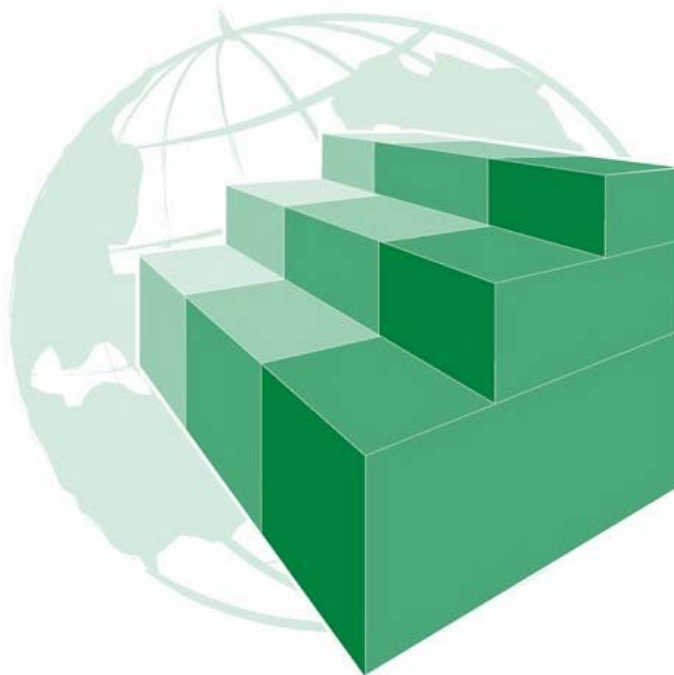


# STEPS: A framework for surveillance



## The WHO STEPwise approach to Surveillance of noncommunicable diseases (STEPS)

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## Preface

The growing burden of noncommunicable diseases (NCD) represents a major challenge to health development. WHO has responded by giving higher priority to NCD prevention, control and surveillance in its programme of work. Surveillance involves ongoing collection of data for better decision-making. It underpins public health action and health promotion activities.

The WHO STEPwise approach to surveillance (STEPS) is the WHO-recommended framework for NCD surveillance. We are building one common approach to defining core variables for surveys, surveillance and monitoring instruments. The goal is to achieve data comparability over time and between countries. STEPS offers an entry point for low and middle income countries to get started in NCD prevention and control activities. It is a simplified approach providing standardized materials and methods as part of technical collaboration with countries, especially those that lack resources.

It is surveillance data that unites all our programmes. Some countries need data to assess current levels of risk, and others to assess the effectiveness of policies and strategies. The STEPS framework is WHO's contribution to building sustainable surveillance systems which improve national capacity and provide the information necessary for assessing NCD prevention and control activities. This approach will lead to better integration of NCD policy and programme development.

Too often countries take second steps too early. Step 1 involves obtaining core questionnaire-based data on those risk factors that have a major impact on health and are most amenable to intervention. Once Step 1 is in place, countries can build upon it: more complex data can be added sequentially as resources allow. STEPS implementation at the country level is strategic, co-ordinated, builds capacity and is sustainable.

There have been many revisions of the document following extensive discussions at regional and national meetings and workshops. We expect this process to continue during the implementation phase and expect the document to evolve over time. In the meanwhile, WHO will foster and encourage participation in the growing network of countries attempting to put in place systems now for understanding the changing profile of risk factors.

Two parallel activities accompany the development of the STEPS programme. As comparable core data become available, countries will have the option to add these to the WHO Global NCD InfoBase, a risk factor database with country specific information. The purpose is to make standardized NCD surveillance information available on one Internet site. A related project is a global report on the current status of country NCD surveillance systems and strategies.

Finally, this document is a contribution to building sustainable surveillance systems, which improve national capacity and provide the information necessary for NCD prevention and control. Future initiatives will improve country-level data on noncommunicable disease endpoints, including the use of rapid assessment procedures to describe national NCD surveillance capacity and needs.

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## Summary

Noncommunicable diseases (NCD) are responsible for a high proportion of the death and disability burden in all countries. In developing countries the burden of disease caused by NCD is increasing rapidly and will have significant social, economic, and health consequences.

Based on current trends, by the year 2020 noncommunicable diseases are expected to account for 73% of deaths and 60% of the global disease burden. Most of this increase will result from the epidemiological transition in developing countries, although the burden of NCDs in developed countries also continues to increase steadily.

The key to control of the global epidemics of NCDs is primary prevention. The aim must be to avert these epidemics wherever possible and to control them as quickly as possible where they are entrenched. Surveillance is fundamental to this task.

Surveillance of NCDs and their risk factors is an essential element in planning and evaluating programs. In a world of finite resources, the priority is to collect data necessary for informing these programs, monitoring their impact and predicting the future caseload of NCDs. While data on major risk factors for NCDs are available in many developed countries, these data are scarce for many developing countries. Lack of this information is seriously handicapping efforts to control NCD epidemics.

Data must be collected, analysed and used in a regular and systematic way. The interval between the episodes of data collection may vary depending on the measurements involved and the infrastructure available to conduct surveys. Surveillance involves commitment to data collection on an ongoing (repeated) basis, as well as the use of the data for public health policy.

Four considerations guide the choice of risk factors for inclusion in surveillance activities:

- **The significance of the risk factor for public health** in terms of the nature and severity of the morbidity, disability and mortality of the NCDs associated with these risk factors;
- **The cost of collecting valid data** on a repeated basis;
- **The availability and strength of the evidence** that intervening on the factor will reduce NCDs in the community; and
- **The ability to measure the risk factor burden uniformly** in different settings to ensure comparability and to measure changes over time.

This document presents the rationale for NCD risk factor surveillance, outlines criteria for selection of NCD risk factors for surveillance purposes, and recommends a set of core NCD risk factors which should be integral to NCD surveillance systems world-wide. The document also presents a simple surveillance system for countries interested in developing appropriate NCD risk factor surveillance infrastructure.

The WHO STEPwise approach to Surveillance (STEPS) of NCD risk factors<sup>1</sup> is based on two key premises: collection of standardized data, and sufficient flexibility for use in a variety of country situations and settings. This approach encourages the development of an increasingly comprehensive and complex surveillance system depending on local needs. For surveillance to be sustainable, however, the STEPwise approach emphasises that small amounts of good quality data are more valuable than large amounts of poor quality data.

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<sup>1</sup> Recommendations on data for diseases other than diabetes and hypertension are not provided in this document. Nonetheless, information on disease occurrence is important in determining public health priorities and monitoring the effectiveness of disease prevention. Where resources allow, these data should be included in surveillance systems.



# 1. Surveillance of noncommunicable diseases

## 1.1 Public health surveillance

The term “surveillance” is derived from the French word meaning “to watch over” and, as applied to public health, means the close monitoring of the occurrence of selected health conditions in the population (1). In 1963 disease surveillance was defined as “*the continued watchfulness over the distribution and trends of incidence through systematic collection, consolidation, and evaluation of morbidity and mortality reports and other relevant data*” directly linked to timely regular dissemination of the results to “*those who need to know*” (2). In 1968 the 21<sup>st</sup> World Health Assembly described surveillance as the “*systematic collection and use of epidemiologic information for the planning, implementation, and assessment of disease control*”; in this sense, surveillance implies “*information for action*” (3).

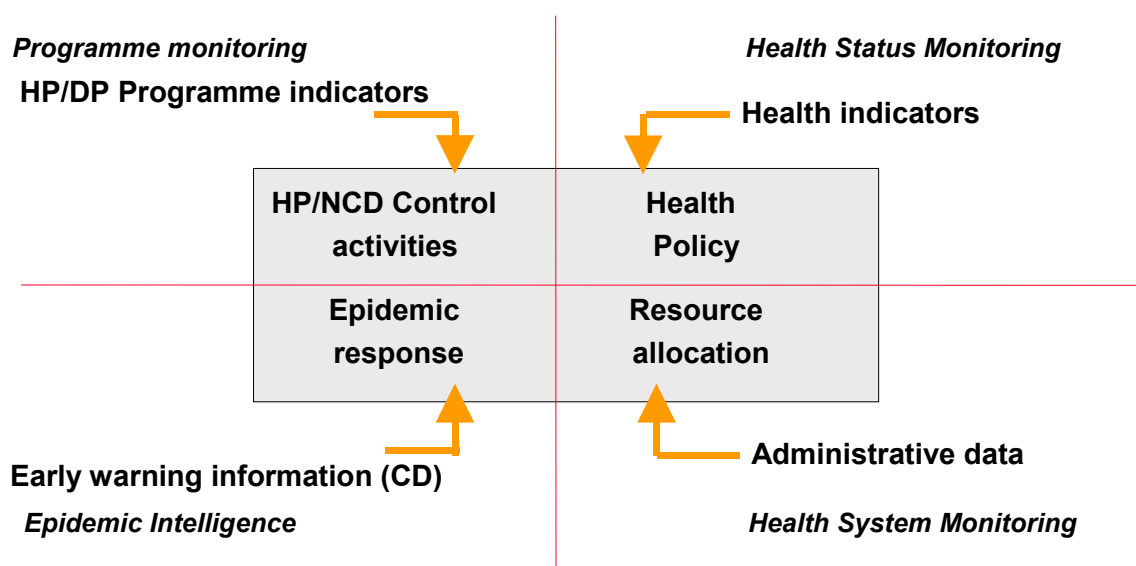
Both the role and concept of public health surveillance continue to evolve as the scope of surveillance broadens and as increasingly sophisticated methods are applied. In the past, public health surveillance was primarily related to surveillance of infectious diseases and indicators of disease such as morbidity or mortality. While infectious disease surveillance has a long history, many countries are now facing the epidemiological transition with increasing need to have information about the growing epidemics of NCDs. Given the long time-lag between exposure to risk factors and the occurrence of disease, the surveillance of disease indicators is no longer sufficient to inform public health decision making adequately. Therefore, during recent years the concept of public health surveillance has evolved to encompass a much wider range of surveillance indicators, including surveillance of conditions or exposures known to have a negative impact on the occurrence of the disease of interest.

The distinction between monitoring and surveillance of NCDs is blurred and the terms are often used interchangeably. Surveillance implies an integrated approach connecting the data to development and evaluation of programmes (4) whereas monitoring is not always associated with programmes of action.

## 1.2 The role of public health surveillance

Public health surveillance is the epidemiological foundation for modern public health. The ultimate goal of surveillance is the use of the data collected for the formulation of policies and programmes to promote health and prevent disease (1-5). Surveillance is also an essential tool for measuring the impact of preventive efforts. It involves the systematic collection of data, to ensure consistent and comparable data are collected in a regular fashion. Analysis of trends and important emerging health issues can then be incorporated into the system. Surveillance is based on a public health agenda, not a research agenda. Data need to be collected in a timely way and should be of direct relevance to the health needs of a population.

Figure 1. Data needs in public health surveillance



### 1.3 Communicable and noncommunicable disease surveillance

The potential usefulness of surveillance as a public health tool to address problems beyond infectious disease was emphasized in 1968 when the 21st World Health Assembly recommended the application of surveillance principles to a wider scope of problems, including cancer, atherosclerosis, and social problems such as drug addiction (3). Many of the principles of surveillance traditionally applied to acute infectious diseases have also been applied to chronic diseases and conditions. Common to both is their purpose in describing the health problem, monitoring trends, estimating the health burden, and evaluating programs for prevention and control. Some of the key differences between communicable and noncommunicable disease surveillance are outlined in Table 1. Even though chronic diseases may have long latency periods, trends in their incidence or risk factors may change relatively quickly. Surveillance can detect changes that result from effective public health interventions.

