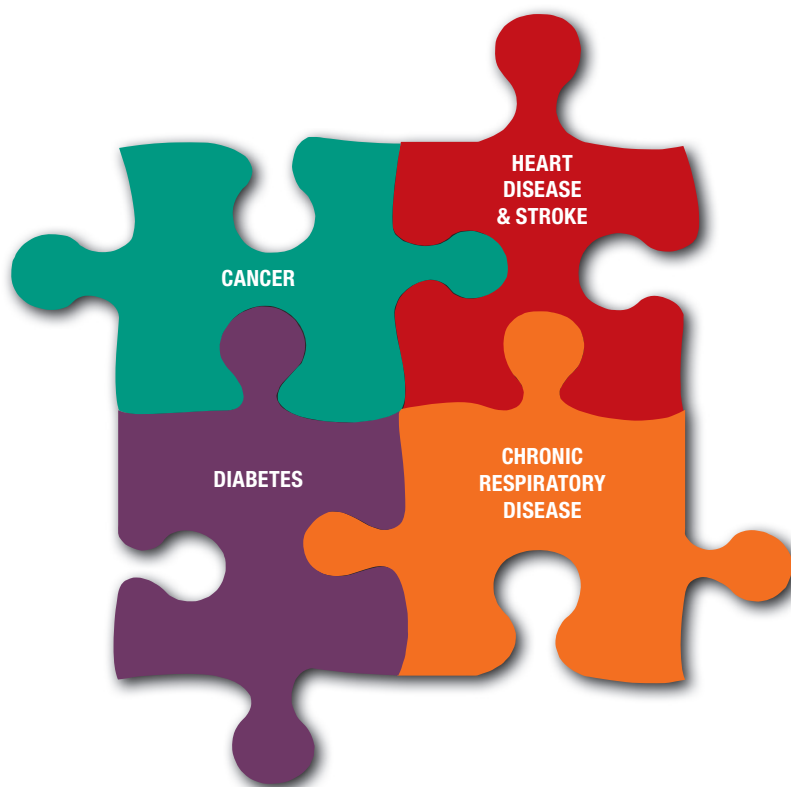


**Package of Essential
Noncommunicable (PEN) Disease
Interventions for
Primary Health Care
in Low-Resource Settings**



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The World Health Organization meeting on Package of essential noncommunicable disease interventions for primary health care in low resource settings, was held Geneva, on 1–2 December 2008. A preparatory meeting was held in the previous year at WHO headquarters in Geneva on 22–24 August 2007. The meetings were organized by the Chronic Disease Prevention and Management unit of the department of Chronic Diseases and Health Promotion, Non-communicable Disease and Mental Health cluster, in collaboration with WHO regional offices.

The implementation plan of the Global Strategy for Prevention and Control of NCDs was endorsed by the World Health Assembly in May 2008. The objective 2 of the NCD Action Plan highlights the need to establish national policies and plans for NCD prevention and control. As one of the key components of this objective, WHO is called upon to “provide technical guidance to countries in integrating cost-effective interventions against major NCDs into their health systems”. Furthermore, the Action Plan proposes that Member States “implement and monitor cost-effective approaches for the early detection of cancers, diabetes, hypertension and other cardiovascular risk factors” and “establish standards of health care for common conditions like CVD, cancers, diabetes and chronic respiratory diseases integrating when ever feasible their management into PHC”.

Hence, the objectives of the meeting were to:

- Develop a conceptual framework for a Package of Essential NCD Interventions for strengthening equity and efficiency of primary health care in low-resource settings;
- Identify core technologies, medicines and risk prediction tools;
- Discuss protocols required for implementation of a set of essential NCD interventions;
- Develop a technical and operational outline for integration of essential NCD interventions into primary care and for evaluation of impact.



A multidisciplinary group of international experts in the field of noncommunicable diseases (NCDs), with specific expertise in cardiovascular disease, diabetes, chronic respiratory disease and cancer contributed to them and for the peer review of this report. Collectively, the expertise of the group covered general medicine, cardiology, neurology, diabetes, oncology, respiratory medicine, nephrology, general practice, palliative care, public health and epidemiology. The composition of the group included specialists, primary care physicians, generalists, health-care managers and nurse practitioners. They were from Algeria, Argentina, Australia, Bangladesh, Botswana, Cameroon, China, Denmark, Eritrea, France, India, Ireland, Kenya, Mexico, Mozambique, Nepal, Netherlands, Nigeria, Pakistan, Russian Federation, Saudi Arabia, South Africa, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Turkey, Uganda, United Kingdom of Great Britain and Northern Ireland, and United States of America.

This work was coordinated by Dr Shanthi Mendis under the overall supervision of Dr Ala Alwan and Dr Benedetto Saraceno. The full list of participants and affiliations are included in the compact disc attached to the back cover.

Conflicts of interest

All participants were asked to provide conflict of interest statements using the Declaration of Interests for WHO Experts. None have declared one that was considered significant. Only WHO funds were used for the meetings.

Acronyms and abbreviations	
AIDS	acquired immunodeficiency syndrome
BP	blood pressure
BPMD	blood pressure measuring device
COPD	chronic obstructive pulmonary disease
CVD	cardiovascular disease
DALY	disability adjusted life years
DM	diabetes mellitus
HIV	human immunodeficiency virus
ISH	International Society of Hypertension
LMIC	low- and middle-income countries
MoH	Ministry of Health
NCD	noncommunicable disease
NGO	nongovernmental organization
PHC	primary health care
QALY	quality adjusted life years
SBP	systolic blood pressure
TB	tuberculosis
TIA	transient ischaemic attack
WHO	World Health Organization
WHO PEN	WHO Package of Essential NCD Interventions



Executive Summary

As low- and middle-income countries (LMIC) begin to make gains in combating infectious disease and malnutrition and garner the benefits of economic development, they have become increasingly vulnerable to the impact of noncommunicable diseases (NCDs). NCDs such as cardiovascular disease (CVD), cancer, respiratory disease and diabetes are already the leading causes of death in all LMIC except those in sub-Saharan Africa. Projected data indicate that there will be a rapid increase in NCDs over the next seven years, including in sub-Saharan Africa. The economic impact of this increase will be substantial because working-age adults account for a high proportion of the NCD burden.

Effective approaches to reduce the NCD burden in LMIC include a mixture of population-wide and individual interventions. Such cost-effective interventions are already available and include methods for early detection of NCDs and their diagnoses using inexpensive technologies, non pharmacological and pharmacological approaches for modification of NCD risk factors and affordable medications for prevention and treatment of heart attacks and strokes, diabetes, cancer and asthma. These low technology interventions, if effectively delivered, can reap future savings in terms of reduced medical costs, improved quality of life and productivity. However, due to weak health systems, there are substantive gaps in their implementation particularly in LMIC.

Efficient use of limited health care resources, sustainable health financing mechanisms, access to basic diagnostics and essential medicines and organized medical information and referral systems are imperative for provision of equitable care for people with and at risk of NCDs. They require long-term care that is proactive, patient centered, community based and sustainable. Such care can be delivered equitably only through health systems based on primary health care (PHC).

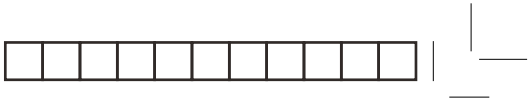
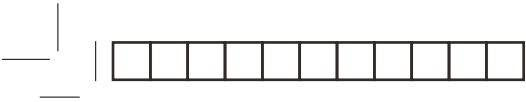
Further, two billion people in the world are living below the poverty line and poverty and NCDs are linked through many pathways. Although providing good quality care for the poor is an ethical imperative, due to weak health systems and inadequate health-care expenditure of many countries, the poor do not have access to services at all or receive substandard services. Furthermore, out-of-pocket expenditure is unacceptably high in many LMIC. Countries need to transform and regulate health systems for universal access and social protection. This transformation will take several years given the global financial status and wide disparities in domestic resources between countries. In the meantime, Ministries of Health (MoHs) need to take steps to improve health outcomes and to reduce rising health-care costs due to NCDs and their preventable complications.

The WHO Package of Essential Noncommunicable Disease Interventions (WHO PEN) for primary care in low-resource settings is an innovative and action-oriented response to the above challenges. It is a prioritized set of cost-effective interventions that can be delivered to an acceptable quality of care, even in resource-poor settings. It will reinforce health system strengthening by contributing to the building blocks of the health system. Cost effectiveness of the selected interventions will help to make limited resources go further and the user-friendly nature of the tools that have been developed, will empower primary care physicians as well as allied health workers to contribute to NCD care. It should not be considered as yet another package of basic services but, rather, an important first step for integration of NCD into PHC and for reforms that need to cut across the established boundaries of the building blocks of national health systems. WHO PEN is the minimum standard for NCDs to strengthen national capacity to integrate and scale up care of heart disease, stroke, cardiovascular risk, diabetes, cancer, asthma and chronic obstructive pulmonary disease in primary health care in low-resource settings. Most importantly, it defines a minimum set



of essential NCD interventions for any country that wishes to initiate a process of universal coverage reforms to ensure that health systems contribute to health equity, social justice, community solidarity and human rights.

WHO PEN will be further developed to provide guidance and tools to assess needs and capacity, implement essential NCD interventions, evaluate impact, strengthen health systems and human resource capacity in PHC with a special focus on primary care (first contact) level. The components been developed and validated include protocols for clinical diagnosis and treatment, tools for risk prediction of heart attacks and strokes, guidance on minimum requirements for essential medicines and affordable technologies, standards and indicators to measure progress of implementation and impact of WHO PEN.





1. Conceptual Framework

Essential NCD Interventions for strengthening equity and efficiency of health systems in low-resource settings

1.1 Prevention and control of noncommunicable diseases (NCDs)

Develop or strengthen, where applicable, preventive, promotive and curative programmes to address noncommunicable diseases and conditions, such as cardiovascular diseases, cancer, diabetes, chronic respiratory diseases, injuries, violence and mental health disorders and associated risk factors, including alcohol, tobacco, unhealthy diets and lack of physical activity.

