

**Noncommunicable Diseases:**  
How to act now to reverse the  
curve tomorrow?

February 2017

# 1. Background on Noncommunicable Diseases

Noncommunicable Diseases (NCDs) are the world’s largest killers, with an estimated 38 million deaths annually representing 68 percent of all deaths worldwide [1]. Primarily heart and lung diseases, cancers, and diabetes, noncommunicable diseases are diseases of long duration and generally slow progression that lead to premature deaths. It is estimated that 44 percent of all deaths caused by NCDs are people under 70 years of age [2].

For a long time, NCDs were considered a problem limited mostly to high income countries, while infectious diseases seemed to affect low income countries where most of the world’s population lives. This is no longer the case. Today, 80 percent of chronic disease deaths occur in low and middle income countries where people tend to develop diseases at younger ages, suffer longer—often with—and die sooner than those in high income countries. Figure 1 below illustrates the distribution of the number of deaths by major cause and by income group [3].

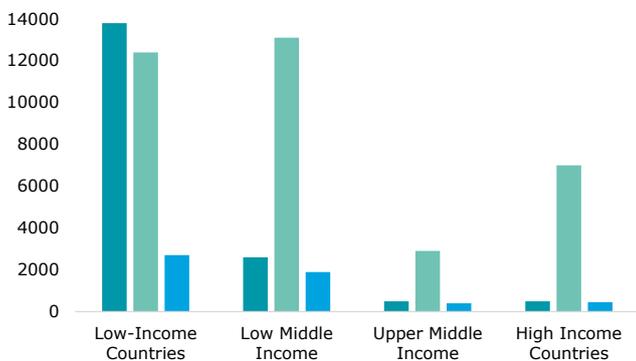


Figure 1: Projected deaths by major cause and World Bank income group, all ages, 2005

■ Communicable Diseases, maternal and perinatal conditions, and nutritional deficiencies  
 ■ Chronic diseases include cardiovascular diseases, cancers, chronic respiratory disorders, diabetes, neuropsychiatric and sense organ disorders, musculoskeletal and oral disorders, digestive diseases, genito-urinary diseases, congenital abnormalities, and skin diseases.  
 ■ Injuries

Facing NCDs is becoming a vital investment for the future, due to the expected increase of the number of people affected by NCDs over the next decades. This projection is the result of two major demographic trends. First, the worldwide population is increasing; UN projections indicate that there will be approximately 2 billion more people by 2050. At the same time, the population is getting older, and the share of those aged 60 and older is expected to grow very rapidly in the coming years (Figure 2). Since NCDs mainly affect this age group, the incidence of these diseases

can be expected to accelerate in the coming years, especially in the developing countries where the prevalence of the key risk factors is increasing due to globalization and urbanization [4].

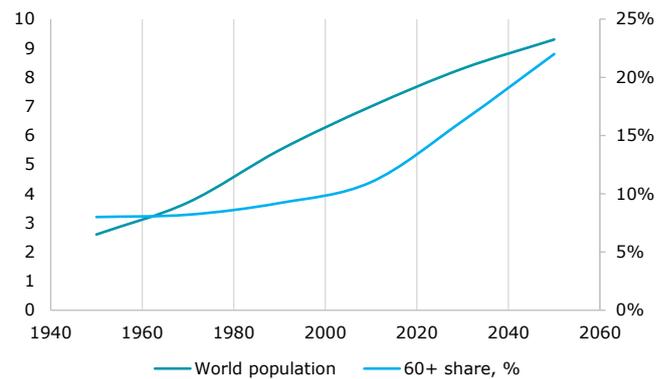


Figure 2: World population is growing and getting older

Recognizing the dominance of NCDs on a global scale, in 2011 the United Nations (UN) General Assembly adopted a political declaration on the prevention and control of noncommunicable diseases ([Resolution A/66/2](#)). This is the second public health issue to be the subject of a high-level General Assembly Meeting, ten years after the one focusing on HIV/AIDS in 2001. This text highlights the need to adopt a coordinated, multisector approach in order to reduce the impact of the common noncommunicable disease risk factors [5].

## How to define Noncommunicable Diseases?

Multiple terminologies are used to name this category of diseases. The term “noncommunicable diseases” is used to make the distinction from infectious or “communicable” diseases. However, several NCDs have an infectious component to their cause, such as cervical cancer and liver cancer. “Lifestyle-related” diseases is a term sometimes used to emphasize the contribution of behavior to the development of chronic diseases. In fact, these diseases are heavily influenced by environmental conditions. Also, the term “chronic diseases” can be preferred as it covers specific characteristics: the chronic disease epidemics take decades to become fully established and start at young ages; given their long duration, there is space for prevention; they require a long-term and systematic approach to treatment; and health services must integrate the response to these diseases with the response to acute diseases.

The High-Level General Assembly Meeting has identified five main diseases in NCD mortality and morbidity [6,7]:

**Cardiovascular disease (CVD)** refers to a class of disorders involving the heart, blood vessels, or a poor blood supply due to a diseased vascular supply. Over 82 percent of the CVD mortality burden is caused by ischemic or coronary heart disease, stroke (both hemorrhagic and ischemic), hypertensive heart disease, or congestive heart failure. Over the past decade, CVD has become the single largest cause of death worldwide, killing 17.5 million people in 2012, which is 3 in every 10 deaths. Of these, 7.4 million people died of ischemic heart disease and 6.7 million from stroke.

**Cancer** refers to a range of diseases in which abnormal cells proliferate and spread out of control. These cells outlive normal cells and have the ability to metastasize, or invade parts of the body and spread to other organs. There is a plethora of types of cancers, and different risk factors related to their development (environment, genetics, etc.). Cancer is the second largest cause of death worldwide with 8.2 million cancer-related deaths in 2012. According to the World Cancer Report published in 2014, it is expected that annual cancer cases will rise from 14 million in 2012 to 22 million within the next 2 decades.

