though preventive services are apt to be more cost-effective than curative services are. Preventive services have to be provided initially by the public sector and not as a consequence of demand. With health education, the provision of safe water supplies, immunization, etc., there is a gradual demand from the public for preventive services, but it may take decades for it to be manifested. Accordingly, if manpower planning is based solely on the effective economic demand for services, the tendency will be to continue emphasizing hospital services and the provision of care in urban areas.

Whatever the basic planning method adopted, the planner will probably need to modify it to cope with the problems mentioned at the beginning of this chapter. He must not forecast only one possible demand/supply situation but provide policy-makers with a range of options; manpower plans should not be treated as the basis for action for the whole extent of time of the forecast. If eight years elapse between planning a medical school and producing its first graduates, it is reasonable to have a planning horizon of at least ten years. Moreover, the plan should be modified every year to fit in with budgetary cycles and to take into account any new conditions that have arisen or any policy changes that might have occurred. As has been stressed repeatedly in this book, manpower planning cannot be regarded as a sporadic exercise but must be made a continuous process involving repeated updating of the manpower supply and demand projections and monitoring of the implementation of the plan.

A realistic approach requires that health manpower plans should be established with some rational ordering of the priorities. The economic concepts of supply, demand, opportunity cost, and cost-benefit suggest that the plans take the principles of rational resource allocation into account. National political decisions may discard these principles, but once the decisions have been made the planner’s task is to find the most efficient way of implementing them. What is more probable, however, is that planners who consciously strive towards a rational allocation of resources will be better able to influence national political decisions towards making the best use of the country’s resources.
Manpower planning
and the political process
Thomas L. Hall 1 & Bogdan M. Kleczkowski 2

The record of accomplishments of those concerned with health manpower planning is modest indeed, as has been noted in the introductory chapters. Many plans never lead to action, while others are implemented only partially or with very mixed results. The limited accomplishments of manpower planning are in part due to deficiencies in methodology and the difficulty in applying techniques to specific situations, in which the number and complexity of variables to be considered are far greater than for facility planning.3 Of even more significance, however, is the failure of both planners and policy-makers to provide for an adequate linking of the planning and political processes, a problem which is especially prevalent in many non-socialist countries where planning tends to be poorly integrated into the decision-making process. In many countries planners have tended to insulate themselves from the seeming irrationality of the political process and have thereby ensured their limited relevance to it. This isolation has been reinforced by the tendency of policy-makers 4 to confine planners to the purely technical role of working out the details of a specific policy option, often selected without due consideration of the full range of options potentially open to them. So planners have often tended to isolate themselves from politics. But planning without political support is no more than an academic exercise and politics without planning is usually irrelevant to the needs and aspirations of society. Those who prepare plans and those who carry them out are inextricably linked; hence planning must be viewed as an integral part of the political process. Planner effectiveness is largely dependent on the ability of planners to understand this process, work with it, and mobilize its intrinsic power.

This chapter describes the interaction between manpower planning and the political process. It is more practical than theoretical, attempting

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1 Professor of Health Administration, School of Public Health, University of North Carolina, Chapel Hill, NC, USA.
2 Chief Medical Officer, Resource Group, Division of Strengthening of Health Services, WHO, Geneva.
4 Unless otherwise specified, the term “policy-makers” refers both to administrators with policy-making responsibilities and to political authorities involved in decisions affecting the health sector.
to show the link between the technical aspects of planning and the transformation of plans into policies and programmes. To make the discussion more concrete, examples are given to illustrate the way in which points mentioned in earlier chapters can be applied in practice.

**Some concepts and definitions**

The health manpower process has been defined in Chapter 1 and the health system itself in Chapter 2. The fact that health manpower planning involves political decisions at various levels has also been stressed. Plans, therefore, must be formulated in accordance with prevailing policies and legislation. Health manpower plans conflicting with prevailing educational policies are unlikely to be implemented, and educational plans dissociated from health manpower policies are likely to be irrelevant to national needs. As has also been pointed out, in many cases a central problem in drawing up and implementing health manpower plans is the lack of coordination among the various groups concerned, particularly the health manpower providers (the training institutions) and the health manpower consumers (the health services). To overcome this obstacle, the concept of integrated health services and manpower development has been evolved. It aims at the integration of the different elements of the health services and suppliers of health manpower into a unified system providing health care directly relevant to the health needs of the population.