Article 54(o) of the Plan of Implementation of the World Summit on Sustainable Development (2).

Noncommunicable diseases (NCDs) caused an estimated 35 million deaths in 2005. This figure represents 60% of all deaths globally, with 80% of deaths due to NCDs occurring in low- and middle-income countries (LMIC), and approximately 16 million deaths involving people less than 70 years of age (3–5). NCDs make a significant proportion of premature deaths in LMIC (Figure 1).

Total deaths from NCDs are projected to increase by a further 17% over the next 10 years (Table 1; Figure 2) (5).

Figure 1 Contribution of NCDs, communicable diseases, injuries, maternal and nutritional conditions to premature death in different regions of the world (5)

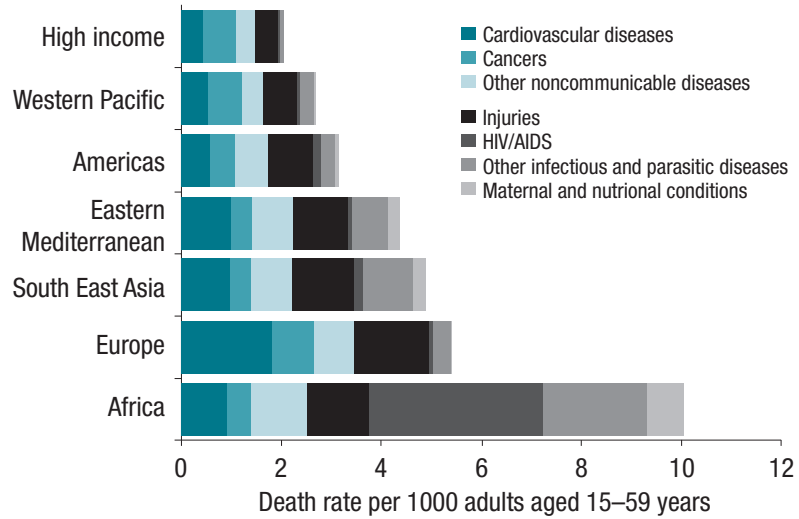


Figure 2 Projected global deaths, 2004–2030 (5)

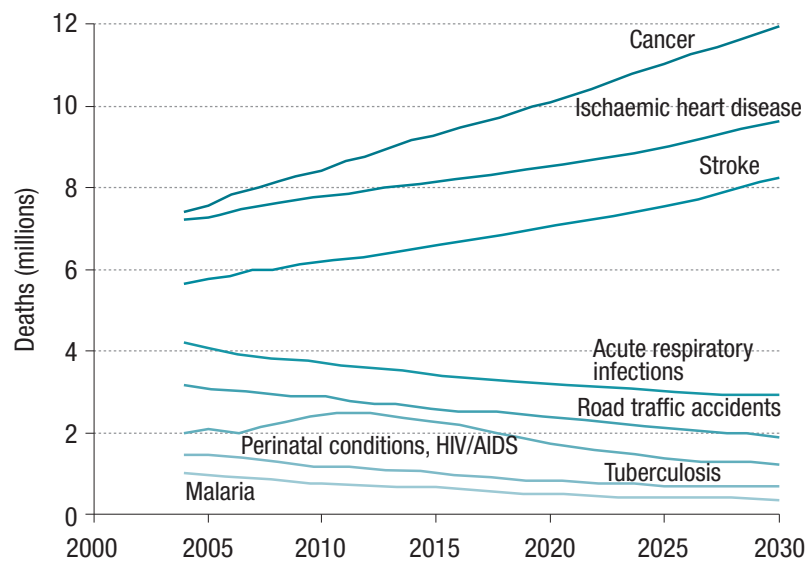


Table 1. Trends in NCD deaths, 2006–2015, in WHO regions (5)

	2005		2006–2015 (cumulative)		
Geographical regions (WHO classification)	Total deaths (millions)	NCD deaths (millions)	NCD deaths (millions)	Trend: death from infectious disease	Trend: death from NCD
Africa	10.8	2.5	28	+6%	+27%
Americas	6.2	4.8	53	-8%	+17%
Eastern Mediterranean	4.3	2.2	25	-10%	+25%
Europe	9.8	8.5	88	+7%	+4%
South-East Asia	14.7	8.0	89	-16%	+21%
Western Pacific	12.4	9.7	105	+1	+20%
Total	58.2	35.7	388	-3%	+17%

The World Health Organization (WHO) projects that over the next 10 years, the largest increase in deaths from cardiovascular disease (CVD), cancer, respiratory disease and diabetes will occur in developing countries (5).

Current epidemiological evidence indicates that four major NCDs – CVD (heart disease and stroke), cancer, chronic respiratory disease and diabetes – together are responsible for 28 million deaths a year and make the largest contribution to the NCD burden in LMIC (3–5). The rapidly increasing magnitude of these diseases is affecting poor and disadvantaged populations disproportionately, contributing to widening health disparities between and within countries and increasing health-care budgets. Heart disease, stroke and diabetes alone are estimated to reduce gross domestic product between 1% and 5% per year in LMIC experiencing rapid economic growth (3).

At the household level, the link between poverty and NCDs is strong. In most countries, it is those in lower socioeconomic groups who are most at risk of developing chronic diseases and dying prematurely from them, including many middle-aged people. In some cases, this may be because the poor have higher rates of exposure to risk factors such as smoking prevalence and maternal undernutrition. In other cases, poverty may contribute directly to the higher prevalence of NCDs and mortality rates from NCDs because the poor are less likely to benefit from early detection and proper management. NCDs also can prevent people from pursuing gainful employment due to frequent exacerbations of the illness. Further, costly hospital health care required for dealing with heart attacks, strokes, dialysis for kidney disease and complications of diabetes such as amputations can result in catastrophic health expenditure. This can push households more deeply into poverty. Other documented links between poverty and NCDs include: (i) association between low birth weight and NCDs in adulthood; (ii) links between chronic stress, which poverty can induce, and NCDs; (iii) restriction of healthy food choices and physical activity choices due to poverty; (iv) use of disposable income by the poor on commodities that contribute to NCDs, e.g. tobacco and alcohol; and (v) illiteracy and lower education levels that often prevent health promotion from reaching the poor (6).

Tobacco smoking, physical inactivity and an unhealthy diet are the behavioural risk factors of major NCDs. They contribute to raised blood pressure (hypertension), raised blood sugar (diabetes), raised and abnormal blood lipids (dyslipidaemia) and obesity. Social, political, economic, environmental, epidemiological and behavioural factors also contribute to the rising trends of NCDs and NCD risk factors and are key barriers to NCD prevention and control. They include:

-
- financial instability that further reduces the investment in health and health systems;
 - high and increasing prevalence of tobacco smoking;
 - globalization that promotes diets rich in calories, salt and fat;
 - rapid urbanization that contributes to physical inactivity;
 - obesity resulting from change in healthy eating habits and reduction in physical activity;
 - poverty that affect affordability of healthy food and health care;
 - economic growth and industrialization that increase the levels of atmospheric air pollution;
 - high levels of indoor and outdoor air pollution;
 - Increasing prevalence of alcohol abuse;
 - business interests that promote the sale of unhealthy food and drinks to children;
 - poverty and illiteracy that deprive people of opportunities and means to protect their health;
 - lack of social responsibility of certain commercial entities that deprive the poor of essential medicines and technologies;
 - poor governance, corruption and lack of accountability of governments and systems, including health systems;
 - authoritarian regimes that deprive people of human rights and the right to health;
 - ageing of populations.

Public health solutions for prevention and control of NCDs

For preventions and control of NCDs, comprehensive public health approaches that target the human lifespan are required. Such interventions should target people in infancy, childhood, adolescence and adulthood as listed below.

Infancy:

- exclusive breastfeeding for 6 months
- nutritionally adequate and safe complementary feeding starting from the age of 6 months with continued breastfeeding up to 2 years of age or beyond.

Childhood and adolescence:

- improve life skills education;
- promote physical activity in school and society;
- safe and healthy foods in schools;
- restrict marketing of and access to food products high in salt/sugar/unhealthy fats;
- institute tobacco and alcohol controls.

Adulthood:

- improve maternal nutrition;
- implement tobacco prevention and cessation programmes;
- improve availability and affordability of food;
- encourage physical activity (worksites, urban design);
- provide access to effective prevention and care of risks and diseases.

Adoption of the WHO Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases (NCDs), endorsed at the World Health Assembly 2008 (7,8), and its implementation plan endorsed by governments, industry and

nongovernmental organizations (NGOs), provides a overarching framework for implementation of the above activities.

The public health solutions alluded to above include interventions applicable to the whole population as well as to high risk people. Application of these interventions has already resulted in declining CVD trends in many high-income countries (9). Population-wide approaches to prevention have the potential to substantially avert the NCD burden (WHO Framework Convention on Tobacco Control, WHO Global Strategy on Diet, Physical Activity and Health, Bangkok Charter for Health Promotion in a Globalized World) (10–12). Early detection and better management of people at high risk, either because of their exposure to the main risk factors or because they already have established disease, are also absolutely necessary and will be the focus of the ongoing work on the WHO Package of essential NCD interventions outlined in section 1.2.

Objective 2 of the NCD Action Plan highlights the need to establish national policies and plans for NCD prevention and control. As one of the key components of this objective, WHO is called upon to “provide technical guidance to countries in integrating cost-effective interventions against major NCDs into their health systems”. Furthermore, the Action Plan proposes that Member States “implement and monitor cost-effective approaches for the early detection of cancers, diabetes, hypertension and other cardiovascular risk factors” and “establish standards of health care for common conditions like CVD, cancers, diabetes and chronic respiratory diseases integrating when ever feasible their management into PHC”. The ongoing work of WHO in collaboration with Ministries of Health, addresses the important issue of context specific adaptation of tools for the integration of NCDS into primary care. These activities therefore are in alignment with the objective 2 of the NCD action Plan endorsed by the World Health Assembly in May 2008 (7).