**Chronic respiratory diseases** refer to chronic diseases of the airways and other structures of the lung. Some of the most common are asthma, chronic obstructive pulmonary disease (COPD), respiratory allergies, occupational lung diseases, and pulmonary hypertension. According to the latest World Health Organization (WHO) estimates, currently 235 million people have asthma, 64 million people have COPD, while millions have allergic rhinitis and other often-underdiagnosed chronic respiratory diseases. In particular, more than 3 million people died of COPD in 2012, which is equal to 6 percent of all deaths globally that year. More than 90 percent of COPD deaths occur in low- and middle-income countries. The primary cause of COPD is tobacco smoke (through tobacco use or second-hand smoke).

**Diabetes** is a metabolic disorder in which the body is unable to appropriately regulate the level of sugar, specifically glucose in the blood, either by poor sensitivity to the protein insulin, or due to inadequate production of insulin by the pancreas. Type 2 diabetes comprises the majority of people with diabetes around the world. In 2012, diabetes was the direct cause of 1.5 million deaths and high blood glucose was the cause of another 2.2 million deaths. It is a major risk factor for other causes of death and has a high attributable burden of disability.

**Mental illness** is a term that generally refers to some combination of abnormal thoughts, emotions, behavior, and relationships with others. Examples are depression, bipolar affective disorder, schizophrenia and other psychoses, dementia, intellectual disabilities, and developmental

disorders including autism. These conditions affect hundreds of millions of people worldwide. Depression is a common mental disorder and one of the main causes of disability worldwide. Globally, an estimated 350 million people are affected by depression, about 60 million people are affected by bipolar affective disorder, and 21 million people from schizophrenia.

This list is not comprehensive, and does not include some diseases that are responsible for significant costs and social disabilities such as rheumatoid arthritis, digestive diseases, or musculoskeletal diseases.

### What are the major NCDs risk factors?

The causes of NCDs are multiple and can be classified into two categories: **Inherent risk factors** are not modifiable and related to the individual or the environment. These risk factors include age, sex, racial/ethnic distribution, and genetic. Although they cannot be modified, they remain relevant indicators to design suitable prevention programs and determine their effectiveness. **Modifiable risk factors** are the primary targets of intervention, as they are related to features that individuals or societies can change with the aim to safeguard and improve their health. WHO typically refers to four key risk factors, which are poor diet, physical inactivity, tobacco use, and harmful alcohol use [8] (Figure 3).

These risk factors explain the vast majority of chronic disease deaths at all ages and in all parts of the world. Each year at least 4.9 million people die as a result of tobacco use, 2.6 million people die as a result of being overweight or obese, 4.4 million people die as a result of raised total cholesterol levels, and 7.1 million people die as a result of raised blood pressure [9]. Also, socioeconomic, cultural, political, and environmental determinants can influence the instruments and approaches to fight against NCDs.

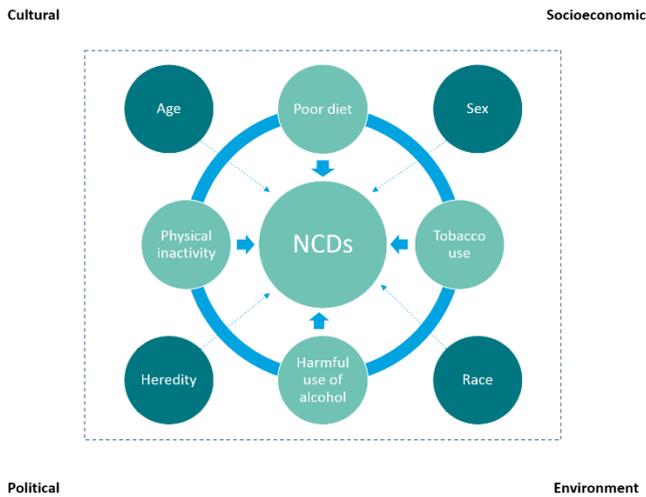


Figure 3: Major Noncommunicable Disease risk factors

**Poor diet:** Diets evolve over time because of factors such as changes in food availability, food prices, and level of income. In low and middle income countries, largely plant-based diets are being replaced by diets that are high in sugars and animal fats and low in starches, dietary fiber, fruits, and vegetables. On average, the amount of food consumed per person has increased by nearly 20 percent between the mid-1960s and late 1990s, reaching an estimated 2940 kcal per day in 2015. The increase has generally been even greater in developing countries. However, levels of consumption have remained nearly constant in sub-Saharan Africa and have fallen in countries in economic transition [10]. In particular, over the last decade, global sugar consumption has grown from about 130 to 178 million tons. Sugar is widely available and cheap, facilitating over-consumption. Excessive sugar consumption is one factor promoting overweight and obesity [11]. This nutrition transition, combined with a general trend toward a more sedentary lifestyle and a low level of physical activity at work and during leisure time is the main determinant of the obesity epidemic.

**Physical inactivity:** Modern life increasingly enables a sedentary lifestyle. Over recent decades, technological and engineering progress has successfully reduced the repetitive physical labor faced by most people at home and at their

workplace. Combined with a growing level of urbanization, people are becoming less active, increasing the prevalence for chronic disease like obesity and heart diseases. Globally, in 2010, 1 in 4 adults is not active enough (men 20 percent and women 27 percent). In high-income countries, 26 percent of men and 35 percent of women were insufficiently physically active, as compared to 12 percent of men and 24 percent of women in low-income countries. In particular, more than 80 percent of the world's adolescent population is insufficiently physically active according to WHO recommendations. NCD-related risk behaviors are commonly established in childhood and adolescence, therefore promoting a healthy diet and physical activity among these age groups is crucial, taking into account the statistics [12].

**Tobacco use:** WHO has estimated that tobacco use is currently responsible for the death of about six million people across the world each year, with many of these deaths occurring prematurely. This total includes about 600,000 people who are also estimated to die from the effects of second-hand smoke [13]. Nearly 80 percent of the more than 1 billion smokers worldwide live in low- and middle-income countries, where the burden of tobacco-related illness and death is heaviest. Over 1.3 billion people, or 18 percent of the world's population, are protected by comprehensive national smoke-free laws [14].