*Politics and the political process* usually mean the relationships of power, authority, or influence in the context of government. The political process seeks to identify popular concerns, to assess the power distribution within a population, to propose the allocation of available resources, and to decide on the required courses of action. Ideally, planning and the political process should complement one another. Properly integrated, they should combine technical understanding with popular preference and lead to a maximization of satisfaction.

All the components of the health manpower process—planning, production, and management—must be considered in a political setting, whether or not this is explicitly acknowledged. The political setting covers all the constraints and levers implicit in power, irrespective of whether it is exercised overtly or covertly by individuals or by groups, is duly constituted or not, or is derived from an ideology, a personality, a position, or money. The way the political process operates differs greatly from country to country, depending on such factors as the economic system (centrally planned or laissez-faire), the political organization (a federal or unitary system of government, single or multiple parties), and the level of development. Even in countries with similar political systems the approaches to planning vary substantially. In Yugoslavia planning
is regionalized and in the USSR it is centralized, whereas the German Democratic Republic has adopted a mixed system.

The value system of planners has an important bearing on how they interpret the political setting and on their effectiveness within it. Moreover, the relationship between the planning and the political process is two-way, each affecting and being affected by the other.

It can be taken for granted that the health services in any given country are part of its social and administrative structure. Therefore the principles that govern national life, especially in politics, are also reflected in the health services. However, in certain countries the main difficulty in defining the political setting of the health services lies in identifying the principal features of such a setting. A number of useful characteristics have recently been proposed for the values, goals, and objectives underlying the political setting of a health care system. They include (1) health as a societal value, (2) collectivism as opposed to individualism, and (3) the distribution of responsibility.1

The value placed on health may be scored from “maximal”, when society takes full financial and organizational responsibility for the health services (as in the socialist countries) to “low”, when society assumes little financial and organizational responsibility, or “negligible”, when society assumes hardly any responsibility.

The balance between collectivism and individualism depends on what is considered to be the collective optimum and the extent of individual tolerance of regulations and guidance. It may be scored from “maximal”, when the system is oriented toward the maximum benefits to society as a whole, leaving little or no choice to the individual, to “negligible”, when ill health and care are viewed as problems of the individual unless they pose a direct threat to society.

In the same way, the scoring for the distribution of responsibility may be “maximal”, when every citizen is eligible, in theory and in practice, to the same standard of service and there are no barriers to the utilization of services such as inability to pay or unduly lengthy travel time, to “negligible”, when society exerts no influence whatsoever on the distribution of resources and services.

These proposed categories show that certain elements predominate in a given political setting and are likely to influence various aspects of health manpower planning.

A policy is a statement of intent or direction that provides institutions and individuals with guidelines. Policies may be explicit or implicit,

specific or general, and may encompass whole sectors (health, agriculture), issues (fiscal, personnel), functions (legislative, administrative), or specific subtopics (student admissions, facility construction). Policies may arise from a deliberative process during which various policy options are reviewed or, alternatively, from an intuitive process based on few or no options. Whatever their origins and however expressed, policies are both inputs and outputs for the planning process because they represent a general framework for the development of plans and are a major instrument for implementing them.

Policy analysis means either the study of factors that influence policy-making or the process whereby policy options are evaluated to determine their likely consequences. Inputs from a number of disciplines are necessary to carry out policy analysis systematically in the health sector. Some of the more important disciplines concerned are economics, demography, political science, sociology, public administration, operations research and, of course, planning.

Strategy means the approach or sequence of approaches to the attainment of a defined set of objectives. Usually attainment of the objectives is hindered by perceived obstacles such as inadequate resources, an inappropriate structure, or political opposition. To overcome the obstacles planners and administrators must select from among alternative strategies those which hold the greatest likelihood of success.