Table 1. Communicable and noncommunicable disease surveillance	
Communicable Disease Surveillance	Noncommunicable Disease Surveillance
<b>PURPOSE</b>	
Emphasis on weekly or monthly variations to detect outbreaks	Emphasis on trends over years
Focus is on identifying individuals with disease	Focus is on describing population burden and risks
Short time frame between exposure and disease	Longer time frame between exposure and disease
Rapid response	Planned response
<b>DATA</b>	
Reliance on notification by health-care providers and/or laboratories	Greater use of existing databases e.g. population surveys, vital statistics, hospital discharge, etc
<b>DATA ANALYSIS</b>	
Emphasis on case counts	Emphasis usually on rates, population means
<b>DATA DISSEMINATION</b>	
More frequent	Less frequent

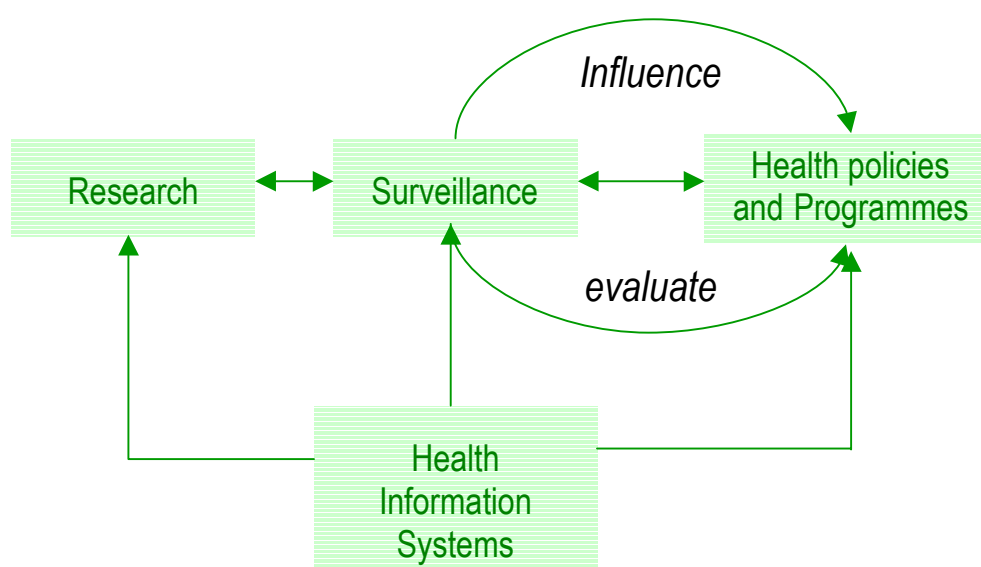
Surveillance of both infectious and non-infectious diseases share similar functions and in some circumstances can use the same structures, processes and to some extent personnel. An integrated approach to surveillance aims to establish a well co-ordinated surveillance system that seeks opportunities for integration of essential and support functions, maximizes synergies, builds on existing resources, and benefits from successful public health initiatives. Sharing of experiences and resources avoids duplication of efforts and addresses the needs of public health programs. A co-ordinated approach to data collection, analysis, interpretation and dissemination is the ultimate goal.

Because of the differences, integration of communicable and noncommunicable disease surveillance presents particular challenges and could, however, result in the restriction of usefulness of either of them. Nevertheless synergies based on common principles and logistics should be explored in the context of an overall public health surveillance system.

#### 1.4 Characteristics of a NCD surveillance system

The critical components in the definition of a surveillance system include the ongoing collection, analysis, and use of health data (1-5). Demographic or health information systems (for example, registration of births and deaths, routine abstraction of hospital records, health surveys in a population) that are not linked to specific prevention and control programs, do not constitute a surveillance system. However, data collected from ongoing health information systems may be useful for surveillance when systematically analysed and applied to policy on a timely basis. In this regard the link between information collected and its use to influence health policies characterises a surveillance system. The reverse situation is also a characteristic of the integration of surveillance into a system: surveillance can also be used as tool to evaluate health policies and preventive interventions (Figure 2).

Figure 2. Characteristics of a surveillance system



A well functioning NCD surveillance system is an integral part of public health surveillance and the wider health information system. It provides information for planning, implementation, monitoring and evaluation of public health intervention programmes. The use of the information determines the data collected and the speed necessary for the information flow within the system. Surveillance needs to be grounded in evidence based approaches. This document stresses that NCD surveillance is an essential national public health function.

Multiple sources of information can contribute to an on-going surveillance system (Table 2).

<b>Source</b>	<b>Information</b>
Surveys	Population-based data
Disease registries	Incidence and case fatality
Hospital activity data	Morbidity and health service use indicators
Administrative data	Births, deaths, Insurance claims, medication use, health systems performance, hospital audits
Aggregate consumption data	Per capita consumption
Economic activity data	Economic indicators

## **1.5 Consumption data for surveillance**

Many of the important risk factors are part of the economic and political processes of a population and are included in routine national data collections. Data on the aggregate level will therefore be available for factors such as consumption of food, alcohol and tobacco. The quality of such data, however, varies among countries and will often be of limited usefulness. In addition, as the collection involves a different set of processes from those in the approach based on a sample of the population, which is the focus of this document, recommendations on how to obtain such data are not provided here.

However, these data are important for primary prevention programs and Ministries of Health should explore the possibility of obtaining good aggregate consumption or other relevant ecological data in parallel with the sample-based surveillance approach. An example is provided by estimates of per capita consumption of alcohol across the entire population aged 15 years or older. Such data derived from national consumption statistics can provide policy makers with some sense of the magnitude of trends in alcohol-related problems. Among those who drink at all, the 10 per cent who drink more heavily typically account for 50 per cent or more of all alcohol consumed. Trends in per capita alcohol consumption may be a good proxy for problems of chronic heavy drinking such as cirrhosis of the liver, but less so for problems typically more widely distributed such as alcohol-related traffic casualties. The WHO *International Guide for Monitoring Alcohol Consumption and Related Harm* is recommended for more information on how to obtain aggregate consumption data (6).

## **1.6 From surveys to surveillance**

For surveys to be used most effectively for public health purposes, such as setting priorities, developing programs, and evaluating interventions, data must be collected, analysed and used in a regular and systematic way. The interval between the episodes of data collection will vary depending on the nature

of the data to be collected, the different measurements involved and the infrastructure currently available to countries. Surveillance involves commitment to data collection on an ongoing (repeated or periodic) basis, as well as a commitment to use of the data for informing public health policies and programs.

There are several factors influencing the decision whether to implement ongoing or periodic data collections. (Table 3).

	<b>Ongoing collection</b>	<b>Periodic collection</b>
Data collection	Small team	Large teams or multiple teams
Data accessibility	Initially slow	Faster turnaround for cross-sectional status report
Data usefulness for trend analyses	Ongoing results	Trend data after three rounds of data collection
Evaluation of health intervention	Continuous monitoring of impact	Timing of collection not necessarily linked to intervention
Budget	Line item in health budget	One-off investment at each cycle

The establishment of routine and ongoing risk factor surveillance as a dedicated entity within a Department or Ministry of Health, while ideal, may only be possible for some countries. Surveys undertaken on a periodic basis are more often seen as achievable. An integrated surveillance perspective requires collection of population-based data as opposed to a specific focus on one particular high-risk group. It also assumes collection of data that are directly relevant and important to the public health field, and a systematic approach in which infrastructure for conducting surveillance can be developed, maintained, and expanded over time.

In some countries, surveillance of NCD risk factors is already under way. For other countries that are just beginning to implement programmes of health promotion and disease prevention, an appropriate first step towards initiating surveillance is to conduct a ‘baseline’ survey of sufficient sample size to have the power to detect changes over time. It will also provide very important information for determining the priorities for interventions, and for raising public and political awareness concerning the likely extent of the problem. Nonetheless, a baseline survey is only the first step in what must become an on-going surveillance system.

## **1.7 From disease surveillance to risk factor surveillance**

The key to the control of the global epidemics of NCDs is primary prevention. The aim is to avert epidemics wherever possible and to reverse them where they have begun. The basis of prevention of NCDs is identification of the major risk factors and their prevention and control. Where resources are available it is recommended to include data on diseases (for example, heart disease, stroke, cancer) in the surveillance process. This information is important in assisting health services planning, determining public health priorities and monitoring the long-term effectiveness of disease prevention campaigns. However, from a primary prevention perspective, surveillance of those major risk factors which are known to predict disease, has a high priority.

Research has identified a number of “independent” risk factors common to many NCDs. The conventional approach often focuses on the isolated contribution each of them makes to causality rather than on the totality of risk. For this reason, the risk factor paradigm has limitations (7) but much of the debate can be refocused by distinguishing the application of the risk factor concept to an individual’s

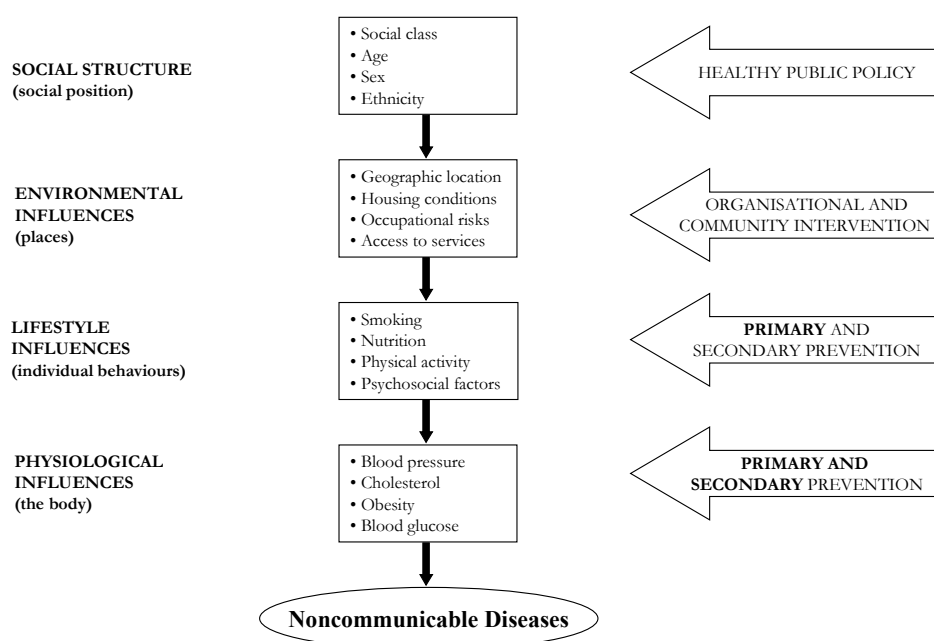
health prospect from that of a population (8). In the context of public health, risk factors are a probabilistic concept that apply to an aggregate of individuals and not to a specific individual.