**Harmful use of alcohol:** Alcohol use in excessive quantity has been causally linked to many cancers and with many types of cardiovascular diseases. In 2012, about 3.3 million deaths, or 5.9 percent of all global deaths, were attributable to alcohol consumption. Alcohol consumption causes death and disability relatively early in life. Among 20-39 year-olds, approximately 25 percent of the total deaths are alcohol-attributable. Beyond health consequences, the harmful use of alcohol brings significant social and economic losses to individuals and society at large [15].

Social inequalities, poverty, and inequitable access to resources, including health care services due to financial constraints or a lack of proximity or availability of transport to clinical centers, increase the risks of developing a chronic disease. In particular, low income countries are more affected by these considerations, as health inequalities have been widening over the last decades.

## 2. Global socioeconomic burden of NCDs

National economies are reportedly suffering significant burden because of premature deaths or inability to work resulting mainly from cardiovascular diseases and mental health conditions. Tackling the major risk factors for NCDs will not only reduce the number of deaths worldwide, it will also hugely boost the economic development of countries.

Chronic diseases have direct and indirect impacts on national economies. They reduce the quantity and productivity of labor while increasing medical expenses and cutting savings and investments. Furthermore, the socioeconomic impact of chronic diseases can be split into the effect on income or earnings at the household level, and the effect on national income or gross domestic product (GDP) at the national level (Figure 4).

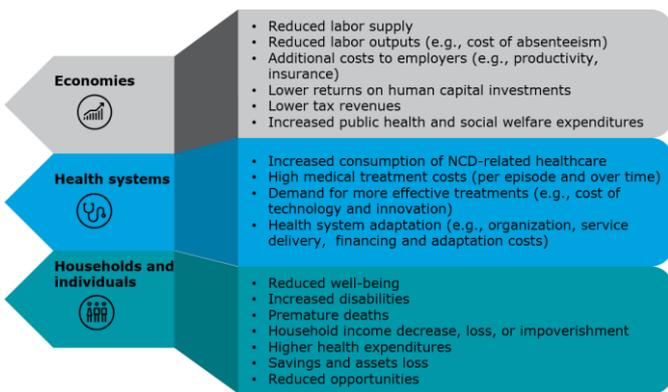


Figure 4: Identified costs of NCDs to Economies, National Health systems, and Households (Sources: World Bank analysis in “Chronic Emergency: Why NCDs Matter.” Health, Nutrition, and Population Discussion Paper. 2011. Washington DC: World Bank)

The potential cost of NCDs to economies, health systems, households, and individuals in middle- and lower-income countries is high. NCDs are affecting populations at younger ages, resulting in longer periods of ill-health, premature deaths, and greater loss of productivity that is so vital for development. The high income countries are not spared from the negative impacts of noncommunicable diseases. NCDs represent, indeed, the largest component of the disease burden in Europe, comprising about 85 percent.

### Impact on economies

Because of their specific characteristics and as they mainly affect adults—often in their working years—NCDs require costly long term treatment and care, and often are accompanied by some degree of disability. Therefore, they could potentially have a larger socio-economic impact than

other health conditions. Increased NCDs levels can reduce labor supply and outputs, increase costs to employers (absenteeism and higher health care coverage costs), lower returns on human capital investments, reduce domestic consumption, and lower tax revenues, as well as increase public health and social welfare expenditures. Several studies have quantified this impact. In 2005, the estimated losses in national income from heart disease, stroke, and diabetes (reported in international dollars to account for differences in purchasing power between countries) are 18 billion dollars in China, 11 billion dollars in the Russian Federation, 9 billion dollars in India, and 3 billion dollars in Brazil. Similarly, the losses for the United Kingdom, Pakistan, Canada, Nigeria, and Tanzania are 1.6 billion, 1.2 billion, 0.5 billion, 0.4 billion, and 0.1 billion international dollars, respectively [16]. For another example, in Egypt, a recent World Bank study found the country’s aggregate labor supply to be some 19 percent below its potential, caused by lost employment and reduced numbers of hours worked by people reportedly suffering from NCDs; this implied an overall production loss of approximately 12 percent of the country’s GDP [17]. These losses can be translated into percentage reductions in GDP by comparing what would have happened to GDP in the absence of chronic diseases with what happens in their presence. For instance, in China, reducing cardiovascular mortality by one percent per year over a 30 year period could generate an economic value equivalent to 68 percent of the country’s real GDP in 2010—more than US\$10.7 trillion at purchasing power parity. A recent study has illustrated the economic impact of NCDs in India by estimating that if NCDs were “eliminated,” the country’s 2004 GDP would have been 4 to 10 percent greater [18].

### Impact on healthcare systems

The rise of NCDs will also dramatically affect the health systems. As the prevalence of NCDs increase, there will be a higher demand for NCD-related health care, which will create increasing pressure for health expenditures and additional health financing challenges. NCDs are generally more expensive to treat and require patients to have multiple interactions with health systems (as different NCDs can be correlated) over a longer period of time. The demand for more effective treatments is likely to rise. These trends highlight the need for health systems in many countries to undergo significant adaptation (related to service delivery, organization, skills, equipment, and financing models) in order to effectively address NCDs in both care and financial aspects. Health systems in many lower-income countries will face a particular challenge, as they will have to face the “double burden” of NCDs and infectious diseases.

For instance, in the United States, the Centers for Disease Control and Prevention states that 86 percent of all health care spending in 2010 was for people with one or more chronic medical conditions. The total costs of heart disease and stroke in 2010 were estimated to be US\$315.4 billion. Of this amount, US\$193.4 billion was for direct medical costs, not including costs of nursing home care. Also, the total estimated cost of diagnosed diabetes in 2012 was US\$245 billion, including US\$176 billion in direct medical costs and US\$69 billion in decreased productivity. Decreased productivity includes costs associated with people being absent from work, being less productive while at work, or not being able to work at all [19].

Cancer costs EU countries over €50 billion in lost productivity and €20 billion in family care spending. Cardiovascular diseases cost EU countries €35 billion in lost productivity and €30 billion in informal health care costs. The burden of NCDs in Europe is growing—WHO estimates that if the NCD epidemic is not halted, mortality from these diseases will increase to 8.6 million deaths per year by 2016. The aging European population and limited public resources are adding to the challenge [20].