Planning, policies, and the political process

The roles of planners, administrators, and political authorities are sometimes self-evident and present no problem. This, however, is not always true, especially in developing countries with limited experience of planning and plan implementation; role confusion can then arise and is most apt to occur in relation to the development of policy. In an ideal situation the roles are clear: the political authorities, with or without public participation, specify the general objectives and define the limits within which they should be reached; the planners, working in close collaboration with the administrators, prepare increasingly detailed statements of how the objectives can be attained and at what cost; the administrators, either on their own authority in the case of small issues or in cooperation with the political authorities in the case of important ones, select and implement the plan; and finally, all the interested parties share in an evaluation of what has been accomplished. In reality, however, the roles are seldom so clear-cut. The planner is often drawn into policy formulation and occasionally into implementation of the plan. This role shift may reflect the planner’s style or aspirations, though more probably it mirrors the failure of the administrative and political authorities to assume their roles
fully. In such situations planners may have to take more responsibility for identifying, shaping, and even formulating policy than would normally be appropriate—a responsibility that may render them more vulnerable politically.

The contribution that political authorities can make to planning and plan implementation goes far beyond giving general approval to proposals or voting the necessary funds. If communications within the political system are reasonably open, politicians will be much better placed than health officials to voice community needs, to mobilize support for innovation, and to articulate the wishes of the sectors concerned in planned change. The efficient planner will develop and maintain good communication with the relevant political authorities as well as with the health administrators.

Problem identification

Manpower-related problems can be brought to the attention of planners by the institutions responsible for manpower training and utilization, previous studies or, more generally, the institutions responsible for the health services. Often, however, the public at large, either directly or through their political representatives, make planners aware of such problems. In this case there may be little apparent relation between the initial concern expressed and its relevance to health manpower; it may be rather only an ill-defined dissatisfaction with the health care system concerned, a dissatisfaction that has its roots in harsh socioeconomic realities and unfulfilled aspirations.

Whoever or whatever brings the problem to the planner's attention, his task will be much easier if it is presented without a solution already attached to it. Unfortunately, this is not always the case. Problems are often linked with preferred solutions (e.g., a new medical school may be advocated in order to correct a deficit in the availability of rural health care). In such a situation planners have to contend with a serious handicap, since the solution advocated prejudices the issue and tends to polarize the debate and prevent an unbiased review of all the possible options. During this initial phase planners should try to formulate, or if necessary reformulate, the problem in terms acceptable to the major groups concerned while preserving the maximum degree of flexibility in relation to alternative solutions.

At this point two specific tasks are fairly obvious to the planner and need only brief elaboration. First, he must identify the individuals and groups actually or potentially concerned with the problem, the likely reasons for their concern, and the solutions they propose, the strength they can mobilize to further their views, and the possible points of compromise.
This task need not be time-consuming since the planner will base himself on the practical knowledge he has of the system within which he is working. There is no need to carry out a scientific study of the local power structure to identify pressure or interest groups such as professional associations, unions, or major consumer groups, nor is it difficult to forecast their views and how strongly they will fight for them.\footnote{A knowledge of the political background to recent decisions on similar problems will be sufficient.} The second task for the planner is to verify the existence of the alleged problem and assess its significance and the validity of the assumptions related to its cause and its effect. The results of these inquiries can be of decisive importance in determining whether further action is justified and may reveal that the problem must be considered almost entirely in political rather than in scientific terms.

It may be useful at this stage to set up a special study group to investigate the problem and to propose a solution or solutions. This method has been used effectively by many countries, irrespective of their political system. A group appointed by a high authority comprising representatives of all the interested parties, having the necessary authority to receive evidence of all kinds and ask difficult questions, and receiving adequate secretarial support can frequently make a more effective and a more politically acceptable contribution to a solution than the established bureaucracy can. The group cannot deal with all aspects of the planning process, however, and must therefore be considered as an adjunct to, but not a substitute for, an institutionalized planning body.

\textbf{Preliminary selection of policy options}

Identification of the specific problem, however, is usually not sufficient for the development of a study design for data collection and analysis. The planner will generally find it advantageous, in close collaboration with policy-makers, to set out the policy options of most relevance to the study findings. In other words, if the problem under consideration concerns a shortage of laboratory technicians, at the same time as studies are being carried out to verify and characterize the shortage information should be collected relevant to the main policy options likely to be considered. In the case of a laboratory technician shortage, the potential alternatives may be few and self-evident, but for many planning problems the options may be numerous and extremely diverse. In Chapter 1 a method has been briefly described showing that an entire manpower study can be carried out in abbreviated form before undertaking field work. This approach certainly facilitates the testing of policy options and their...
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implications for policy design. It should be carried out in close collabor-
oration with the relevant administrative and political authorities, since
only they can make a final decision about the acceptable options. In
this respect two distinct tasks must be undertaken.