Major NCDs (heart disease, stroke, cancer, asthma, chronic obstructive pulmonary disease [COPD], diabetes, hypertension and other cardiovascular risk factors including tobacco) can be addressed in primary care using cost effective interventions. Currently, in many settings vertical programmes in primary care focus on single risk factors such as hypertension. Although this approach appears simple, it can result in committing a patient with only a small cardiovascular risk to many years of drug therapy or, conversely, neglecting to treat those with an overall higher cardiovascular risk. Further, treating risk factors such as blood pressure and blood lipids is cost effective only if targeted to high-risk individuals (4, 9). In addition, the single risk factor approach does not take into cognizance the continuous relationship between blood pressure, blood glucose, blood cholesterol and cardiovascular risk (4).

An integrated approach is particularly important for low-resource settings for efficient utilization of limited resources. Bringing about the paradigm shift from a vertical to an integrated approach involves selection of a set of core interventions that can be integrated and the development of tools for integration. Since integration of NCDs into primary health care (PHC) in low-resource settings is an area where evidence is emerging and evolving (13-15), the implementation of such a package will involve validation, adaptation and use of diverse plans and models to suit local contexts.

1.2 Strengthening health system equity and efficiency through integration of NCDs into primary health care

By any measure, NCDs account for a large enough share of the disease burden of the poor to merit a serious policy response (World Bank)(16).

Rationale for a core set of NCD interventions

Properly functioning health systems are vital for prevention and control of NCDs (7, 8, 17), and for improving health outcomes in general. In developed countries, launching NCD-specific responses within health systems have contributed considerably to declining NCD trends (17). Such a response is also urgently needed in LMIC to curb the steadily rising NCD epidemic. It is also part of the solution to strengthening equity and efficiency of health systems.

Ensuring fair health opportunities for everyone is crucial if governments want to uphold the values of equal opportunity, social justice and solidarity. There are growing social inequalities in heart disease, stroke, diabetes, asthma and cancer. The reduction of these health inequities is also an ethical imperative (6), although little is known about the best ways to reduce them. There is recent evidence that population-wide interventions to address tobacco use and raised blood pressure, blood cholesterol and blood sugar could significantly reduce the difference in cardiovascular risk between high- and low-socioeconomic groups (18). There is an urgent need to gather similar evidence for what works within health systems to reduce the social inequalities of NCDs. A minimum set of essential interventions targeting vulnerable and disadvantaged groups provides opportunities for data gathering and analysis to produce robust evidence that can better inform the policy dialogue on health equity.

There is also an enduring lack of clarity about what functioning health systems actually entail for prevention and control of NCDs. This lack of clarity is even greater in low-resource settings where there are additional challenges because of the essential need to make choices and to prioritize. Furthermore, where resources are limited (e.g. weak technical capacity, thin finances), the policy environment needs to be even more open to using evidence. Mistakes that result from haphazard policy decisions in such settings where opportunities are few can have extremely serious consequences on the health and well-being of people. The implementation of a core set of essential NCD interventions can also provide a better understanding of the operational aspects of the complex functions of health systems that are vital for NCD prevention and control.

Several approaches are needed to contain the escalating costs of health care required for providing sophisticated medical services for NCDs and their complications. First, there should be more investment in prevention and primary care. Second, the cost of treating CVD, diabetes and COPD can be reduced to a minimum by carefully selecting essential evidence-based interventions. Third, the cost of treating complications of NCDs that require hospitalization (e.g. heart attacks, strokes, amputations, blindness due to diabetic or hypertensive retinopathy, end stage renal disease requiring dialysis) can be reduced (9,14,19).

Despite the existing knowledge, far too few people with NCDs are receiving appropriate services in primary care in resource-constrained settings. At this level of care, either too little is done to address NCDs or what is offered is inappropriate and not evidence based. The situation is compounded by the low per capita health expenditure of many countries that is inadequate to integrate NCD interventions into primary care in a comprehensive manner. The only option available, therefore, is to prioritize a core set of interventions.

Primary Health Care and NCDs

Both the 1978 WHO Declaration on Primary Health Care and the 2008 *World Health Report* “Primary health care: now more than ever” (1, 20), are underpinned by social justice, equity and solidarity. These fundamental values are threatened by disparities within and between countries and have been worsened by the pressures of globalization. All countries, particularly the LMIC, need to establish strong and efficient primary care as an integral component of their health systems. World Health Report 2008 provides guidance on the four sets of PHC reforms that are required for providing an effective response to health challenges. These reforms address universal coverage, service delivery, leadership and governance and public policy. Many countries and development partners have reaffirmed the relevance and validity, today, of the basic principles of Alma Ata Primary Health Care approach (1,20,21).

The evidence that primary care can deliver better health outcomes at lower cost is strong. People with NCDs or at risk of developing NCDs require long-term care that is proactive, patient centred, community based and sustainable. Such care can be delivered equitably only through health systems based on PHC. The key features of a health system led by primary care include: (i) a person focus across the lifespan rather than a disease focus; (ii) accessibility with no out-of-pocket payments; (iii) distribution of resources according to population needs rather than demand; and (iv) availability of a broad range of services including preventive services and coordination between different levels in the health system (1,22-24).

There are numerous barriers for delivery of NCD interventions at the primary care level, however, there are a large number of NCD conditions and several hundred interventions to address them. Not all of them can be integrated into “close-to-client” primary care facilities in resource-constrained settings. Apart from the lack of resources, there are many other reasons why this is the case. First, interventions available for some

NCDs are not cost effective. Second, high technology facilities required for diagnosis and treatment may preclude the delivery of such interventions in primary care. Third, the health financing schemes available may not be able to cover all NCD interventions. Fourth, the skills needed for delivery of all NCD interventions are too complex to be learnt by the primary care workforce. Finally, as there are many competing priority conditions that countries need to address at the primary care level, it is unrealistic to expect low-income countries to integrate care of all NCDs into primary care at once.

How can Ministries of Health (MoHs) respond to the call for effective and equitable care for NCDs in low-resource settings?

The growing NCD burden is contributing to escalating health-care costs and widening of disparities. Despite many constraints, Ministries of Health (MoHs) need to respond to the NCD burden to contain its social, economic and health impact. In this context, WHO's work in this area aims to provide guidance to Ministries of Health address the question; “*What can be done for NCD prevention and control in PHC with a modest increase in investment ?*”. As such guidance needs to go well beyond pilot projects and result in sustainable national initiatives. The task at hand is particularly challenging.

The priority conditions that have been selected for this effort include cardiovascular disease, diabetes, chronic respiratory disease and cancer. The selection was based on the following criteria:

- They are major public health issues that contribute the most to the global NCD burden.
- Evidence-based interventions are available for addressing the condition.
- These conditions share behavioural risk factors: tobacco use, unhealthy diet and physical inactivity.
- They are the focus of the Global NCD Action Plan.

As a starting point, a core set of interventions need to be provided to address the major NCDs, starting at the primary care level, followed by the district hospital level. First, the core set should be made accessible to all people based on need and not the ability to pay. Then, it could be expanded to include other NCD areas and other interventions for major NCDs. Every country needs to consider the provision of at least the core set of NCD interventions within the public health sector. This could be the beginning of scaling up health systems for NCD prevention and control.

A minimum set of interventions is defined in the WHO Package of Essential NCD (WHO PEN) interventions. Interventions selected are those that are feasible for implementation even in low-resource settings with a modest increase in investment. They can be delivered by primary care physicians and non-physician health workers in primary care. The interventions are for detection, prevention, treatment and care of CVD and risk factors (heart disease, stroke, hypertension) diabetes, chronic respiratory disease (asthma and COPD) and cancer.

The interventions that comprise WHO PEN are outlined below in Table 2. If effectively integrated into primary care they can make a significant contribution to the reduction of morbidity and premature mortality from major NCDs. Appropriate referral, regular follow up, a core set of technologies and essential medicines (Table 5 and Table 6) and a conducive policy environment to support healthy behaviour are key to their effective implementation.

Depending upon country needs, other conditions for which cost-effective interventions are available could be added on – e.g. vitamin deficiencies, nutritional anemia, epilepsy, sickle cell anemia, thalassaemia, snakebite, organophosphate poisoning and others.

The aim of such a package is to provide an equitable framework for starting work to scale-up primary care as countries strive to achieve universal access in the health sector.