Physical inactivity led to economic costs of €9.2 billion in 2012 through four major noncommunicable diseases (coronary heart disease, type II diabetes, colorectal cancer, and breast cancer), and through the indirect costs of inactivity-related mood and anxiety disorders. This is equivalent to 6.2 percent of all European health spending—€5 billion more than the entire world spends on cancer drugs each year. Looking ahead, this economic cost burden is set to rise to annual costs of over €125 billion in 2030 [21]. Figure 5 illustrates the direct costs related to physical inactivity in 2012 across six European countries. These costs comprise the total (public and private) health expenditure on the four major NCDs quoted above.

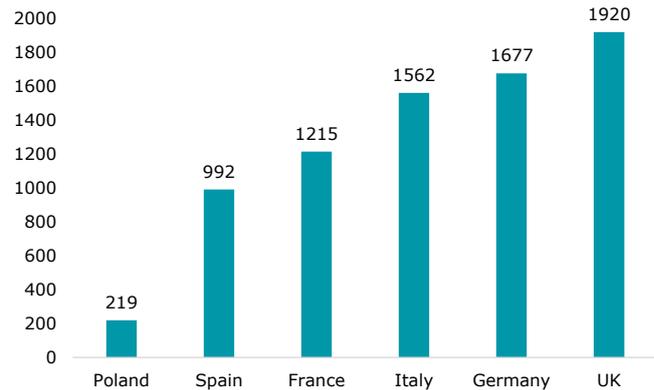


Figure 5: Direct cost of physical inactivity across six focus countries in 2012 (million of €). Source: Lee et al. (2012), WHO, OECD, Eurostat, IDA, EUCAN, Cebr analysis

### Impact on households

The most immediate impact of NCDs lies on individuals who experience a decreased well-being and potentially a reduction of income. Indeed, because NCDs affect adults in their productive years, require long term treatment, and often cause disability, they can have severe economic consequences for individuals and their families, including decrease or loss of household income, impoverishment, loss of savings and assets, and reduced opportunities [22].

**The results are unequivocal. A unified front is needed to invert the curve related to the evolution of NCDs. Governments, but also civil society and the private sector, must commit to the highest level of engagement in combatting these diseases and their rising economic burden. Prevention of NCDs, i.e, surveillance and population-based prevention, are fundamental to the mission to prevent deaths from NCDs.**

### 3. How to better prevent and control noncommunicable diseases?

Accounting for two-thirds of deaths worldwide, noncommunicable diseases are a growing burden for health care systems and economies. Health promotion, in conjunction with better awareness of social and environmental factors affecting health, is key to an effective and long-lasting response to these diseases.

Countries are developing strategies and guidelines for addressing NCDs and risk factors through innovative changes to health infrastructure, new funding mechanisms, improved surveillance methods, and policy responses.

This part of the whitepaper aims at providing guidance, based on WHO recommendations, to governments for the design of an efficient public policy to prevent and control noncommunicable diseases.

#### Adhere to the global framework for better coordination

In September 2011, recognizing the dominance of NCDs on a global scale and their significant social, economic, and public health impact, the UN General Assembly adopted a political declaration on the prevention and control of noncommunicable diseases ([Resolution A/66/2](#)). This text highlights the need to adopt a coordinated, multisector approach in order to reduce the impact of the common noncommunicable disease risk factors, namely tobacco use, harmful use of alcohol, unhealthy diet, and physical inactivity (detailed in part 1).

The WHO has been assigned the task of creating an NCD Global Monitoring Framework, together with a Multi-sectoral Action Plan: the WHO Global action plan for prevention and control of noncommunicable diseases 2013–2020 (known as the Global NCD Action Plan). Adopted in 2012, this framework sets a target of a 25 percent reduction in premature mortality from NCDs by 2025, and includes eight other voluntary global targets based on the various risk factors, and 25 monitoring indicators (Figure 6) [23].

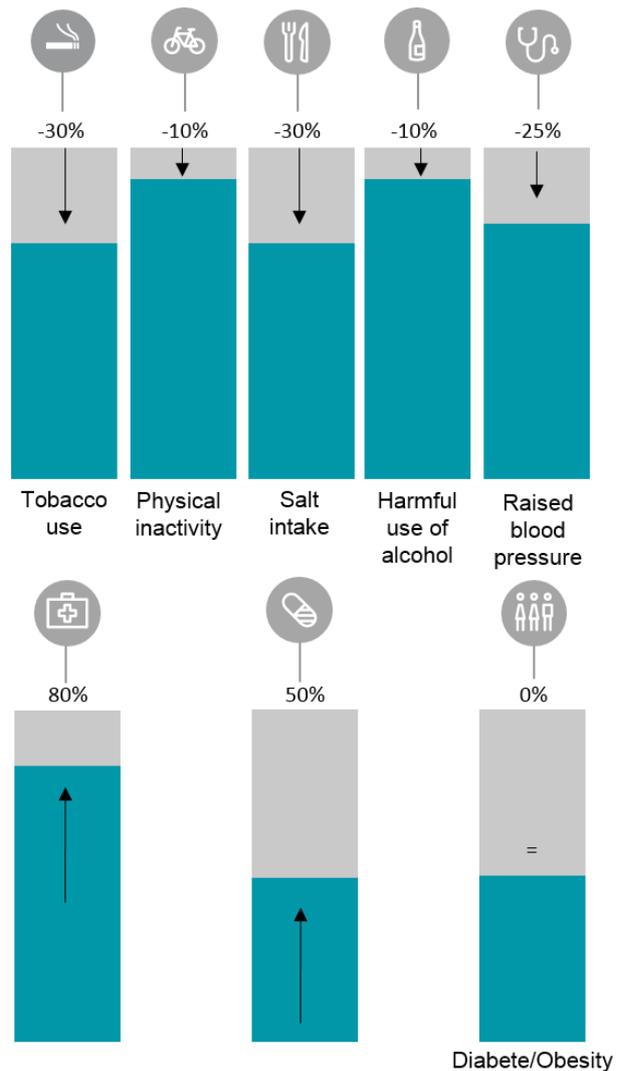


Figure 6: Global NCDs Monitoring Framework, 2025 targets

The global action plan aims at strengthening national efforts to address the burden of NCDs and provides a road map and a menu of policy options for multiple stakeholders such as EU member states, WHO, other UN organizations and intergovernmental organizations, NGOs, and the private sector, which, when implemented collectively, will attain the global targets [24].