(1) A list of all the major options potentially available for the solution
of the problems under consideration must be drawn up. A deliberate,
systematic effort should be made to list all the options, even those remotely
feasible. The options can then be ranked according to the criteria described
below. By starting with a broad frame of reference, planners and other
authorities reduce the risk of finding themselves prematurely committed
to one or another option. In drawing up a list of policy options it should
be recalled that maintenance of the status quo is an alternative that should
be listed along with the others.

(2) The various options, or at least the major ones, should be ranked
according to predetermined selection criteria applied to both the short
and the medium term. Rating values can be expressed either numerically
(1, 2, 3...) or qualitatively (high, medium, low). The values should not
be used rigidly but so as to help provide an overview of the comparative
advantages and disadvantages of the options under consideration. The
following major selection criteria are listed in the sequence usually
adopted.

Probability of a favourable outcome. The first criterion concerns the
extent to which each option is likely to have a favourable impact on the
problem under review. It must be recognized that in some situations
the options may be more of a political than a health nature. At this
stage planners should concentrate on identifying options that, while
probably having little impact on the target problem, would nevertheless
be so easy to implement as to warrant consideration. Conversely, there
may be options with a high impact that should be downgraded because
of their cost or because of the likelihood that they will introduce new prob-
lems. To ensure that fair comparisons are made between options, planners
should assess the likely benefits and liabilities of each one at several points
in time, at least through a mid-term projection.

Feasibility. Policy options likely to have beneficial effects should
then be examined for their technical, economic, administrative, and
political feasibility. Each of these four approaches is different and should
therefore be taken into account separately. For instance, a policy option
may be judged technically feasible and politically possible, but its cost
may be high and there may be doubt about the administrative ability to

1 These criteria are adapted from those presented in an unpublished document, "Formulación de
Políticas de Salud", Santiago, Chile, Centro Panamericano de Planificación de la Salud, Organización Pan-
carry it out. On political criteria alone such an option would initially have been considered feasible, but once its cost and the administrative problems are taken into account its political feasibility may be much reduced. For options that pass this initial test subsidiary criteria can be used, such as the feasibility of covering ongoing operating costs once the option has been chosen or the degree to which the choice of option depends on prior action that is itself difficult or expensive.

Policy coherence and congruence. Lastly, options found to be potentially effective and feasible should be examined to determine their internal coherence (i.e., the absence of any major internal contradictions) and their degree of congruence or even synergism with other options.

On concluding this preliminary and generally non-quantitative review and selection of options, the planner will have a firm basis on which to develop and implement a study using the techniques outlined in Chapters 1, 3, 4, and 5. The review can be quite brief and the time devoted to it will be repaid many times by increased planning efficiency and improved prospects for plan implementation. The involvement of political, administrative, and consumer groups in the identification and selection of the primary options is of great importance for successful implementation of the plan.

Policy formulation and implementation

We can now skip the stage during which most of the technical planning takes place, as described in earlier chapters, and come to the point in the planning cycle where the results of specific studies are reviewed, preferred policy options selected, and the details of plans and policies completed. The initial review of policy options, as will be recalled, is rather cursory, and although participants in the review must naturally select alternatives with due regard to the characteristics of the local situation, the characteristics need not exert a compelling effect. At the second review, however, the roles and perspectives change. Whereas at the first review planners take the initiative in developing a list of major policy options for subsequent screening by other experts, at the second review the responsibility for selecting policy options clearly rests with the administrative and political authorities. Policy-makers must now ensure that the options finally selected are not only beneficial, feasible, and internally consistent but also in general harmony with other policies—short-term and long-term—in the health sector and elsewhere.

The procedures for conducting the second review are essentially the same as for the first, except that detailed planning data are now available for most of the options and the final scrutiny is therefore much more precise. During this phase of the analysis modelling and simulation
techniques are of special value since they can help planners and policy-makers grasp the potential effects of the various alternatives under consideration. These topics were discussed briefly in Chapters 3 and 4 with reference to the projection of manpower supply and demand. In essence, through the use of models the planner seeks to construct symbolically a part of an actual or potential situation and then, through manipulation of specific variables, to test the effect of changes.