Knowledge about risk factors should be applied to shift population distributions of these factors and for achieving that, to understand their social, economic, and political determinants. At the individual level, however, such risk factors might be quite poor screening tools. In addition, results from community-intervention trials aimed at the reduction of individual risk factors have been disappointing and this has led to a more comprehensive look at the fundamental determinants of disease and the need to integrate prevention efforts across several factors.

Figure 3 shows the multidimensional view of disease determinants, grouping risk factors along a causal scale from more distant to closer to the actual disease/condition in question (7). A number of these determinants are common to several NCDs. Socio-economic status is a key determinant of health status and many indicators have been developed to describe the social structure (9) for public health purposes (10-13). This view illustrates also that some of the risk factors (for example, obesity) are themselves often the outcome of other factors (for example, physical inactivity), a distinction that should be used for guiding interventions to reduce the risk to health.

The multidimensional understanding of the determinants of disease requires targeting of various preventive actions to different levels of causation. For instance, at the physiological level, clinical (pharmacological) interventions may be appropriate (14) whereas at the level of social structure, the intervention might be directed at alleviation of poverty. Community interventions aimed at changing the pattern of behaviours that predict the occurrence of disease - for example, physical inactivity or smoking - are in midway in the scale.

**Figure 3. Levels of causation and corresponding types of intervention (7)**



## 1.8 The WHO STEPwise approach to NCD surveillance

The WHO STEPwise approach to Surveillance (STEPS) of NCDs is based on sequential levels of surveillance of different aspects of noncommunicable diseases, allowing flexibility and integration at each step by maintaining standardized questionnaires and protocols to ensure comparability over time and across locations (Table 4).

<b>Table 4. The WHO STEPwise approach to NCD surveillance</b>			
<b>NCD</b>	<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b>
<b>Risk factors</b> (the future)	Questionnaire-based report on key behavioural risk factors	Questionnaires plus objective physical measurements	Questionnaires plus objective physical measurements plus bio-chemical measurements
<b>Diseases</b> (the present)	Hospital or clinic admissions, by age and sex	Rates and principal condition by age, sex and principal conditions: communicable diseases, NCDs and injury	Age, sex, and cause-specific disease incidence or prevalence
<b>Deaths</b> (the past)	Death rates by age and sex	Death rates by age, sex and broad cause of death (verbal autopsy)	Death rates by age, sex and cause of death (death certificate)

While the STEPS approach can be similarly applied to mortality and morbidity, the focus of this document is its implementation for NCD risk factors.

## 2. The emerging epidemic of chronic diseases

### 2.1 Increased burden of chronic diseases

All countries, irrespective of their stage of economic development or demographic and epidemiological transition, face an increasing burden of noncommunicable diseases. In 2000, around 60% of all deaths and 43% of the global burden of disease, was due to coronary heart disease, stroke, cancers, and type 2 diabetes mellitus (118). Among developing countries, around 50% of deaths and 40% of burden are due to noncommunicable conditions. Heart disease, stroke, cancer, diabetes, and respiratory disease are responsible for an increasing proportion of disease burden in many developing countries undergoing an epidemiological transition (119). Based on current trends, these diseases are predicted to account for 73% of global deaths and 60% of the global burden of disease by the year 2020 (16).

The emergence of epidemics of NCDs is the result of demographic and epidemiological transitions, along with increases in levels of risk factors resulting from social and economic changes. NCDs have been of major importance in developed countries for several decades. Now they are becoming recognized as a major public health threat in the developing world. For example, over the next 30 years, the burden of disease from NCDs in developing and newly industrialized countries is expected to rise by more than 60% (16). In comparison, the increase in developed countries is expected to be less than 10%.

The increasing burden of NCDs threatens to overwhelm already stretched health services. The factors underlying the major NCDs (heart disease, stroke, diabetes, cancer, and respiratory disease) are well documented. Primary prevention based on comprehensive population-based programmes(17) is the most cost-effective approach to containing the emerging epidemic of NCDs.

The example of cardiovascular disease (CVD), which contributes a substantive part of both mortality and morbidity, illustrates the problem. There is strong evidence that smoking, blood pressure and cholesterol are the cause of at least two-thirds of heart attacks and strokes (18) (19). It has also been shown that major changes in the rates of CVD are explained by changes in levels of risk factors in populations (15). CVD (mainly heart disease and stroke) is responsible for approximately half of all NCD deaths and one fourth of the worldwide NCD burden. Low and middle income countries suffer the major impact of the CVD epidemic, with two thirds of the global CVD deaths and three quarters of the global CVD disability occurring in these countries (20). Furthermore, CVD is more likely to affect people at younger ages in low and middle income countries: 47% of CVD deaths in developing countries occur in people below the age of 70 years, in comparison with 23% in established market economies (16).

### 2.2 The need to control the emerging epidemic of NCDs

Governments need to plan to control the emerging NCD epidemics. The economic burden associated with NCDs is increased by expensive modern medical and surgical treatment that is both labour-intensive and technologically sophisticated. Hence, there is an urgent need to prioritize resources for the prevention of noncommunicable diseases in the first place (21). Prevention and control programmes require specific goals and quantifiable outcomes to be reached within a defined timeframe. Assessment of progress towards these goals requires surveillance of NCDs and their risk factors.

A vast body of knowledge now exists about the risk factors for NCDs and experience in the prevention of them. Although most of these data come from developed countries, the causal relationships are broadly similar in developing countries. It has also been shown in a number of countries, both



developed and developing, that a comprehensive, long term approach has the potential to reduce risk factors in the population and in turn, disease, disability and death (15). In this sense, the risk factors of today predict the diseases of the future

Prevention through risk factor-focused interventions requires country- specific data on risk factors so that priorities can be appropriately set, targeted programs developed and interventions monitored. For surveillance to inform this process most effectively, data must be collected, analysed and used in a regular and systematic way. Repeated collection of data on risk factors as surrogate measures of disease can be undertaken to monitor trends.

### **2.3 The role of WHO in responding to the accelerating NCD epidemics**

In 2000, the WHO Fifty Third World Health Assembly of WHO passed a resolution on the *Prevention and Control of Noncommunicable Diseases* (15) with the goal to support Member States in their efforts to reduce the toll of morbidity, disability and premature mortality related to NCDs. This global strategy has three main objectives:

- To map the emerging epidemics of NCDs and to analyse their social, economic, behavioural and political determinants to provide guidance for policy, legislation and finance;
- To reduce the level of exposure of individuals and populations to the common risk factors for NCDs;
- To strengthen health care for people with NCDs.

Risk factor surveillance contributes to the implementation of this resolution by providing data on critical and modifiable risk factors associated with the leading causes of NCD mortality and morbidity. Information on risk factors also helps to guide the development and implementation of disease prevention and health promotion policies and programs and to measure their impact.

The overall goal of the WHO global NCD surveillance strategy is to enable countries to build and strengthen their capacity to conduct risk factor surveillance within the framework of an integrated, systematic approach aimed at sustainable national collection of data on NCDs. This process enables countries to use the data collected for decision making and also contributes to the collection of standardized information for global comparisons.

The WHO NCD global surveillance strategy includes:

- Identification of the key risk factors to be addressed together with recommended WHO standardized definitions;
- A co-ordinated approach for conducting surveillance of risk factors that upholds scientific principles and is sufficiently flexible to meet local and regional needs and allows international comparisons;
- Technical materials and tools, including training, to support the implementation of the surveillance tools;
- Effective communication strategies for providing data to planners of policy and intervention programmes, decision-makers, potential funding sources, as well as to the general public; and
- Use affordable and accessible technology to share information within and between countries.

## 3. The WHO STEPwise approach (STEPS) to Surveillance of NCD risk factors

### 3.1 Rationale for the selection of key risk factors

A “risk factor” refers to any attribute, characteristic, or exposure of an individual which increases the likelihood of developing a noncommunicable disease. In the context of public health, population measurements of these risk factors are used to describe the distribution of future disease in a population, rather than predicting the health of a specific individual. Knowledge of risk factors can then be applied to shift population distributions of these factors in a positive direction.

Emphasis in surveillance should be given to risk factors that are amenable to intervention. Some factors not amenable to intervention, such as sex and age, are also important for estimating trends in NCDs. Intervention strategies can often be delivered cost effectively by community-wide activities, including information and education campaigns, and legislative reform or structural changes that encourage health-preserving behaviour.

### 3.2 Risk factors and disease burden

The major risk factors for one NCD are also likely to affect one or more of the other NCDs. In addition, some of the NCD risk factors tend to appear in ‘clusters’ in individuals (i.e. physical inactivity often clustering with poor diet and smoking ). Furthermore, a relatively limited set of risk factors account for a large fraction of the risk of NCD in the population (22), (23). It has been estimated, for example, that, social class, tobacco and alcohol use, obesity, blood pressure and diabetes explain about half of the variance in stroke in men and two thirds in women (19).

The World Health Report 2002 (118) , shows that in 2000, of the leading 12 risk factors as causes of burden of disease, seven are included in the STEPS surveillance system (tobacco use, alcohol consumption, low fruit and vegetable intake, physical inactivity, blood pressure, cholesterol, body mass index).

Even in developing countries with high mortality, tobacco use, cholesterol, alcohol consumption, and low fruit and vegetable consumption, were in the top 12 leading risk factors (see Table 5).

Table 5 indicates the change in importance of risk factors as countries move through the epidemiological transition (described in Section 2.1) from high mortality developing countries where underweight and unsafe sex are the leading risk factors, to low mortality developing countries where alcohol consumption and blood pressure rank highest, to developed countries where tobacco use and blood pressure rank highest.

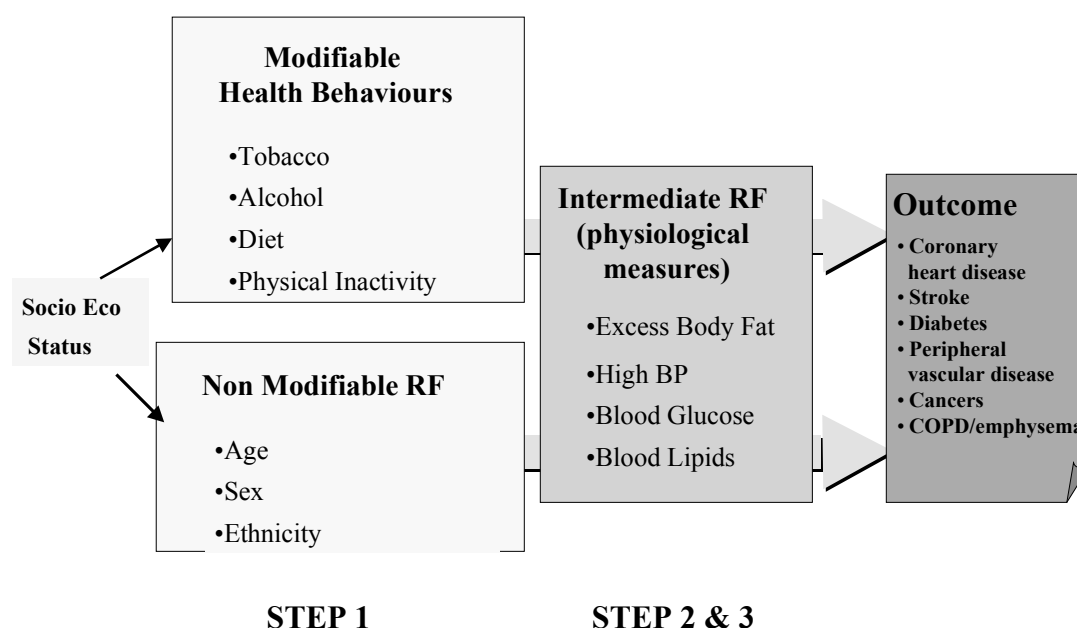
There is a major concentration of risks in the high mortality developing countries. Among these countries with just over two-fifths of the world’s population, not only are the rates of disease and injury particularly high, but the contribution made by relatively few risk factors is great. About one-sixth of the entire disease burden in these countries is attributed to underweight.