In order to support the implementation of the Global NCD Action Plan, WHO has established the WHO Global Coordination Mechanism on prevention and control of NCDs (GCM/NCD) on 15 September 2014, which will enhance the coordination of NCD activities, multi-stakeholder engagement, and action across different sectors in order to contribute to the implementation of the WHO Global NCD Action Plan 2013–2020. The WHO GCM/NCD is led by EU member states, and other participants include United Nations organizations and non-state actors such as non-governmental organizations, philanthropies, business associations, and academic institutions [25].

Adhering to the global framework facilitates the definition of the prevention program as guidelines are provided and can be customized. The creation of partnerships supporting the wide dissemination of information, promoting public debate, and encouraging policy makers to take concrete actions can also be facilitated through a recognized global framework. Fighting against NCDs must be a global combat, not only at the national or regional level. That's why collectively implementing a common roadmap and a set of policy options will allow the attainment of the global targets, including a 25 percent relative reduction in premature mortality from NCDs by 2025.

As highlighted by the former Director General of WHO, Lee Jong-wook, *"The cost of inaction is clear and unacceptable. Through investing in vigorous and well-targeted prevention and control now, there is a real opportunity to make significant progress and improve the lives of populations across the globe."*

### Combine different approaches to achieve a common goal

Rapid health gains can be achieved with comprehensive and integrated actions targeting the global population and individuals at the same time.

**Population-wide approaches** seek to reduce the risks throughout the entire population. They address the causes rather than the consequences of chronic diseases and aim to prevent the emergence of future epidemics. Population-based prevention focuses on broad policy and program and environmental interventions targeted at the general population more than just the high-risk individuals. Small reductions in the exposure of the population to risk factors such as tobacco use, unhealthy diet, and physical inactivity

lead to population-level reductions in cholesterol, blood pressure, blood glucose, and body weight.

**Interventions for individuals** focus on people who are at high risk and those with established chronic disease. These interventions reduce the risk of developing chronic disease, reduce complications, and improve quality of life.

Population-wide and individual approaches are complementary. They should be combined as part of a comprehensive strategy that serves the needs of the entire population and has an impact at the individual, community, and national levels. Comprehensive approaches should also be integrated: covering all the major risk factors and cutting across specific diseases [26].

Multiple interventions exist (Table 1) and need to be deployed together as part of a comprehensive, integrated approach to achieve the global goal for preventing chronic diseases. The government in partnership with the private sector and civil society have to work together to develop a suitable framework to put such approaches into practice.

Table 1: Example of population-based interventions

NCD risk factors	Example of population-based interventions
<b>Tobacco use</b>	Accelerate implementation of the Framework Convention on Tobacco Control: <ul style="list-style-type: none"> <li>• Raise taxes on tobacco</li> <li>• Enforce bans on tobacco advertising, promotion, and sponsorship</li> <li>• Ban smoking in public places and protect people from tobacco smoke</li> <li>• Offer help to quit tobacco use and warn about the dangers of tobacco use</li> </ul>
<b>Excessive dietary salt intake</b>	<ul style="list-style-type: none"> <li>• Regulate salt concentration limits in processed and semi-processed foods</li> <li>• Reduce dietary salt levels through voluntary action by food industry</li> <li>• Promote low-sodium salt substitutes</li> <li>• Implement information and education campaigns to warn about the harm from excessive salt intake</li> </ul>

<b>NCD risk factors</b>	<b>Example of population-based interventions</b>
<b>Harmful alcohol use</b>	<ul style="list-style-type: none"> <li>• Increase taxes</li> <li>• Ban advertising</li> <li>• Restrict access</li> </ul>
<b>Unhealthy diets, physical inactivity, obesity</b>	<ul style="list-style-type: none"> <li>• Introduce taxes for unhealthy food (e.g. sugar, fat, etc.)</li> <li>• Provide subsidies for healthy food</li> <li>• Promote labeling</li> <li>• Administer marketing restrictions</li> </ul>

Source: The Growing Danger of Noncommunicable Diseases, Acting Now to Reverse Course, World Bank, September 2011

WHO estimated the requirements for “best buy” population-based NCDs interventions would have a median cost of less than US\$0.20 per person per year for low-income and lower middle-income countries and US\$0.50 for upper middle-income countries. Individual-based, mainly preventive, interventions provided at a primary care level would cost less than US\$1.00, US\$1.50, and US\$2.50 per person per year in low-, lower middle-, and upper middle-income countries respectively. The total cost for these “best buy” population- and individual-based interventions in all developing countries would be US\$11.4 billion annually and represent about 4 percent, 2 percent, and less than 1 percent of the current annual health expenditure in low-, lower middle-, and upper middle-income countries respectively [27].

Investments in chronic disease prevention represent a relatively small amount compared to the hundreds of billions dollars of economic losses generated by NCDs and the dramatic high number of related deaths. Increasing the investments in fighting against the NCDs combined with a robust and integrated national framework will translate the averted deaths into substantial gains in countries.

### Provide a national framework for efficient implementation

#### Define the population risk factors profile

Primarily, the role of the government is to define a sound and unifying policy framework to ensure that actions are coherent and mutually supportive across sectors and at all levels. The definition of this framework needs to estimate population need and advocate for action. Indeed, the distribution of risk factors among the population is the key information required by countries in their planning of prevention and control programs. This information describes the current situation related to chronic diseases and predicts their future burden; it must then be synthesized and

disseminated in a way that successfully argues the case for the adoption of relevant policies.