Table 2. A core set of evidence based interventions for reducing morbidity and mortality from major NCDs, that are feasible for implementation in primary care in low resource settings (see Annex A for information on cost effectiveness)

Essential Interventions for primary care (category of evidence)*
Primary prevention of heart attacks and strokes: <ul style="list-style-type: none"> ■ Tobacco cessation (level 1), Regular physical activity 30 minutes a day (level 1), Reduced intake of salt <5 g per day (level 1), Fruits and vegetables at least 400g per day (Level 2) ■ Aspirin, statins and antihypertensives for people with 10 year cardiovascular risk >30% (Level 1) ■ Antihypertensives for people with blood pressure ≥160/100 ■ Antihypertensives for people with persistent blood pressure ≥140/90 and 10 year cardiovascular risk >20% unable to lower blood pressure through life style measures (Level 1)
Acute myocardial infarction: <ul style="list-style-type: none"> ■ Aspirin (level 1)
Secondary prevention (post myocardial infarction): <ul style="list-style-type: none"> ■ Tobacco cessation (Level 1), healthy diet and regular physical activity (Level 2). ■ Aspirin, angiotensin-converting enzyme inhibitor, beta-blocker, statin (Level 1):
Secondary prevention (post stroke): <ul style="list-style-type: none"> ■ Tobacco cessation, healthy diet and regular physical activity (Level 2). ■ Aspirin, antihypertensive (low dose thiazide, angiotensin-converting enzyme inhibitor), and statin (Level 1)
Secondary prevention (Rheumatic heart disease): <ul style="list-style-type: none"> ■ Regular administration of antibiotics to prevent streptococcal pharyngitis and recurrent acute rheumatic fever (Level 1)
Type 1 diabetes: <ul style="list-style-type: none"> ■ Daily insulin injections (Level 1)

Essential Interventions for primary care (category of evidence)*
Type 2 diabetes: <ul style="list-style-type: none">■ Oral hypoglycemic agents for type 2 diabetes, if glycemic targets are not achieved with modification of diet, maintenance of a healthy body weight and regular physical activity (Level 1)■ Metformin as initial drug in overweight patients (Level 1) and non overweight (Level 4).■ Other classes of antihyperglycemic agents, added to metformin if glycemic targets are not met (Level 3)■ Reduction of cardiovascular risk for those with diabetes and 10 year cardiovascular risk >20% with aspirin, angiotensin converting enzyme inhibitor and statins (Level 1)
Prevention of foot complications through examination and monitoring (Level 3) <ul style="list-style-type: none">■ Regular (3-6 months) visual inspection and examination of patients' feet by trained personnel for the detection of risk factors for ulceration (assessment of foot sensation, palpation of foot pulses inspection for any foot deformity, inspection of footwear) and referral as appropriate
Prevention of onset and delay in progression of chronic kidney disease: <ul style="list-style-type: none">■ Optimal glycemic control in people with type 1 or type 2 diabetes (Level 1)■ Angiotensin converting enzyme inhibitor for persistent albuminuria (Level 1)
Prevention of onset and delay of progression of diabetic retinopathy: <ul style="list-style-type: none">■ Referral for screening and evaluation for laser treatment for diabetic retinopathy (Level 1)■ Optimal glycemic control (Level 1) and blood pressure control (Level 1)
Prevention of onset and progression of neuropathy: <ul style="list-style-type: none">■ Optimal glycemic control (Level 1)
Bronchial asthma: <ul style="list-style-type: none">■ Relief of symptoms: Oral or inhaled short-acting β_2 agonists (Level 1)■ Inhaled steroids for moderate /severe asthma to improve lung function, reduce asthma mortality and frequency and severity of exacerbations (Level 1)
Prevent exacerbation of COPD and disease progression: <ul style="list-style-type: none">■ Smoking cessation in COPD patients (Level 1) Relief of breathlessness and improvement in exercise tolerance <ul style="list-style-type: none">■ Short-acting bronchodilators (Level 2) Improvement of lung function <ul style="list-style-type: none">■ Inhaled corticosteroids when FEV1 < 50% predicted (Level 2)■ Long-acting bronchodilators** for patients who remain symptomatic despite treatment with short-acting bronchodilators (Level 1)
Cancer: <ul style="list-style-type: none">■ Identify presenting features of cancer and refer to next level for confirmation of diagnosis (Level 3)
<p>* Category of evidence Level 1=meta-analyses or systemic reviews of randomized controlled trials or randomized controlled trials, Level 2= Case control studies or cohort studies or systematic reviews of such studies, Level 3 =Case reports and case series, Level 4 = Expert opinion</p> <p>** Not in essential medicines list at present</p>

Therefore, WHO PEN should be an integral component of pro-poor primary health care programmes targeting vulnerable and disadvantaged groups.

It should not be used as a means of rationing care in settings where health-care investment is inadequate despite resource availability, due to poor governance and leadership. As noted, the package should be considered as a minimum standard and only as a starting point for action to address NCDs in primary care in low-resource settings.

WHO PEN is intended primarily for use in low-resource settings that have adopted a national policy framework for prevention and control of NCDs. These essential NCD interventions can have a significant impact on disability, morbidity and premature mortality if operationalized in parallel with the following:

- implementation of tobacco control policies
- consider health impact of all government policies
- policies to promote a healthy diet and physical activity
- community engagement
- health system strengthening.

In addition, this core set of interventions needs to be expanded in a time-bound manner based on the local requirements and available resources.

Components of WHO PEN

There is little guidance on integrated approaches to NCD case management at the primary care level. Specialized and hospital-oriented guidelines on specific diseases are difficult to apply to primary care in resource-constrained settings particularly in scenarios with non-physician health workers (25-27). Furthermore, such guidelines fail to take into account both the role and conditions of PC in resource-constrained settings as well as the evaluation of their impact.

WHO PEN includes tools (see example in compact disc) that have been developed and validated to support the implementation of essential NCD interventions and evaluation of their impact:

1	Tool for assessment of gaps, capacity and utilization of primary care
2	Tool for assessment of population coverage of NCD care
3	Templates to collect Health Information
4	Evidence based protocols for essential NCD interventions for PHC
5	Core lists of essential technologies and medicines
6	Tools for cardiovascular risk prediction
7	Tools for auditing and costing
8	Tools for monitoring and evaluation
9	Training material
10	Aids for self care

Scaling-up primary care for NCD and health system strengthening are mutually reinforcing. WHO PEN will compliment the building blocks of the health system, as outlined in tables 3 and 4).

Expected benefits of implementing WHO PEN in primary care:

For equity and efficiency of Primary Health Care

Implementation of the package will help to strengthen the health services delivery and the management of the PHC system through the following:

- increasing the proportion of primary health facilities that have trained professional for diagnosis and treatment of NCDs;
- providing feasible and evidence-based technical guidance on diagnosis and treatment of major NCDs among patients attending health posts and health centres;

Table 3. Contribution of WHO PEN to Health System Building Blocks

Leadership/ governance	<ul style="list-style-type: none"> ■ Assess needs and gaps and facilitate the use of available resources for prevention and control of NCDs efficiently and equitably ■ Support government efforts to drive the agenda towards universal coverage.
Financing	<ul style="list-style-type: none"> ■ Prioritize NCD interventions to support raising of adequate funds for universal coverage ■ Facilitate phased- out provision of financial protection for NCDs.
Medical products and technologies	<ul style="list-style-type: none"> ■ Define prerequisites for integrating a core set of essential NCD interventions into primary care ■ Develop an affordable list of essential medicines and appropriate technologies ■ Improve access to essential medicines.
Health information system	<ul style="list-style-type: none"> ■ Provide templates to gather reliable health information of people
Health workforce	<ul style="list-style-type: none"> ■ Provide training material to enhance knowledge and skills for NCDs prevention and control ■ Audit performance
Service delivery	<ul style="list-style-type: none"> ■ Improve access to essential preventive and curative NCD interventions ■ Provide equitable opportunities for early detection ■ Define core set of cost-effective NCD interventions ■ Provide tools for their implementation ■ Improve quality of care ■ Improve gate-keeper function of primary care ■ Reduce costs due to hospital admissions and complications.
People	<ul style="list-style-type: none"> ■ Develop tools for community engagement and empowerment of people for self care ■ Improve health outcomes.

- providing guidance on essential equipment and medicines for the diagnosis and treatment of major NCDs with due consideration of affordability;
- standardization of treatment that will entail a reduction in the inappropriate use of medicines;
- expanding the use of evidence-based treatment;
- establishing a referral system for the case management of NCDs;
- improving the health management information system;
- promotion of clinical prevention and health education;
- Measurement of gaps, progress and impact.

For prevention and control of major NCD

Implementation of the package will help strengthen primary care to address NCD prevention and control through:

- identification of people at risk of NCDs and those with NCDs;
- better quality of diagnosis, case management and follow-up;
- Support for adherence and change of health-related behaviour;
- clear guidance on diagnostic and referral procedures;
- strengthening the health management information system for NCD prevention and control.

For health-care workforce

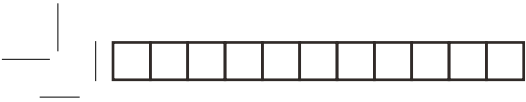
Implementation of the package should convey benefits to the health staff working at first level health facilities. The potential benefits for the health-care workforce are:

- to increase motivation, skills and competence;
- to apply the experience gained in case management of major NCDs to other NCDs;
- to strengthen the connections between health workers at the first level health facilities and medical professionals at the first referral level.

Table 4. WHO PEN for primary care in low-resource settings overview

Vision
Effective and equitable prevention and care for people with NCDs
Goals
Closing the gap between what is needed and what is currently available to reduce the burden, health-care costs and human suffering due to major NCDs by achieving higher coverage of essential interventions in LMIC
<ul style="list-style-type: none"> ■ To achieve universal access to high-quality diagnosis and patient-centred treatment ■ To reduce the suffering and socioeconomic burden associated with major NCDs ■ To protect poor and vulnerable populations from heart disease, stroke, hypertension cancer, diabetes, asthma and chronic respiratory disease ■ To provide effective and affordable prevention and treatment through primary care ■ To support early detection, community engagement and self care

Objectives
Equity and efficiency objectives Improve the efficiency of care of major NCD in primary care through: <ul style="list-style-type: none"> ■ enhanced implementation of human rights standards; ■ provision of cost effective interventions based on need rather than ability to pay; ■ targeting limited resources to those who are most likely to benefit due to high risk; ■ standardization of diagnostic and investigation procedures and drug prescription; ■ formulation of referral criteria for further assessment or hospitalization; ■ definition of parameters for planning and budget; ■ selection of monitoring and evaluation indicators.
Quality of care objectives Improve the quality of care of major NCD in primary care through: <ul style="list-style-type: none"> ■ cost effective case management; ■ appropriate referral and follow-up; ■ prevention, early detection and cost effective case management ■ management of exacerbations and emergencies; ■ follow-up of long-term treatment prescribed by the specialist.
Health impact objectives Have a beneficial impact on health through: <ul style="list-style-type: none"> ■ reduction of tobacco consumption in NCD patients; ■ reduction of the average delay in the diagnosis of NCD by the health services; ■ reduction of the risk of heart attacks, strokes, amputations and kidney failure; ■ reduction of case fatality of major NCDs; ■ prevention of acute events and complications; ■ prolongation of the duration of stable clinical periods for CVDs, diabetes, asthma and COPD patients.