<b>Table 5. Leading 12 risk factors as causes of burden of disease in developing and developed countries.</b>			
<b>Developing countries</b>		<b>Developed countries</b>	
	<b><i>High Mortality</i></b>	<b><i>Low Mortality</i></b>	
1	<b>Underweight</b>	Alcohol	Tobacco
2	<b>Unsafe sex</b>	Blood pressure	Blood pressure
3	<b>Unsafe water</b>	Tobacco	Alcohol
4	<b>Indoor smoke</b>	Underweight	Cholesterol
5	<b>Zinc deficiency</b>	Body mass index	Body mass index
6	<b>Iron deficiency</b>	Cholesterol	Low fruit & vegetable intake
7	<b>Vitamin A Deficiency</b>	Low fruit & vegetable intake	Physical inactivity
8	<b>Blood pressure</b>	Indoor smoke – solid fuels	Illicit drugs
9	<b>Tobacco</b>	Iron deficiency	Unsafe sex
10	<b>Cholesterol</b>	Unsafe water	Iron deficiency
11	<b>Alcohol</b>	Unsafe sex	Lead exposure
12	<b>Low fruit &amp; vegetable intake</b>	Lead exposure	Childhood sexual abuse

The most common NCDs and their established behavioural and physiological risk factors that meet criteria for surveillance are summarized in Figure 4.

The rationale for inclusion of these core risk factors include the following:

- They have the greatest impact on NCD mortality and morbidity;
- There is evidence that their modification is possible and effective in primary prevention;
- The measurement has some validity;
- The measurement can be applied in both developed and developing countries, and comparison across countries will be meaningful; and
- The measurement can be obtained while following appropriate ethical standards.

**Figure 4. Behavioural RF, Intermediate RF and their outcomes**

Socio-economic status influence modifiable health behaviours which will influence as well the intermediate risk factors which are respectively included in STEP 1 and STEP 2 and 3. The risk factors strongly influence the outcome. The figure shows therefore that if primary prevention is carried out and modifies the status of modifiable health behaviours, the outcome will also be different and disease burden will decrease.

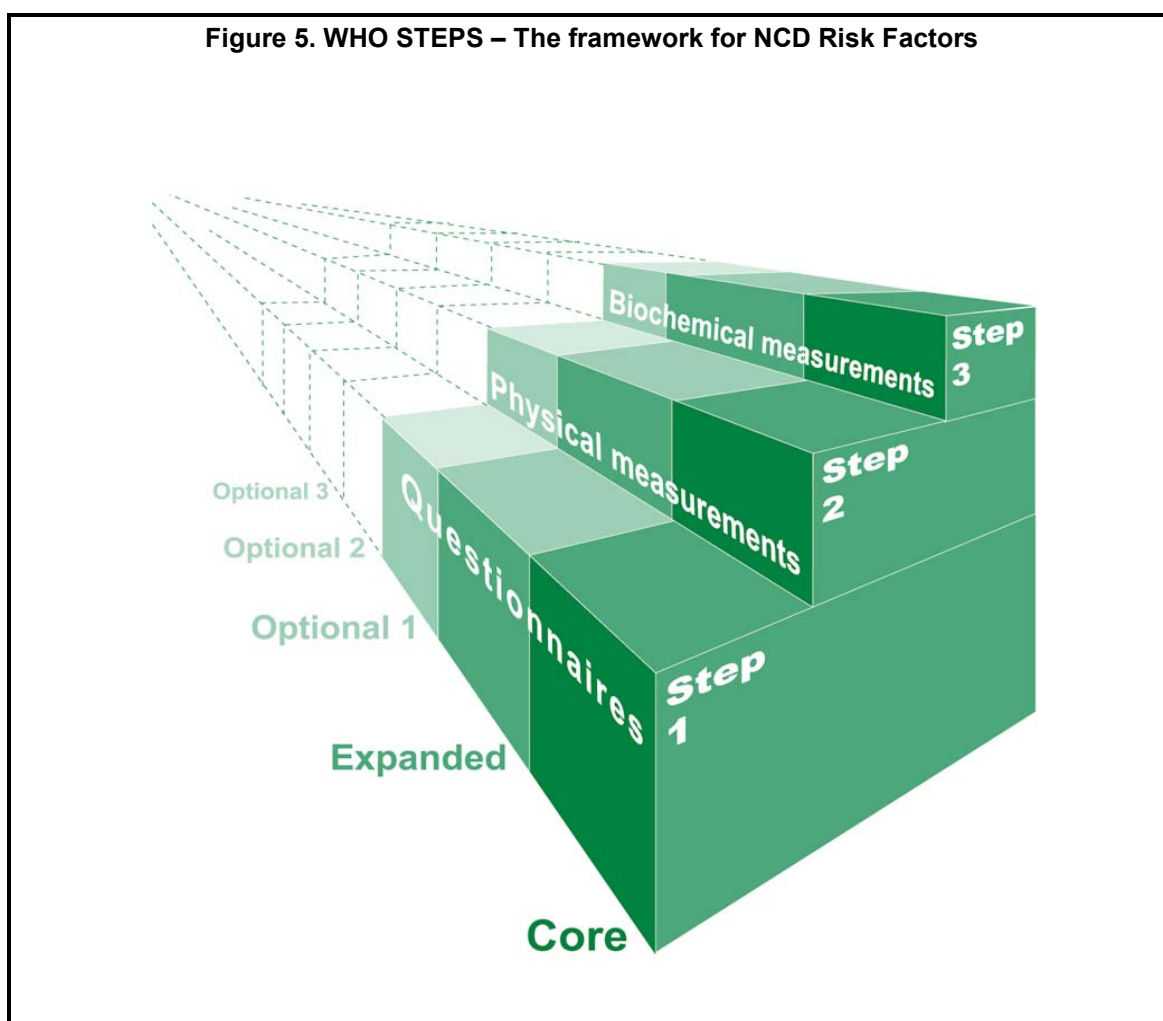
### 3.3 A framework for risk factor surveillance: a STEPwise approach

The WHO STEPwise approach to surveillance (STEPS) is the WHO recommended NCD surveillance tool. This framework unifies all WHO approaches to defining core variables for population-based surveys, surveillance and monitoring instruments. The goal is to achieve data comparability over time and between countries. STEPS offers an entry point for low and middle income countries to get started in NCD activities. STEPS for NCD risk factors is based on the concept that surveillance systems require standardised data collection as well as sufficient flexibility to be appropriate in a variety of country situations and settings (Figure 5). The STEPwise approach, therefore, allows for the development of an increasingly comprehensive and complex surveillance system depending on local needs and resources.

For surveillance to be sustainable, the STEPwise approach advocates that small amounts of good quality data are more valuable than large amounts of poor quality data. A strong argument can also be made for the benefits of monitoring a few modifiable NCD risk factors since they reflect both a large part of future NCD burden as well as indicating the success of interventions considered to be beneficial to a wide range of NCDs.

In the STEPS approach, the recommended surveillance measures are categorised according to the degree of complexity and cost in obtaining the data. The degree of difficulty equates to whether

instruments alone are used, physical measures are collected in the field, or laboratory measurements requiring external expertise are required.



The key feature of the STEPS framework is the distinction between the different levels of risk-factor assessment:

- self report information by questionnaire (**Step 1**),
- objective information by physical measurements (**Step 2**), or
- objective information by blood samples for biochemical analyses (**Step 3**);

and the three modules involved in describing each risk factor:

- core
- expanded core
- optional

The STEPS approach moves along a sequential process. The key premise is that, by using the same standardized questions and protocols, all countries can use the information not only for informing within-country trends, but also for between-country comparisons. The questionnaires and methods recommended must therefore be relatively simple. Because they have been selected on the basis of their

ability to provide trends in summary measures of population health, they may not necessarily give a complete picture of each risk factor.

A good illustration of the conceptual framework underlying STEPS is given in Table 6, where the different levels of risk factor data assessment (self-report, physical or biochemical measurement) are related to the three categories of comprehensiveness involved in describing each risk factor: core, expanded core and optional modules.

<b>Measures</b>	<b>Level</b>		
	<b>Step 1 (Self Report)</b>	<b>Step 2 (Physical)</b>	<b>Step 3 (Biochemical)</b>
<b>Core</b>	Socio-economic and demographic variables, years of education, tobacco and alcohol use, physical inactivity, intake of fruit and vegetables	Measured weight and height, waist circumference, blood pressure	Fasting blood sugar, total cholesterol
<b>Expanded Core</b>	Ethnicity, Income education, household indicators, dietary patterns	Hip circumference, pulse rate	HDL-cholesterol, triglycerides
<b>Optional (examples)</b>	Other health-related behaviours, mental health, disability, injury	Timed walk, pedometer, skinfold thickness	Oral glucose tolerance test; urine examination

The STEPS approach encourages a focus on obtaining core data at each level on the established risk factors that determine the major disease burden. It is sufficiently flexible to allow each country to expand on the core variables and risk factors, and to incorporate optional modules related to local or regional interests. By including optional modules, the surveillance system can provide more in-depth information but the balance between quantity of data and quality of data must always be considered.

An important feature of the STEPwise approach is that it allows expansion of the key variables by the addition of optional modules if there is strong (local) interest in them. However the focus of WHO STEPS is to propose at each level, a minimum of core standardised variables and methods that will not only be useful at the country level, but will also allow comparability of the collected information for more countries participating in the global surveillance network. This does not apply to the extensions chosen and developed locally. The STEPwise approach is also designed so that, independent of any additions made, data sets should always be 'downwards compatible' by using exactly the same methods such as an agreed common denominator for surveillance.

In countries where health promotion activities, such as campaigns to promote use of seat belt are in place, data on the use of seat belts would be appropriate. A system for monitoring a range of factors related to intentional and unintentional injury is under preparation (25). In some settings, the teams responsible for the surveillance process may also wish to add more sophisticated laboratory measures to the STEPwise protocols recommended here.

### **3.4 Expansion to suit local needs**

In the context of health promotion activities, behavioural risk factor surveillance allows a measure of impact on surveillance. Inclusion of other behavioural factors including knowledge, attitude, belief and

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practice with local relevance (such as injury, sexual behaviour, mental health, substance abuse) are optional. An optional module of a wide range of additional behavioural risk factors is currently under preparation as part of a behavioural risk factor surveillance system (BRFSS).

The behavioural dimension of the STEPS approach can be expanded to include a range of additional risk behaviours. For the expansion of this particular dimension the WHO Mega Country Health Promotion Network (26) interacts with the WHO STEPS approach at Step 1.