WHO has developed a tool to help low- and middle-income countries assess their risk factor profiles—the STEPwise approach to Surveillance (STEPS). WHO STEPS focuses on building capacity in low- and middle-income countries to collect small amounts of high-quality risk factor data through questionnaire-based information about diet and physical activity, tobacco use, and alcohol consumption (step 1); standardized physical measurements to collect data on blood pressure, height, and weight (Step 2); and physical measurements with the collection of blood samples for measurement of lipids and glucose status (Step 3). Although most countries have the resources for collecting data in the first two stages, the third is resource-intensive and not suited for all countries situations. This instrument is designed to allow flexibility for local adaptation [28].

For instance, the WHO Regional Office for the Americas (AMRO) held a series of workshops in collaboration with the International Union Against Cancer to advocate for cervical cancer prevention policies and programs in Latin America and the Caribbean. More than 300 key stakeholders from the ministries of health, nongovernmental organizations, medical and professional associations, and international agencies participated. The objectives were to achieve consensus on the need for, and the process by which, cervical cancer prevention and control could be placed on the agenda, and to encourage countries to strengthen or develop their cervical cancer prevention and control programs. Following the workshops, more than 10 countries in the region critically assessed their programs with assistance from AMRO, devised strategic program plans, and received seed funding to implement new strategies for cervical cancer prevention [29].

#### Design comprehensive policy involving relevant organizations across sectors

After estimating the population need and advocating for action, the government is responsible for formulating and adopting a policy which defines the vision for prevention and control of the major chronic diseases at a national level and the plan for action over the next 5 to 10 years. Combined with complementary policies, plans, and programs at the sub-national level to respond to local specificities, public policy for NCDs and its related framework planning aims at giving priorities related to NCDs. Also, it organizes resources efficiently to reach the set goals (i.e., improve the health of population, answer to the needs of people affected by NCDs, and provide financial protection against the costs of ill-health).

As highlighted in the WHO Global Report, NCD policy should be defined based on four key principles [30]: (1) be *comprehensive and integrated* in order to avoid overlap and

division in the health system; (2) be *inter-sectoral* as the underlying determinants of the NCD burden lie outside the health sector, such as poverty, lack of education, or harmful environmental conditions. Promoting healthy diets and lifestyles to reduce the global burden of noncommunicable diseases requires a multisector approach involving the various relevant sectors in societies. For instance, the agriculture and food sector figures prominently in this initiative and must be given due importance in any consideration of the promotion of healthy diets for individuals and population groups. Therefore, the formulation of NCD policy must be driven by the ministry of health but must also involve representatives from other relevant ministries (environment, transportation, education, trade, etc.) in order to reach a win-win situation and align the agendas and priorities of the different sectors; (3) take into account *the life course* to define specific interventions for particular age groups. For instance, childhood and adolescence must be specifically targeted through school health programs to promote healthy diet, physical activity, and tobacco abstinence as risk behaviors are particularly adopted at these periods of age; and (4) be *implemented gradually*. In case of limited resources, the core feasible interventions that can be implemented in the short term should be the first priority. Indeed, selecting a smaller number of actions and doing them well is likely to have more impact than tackling a large number and doing them messily. Other activities should be implemented in a second and third step depending on their feasibility, potential impact on the local conditions, and likely constraints to implement them.

**Identify adequate means for policy implementation**

The comprehensive approach requires a range of interventions to be implemented in a stepwise manner. Multiple health policy levers exist to support their implementation (Table 2). These levers must be adapted taking into account the existing constraints at the local, regional, or national levels [31]:

Table 2: Policy levers to be used for interventions implementation

Health Policy Levers	Examples
<b>Health Financing</b>	An effective policy instrument for reducing the use of tobacco products is to tax them heavily. Taxation also influences the consumption of food and drinks. Revenue from dedicated taxes can be allocated for specific purposes. These taxes do not necessarily become part of consolidated revenue but can be allocated directly to a

Health Policy Levers	Examples
	<p>specific purpose such as population-wide prevention interventions.</p> <p>Case: In Thailand, funding of approximately US\$50 million per year comes from a 2 percent excise tax on alcohol and cigarettes and is used to support activities that reduce risk factors and promote healthy behavior.</p> <p>Also, more countries have implemented a tax on sugar-sweetened beverages to encourage reduced sugar intake in order to address the issue of obesity and unhealthy diets. The UK announced the introduction of a new sugar levy on the soft drink industry by 2018. The tax will be levied on the drink companies in two years' time, giving them time to change the ingredients and recipes of their products. Manufacturers will be taxed according to the quantity of the sugar-sweetened drinks they produce or import. The estimated £520m raised will be put toward boosting primary school sports.</p>
<b>Legislation and Regulation</b>	<p>Ban tobacco smoke in all indoor places; enforce bans on sales of tobacco products to youth; incorporate mandatory health warning labels on tobacco products</p> <p>Case: Italy has implemented smoke-free workplace legislation in all enclosed public spaces, including restaurants and bars.</p>
<b>Improving the built environment</b>	<p>Specific built environment intervention can be successfully conducive to active transport and physical activity such as provision of easily accessible, well-lit stairs in buildings; provision of bicycle and walking paths in urban and rural communities; and provision of accessible sports, fitness, and recreation facilities.</p> <p>Case: In Chennai, India, realizing the importance of physical activity, residents raised money from philanthropists and collected donations from residents to construct a park. Following the construction of the park, a follow-up survey showed that there was a threefold increase in people</p>

Health Policy Levers	Examples
	undertaking regular physical activity (from less than 15 percent to 45 percent).
<b>Advocacy initiatives</b>	<p>Advocacy includes a range of strategies for communicating risk, increasing motivation to change, and disseminating ideas through communities and societies.</p> <p>Case: In the UK, the 5 A DAY Program, like France’s “5 fruits et légumes par jour” program, aims to increase the daily level of around five portions to reduce mortality rates from cardiovascular disease and cancer, and the rise in obesity among children. The program communications provide information and advice for consumers through television and radio advertising, leaflets, posters, booklets, a website, and magazine ads and articles. A survey conducted in October 2003 found that over a quarter of children and their families reported that they were eating more fruit at home after joining the scheme, including in lower socioeconomic groups.</p>
<b>Community mobilization</b>	<p>Schools and workplaces provide a unique point of access for interventions to reduce chronic disease risk factors and promote effective management of chronic conditions. Large-scale school-based projects are being implemented in developing countries to reduce obesity, improve nutrition, and increase physical activity.</p> <p>Case: In Zhejiang Province, an unhealthy diet is a major cause of both undernutrition and obesity among school-age children. In 2000, a health-promoting school project to improve nutrition was launched by the Provincial Education Commission and the Health Education Institute of the Centers for Disease Control and Prevention. Zhejiang Province’s health-promoting school project improved nutrition among 7500 students and their families and 800 teachers and school staff personnel.</p>
<b>Health services</b>	Health services need to shift away from the traditional focus on acute health care to a systematic patient-centered approach for a better prevention and control of chronic