1.3 WHO Package of Essential NCD Interventions (WHO PEN) for primary care in low-resource settings: essential technologies and medicines and risk prediction tools

Reducing health inequities is for the Commission on Social Determinants of Health an ethical imperative. Social injustice is killing people on a grand scale (6).

Essential and affordable technologies

A wide array of medical technologies are utilized for the management of NCDs. Selecting the appropriate mix of the most cost-effective technological applications is particularly challenging when investment in health is small and inadequate as is the case in many low-resource settings. In the interests of equity, a prioritized set of technologies has to be made available in primary care based on population needs. These technologies include a few core medical devices such as weighing scales, sphygmomanometers, peak flow meters and equipment for urine albumin and blood glucose analysis (Table 5). When resources permit, pulse oximeters, nebulizers, electrocardiographs, defibrillators, and blood cholesterol and creatinine assays also need to be added on to this list. If combined with trained personnel and referral systems, these basic technologies will enable most patients with major NCDs to be treated close to client facilities and will help to enhance utilization of primary care services.

Table 5. Essential technologies and tools for implementing essential NCD interventions in primary care

Technologies	Tools
Thermometer Stethoscope Blood pressure measurement device* Measurement tape Weighing machine Peak flow meter** Spacers for inhalers Glucometer Blood glucose test strips Urine protein test strips Urine ketones test strips	WHO/ISH risk prediction charts Evidence based clinical protocols Flow charts with referral criteria Patient clinical record Medical information register Audit tools
Add when resources permit: Nebulizer Pulse oximeter Blood cholesterol assay Lipid profile Serum creatinine assay Troponin test strips Urine microalbuminuria test strips Tuning fork Electrocardiograph(if training to read and interpret electrocardiograms is available) Defibrillator	
<p>* For facilities with nonphysician health workers a validated blood pressure measurement device with digital reading is preferable for accurate measurement of blood pressure (28, 29)</p> <p>** Disposable mouth pieces required. Peak flow meters with one-way flow preferable.</p>	

Essential medicines for prevention and control of major NCDs

A major strategy in reducing the burden of NCDs is the provision of affordable and effective medicines. However, evidence indicates that medicines for NCDs are unavailable in many countries and, in a few instances when they are available, they are largely unaffordable or of poor quality(30). This occurs because medicine procurement and distribution systems are often inefficient in many countries. Although national

governments are often able to procure essential medicines at competitive international prices, patients, on the other hand, are exposed to the challenges of high uncompetitive prices at the point of use. Where people have limited access to insurance coverage, the attendant out-of-pocket expenditures for essential medicines may discourage appropriate use of medicines, and generally reduce the potential for adherence to treatment.

The prices at which governments and people purchase essential medicines are being monitored on a continuous basis by WHO and Health Action International. This monitoring system has identified a number of factors responsible for the high and unaffordable prices of essential NCD medicines in many countries. Duties, taxes, mark-ups, distribution costs and dispensing fees are often high, constituting between 30% and 45% of retail prices, and occasionally up to 80% or more of the total (31,32). It is inequitable for people to have to expend 15 days of average earnings on a month's supply of essential NCD medicines, especially where there are avenues for governments to pass on low procurement prices to their citizens. Failing this, poorer people will in reality be paying the price – both economically and with their health (32). For implementing basic NCD interventions (WHO PEN) in primary care facilities a core set of essential medicines need to be made available (Table 6).

Many of the medicines needed to treat major NCDs are very low cost and could be funded if purchased efficiently (33). The two key exceptions to this general statement are insulin and asthma inhalants. The following measures can improve access to medicines for NCDs:

- Investigating and rectifying the low public sector availability and large differences in prices that need investigation;
- Removal of taxes and duties;
- Provision of funds for procurement in the public sector;
- Promotion of differential pricing initiatives for insulin, and the use of the asthma drug facility;

Table 6. Core list of medicines required for implementing essential NCD interventions in primary care

For Primary Care facilities with Physicians (for PC facilities with only non-physician health workers most of the medicines below are required for refill of prescriptions issued by physicians at a higher level of care)	
Thiazide diuretic Calcium channel blocker (amlodipine) Beta-blocker (atenolol) Angiotensin inhibitor (enalapril) Statin (simvastatin) Insulin Metformin Glibenclamide Isosorbide dinitrate Glyceryl trinitrate Furosemide Spironolactone Salbutamol Prednisolone Beclometasone Aspirin Paracetamol	Ibuprofen Codeine Morphine Penicillin Erythromycin Amoxicillin Hydrocortisone Epinephrine Heparin Diazepam Magnesium sulphate Promethazine Senna Dextrose infusion Glucose injectable solution Sodium chloride infusion Oxygen
Source: WHO model list Essential Medicines 16th edition (March 2009)	

- Promotion of generic competition and publicizing quality assured generics;
- Making price and availability reporting mechanisms available in each WHO region;
- Addressing issues related to medicines, particularly for the poorest 40% of the population as national NCD strategies are developed;
- Ensuring the availability of NCD medicines through policy and programmatic initiatives.

Vascular risk prediction charts for integration of age, gender, tobacco use, blood pressure, diabetes and blood cholesterol for predicting heart attacks and strokes

To prevent heart attacks and strokes, the current distribution of cardiovascular risk of the population has to be shifted to a more optimal distribution (Figure 3) using a combination of population-wide strategies and strategies that focus on high-risk groups (9). Decisions about whether to initiate specific preventive and treatment interventions for high risk groups, and with what degree of intensity, should be guided by the estimation of the risk of suffering vascular events such as heart attacks and strokes. Bringing this paradigm shift from single risk factor management to total cardiovascular risk prediction and management will enable limited health-care resources in LMIC to be targeted to the segment of the population that is most in need and most likely to benefit from interventions (9).

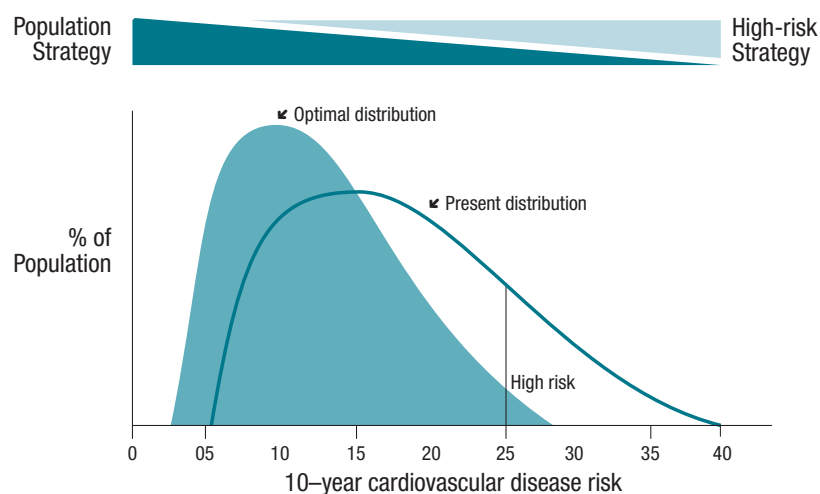
The threshold for implementing high-risk strategies; particularly drug treatment will depend on the economic, political and social realities of each country. For example, very low-income countries may have to decide to place the threshold for implementing high-risk strategies at a 10-year risk of CVD at 40%. Other countries with additional resources may lower it to 30%. As the threshold is lowered, health benefits will increase and costs will escalate. The level of risk at which drug treatment should be started when managing patients within the public health sector is a policy decision that has to be made by health authorities and experts at the national level. The WHO/ISH risk prediction charts facilitate the operationalization of such policy decisions.

The WHO/ISH risk prediction charts is a tool that enables integrated risk assessment and risk prediction in non-Western populations. The risk prediction charts enable the total risk stratification approach for management of CVD to be

introduced in WHO regions where cohort data and resources are not readily available for development of population specific risk prediction charts (9) (Figure 4, WHO/ISH risk charts for all Regions are in compact disc).