The Mega Country Health Promotion Network focuses on countries with a population of more than 100 million (Bangladesh, Brazil, China, India, Indonesia, Japan, Mexico, Nigeria, Pakistan, Russian Federation, and the United States). The goal of this network is to strengthen capacity for health promotion in the Mega country populations. These efforts are accompanied by Behavioural Risk Factor Surveillance (BRFS) to monitor and evaluate health promotion activities in these countries.

The Mega country BRFS is modelled on the successful Centre for Disease Control BRFSS (27). In general, self-reported information is obtained either by telephone, mail, or face-to-face interview; it does not encompass physical measurements.

To ensure consistency and comparability of basic global self-report information, both the WHO STEPS approach and the WHO Mega country BRFS share the same core and expanded set of risk factors of Step 1 (socio-economic and demographic variables, tobacco use and alcohol consumption, physical inactivity, and diet). The Mega Country BRFS covers a larger range of health risk behaviours, including seat belt use, mental health, perceived health, sexual behaviour, screening and health services use. The Mega country BRFS expands the comprehensiveness of the STEPS components at the optional level of Step 1 (26); the additional optional modules are generally program-specific.

WHO recommends a limited core set of key NCD risk factors as discussed previously. Other important risk factors, such as mental health and nutritional status are not included because of the absence of simple standardized measures.

Within these selected core variables, choices must be made which distinguish between surveillance purposes and research purposes - including one-off surveys. Nutrition provides a good example. There are four major nutritional issues likely to be important in communities dealing with a large or growing burden of NCDs;

- oversupply of calories
- imbalance of macro-nutrients
- excessive intake of salt
- suboptimal intake of fresh fruit and vegetables.

An indication of over-consumption of calories can be obtained from an assessment of trends in body weight (included in Step 2) together with information on trends in physical activity patterns (Step 1). The intake of macro nutrients is impracticable to monitor on an adequate scale over a prolonged period. The intake of salt, can be difficult to measure, and is perhaps less important if blood pressure is being measured (Step 2). In regard to the suboptimal intake of fruit and vegetables, while the evidence implicating low intakes of specific micronutrient in the aetiology of NCDs is largely presumptive, measurement of a relevant “macro-exposure”, intake of fruit and vegetables is important (29;30). An indicative measure of fruit and vegetable intake is relatively easy to obtain (compared with biochemical assessments or long food frequency questionnaires) and has therefore been included as a core item in Step 1.

Measures of perceived general quality of life may be related to the future burden of morbidity. However, from a surveillance perspective, the scope for a primary preventive response is not yet clear. Measurement of general levels of psychological and social well-being will be useful where governments are committed to improving physical, social and occupational environments, as well as encouraging individuals to adopt more health promoting lifestyles. It is hoped that governments will respond to the World Mental Health report 2001 to institute such programs. Methods to assess the effectiveness of mental health measures at a population level are likely to be specific to individual countries.

Use of psychoactive drugs is an important public health issue in some countries and there may be a case for including use of psychoactive drugs in surveys of NCD risk factors. Indeed, surveys of the general population will be used to establish estimates for the prevalence of substance abuse. However, because of differences in cultural contexts, and because of the generally low prevalence of use, such measures are not considered “core” in the global surveillance context.



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## 4. Components of the WHO STEPwise tool for Surveillance of NCD risk factors

### 4.1 Introduction

The basis for the choice of risk factors included in STEPS has been outlined in Section 3 above. The protocol for the measurement of each particular risk factor is provided in an accompanying document, the STEPS Field Manual (<http://www5.who.int/noncommunicable-diseases/main.cfm?p=0000000769>.)

The social and demographic information to be collected to permit comparisons of subgroups in the survey sample is given followed by the rationale for each recommended variable (based on the questionnaire or physical or biochemical measurement) including:

- a description of its design and use;
- definitions applicable to the data it provides;
- needs for calibrating equipment and training of staff;
- maintaining quality control; and
- guidelines for analysis and interpretation of the data obtained.

The corresponding data can and should be regarded as having core significance in monitoring trends in risk factors for NCDs and in planning and evaluating the corresponding primary prevention programs. Each recommendation is based on a review of a wide range of materials from the sources listed in Appendix 1. A brief rationale is provided for each of the recommendations, but the guiding principles underlying them are:

- evidence of validity;
- likelihood of obtaining comparability across countries over time;
- lack of ambiguity, especially in a variety of cultural and linguistic settings.

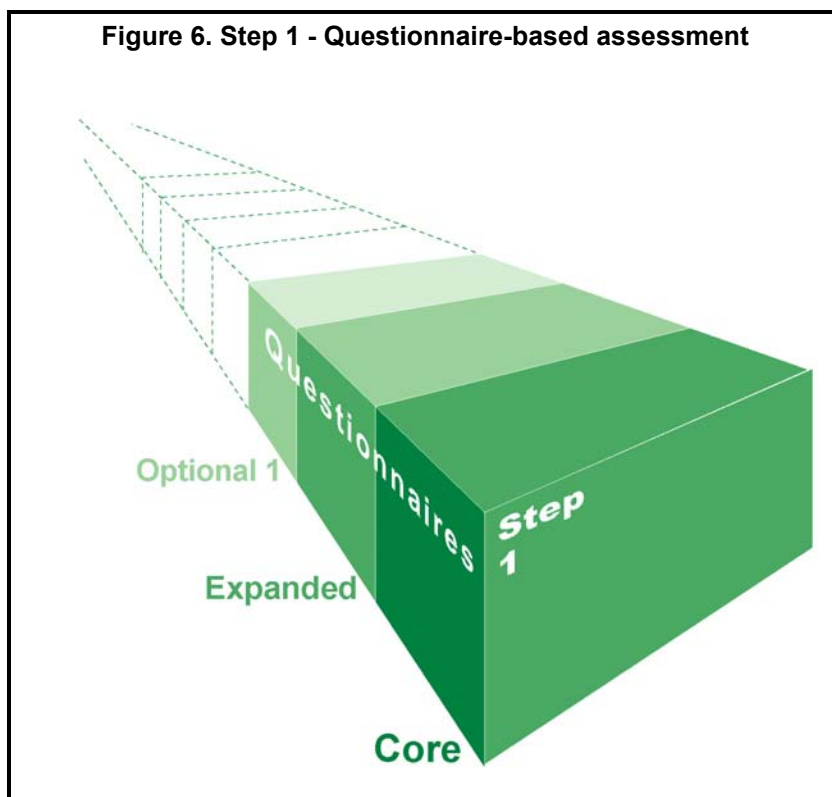
### 4.2 Step 1 – Questionnaire-based assessment

The STEPS approach has three levels and within each level, risk factor assessment is divided into core, expanded core and optional modules.

Step 1 contains as the core or “minimum set”, self-report measures that all countries should obtain (Figure 6 and Table 7). In addition to socio-economic data, data on tobacco and alcohol use, some measure of nutritional status and physical inactivity are included as markers of current and future health status. Standard WHO definitions for measuring the prevalence of tobacco use (31) and alcohol consumption (6) and internationally derived measures of physical activity are recommended (32). The information can be used not only for within-country trends, but also for between-country comparisons where it will form the basis of the WHO Global NCD Infobase. The questionnaires used in the core data set are simple and few in number and are not intended to give a complete picture of each behaviour but rather to provide information on the population distribution of risk.

Expansion of the basic core questions is possible in settings where resources and local surveillance needs allow a more comprehensive assessment of these key risk factors. For both, core and expanded

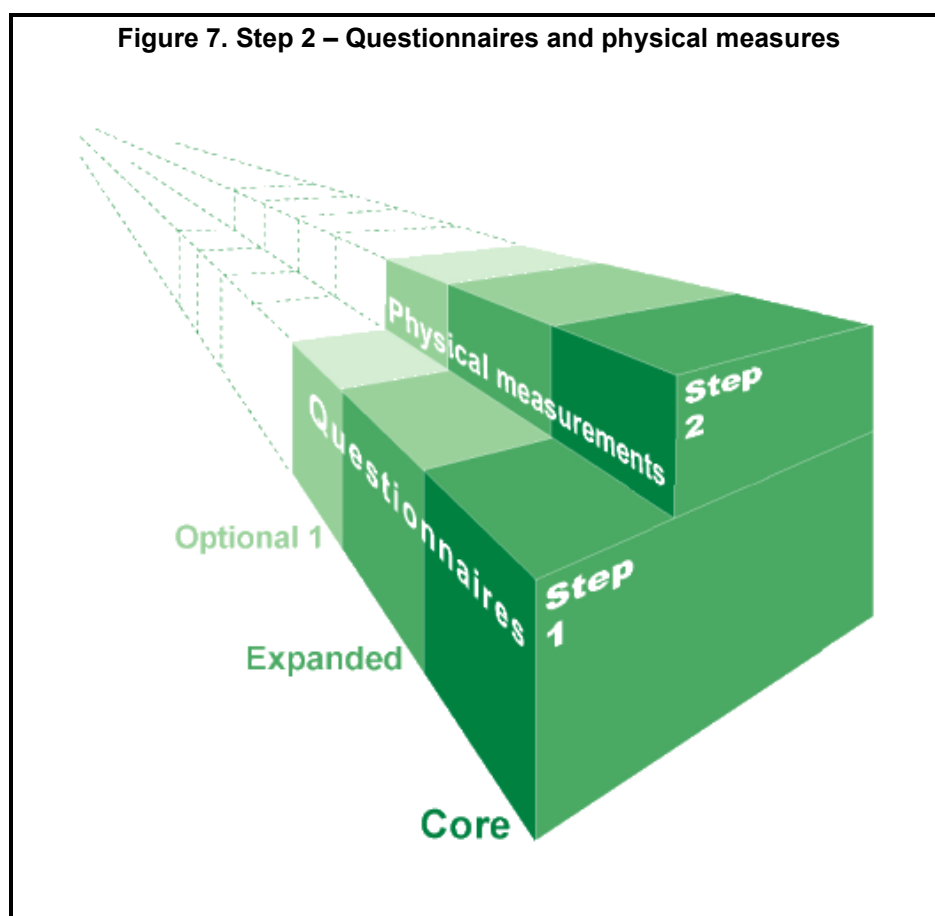
core assessment, STEPS Instruments for manual data entry (or Teleform if preferred) are provided; the question by question guidelines are provided in the STEPS Field Manual.



The development of optional modules covering additional NCD risk factors of (local) interest is discussed in Section 3.4 but is not included in the remainder of this document.