Health Policy Levers	Examples
<b>organization and delivery</b>	<p>diseases. For instance, health services shall promote the monitoring of patient symptoms based on effective clinical information systems, the provision of tools to encourage the patients to effectively self-manage their conditions on a daily basis, and the cooperation with ministries of education and professional societies to train the healthcare workforce in order to ensure that the right competencies and skills are taught to medical, nursing and other health professionals to prepare them to adequately treat and prevent chronic diseases.</p>

This overall framework for prevention and control determined by the government can be best implemented in collaboration with multiple organizations and sectors. Working together for health is essential as it creates synergies and avoids overlapping and duplication of activities.

**Foster collaborations across organizations and sectors**

Governments alone are unlikely to have sufficient resources, scale, and reach to tackle the complexity of public health related to the prevention and management of chronic diseases. Governments, private sector, civil society, nongovernmental organizations, professional associations, research institutions, and international organizations must be involved together to avoid overlapping and spawn a more powerful impact.

**Workplace initiatives to encourage healthy behavior**

Prevention in the workplace can be effectively powerful as most adults, who are the most affected by chronic diseases, spend most of their time at work and may be influenced by their environment. Companies are increasingly concerned about the rising costs of health and life insurance. In response to these concerns, workplace programs that requires limited resources (e.g., offer healthy food, make a tobacco free environment, promote physical activity, etc.) can be implemented aiming at prevention, detection, treatment, and care of NCDs with a significant positive impact on employees. Such programs are beneficial to both employees who reduce their risks of developing chronic diseases and to the employers who keep their employee productivity high (e.g., less absenteeism...). Table illustrates the increasing involvement of business communities in the

prevention and control of NCDs especially in low-income countries, which are the most affected by the NCD burden.

Table 3: Percentage of companies that have established and implemented policies and programs against NCDs

Policy or program	All countries	Low-income countries	High-income countries
Anti-smoking	59	37	74
Anti-alcohol	56	42	61
Incentives for exercise	30	21	35
Stress reduction	23	14	32
Physical health	36	23	42

Source: The Global Economic Burden of Noncommunicable Diseases, Bloom, D.E., January 2012

Fitbit Inc. is an American company known for its products of the same name, which are activity trackers—wireless-enabled wearable technology devices that measure data such as the number of steps walked, heart rate, quality of sleep, steps climbed, and other personal metrics.

The company is also well known for its internal corporate wellness program, also helping other companies harness the power of their fitness trackers to create customized, engaging programs. Thirty of the Fortune 500 companies participate in Fitbit Wellness, ultimately saving money in terms of medical costs and reduced sick days. Generally, companies use the trackers as a motivator as part of a rewards program or company-wide competition. Then, they can use a Fitbit dashboard with aggregated data to track steps, calories burned, active minutes, distance, hours of sleep etc. BP, for example, has run a one million step challenge where employees who hit the mark over the course of a year are eligible for a more deductible health plan. In one year, 23,000 employees took over 23 billion steps. Internally, Fitbit practices what it preaches. For example, the company plans "Workout Wednesdays," a day devoted to fitness where employees can participate in various workouts throughout the day. [32]

Also, healthier product offerings can be created by the industry. A number of countries have effectively partnered with the food and beverage industry to reduce the salt and sugar contents in multiple food commodities. For example, Danone, which makes a drinkable yogurt for kids, recently

moved to make it even healthier by lowering the sugar content [33].

### Research to better support affected people

The research and development of medicines and technologies to diagnose, prevent, treat, and manage disease is one of the most important contribution to public health that can be made by the research community. Private companies and research centers can strategically invest in some specific disease areas to accelerate progress. For instance, diagnostic companies can focus on developing accurate and cheaper tests for measuring blood sugar and allowing people to self-manage their diabetes, especially those living in remote areas. Today, the blood glucose levels is measured by pricking fingers, squeezing drops of blood onto test strips, and processing the results with portable glucometers. The process can be uncomfortable, messy and often has to be repeated several times every day.

The new technology, developed by Glucosense Diagnostics, uses a small device with low-powered lasers to measure blood glucose levels without penetrating the skin. It could give people a simpler, pain-free alternative to finger pricking. The technology has continuous monitoring capabilities, making it ideal for development as a wearable device. This could help improve the lives of millions of people by enabling them to constantly monitor their glucose levels without the need for an implant. It is also good news for healthcare providers as it could provide a simpler and cheaper alternative to the current methods.

As said by the Professor Gin Jose from the University of Leeds: "As well as being a replacement for finger-prick testing, this technology opens up the potential for people with diabetes to receive continuous readings, meaning they are instantly alerted when intervention is needed. This will allow people to self-regulate and minimize emergency hospital treatment. This wearable device would then be just one step from a product which sends alerts to smart phones or readings directly to doctors, allowing them to profile how a person is managing their diabetes over time" [34].

### Define a clear governance

As mentioned before, a prevention program has to foster collaborations across organizations and sectors. Although the program will be mostly implemented under the name of the Ministry of Health, others ministries and organizations may be involved. The multiplication of players requires the implementation of a good governance model. The role and responsibilities of each organization must be clarified. Also, the process of decision-making and the process by which decisions are implemented (or not implemented) must be described, aligned with the different stakeholders, and communicated for more transparency.