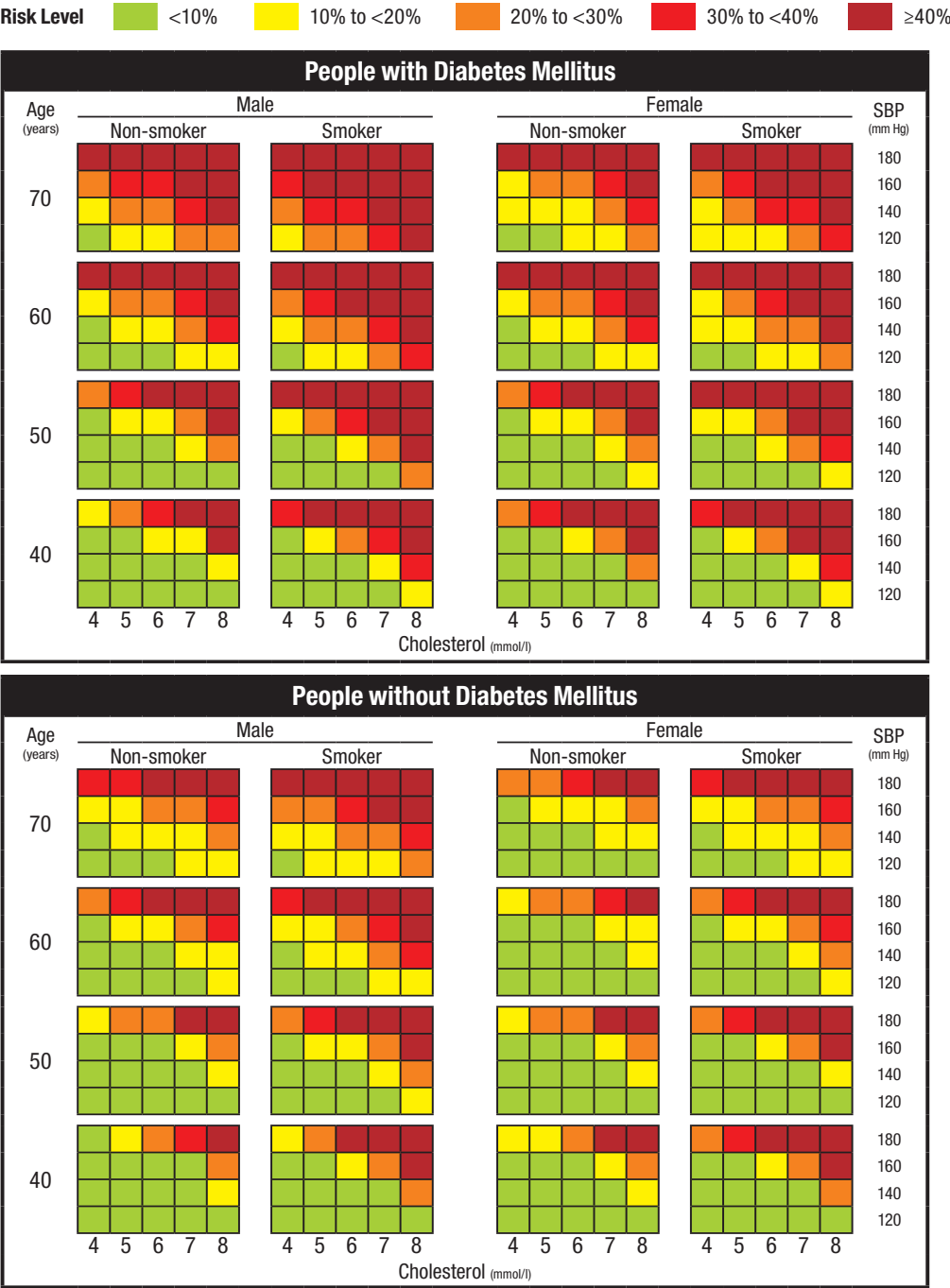
Health systems in low-income countries do not have the basic infrastructure facilities to support resource-intensive risk prediction tools, particularly in PHC. As such, the WHO/ISH risk prediction charts use easily measurable indicators of risk to quantify the 10-year cardiovascular risk (9). These include gender, systolic blood pressure, smoking status, type 2 diabetes mellitus and total serum cholesterol (Figure 4). In many LMIC settings, urine sugar may be used as a surrogate marker for diabetes. Serum cholesterol assay, however, is not routinely available in the vast majority of settings. In such settings, average cholesterol derived from national surveys could be used as default concentrations. This would help to further select those who would benefit most from treatment, and guide the intensity and nature of drug treatment. Alternatively, charts that use gender, blood pressure, smoking status

Figure 3 Population-wide and high-risk strategies complimentary and synergetic (9)



and type 2 diabetes mellitus only are also available for use in countries that do not have national survey data (compact disc). By using the charts for grading risk, lipids assays could be restricted only to those with an initial coronary risk above a predetermined cutoff level (e.g. 30% or more risk of CVD in 10 years). This would help to further select those who would benefit most from treatment, and also guide the intensity and nature of drug treatment.

Figure 4. WHO/ISH risk prediction chart for use in settings where blood cholesterol can be measured. 10-year risk of a fatal or non-fatal cardiovascular event by gender, age, systolic blood pressure, total blood cholesterol, smoking status and presence or absence of diabetes mellitus.





2. Technical and operational outline

Integration of essential NCD Interventions into primary care in low-resource settings

2.1 Planning and implementation at district and national levels

The broad framework for integration of major NCDs in to primary care is outlined here (Figure 5) to provide guidance to health managers and MoHs, international cooperation agencies and NGOs. The overall policy and integration of the WHO PEN into primary care in low-resource settings will rest at the central level of the MoH as the leading agency of the country health sector. Planning and implementation will be the responsibility of the district health level and the authorities of other institutions that provide primary care services.

WHO is providing technical support to Ministries of Health to develop and adapt clinical protocols for integration of NCD in primary care based on evidence based guidelines. A minimum set of NCD interventions should be accessible in primary care for people before any NCD screening programmes are initiated because it does not make sense to detect cases if care cannot be assured.

A primary care approach requires commitment and cooperation of the community. Therefore, it is important to devote time to building consensus and creating a broad base of support during the planning of activities. Countries are encouraged to follow a well-defined logical process: advocacy, political commitment, establishment of a national NCD strategy including a national plan for prevention and control of major NCDs

through a PHC approach, aligning it with the national health development plan.

The WHO PEN is still at the early stage of promotion and development. WHO will partner with multilateral and bilateral cooperation agencies, NGOs, academic institutions, civil society and the private sector to implement and evaluate the WHO PEN.

A manual developed at the national level will provide tools for key managerial elements in relation to mobilization of funds, situation analysis of primary care, financing approaches for the package, budgeting and procurement of essential medicines and technologies, development of training materials, training and supervision, feasibility testing, assessing impact at the district level and planning of national expansion.

The manual will also provide the basic information and key reference resources necessary to develop skills to:

1. enlist political, academic and professional support to implement the WHO PEN;
2. assess the capabilities of the primary care health infrastructure;
3. design communication messages for advocacy and community engagement;
4. formulate an information system to monitor and evaluate the implementation of the WHO PEN aligning it with the established health information system ;
5. adapt training materials to train the health workforce;
6. monitor and evaluate the WHO PEN in a demonstration site;
7. develop a district implementation plan and national extension plan;
8. organize systematic supervision and evaluation of the impact of the WHO PEN.

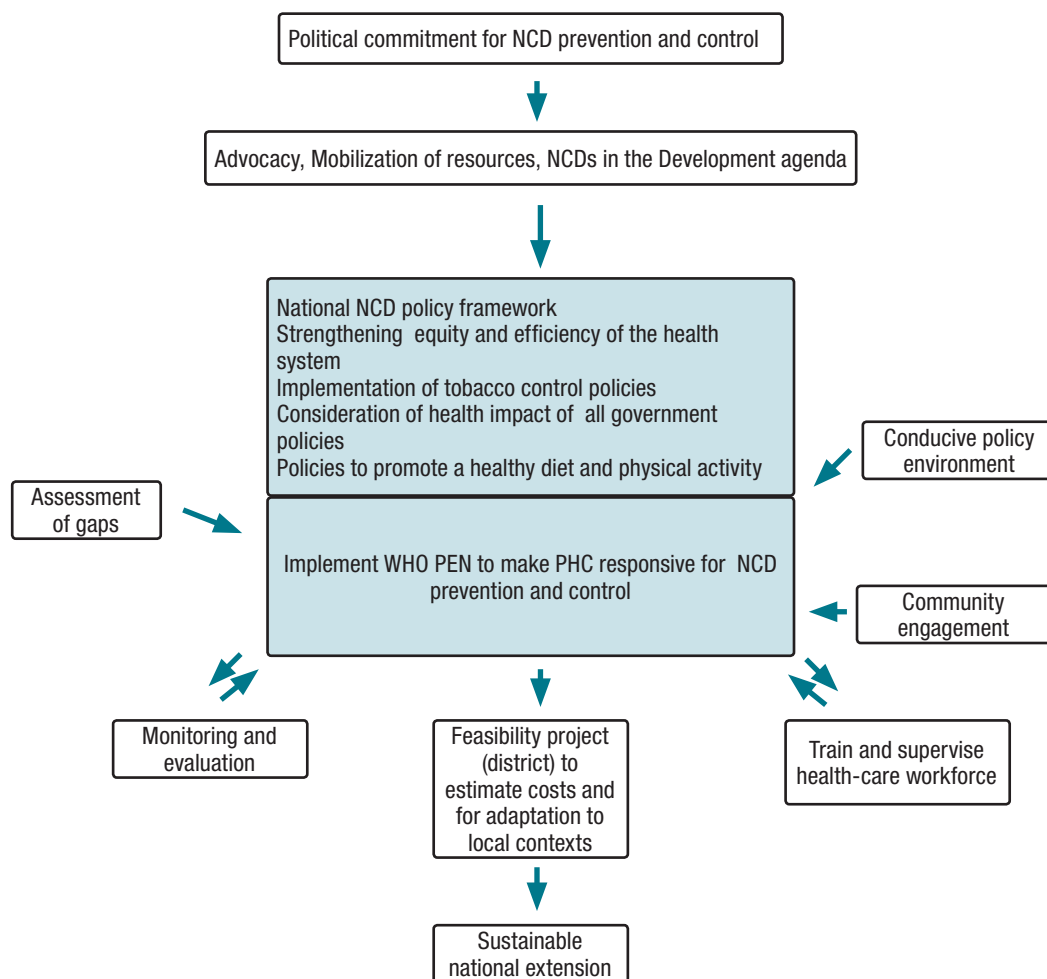


Political commitment to scale up prevention and control of NCD in primary care

Sustainable scaling-up of prevention and control of major NCDs in primary care using the WHO PEN depends on acceptance and political commitment on the part of the national health authorities (Figure 5). Political commitment can be secured through policy briefs and advocacy meetings that discuss NCD issues and by highlighting WHO NCD action plan endorsed by the World Health Assembly in May 2008. The production of the policy briefs and the convening of the advocacy seminars can be organized by the NCD unit of MoH or any academic or teaching institution interested in enlisting support in developing an equitable NCD prevention and control programme in primary care. Advocacy seminars provide a forum for a large group of interested professionals to reach a common understanding of the practical concepts of the WHO PEN and its advantages to bring health equity to low-resource settings. The meetings could discuss the following steps:

- start a feasibility project to gain experience with the implementation of the WHO PEN;
- allocate initial resources for conducting the facility capacity assessment and feasibility study;
- establish coordination mechanisms with next referral level other institutions and agencies;
- prepare and issue an official statement announcing that the WHO PEN will be introduced into the district health system, beginning with a pilot phase;
- designate an officer as the focal point within the MoH to coordinate all relevant programmes and departments (the focal point may be the NCD focal point in the MoH or an officer from the PHC services);
- request that WHO or any technical agency provide technical collaboration to assist in the process of initiating the adaptation and development of the WHO PEN;

Figure 5. Framework for implementation of WHO PEN in primary health care





- appoint a national working group to review the current practices in prevention and management of NCDs in the country and adapt the WHO PEN to suit the local context.