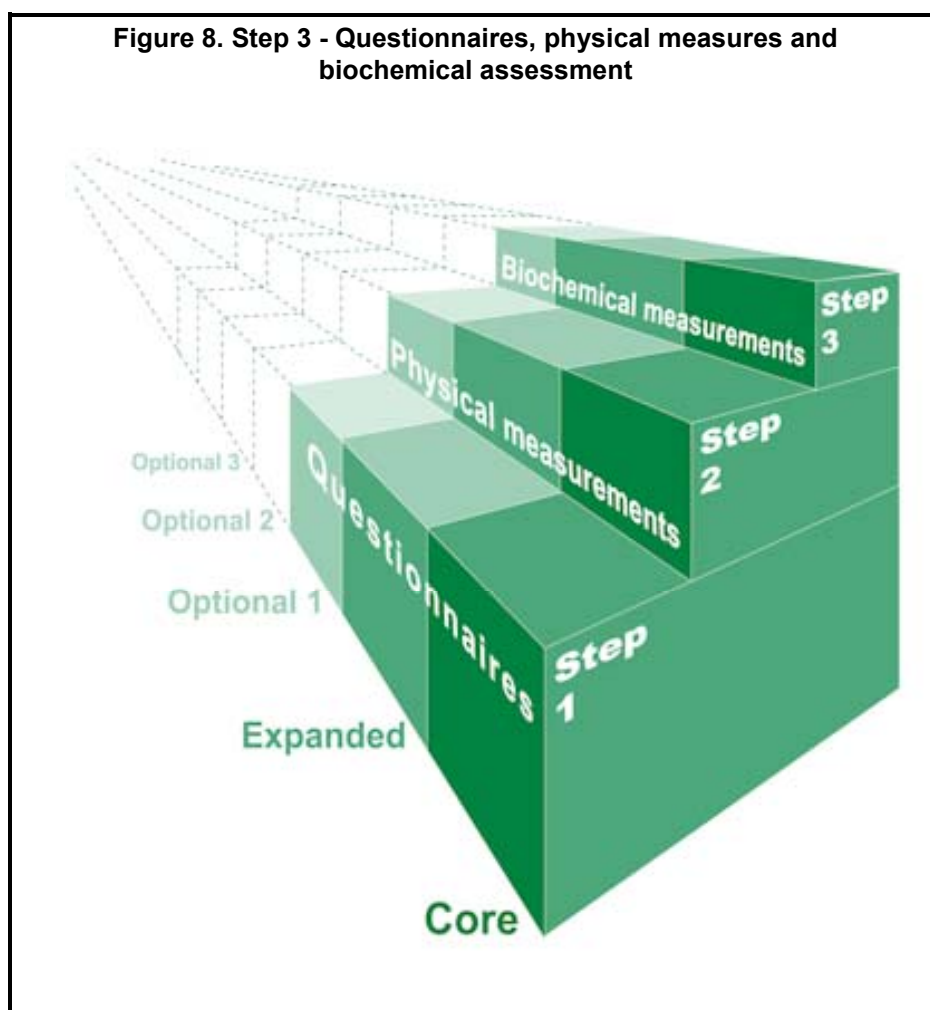
### 4.3 Step 2 – Questionnaires and physical measures

Step 2 adds to Step 1 by the inclusion of simple physical measurements, such as blood pressure, height, weight and waist circumference (Figure 7 and Table 7). Because physical measures are involved, Step 2 requires a direct physical contact with the participant. Step 1 and Step 2 are desirable and appropriate for most developing countries.



#### 4.4 Step 3 – Questionnaires, physical measures and biochemical assessment

Step 3 incorporates all Steps 1 and 2 and adds biochemical measures (Figure 8 and Table 7). All of the core items from Steps 1 and 2 can be readily assessed; inclusion of the expanded items adds little extra complexity. However, additional information at Step 3 is of a biochemical nature and requires access to the appropriate standardised laboratories. As the collection and analysis of blood samples is a relatively complex process, it is only feasible in the context of a comprehensive survey and in settings where appropriate resources are available; it is estimated that the addition of Step 3 increases the cost as well as the complexity of data collection.



<b>Table 7. WHO STEPS: Modular listing of information obtained at each Step</b>			
	<b>Core</b>	<b>Expanded</b>	<b>Optional (examples)</b>
<b>Risk factors at Step 1</b>			
<b>Demography</b>	Age (25-64; 10 year groups), sex, education (years), urban/rural	15-24 and/or 65-74 years, ethnicity, highest level of education, occupation, household income	75-84 years, household size, Marital status, household amenities;
<b>Tobacco</b>	% current daily smokers (+frequency, duration); mean age starting	Amount, time since quitting, type of tobacco consumed; % ex-smokers (daily)	Passive exposure to smoke, attempts to quit, beliefs, knowledge, attitude, behaviour (KAB)
<b>Alcohol</b>	% who consume alcohol currently and in past	Quantity: average volume; At risk levels of drinking	Problem drinking, knowledge & attitudes
<b>Nutrition</b>	% who eat high/low serving of fruit/vegetable	Dietary patterns, most frequent type of oil used for cooking	Food frequency questionnaire
<b>Physical inactivity</b>	% of inactive adults; median level of activity Total minutes of activity Mean minutes of sitting		
<b>Other</b>			Other risk factors (self-report), disability, mental health, perceived health, dental health, seat belt use, stress, violence
<b>Risk factors in Step 2</b>			
<b>Obesity</b>	[M] Height, weight, waist	[M] Hip circumference	[Q] hx of weight loss, of max weight; [M] Bioimpedance
<b>Blood pressure</b>	[M] Systolic and diastolic blood pressure	[Q] % on treatment for raised blood pressure (diet, drugs)	[Q] % aware of blood pressure measurement, heart disease, stroke; compliance, [M] heart rate, family hx cardio-vascular disease
<b>Pulse rate</b>		[M] mean pulse rate	
<b>Risk factors in Step 3</b>			
<b>Diabetes</b>	[B] Fasting blood glucose	[Q] on treatment for diabetes (diet, drugs, insulin)	[Q] Family hx diabetes [B] Oral glucose tolerance test
<b>Blood lipids</b>	[B] Blood cholesterol	[B] Triglycerides [B] HDL Cholesterol [B] LDL Cholesterol	[Q] hx of cholesterol awareness, hx of treatment (diet, drugs)
<b>Tobacco</b>			[B] Carbon monoxide [B] Serum cotinine
<b>Alcohol</b>			[B] Serum gamma GT

KEY:

[Q] Questionnaire based information, either self-  
or interviewer administered

[M] Physical measurement

[B] Biochemical measurement

hx history

## 5. Key issues in planning surveillance

### 5.1 The target population

The risk factors and determinants chosen for population surveillance in the present framework are primarily related to habits that are potentially amenable to intervention.

Several aspects should be taken into account when considering risk factor surveillance. Chronic disease generally occurs following prolonged exposure, usually of several years if not decades, to certain behaviours. For this reason, surveillance of risk factors is generally recommended in the population aged 25 to 64 years. In countries with high life expectancies, such as most developed countries, extension of the age range of the target population to 74 years would be appropriate. As a standard, 10-year age groups (25-34, 35-44, 45-54, 55-64) are recommended. Monitoring the current levels for risk factors at both older ages (65-74 or 75-84 years) as well as younger ages (15-25 years) presents additional challenges with respect to recruitment and response fractions.

Surveillance of the entire target population is neither feasible nor desirable. Surveys in random samples of the target population provide the most cost-effective method for risk factor surveillance needs. Provided the appropriate sampling method is used, the results of the survey can be extrapolated to provide estimates for the entire target population.

### 5.2 Health indicators

#### *Definition*

Health Indicators for populations are summary measures of the health of individuals and if related to some aspect of a health system, they are measures of the status of its performance, or outcomes. As such the definition and selection of health indicators is closely linked with their intended use as markers of performance.

#### *Use of Health Indicators*

Health indicators have the potential to increase the impact of public health programmes by establishing a small number of key health areas that can be brought to the attention of policy makers. They can motivate actions to promote positive changes in these areas, and provide ongoing feedback about progress toward achieving the desired changes. Such a set of health indicators can focus national attention on a limited number of measures that have relevance to, and can be acted upon by, the general public, public and private policy makers, and health and science professionals.

As health interventions will differ regionally and nationally, the most appropriate health indicators chosen will be specific to the setting. Therefore, universally accepted health indicators are few and often do not meet the specific purpose. Nevertheless, definitions and methods of data assessment can be standardized on a global level together with recommendations on how to derive appropriate health indicators from the data.

Health indicators have a focus on either primary, secondary, and tertiary prevention issues or environmental and socio-cultural determinants of health, with the goal of eliminating health disparities and improving the number and quality of years of healthy life. They are characterised by an ability to promote positive changes in behaviours by encouraging and supporting the general public and policy makers to develop interventions that will result in significant and sustained changes in the status of that indicator (Table 8). Selected health indicators should have a level of credibility with support from

individuals, groups, organizations, health professionals, and others involved in the delivery of health care, education and services to the general population.

**Table 8. Examples of health indicators and their associated health conditions, risk factors and data variables**

Key Risk Factor	Data Variable	Indicator	Condition
Tobacco Use	Daily smoker	Proportion adults smoking cigarettes daily	Cancer, cardiovascular disease
Alcohol	Max. number of drinks	Proportion adults engaging in binge drinking	Alcohol related injuries, morbidity
Physical Inactivity	Duration of activity	Proportion adults meeting recommended level of activity (eg 150 minutes/week)	Cardiovascular disease, cancer, diabetes
Diet	Number of servings of fruit and vegetable	Proportion adults eating less than 5 servings a day	Cancer, obesity, cardiovascular disease
Excess Body Fat	BMI,	Proportion adults overweight	Obesity, Cardiovascular disease, diabetes
Blood pressure	SBP, DBP	Proportion of persons with high blood pressure	Hypertension, stroke
Blood lipids	Serum cholesterol	Proportion of persons with hypercholesteraemia	Cardiovascular Disease
Blood glucose	Blood glucose	Proportion of persons with diabetes	Diabetes

### **Criteria for selection of health indicators**

Health indicators reflect the major public health concerns of a population. They are chosen based on their ability to motivate action, by use of data to measure progress, to describe individual behaviours, physical and social environmental factors, and important health system issues that affect the health of individuals and communities. Each indicator is associated with education and the level of income.

The process of selecting health indicators is a collaborative effort often undertaken by individuals and organizations at national and regional meetings using current scientific evidence. Focus groups are sometimes used to ensure that the indicators are meaningful to the public.

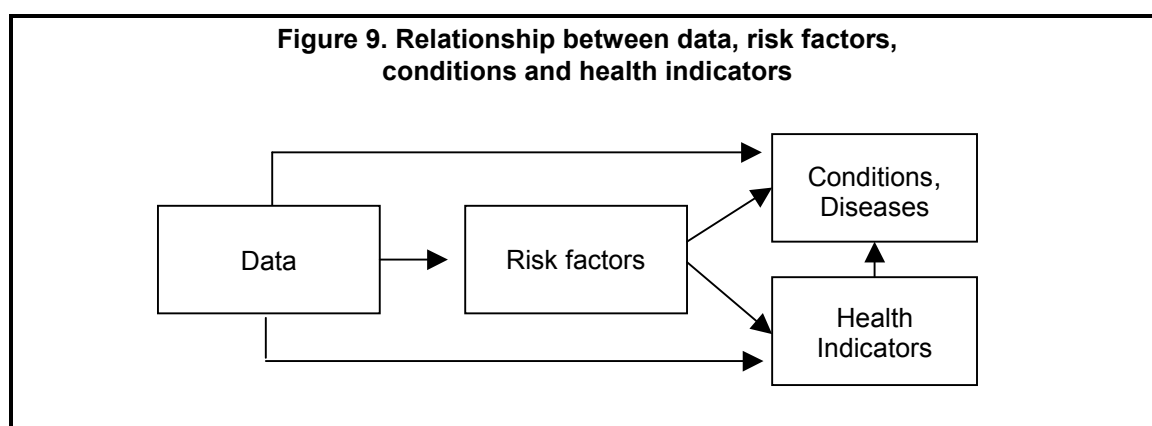
Health indicators are intended to help everyone more easily understand the importance of health promotion and disease prevention activities and to encourage community-wide participation in improving health. Developing strategies and action plans to address one or more of these indicators can have a profound effect on increasing the quality of life and the years of healthy life.