The advantages of using a model to test quickly the implications of alternative policies over given periods are evident. Less well appreciated is the problem that arises when the model is fed with erroneous data or based on unrealistic assumptions. Another problem is the difficulty planners often have in communicating the results of simulation to policy-makers, especially politicians. In persons not familiar with statistics and the use of planning assumptions models may give rise to unwarranted distrust or excessive confidence. To facilitate communication, planners will usually find it advantageous to select models that are as simple as possible and in conformity with the reality they wish to portray. They should also be conservative in the interpretation of the simulation results.

The second policy option review exposes planners to greater risks of political controversy than previously. Up to this point the contending views relative to the problems under consideration are likely to be poorly supported by reliable data. Because they are responsible for the data analysis and the primary interpretation, planners will almost certainly contribute to a shift in the balance of the contending views and in the process they will find themselves—and their data—at the centre of controversy.

Let us assume at this point that the decision-makers in a given country have completed their selection of policy options. Let us further assume that one of these options is aimed at improving rural health care through the use of non-medical health workers functioning under the regular supervision of specially qualified physicians. This option is chosen in preference to others such as increasing the supply of rural physicians, introducing mobile clinics, or continuing to neglect the health needs of the rural population. Let us assume, too, that the decision has been backed by detailed specifications of targets, resource requirements, timetables, and the like, though details have not yet been worked out concerning who does what, when, how, and why. We shall now trace the steps  

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that might be taken to develop a strategy for carrying out a policy that makes use of non-medical health workers to provide basic preventive and curative rural services.

More than ten distinct steps have been identified by some authors in the design of implementation strategies. They can be subsumed under four broad categories: (1) identification of potential obstacles to plan implementation and the points where they might be attacked; (2) specification of design criteria for an acceptable implementation strategy; (3) revision of existing strategies and/or design of new ones to attain the desired objective; and (4) strategy communication between those involved in implementation.

In carrying out the first of these steps, there will be a number of obstacles of a technical, administrative, economic, or organizational nature that have presumably been identified during the earlier planning phase but, if not, can now be considered. Obstacles of a political nature will now need to be investigated in more detail than was done initially. The following questions are particularly relevant.

— What groups or individuals are likely to support or oppose the proposed plan and why? Are their positions based on strongly held ideological principles or on considerations of lesser importance?

— What are the main channels of communication used by potential proponents and opponents of the plan within and outside their own groups? What access do these groups have to political authorities and how much weight do their views carry? What degree of institutional control (e.g., veto over senior personnel appointments, voice in contract negotiations, ability to call a strike or a slowdown in work) do they have and how is it exercised?

— To what extent do areas exist at the margin of each group’s central interests where there is room for negotiation and compromise with other groups? What kind of inducements can be offered to obtain group support?

— Are there neutral or passive groups that might be persuaded to support the plan and how can they be persuaded?

— Does the authority exist to compel compliance with a plan against the opposition of one or another major group? What are the instruments for exercising this authority and under what conditions and subject to what constraints should it be used? What steps must be taken to enforce it, and what side effects could be expected?

The next step is to specify design criteria to help in the selection of a strategy. These criteria will serve to delineate the boundaries within

1 A good example of an "obstacle matrix" is given by Bainbridge & Sapirie (op. cit., p. 129).
which appropriate policy, legislative, administrative, fiscal, and other measures can be used to promote implementation. The following are examples of different types of criteria useful for designing and implementing a strategy to improve rural services through the use of non-medical health workers.

Criteria based on objectives and operational targets

— The basic preventive and curative health services should be available by 1980 within 30 minutes of travel by the means usually available (foot, car, etc.) to 90% of the rural population.
— Medical referral should be available within two hours of travel and hospitalization within three hours.
— Medical supervision of rural health centres should be supplemented by phone or radio consultation at least once a week if necessary.