The official statement should be distributed among all departments in the MoH, all agencies and institutions that deliver health services, schools that train health professionals and agencies collaborating with NCDs programmes and PHC programmes.

The WHO PEN activities need to be linked to various levels of the health system and various departments within the MoH. The coordination and linkages need to be strengthened through regular meetings of national and district level health managers of the MoH with the participation of specific and support programmes involved in NCD prevention and control.

The coordination between NCD prevention and control and PHC services should result in:

- adopting the WHO PEN protocols for diagnosis and treatment of major NCDs for health posts, health centres and first level referral facilities or district hospitals;
- developing materials and organizing activities to train health workers in integrated case management;
- ensuring the supply of essential medicines and equipment;
- delivering educational messages on prevention of NCDs;
- expanding the information system so that it covers all major NCDs;
- monitoring activities for assessment of progress in implementation and impact.

The WHO PEN can be the first building block to integrate NCDs into PC in low-resource settings. In countries with high HIV infection prevalence, close coordination should be established with the HIV/AIDS programme and Stop TB programmes. These partnerships will promote joint activities with the identification of tuberculosis (TB), HIV-positive individuals among patients with NCDs, prevention of NCDs among HIV-infected

persons and development of joint training modules and educational materials.

Linkages should also be established with NGOs that provide health-care services. The collaboration of external allied health agencies may be critical to effective implementation of the WHO PEN in many countries. Collaboration with other multilateral organizations and bilateral cooperation agencies is also useful in securing funding for some activities, or for implementation in specific districts or regions, in conjunction with more general health programmes supported by the agencies.

Coordination with support programmes in the MoH

The main MoH supporting programmes, services and departments at regional and central levels that should participate in the WHO PEN implementation are:

- The **Human Resources Development Department**: can collaborate in the adaptation of training materials to train staff on the use of the WHO PEN technical protocols and tools and organize in-service training courses and evaluate the training activities.
- The **Essential Drugs Programme**: procure and distribute medicines.
- The **Laboratory Services**: issue guidance on laboratory procedures, supplies materials and reagents, and undertake training and quality assurance.
- **Essential Medical Equipment Programme**: can procure and distribute BPMDs, pulse oximeters, nebulizers, peak flow meters and oxygen sources.
- The **Health Education Bureau**: develop and produce educational materials for patients, families and the community.
- The **Public Relations Department**: develop and implement advocacy strategies.
- The **Health Information Management System Department**: should review the information needed to monitor and evaluate the WHO PEN.



- The **Nursing Services**: develop guidance on the role of nurses in integrated approaches to prevention and management of NCDs.
- The **Medical and Nursing Schools**: integrate guidance into medical and nursing curricula on the role of physicians and nurses in integrated approaches to prevention and management of NCDs.

Assessment of capacity of primary care facilities

An important step in the preliminary phase of integrating the WHO PEN into primary care is to assess the capabilities of the health infrastructure to implement the WHO PEN. Therefore, there is a need to collate information on the institutions that provide general health services, their organization, the number, type and distribution of the health facilities, the available resources (equipment, medicines, health workforce), the access to and the utilization of the health services by the population. The “facility capacity questionnaire” available in the WHO PEN package can be used for this purpose. This tool helps to gather information on:

- public health sector policies in relation to: programme priorities, management of health care, planning and financial decentralization, community involvement, budget priorities and contribution of external financial aid to the health sector;
- managerial organization in the form of an organizational chart of the MoH at central, regional and district levels; lines of authority and linkages with primary care;
- managerial activities to implement interventions such as training and supervision;
- structure of general health facilities: number and distribution of hospitals by level of complexity, health centres and health posts;
- average catchment population for district hospitals, health centres and health posts and maps marking the location of the health units and the major roads;

- categories of health workers managing NCD patients at district hospitals, health centres and health posts;
- number of persons in each category: specialists, general physicians, nurses, other paramedical staff and community health workers;
- specialized services for NCDs at hospitals and health centres;
- availability of equipment and materials for diagnosis of major NCDs at hospitals and health centres: blood tests, ECG, radiology, pulse oximeters, peak flow meters and other relevant equipment;
- availability and quantities of medicines used for NCDs that are included in the national list of essential drugs;
- availability of equipment for treatment of NCD in PHC;
- usual referral practices at first level health facilities for patients who need specialized or hospital care and types of transportation;
- description of health information system at health posts and health centres: type of information collected, frequency, forms and periodic reports;
- training needs for personnel at peripheral health units, district hospitals and laboratories.

Training and supervision of the primary care workforce

Health workers need to be prepared to assess, diagnose, manage and refer patients appropriately based on the guidance provided in WHO PEN package. They also need to be guided on counseling activities and on recording and reporting of data.

Workshops need to be conducted to train primary care workers to deliver integrated NCD care. According to a scheduled plan, the health personnel at first level health facilities need to be convened to participate in training workshops by district or provincial health administration. Workshop facilitators/trainers have to be identified from among the members of



the national/provincial working group or a team of master trainers or general physicians or specialists at national or provincial levels.

The training workshop programme may differ among different settings after taking into account the knowledge and skills acquired by local health personnel in their basic training and previous in-service training. In general, for primary care physicians, a two-day workshop will be adequate to update knowledge. For non-physician health workers, longer training will be required. Training materials for this purpose will be available and can be used for different settings after translation and minor adaptations. The main objectives of a training workshop are to provide the essential knowledge and skills to deliver WHO PEN and to comply with the recording and reporting procedures of the information system.

At the end of the training, the participants should be able to at least:

- deliver essential NCD interventions to diagnose, treat and appropriately refer patients with major NCDs;
- use a BPMD, glucometer, peak flow meter, spacer, pulse oximeter and nebulizer;
- become acquainted with the system to collect and report essential data for monitoring and evaluation;
- competently interpret the results of blood pressure, blood sugar and peak flow measurements and WHO/ISH cardiovascular risk prediction tools for the classification and the follow-up of patients;
- become acquainted with standards to be achieved through implementation of the WHO PEN.

In addition, health workers need to acquire the appropriate skills to deliver preventive health interventions. Communicating health education messages and individual counseling are integral parts of the delivery of preventive health interventions in primary care. In many settings, physicians undertake these tasks although performance of these tasks does not require a medical degree. Ideally, physicians should offload these tasks

from their busy clinical schedules to trained health workers and nurses who can provide much of these preventive health interventions. Under the guidance and supervision of a physician, non-physician health workers, preferably from the same locality, should devote adequate time to counseling patients and family members, listening to patients concerns and following up on adherence. Such a change in approach would enhance the continuity of care and build trusting relationships that are central to primary care. Furthermore, this would free up time for physicians to diagnose new cases, conduct clinical examinations, order medication changes and handle physician-level supervisory and managerial duties of the health-care facility.

The health education messages related to regular physical activity, healthy diet, harmful effects of alcohol and tobacco that are contained in the counseling protocols should be adapted to the local needs, including the cultural background and educational level of people. Health workers should give brief individual counseling for cessation of tobacco and harmful use of alcohol at each contact when a smoker attends a health facility. Family members must be made to understand that encouragement from the family can help people to adopt healthy living, e.g. cessation of tobacco and alcohol and taking regular physical activity.

Supervision of implementation of the WHO PEN

Supervision is an important extension of training and should be conducted as a well-organized systematic activity after the health personnel have been trained on the WHO PEN.

Completeness and accuracy of data recorded and collected in primary care facilities need to be supervised. This information gathered from first level health facilities and first referral services will help to identify priority health problems, plan training of the health personnel and provide a regular supply of consumables and essential medicines.



The supervision of the WHO PEN activities should be carried out at three levels. The activities at first level health facilities and first referral services could be supervised by a district medical officer who in turn could be supervised by a director at the district, provincial or national levels.

The supervision of the first level health facilities should be carried out at least once every three months, depending upon the local situation, through a visit by officials from the district health office.

Health information system

Health information system needs to be adapted to track the availability and distribution of human resources, infrastructure, equipment, supplies, and monitor the cost and impact of implementing NCD interventions in primary care. The collection of health information involves data gathering, data analysis and synthesis and use of findings for decision making. To this end, some adaptation may be needed in the existing medical records and reports that are completed by the health personnel. In places where there are no instruments for collection of data, an information system on the delivery of prevention and case management services needs to be developed. If there are ongoing initiatives to support the development of measurement strategies to track health system metrics this work should be aligned with them.



Package of Essential Noncommunicable (PEN) Disease Interventions for Primary Health Care in Low-Resource Settings



2.2 Prevention and management of major NCDs in primary care in low-resource settings

Evidence based clinical protocols have been developed for delivery of a minimum set of essential interventions addressing the four major NCDs. They target physicians and non-physician health workers. They are structured as simple flow charts with clear referral criteria based on the following realities in resource constrained settings:

- The per capita health expenditure of a significant number of low- and middle-income countries is inadequate for providing universal coverage for all interventions and all NCDs (with domestic funds).
- Due to lack of appropriate prevention and care many people are unnecessarily suffering from preventable NCDs and their complications.
- Health-care costs are rising because the cost of treatment of complications (e.g. coronary bypass surgery, amputations, heart attacks and strokes).
- In most regions of the world, the four major NCDs (cardio-vascular disease, cancer, diabetes and chronic respiratory diseases) contribute to at least 50% of the NCD burden. Flow charts address these NCDs only.
- Only evidence-based and cost-effective interventions feasible for application in primary care in low-resource settings have been selected.
- Flow charts take cognizance of the fact that most major NCDs are not symptomatic until late in the development of the disease. A syndromic approach alone, therefore, is not appropriate for NCDs because such an approach will not detect NCDs early in the course of disease to avoid complications. Symptoms that have more discriminatory ability for diagnoses of major NCDs have been selected for symptom-based protocols.
- The integrated multifactoral risk approach is more appropriate for low-resource settings because it is more cost effective and it improves health outcomes.