For selecting suitable health indicators, a set of criteria can be recommended:

Criteria guiding selection of health indicators include the following (39):

- *Worth measuring* - the indicators are important to the public's health;
- *Can be measured for diverse populations* - the indicators are valid and reliable for the general population and diverse population groups;
- *Understood by decision makers* – indicators should be readily understood;
- *Information will galvanise action* - action can be taken at the national, state, local and community levels by individuals, organized groups and public and private agencies, and linked to objectives of public health programmes;
- *Actions that can lead to improvement are known and feasible* - there are proven actions (for example, personal behaviours, implementation of new policies, etc.) that can alter the course of the indicators when widely applied; and
- *Measurement over time will reflect results of action* - if action is taken, tangible improvements in various aspects of the nation's health can be detected.

Figure 9 illustrates the flow from collecting and measuring different types of data in order to gain information on risk factors. Data on risk factors can then be used for providing information to predict diseases and conditions. In addition they can be used to derive health indicators relevant to a particular setting.



### 5.3 Population means as statistical measures

The optimal statistical indicator for a given risk factor varies with the nature of the risk factor and how it is measured. With smoking, for example, the population fits into one of three, mutually exclusive categories for smoking (current smoker, ex-smoker and never smoker). The key indicator for such a categorical variable is the prevalence, the proportion of the population that is in a given category at a given point in time. Judging whether prevalence changes or whether differences are statistically significant must take into account the level of statistical uncertainty surrounding each measurement and this is to a large extent related to the size of the sample on which it is based. Large samples yield more precise estimates of the true population mean and will allow smaller differences or trends to be detected. From the perspective of the health of the whole population, measures of central tendency and dispersion provide important information. The proportion of the population exceeding any given level of a continuous variable is directly related to the average level and the spread of the distribution in that population. For surveillance purposes, average blood pressure is therefore as important as knowledge of the prevalence of blood pressure above or below certain threshold values. The importance of monitoring average blood pressure illustrates the added benefits over the knowledge of the prevalence of hypertension. For example, a 2% decline in the average population level of blood pressure will have a substantial impact in reducing both heart disease and stroke. It has been calculated that almost 1



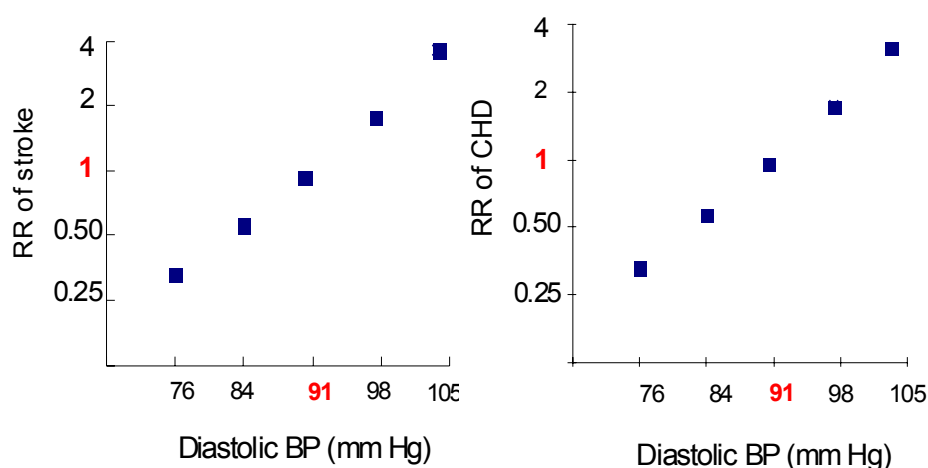
million stroke deaths could be prevented in the Eastern Asian Region annually with a 2% decline (3mmHg) in systolic blood pressure (33).

The threshold of ‘high risk’ blood pressure is somewhat arbitrary. Moreover, this judgement is subject to change as new evidence linking the level of a risk factor and the risk of disease comes to hand. For many years, ‘hypertension’ was defined as either or both a systolic blood pressure (SBP) of 160 mm Hg or more and a diastolic blood pressure (DBP) of 95 mm Hg or more (34). Faced with mounting evidence that even lower levels of blood pressure are associated with important levels of risk, particularly of stroke (Figure 8), these criteria have recently been revised downwards to 140 mm Hg and 90 mmHg, respectively (35). A theoretical minimum was set at SBP >115 mmHg for the calculation of attributable risk in the World Health Report 2002 (118) in recognition that all people with levels above this minimum are at an increased risk.

These different levels of risk inevitably complicate comparisons of reports written at different points in time or by groups using different definitions of ‘hypertension’. By contrast, average SBP and are measured, and assuming standard protocols are used.

With the exception of alcohol, for all of the continuous variables listed the risk of the corresponding NCDs increases in a continuous and graded fashion across the whole distribution of objective measurements. This is in direct contrast to usual clinical thinking that if an individual is not at ‘high risk’, he or she is at *no* risk. Intake of alcohol shows a U-shaped relationship with cardiovascular risk and, indeed, with mortality from all causes (36). Lowest risk is observed not in people who abstain from drinking alcohol, but in middle aged and older individuals who consume 10-20 g of alcohol daily.

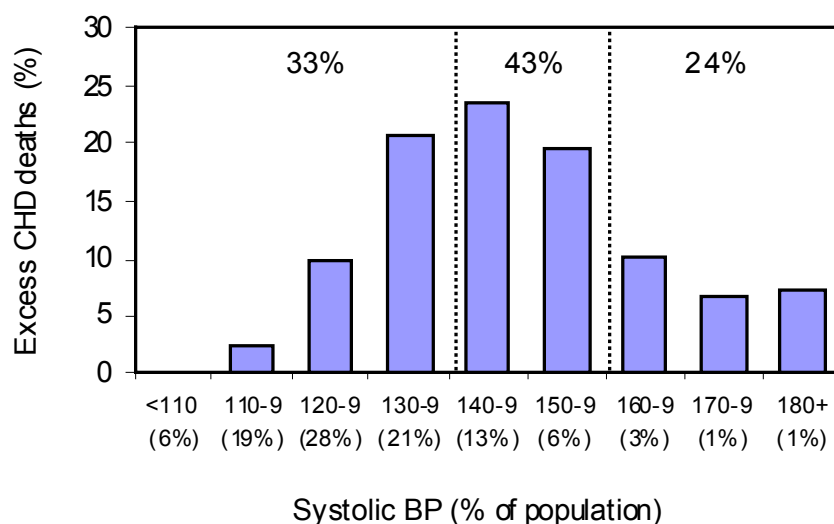
**Figure 10. Relationship of blood pressure to risk of stroke and coronary heart disease (37).**



An important consequence of the continuous relationship between the level of a risk factor and the level of risk is that most events occur in people with ‘average’ or close to ‘average’ levels of the risk factor because, numerically, they constitute the largest sector of the population (Figure 11). Such individuals sit within the range that clinicians would regard as ‘normal’ or ‘borderline’ and therefore not requiring intervention (38).

Members of the much smaller group at the high end of the distribution unquestionably have a high risk of developing the relevant NCDs but, in aggregate, their contribution to the burden of disease borne by the population is limited by their small numbers (Figure 12). Correspondingly, even an intervention that was completely successful in reducing the risk in this group can only have a limited impact on the population-wide experience of disease. Of course, the size of the high risk group depends greatly on how it is defined and targeted.

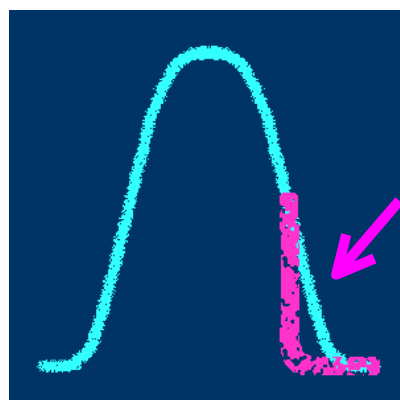
**Figure 11. Excess risk of CHD due to various levels of blood pressure**



From a public health perspective, it is important to recognise that a high risk approach can make a difference to the whole population only when the high risk group is large, but in such a case it is still probable that a population-wide approach will be the most cost-effective. The key aim is to increase the proportion of the population at low risk of an event.

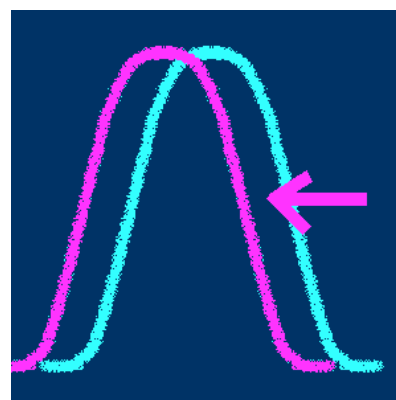
In terms of preventing disease, more will be achieved by moving the whole population distribution of the risk factor downward by a small degree than by concentrating exclusively on those at high risk (Figure 12).

**Figure 12. High Risk and Population Approaches to Prevention**



**Truncate high risk end of exposure distribution (e.g. organize an obesity clinic).**

**Clinical approach to disease prevention.**



**Reduce a small amount of risk in a large number of people (e.g. reduce fat a little in fast food outlets).**

**Lifestyle change plus environmental approach.**

Successful achievement of this goal will reduce the proportion of those exceeding any given level used to define 'high risk' (Figure 12). Both of these consequences reinforce the appeal of primary preventive strategies directed towards whole populations.

In summary, with the exception of tobacco use and alcohol consumption for which the key indicators are proportions of individuals at a specific risk level in the population, the most important risk factors are best summarized by statistical measures of central tendency and dispersion.

#### **5.4 Quality control**

To be able to trust surveillance results, it is crucial that surveillance systems include quality control measures for all key surveillance functions. These functions include;

- ensuring that common questions are used by all participating locations
- standard data collection procedures are adhered to so that results will be valid
- data are analysed consistently across all participating locations.

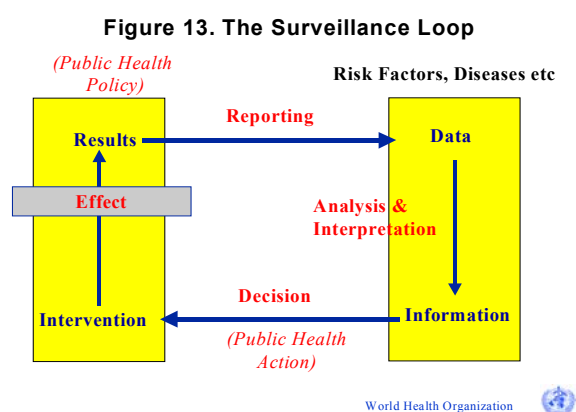
Participation in a global or regional network such as WHO STEPS, which includes guidelines and training materials, will enhance standardized data collection.