Criteria based primarily on policy considerations

— Existing laws and regulations regarding the licensing and certification of practitioners should be observed as far as possible.
— Community involvement in the design and operation of the local health programme should be emphasized.
— A career system should be employed enabling well-qualified and well-motivated rural health workers to follow training programmes so as to attain higher positions.
— First priority in physician referral services should be given to increasing efficiency through selected task reorganization rather than to increasing the number of physicians.

Criteria based primarily on obstacle analysis

— There should be a single centre for programme administration and coordination.
— The design should provide for the orientation and motivation of rural physicians to adopt the new programme.
— To minimize excessive proliferation and the risk of conflict between various manpower categories, priority should be given to training existing manpower for the new functions rather than to developing an entirely new category.
— Uniform training standards should be adopted for the whole province and, in general, should be adaptable to other parts of the country.
Once the plan has been drawn up according to the criteria and specifications discussed above and has been implemented on the basis of a designed strategy, the planner faces yet one more task of major importance. He has to evaluate whether the planned objectives are being met at the due time. If not, he must analyse the reasons for the shortcomings and failures.

**Monitoring and evaluation**

Monitoring and evaluation of plan implementation have been defined in Chapter 2, and the importance, methods, and effects of evaluation have been extensively covered in recent literature ¹ and will not be discussed systematically here. We limit ourselves to a few observations and practical suggestions likely to be of special relevance to those concerned with manpower problems.

Evaluation is often seen as a distinct, highly structured activity that conventionally takes place after implementation of the plan has been completed or is well under way. This view, perhaps appropriate for certain well-defined situations of short duration, is generally too narrow in practice. Decisions affecting manpower tend to be slow to make and implement, and slow in manifesting their effects, and if the decisions are bad it may take many years to correct them. Therefore planners and administrators can ill afford to await the final implementation of the plan before proceeding with an evaluation. Blum's six levels of evaluation ² provide a convenient tool that can be used at different stages of plan implementation to obtain a useful feedback on progress. The questions at each level are: (1) is the planned activity under way? (2) does it meet the operational guidance standards or criteria? (3) can the efficiency of the activity be improved or, conversely, is the activity proceeding at the agreed cost per unit of output? (4) does the activity produce the net outputs that were specifically desired? (5) has the activity achieved the purposes for which the outputs were designed? (6) does the result of the activity actually serve the best interests in general of the larger system of which it is a part? The first two levels of evaluation can obviously be applied very early during the implementation of the plan and the next two can be investigated long before the ultimate results of the plan are apparent.

Comprehensive objective evaluation is bound to be controversial, to generate anxiety, and to provoke opposition. Although these effects cannot be eliminated, two particularly useful measures minimize their adverse

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effects on the evaluation process. The first is to provide a clear specification of the standards to be used for monitoring the assessment of progress. To eliminate subjectivity and to facilitate implementation, it is recommended that such standards should be specified early and widely disseminated.1

Of equal value is the early and sustained involvement throughout the evaluation process of all the significant groups likely to be affected by the results. Such involvement will probably complicate the evaluation because of the inevitable clash of values and points of view. However, the usefulness of getting all the groups to discuss the same questions and review the same data far outweighs the disadvantages.

The social values of a national system can also be used to evaluate the success of specific plans and programmes related to manpower development.

The methods and timing of the evaluation will depend to a great extent on such variables as the intended recipients of the findings, the political feasibility of acting upon the findings, the available resources, the degree of confidence in the course of action being pursued, and the seriousness of the consequences if the course is inappropriate. What is important is that evaluation should be carried out as an essential component of the cycle of planning and implementation.

Evaluation is specially important in successful health manpower planning because of the long latent period in effecting manpower changes, the high costs involved, and the great inertia of the system, which makes it difficult to correct mistakes. Evaluation is indispensable for enabling all those concerned with promoting change to judge the quality and results of past planning, to deepen their awareness of the real needs of the present and to set the stage for future planning.

Both physical and manpower planning are sound instruments which can be used to accelerate social and economic progress. The main lesson to be learned from this study is that health manpower planning, with all its shortcomings and imperfections, can help not only to rationalize decisions to reduce waste, to provide for a fairer distribution of resources, and to contribute to social justice in general, but also, in particular, to expand the coverage of the health services and improve their relevance to the health needs of the people by effecting changes in the supply, distribution, productivity, motivation, and utilization of health labour.

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