- A total risk factor approach enables health workers to target those who are at highest risk of developing heart attacks, strokes, amputations and kidney failure.
- Patient-oriented rather than a disease-oriented approach is needed as NCDs are chronic and present for routine care or with exacerbations as emergencies in the long term.
- Depending on local needs and feasibility protocols for other prevalent conditions can be added (e.g. epilepsy, organo-phosphate poisoning, treatment of snake bite).

The implementation of the WHO PEN interventions, which requires training, adequate financing, provision of essential medicines and equipment, will strengthen the health system efficiency and equity. Once the workforce develop skills to effectively implement these protocols, the portfolio can be expanded to other NCDs and other interventions for major NCDs giving due consideration to issues of equity. A set of complimentary protocols will be developed for the district hospital level.

2.3 Measurement of quality, equity, performance and impact

Quality assurance

The minimum quality assurance standards identified below can be achieved with modest investments, even in low-resource settings. They form a core set of standards for improving the quality of care for people with major NCDs and will also provide simple indicators to measure the performance of the health services with regard to NCD care. Audits of these standards can be conducted to evaluate how well major NCDs are managed in primary care, given the availability of a minimum set of technologies and essential medicines. The core set of standards could be expanded when more services are delivered as the resource situation improves.



1. Registration of basic demographic and clinical data of people reporting to primary care with major NCDs

Objective: Register basic demographic and clinical data to be used for follow-up care, tracking trends in utilization of health posts/primary care centres, and monitoring and evaluation.

Action

- entering relevant data of people who access the health-care facility using paper registers or appropriate computer software.

Implications for service planning

- provision of paper-based registries or computer hardware and appropriate software;
- training of staff for data entry and data analysis.

2. Early identification of people with NCDs

Objective: Detect major NCDs early to prevent complications that are costly to treat and have social and economic consequences, e.g. myocardial infarction, stroke, kidney failure, amputations and visual impairment.

Action

- increasing community awareness through community engagement and mobilization;
- targeted early detection;
- opportunistic screening in primary care centres.

Implications for service planning

- training of health staff to increase awareness;
- community-based mobilization to ensure success of targeted screening e.g. those with a family history of premature heart disease, family history of diabetes, past history of gestational diabetes, central obesity, tobacco use, etc.

3. Application of evidence-based interventions in NCD prevention and care

Objective: Provision of evidence-based clinical care of people with NCD to prevent, cure and/or delay onset of complications and improve quality of life.

Action

- adherence to follow-up;
- appropriate control of blood sugar, blood pressure and blood lipids;
- counseling for smoking cessation, adopting a healthy diet and weight control;
- use of evidence-based clinical protocols;
- conduct medical audits.

Implications for service planning

- empowering patients in self-care;
- providing facilities for measurement of blood sugar, blood pressure (and blood lipids if resources permit);
- training personnel for smoking cessation counseling;
- training health staff in the use of clinical protocols;
- training personnel in basic medical auditing;
- flagging and tracking methods to address non-adherence
- establishing referral criteria;
- provision and maintenance of essential equipment and tools listed in Table 5;
- providing access to essential medicines listed in Table 6;
- training primary care workers in family/community empowerment and engagement.

4. Management of NCD emergencies and exacerbations

Objective: To provide evidence-based medical care to people with major NCDs presenting as emergencies, in order to improve outcomes.



Action

Training medical staff to use evidence-based clinical protocols to provide emergency care using available resources and for appropriate referral of:

- acute myocardial infarction
- stroke
- unconscious patient
- hypoglycaemia
- diabetic ketoacidosis
- severe asthma and COPD.

Implications for service planning

- educating people at worksites and communities to recognize and initially manage common emergencies, e.g. hypoglycaemia, heart attack;
- training of health-care professionals;
- implementing and auditing protocols for management of emergencies;
- ensuring modalities for referral.

5. Monitoring of complications

Objective: Minimize complications through early detection and appropriate intervention.

Action

- measurement of urine albumin;
- setting up foot care service (implementing foot care protocols and training of nurses in essential elements of foot care and prevention of amputation);
- appropriate referral for diagnosis, assessment and management of coronary heart disease, cerebrovascular disease, diabetic retinopathy and renal impairment.

Implications for service planning (assuming presence of necessary medical technologies, evidence-based care and medicines at the referral centre, e.g. district hospitals):

- training staff in foot care
- training staff on referral criteria.

6. Capacity strengthening for health system research and training

Objective: To strengthen national capacity for prevention and control of NCDs with special focus on PHC and health equity.

Action

- improving existing networks to facilitate and coordinate research and training;
- establishing an advisory board (central);
- establishing primary care working groups in each district;
- establishing a team of trainers to train health workers in each district.



Implications for service planning

- capacity building of medical and paramedical staff in implementation research;
- capacity strengthening in training and evaluation methodologies;
- earmark available primary care budget for training and research.

Measurement of equity, performance and impact

Programme performance needs to be monitored to ascertain that activities are accomplished as efficiently as planned. Monitoring is carried out at the health facility through direct contact with health workers and at the district health office by examining periodic reports. Evaluation aims at measuring the progress made in achieving the programmatic objectives, detecting performance shortcomings and planning future programme reform and extension. Evaluation should be based on valid, reliable and simple indicators. A few key indicators that can be accurately and reliably measured should be selected to evaluate managerial, operational, technical and epidemiological aspects of implementation of the WHO Package. Data collected should be disaggregated by gender and social class. Tools for this purpose have been developed in collaboration with Ministries of Health .

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Annex A

Cost-Effectiveness of Interventions¹⁹

(HIV/AIDS treatment given for comparison)

Condition	Intervention	Target population	Cost effectiveness
HIV/AIDS	Antiretroviral therapy for primary prevention in clinic	All ages	922 US\$/DALY (Sub Saharan Africa)
Ischemic heart disease stroke and Diabetes	Legislation with public education to reduce salt content policy level intervention	All ages	1937 US\$/DALY
Diabetes	Screening of individuals at increased risk for undiagnosed diabetes in clinic	Adults over 25	3870 US\$/QALY
Diabetes	Annual screening for microalbuminuria and treating those who test positive	Adults	3310 US\$/QALY
Diabetes	Life style intervention for type 2 diabetes	Adults	60 US\$/QALY
Diabetes	Optimal Glycemic control in clinic	Adults	1810 US\$/QALY (SSA)
Diabetes	Cholesterol control in clinic	Adults	3330 US\$/QALY (SSA)
Diabetes	Smoking cessation, counselling and medication in clinic	Adolescents and adults	660 US\$/QALY (SSA)
Diabetes	ACE inhibitor for blood pressure control	Adults	620 US\$/QALY (EAP)
Diabetes	Annual eye examination to detect proliferative diabetic retinopathy and macular odema followed by photocoagulation to prevent blindness	Adults	320 US\$/QALY (SSA)
Cervical cancer	One-visit VIA (screening and treatment in one visit in district hospital)	Women 35-42 yrs	43 per YLS
Cervical cancer	Three visit cytology in district hospital	Women 35-48 yrs	331 US\$/YLS
Breast cancer	Examination of breast by health worker in clinic annually	Women 40-60 years	522-722 per YLS



Condition	Intervention	Target population	Cost effectiveness
Congestive heart failure	ACE inhibitor and betablocker with diuretics in district hospital	Adults	150 US\$/DALY
Stroke and ischemic and hypertensive heart disease	Combination treatment with aspirin, betablocker, thiazide, ACE inhibitor and statin in district hospital	Adults	2128 US\$/DALY
Stroke	Aspirin dose within 48 hours of onset of acute stroke	Adults over 15	149 US\$/DALY
Myocardial infarction and stroke	Combination treatment with aspirin, betablocker, thiazide and ACE inhibitor for secondary prevention in district hospital	Adults	409 US\$/DALY
Myocardial infarction	Aspirin and betablocker for acute management	Adults	14 US\$/DALY
Ischemic heart disease	Aspirin, betablocker with optional ACE inhibitor for secondary prevention in district hospital	Adults	688 US\$/DALY
Ischemic heart disease	Statin incremental to aspirin, betablocker and ACE inhibitor for secondary prevention in district hospital	Adults	2028 US\$/DALY
Chronic obstructive pulmonary disease	Inhaled corticosteroid in clinic	Adults	14, 400-215,000 US\$/QALY (high income countries)
Asthma	Rapid acting bronchodilators incremental to inhaled corticosteroids	Adults	10,600-13900 US\$/QALY (High income countries)
Alcohol abuse	Brief advice to heavy drinkers by primary care physicians	Adolescents/Adults	642 US\$/DALY
Epilepsy	First-line treatment with Phenobarbital in district hospital	All ages	89 US\$/DALY



Why do we need WHO **PEN** ?

- Noncommunicable diseases (**NCDs**) affect the **poor** as well as the affluent.
- Strokes, heart attacks, diabetes and obstructive lung diseases entrench people in **poverty** as a result of catastrophic health expenditure, loss of gainful employment due to chronic ill health and premature death of breadwinners of families.
- Cost effective interventions for prevention and management of NCDs are available.
- However, these interventions are often not accessible to the **poor** particularly in resource constrained settings.
- WHO Package of Essential Noncommunicable disease interventions (**WHO PEN**) is a tool to improve access of cost effective interventions to the **poor** even in resource constrained settings.

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