#### **5.5 Surveillance infrastructure**

The design of surveillance systems requires ongoing commitment and resources including personnel and technology for communication and data use. Efficiencies are gained by building infrastructure for

surveillance, rather than conducting a series of repeat surveys, in which new staff and new administrative and procedural guidelines must be developed.

As the team begins planning to conduct surveillance across more locations and on a more ongoing basis, a central or lead agency should be identified to co-ordinate the surveillance activities and ensure quality control to ensure that data collected is used for public health action and interventions influenced by health policy. Using a partnership approach that includes receiving input from all participating agencies and locations to help develop, maintain, and expand the surveillance system, will result in a participatory system. These participants, whether at national or local level, will share ownership of the system and the surveillance information produced.



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## 6. Implementation of WHO STEPS

### 6.1 Introduction

The overall goal of the WHO STEPS approach is to develop sustainable infrastructure for NCD surveillance in countries. Improved NCD surveillance will ultimately be reflected in more effective health policy. The WHO STEPS approach represents the WHO recommended NCD surveillance tool.

Strategic alliances are necessary at the global, regional and national levels to implement the WHO STEPS strategy effectively. The WHO STEPS programme is co-ordinated by the Director of Surveillance in the Noncommunicable Diseases and Mental Health Cluster, in close collaboration with the WHO Regional Offices. Strategic alliances at the national and regional level are fostered and encouraged by participation in the STEPS network.

Each Regional Office co-ordinates and establishes a Regional Co-ordinating Committee to oversee the implementation of an ongoing surveillance system in the Region. The WHO STEPS has been adopted in four of the WHO Regions as a regional standard tool for NCD Surveillance to implement and simplify information collected in order to assess trends in risks factors and NCDs.

Each country participating in STEPS will likewise establish a National Interagency Co-ordinating Committee for Surveillance (NICCS) or equivalent to oversee implementation within that country. The roles and responsibilities of each group are provided in detail in the *STEPS Strategic Implementation Plan*.

### 6.2 General Management Structure for STEPS network

#### 6.2.1 WHO HQ

WHO HQ provides the global coordination for implementation of STEPS across the Regions. WHO HQ, in conjunction with the WHO Regional Office also provides training, advice, and access to technical support for all aspects of STEPS planning, implementation, analysis, and dissemination of data. The WHO/HQ Steps Project Coordinator communicates directly with the Regional STEPS focal point.

#### 6.2.2 WHO Regional Office

The main work of the WHO Regional Office is

- to co-ordinate the implementation of STEPS across each region,
- to support countries with the implementation of STEPS,
- to co-ordinate technical support to countries, and
- to co-ordinate government and agency activities at the international and regional levels.

In order to provide overall guidance to the planning and implementation of STEPS across each region, the NCD Regional Adviser selects countries that are ready to implement STEPS and delivers

and funds STEPS training workshops to those countries. In some regions a WHO Collaborating Centre or a STEPS Technical Support Centre may be also available to provide input into the planning and implementation of a STEPS survey. Further, the NCD Regional Adviser is responsible for establishing partnerships to ensure the long term goal of ongoing surveillance in the Region and encourage long term planning. The Regional Office also developed the Regional Surveillance Strategy which SEARO has undertaken.

### **6.2.2 Member States**

Each country implementing STEPS convenes a group or a planning committee (or equivalent) which will work as the STEPS National Interagency Co-ordinating Committee for Surveillance (NICCS). In many cases, such a committee will already be in existence (e.g. The NCD Task Force).

This Committee has the following functions:

- to oversee the practical and logistic issues relating to the overall implementation of the STEPwise approach to NCD risk factor surveillance (STEPS)
- to assist in translating the data into policy and programmes
- to ensure the long term sustainability of STEPS surveillance
- to look for opportunities to form partnerships with other agencies to enhance the capacity for ongoing NCD risk factor within a country.

The work of the national committee is therefore vital to the planning, implementation, and long-term sustainability of STEPS.

The following schema summarizes roles and responsibilities as well as lines of communications between the various STEPS bodies. The actual roles may shift between boxes dependent on capacity within each region-country.

**Figure 13. Co-ordination of NCD Surveillance Activities Summary Schema**

The regional focal points are the key players in STEPS implementation in each of the regions carrying out STEPS. They are the primary links with the WHO/HQ.

### 6.3 Participation as a WHO STEPS Surveillance Site

Because of its modular concept, the WHO STEPS approach has the potential to be implemented by a wide range of institutions across all countries. Such institutions typically include universities, medical schools, research institutes, public health authorities, and others. Institutions can participate in the STEPS approach to NCD surveillance if they have:

- Recognised epidemiological experience and/or experience in the conduct of population-based surveys;
- Support, or assistance of an institution that has this experience; and a
- Commitment to NCD surveillance.

The *STEPS Planning and Implementation Manual* proves a 'how to guide' for the planning and implementation of a STEPS survey. The manual also provides the minimum criteria which a country must meet to gain Regional and HQ approval for inclusion as a STEPS surveillance site. The manual should be used as a guide to prepare and implement a STEPS survey as one component of an ongoing NCD risk factor surveillance system.

The WHO STEPS approach to surveillance aims to ensure that the STEPS implementation at the country level, is strategic, co-ordinated, builds capacity and is sustainable. The first contact for any institution interested in participating in the WHO STEPS would be the WHO Representative in their country who are in contact with the regional NCD advisers in the relevant WHO Regional Offices.

WHO can assist countries to develop a national STEPS surveillance network in association with the relevant Ministries of Health in order to encourage sustainable data collection, analyses and use.

Stakeholders are equally encouraged to participate in the STEPS network, even if they do not intend to be explicitly responsible for the implementation of WHO STEPS. Their contribution for further development of any aspect of STEPS is valued.

### ***Participation in a regional WHO STEPS training workshop***

All interested centres or institutions will be encouraged to participate in a WHO STEPS planning training workshop. The training workshop will provide an overview of the emerging NCD epidemics, the rationale for the NCD risk factor surveillance, and the STEPS framework, as well as practical training in planning, implementation, and reporting of STEPS surveys (see Annex 2).

### ***Survey implementation at the country level***

Following participation in a regional WHO STEPS training workshop, implementation of the STEPS survey (s) will be encouraged and supported. WHO will help participants to publish their major results as an official report or a peer-reviewed scientific publication. The STEPS publication policy (see below) will assist in standardising these reports.

#### ***WHO STEPS publication policy***

The goal of the STEPS publication policy is to ensure that results from STEPS surveillance efforts are made available to those who need to know. The specific objective of the STEPS publication policy is to encourage publications of STEPS results in all forms, while ensuring that the information is provided as complete as possible.

A copy of the final publication should be submitted to the WHO STEPS team for inclusion into the WHO Global NCD Infobase in which core aggregate data will be published on an ongoing basis. The results and experience gained from STEPS implementation will also be shared with other programmes that are implementing or further developing the STEPS methodology.

### ***Standards for contributing selected core results to the WHO Global NCD Infobase***

The WHO Global NCD Infobase is a NCD risk factor database with country specific information created by the Surveillance Department of the WHO Noncommunicable Diseases and Mental Health Cluster. Its purpose is to make available all existing Global NCD surveillance information on one Internet site.

## **6.4 Conclusion**

WHO is recommending, for the first time, that countries implement NCD surveillance by initially focussing on a few major risk factors that predict the main noncommunicable diseases. This document outlines a strategy for establishing a Global NCD Surveillance System within the context of the Global Forum for NCD Prevention and Control. Surveillance represents the first step towards an integrated approach to noncommunicable disease control and prevention.

Further information can be obtained at:

<http://www5.who.int/noncommunicable-diseases/main.cfm?p=0000000769>



We encourage constructive criticism of this approach and ask participants to send comments and suggestions for improvement of this methodology. We are particularly interested in hearing from researchers from developing countries who may have insight into surveillance from a low resource setting.

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## Annex 1: List of NCD surveillance documents consulted

Only measurement methodologies that have been designed for use in more than one country and which have involved relatively broad international input are listed as primary documents consulted in the preparation of WHO STEPwise approach to Surveillance of NCD Risk Factors. Some individual country protocols from Africa have been included; with the exception of the INDEPTH network methodology, which was not designed principally for NCD data collection, there are no internationally developed protocols specifically for Africa.

### 1. From European Sources

*CINDI* - Countrywide Integrated Non-communicable Disease Intervention

This data collection was established to support the planning and evaluation of health promotion interventions. It includes 28 countries in Europe and 3 centres in Canada. The main emphasis is on process measures to evaluate interventions although part of the data collection process also involves health status and risk factors for NCD. Involves both physical and questionnaire measures.

*EHRM* -European Health Risk Monitoring Project

<http://www.ktl.fi/ehrm>

*FINBALT* - Health and risk factor monitoring using CINDI materials

*INDEPTH* - International Field Laboratory Network

Surveillance system established with Swedish support in a number of developing countries. To date principally involves questionnaire data but has capacity to augment this with physical measures.

*Health, Alcohol and Psychosocial Factors in Eastern Europe*

UK National Health Survey

<http://www.official-documents.co.uk/document/doh/survey98/hse-03.htm>

### 2. From North and South America

*Behavioral Risk Factor Surveillance System.* ([www.cdc.gov](http://www.cdc.gov))

Telephone-based sampling and interviews. Based on self-report data from questionnaires. Includes short inter sample intervals and has the advantage of having been conducted in essentially the same way since 1984. All US States now participating.

*CARMEN* - The Americas equivalent of CINDI.

*Tobacco or Health Data Base*

*Networking for the Surveillance of Risk Factors in NCD in Latin America and the Caribbean* (SURFNET) – a PAHO initiative

### **3. Eastern Mediterranean**

*Population Survey for Cardiovascular Disease Risk Factors in the Eastern Mediterranean Region, 1995* – based on the protocols and methods of the WHO MONICA Project

### **4. Africa**

*South Africa Demographic and Health Survey*. The 2001 final report is now available.

*Questionnaire for the Study of Physical Activity in Cameroon*

### **5. Asia**

*CVD Research Initiative in the Developing Countries and Consultation on Research Initiative for CVD Control in Developing Countries (Capetown, South Africa 1999)*

*Indian Industrial Surveillance System - Integrated Disease Surveillance*

### **6. World Health Organization**

*Diabetes and NCD Risk Factor Survey – a Field Guide (WHO, 1999)*

*Guidelines for Controlling and Monitoring the Tobacco Epidemic (1998)*

*Global International Physical Activity Questionnaire (GPAQ)*

*Global Youth Tobacco Survey*

*Guide to Drug Use Epidemiology (WHO, 2000)*

*International Guide for Monitoring Alcohol Consumption and Related Harm (WHO, 2000)*

*International Physical Activity Questionnaire (IPAQ): <http://www.ipaq.ki.se/>*

*Mega Country Health Promotion Network*

The development of this initiative has had significant CDC input and is based on the BRFSS. The surveillance guidelines at this point identify risk factor indicators rather than an explicit description of specific questions or measures.

*Obesity – Preventing and Managing the Global Epidemic (1997)*

*The WHO MONICA Project <http://www.ktl.fi/monica/>*

*WHO Consultation on Future Strategies for the Prevention and Control of NCDs*

*WHO Recommended Surveillance Standards for communicable disease (1999)*

*WHO Recommended Surveillance Standards for Selected NCDs*

*World Health Survey*