## Set up efficient monitoring and evaluation processes

When running a program, it is essential to manage two specific tasks: (1) to deliver the program in an efficient manner (the management of a program) and (2) to assess whether the program has produced the desired effects.

The prevention program has to certainly be assessed as a whole. However, each related intervention, such as tax introduction, should be assessed along with the result of the program, relying on the efficiency of the underlying interventions.

The program assessment must be done through two phases: (1) **Monitoring** of outputs to observe during the program implementation whether intended outputs are delivered and whether implementation is on track. Monitoring allows results, processes, and experiences to be documented and used as a basis to steer decision-making and learning processes. Monitoring is checking progress against plans; (2) **Evaluation** to observe at the end of the program or at the end of a cycle whether there are changes in the result indicator due to the actions of the public/private intervention in the framework of the prevention program. Evaluations appraise data and information that inform strategic decisions, thus improving the program in the future. Evaluations should help to draw conclusions about five main aspects of the intervention: relevance, effectiveness, efficiency, impact, and sustainability.

Indicators must be defined to support the assessment of the program and the related interventions. These indicators should respond to some quality criteria: **Representative** to the results the program aims to obtain; **Normative**, i.e., there must be agreement that a movement in a particular direction is a favorable or an unfavorable result; **Robust**, i.e., reliable, statistically validated; and **Available** and easy to collect.

However, expecting an impact on health and human behavior (related to diet), the effect of the prevention program on health might be complicated to measure on a short-term period. Change in dietary behavior can be assessed through direct empirical observations. Nevertheless, this approach remains quite complex because (1) the time lag that often occurs between the effects of the program on consumption and the health consequences of the change in consumption; (2) the difficulties involved in isolating the effect of the program from those of a multitude of concurrent factors (increase of the physical activity, higher income allowing to afford more healthy food, etc.).

Taking into account the multiple players, governments have to design a national framework that offers flexibility and allows them to balance the diverse priorities while tackling the needs of the population related to NCDs using evidence-based interventions. As summarized in Figure 7, WHO proposed a practical approach that can be used by ministries of health to design a prevention program and to choose an efficient combination of interventions that can be considered as levers for putting the policy into practice with maximum effect.

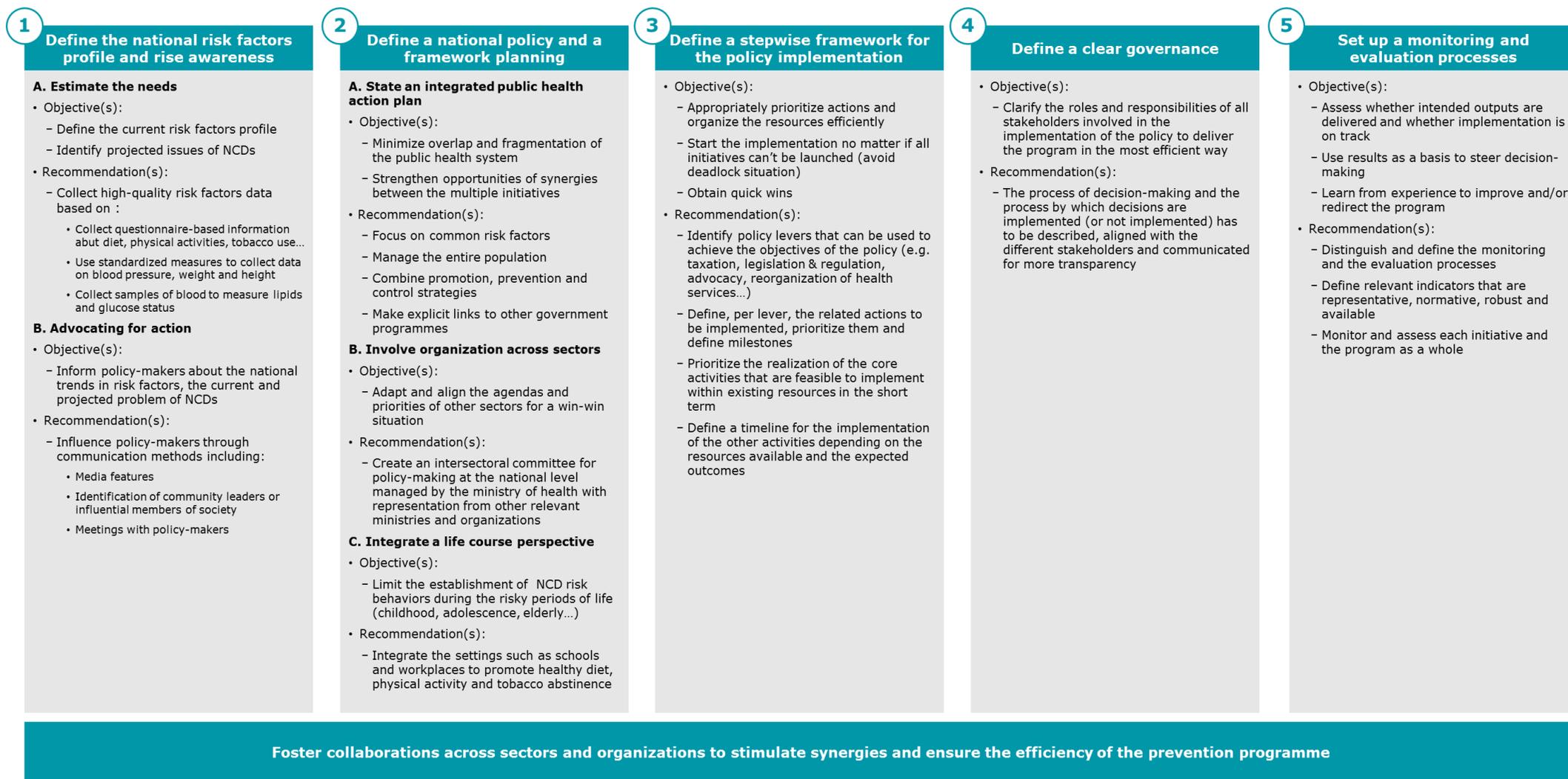


Figure 7: Approach to assist ministries of health in designing prevention programs

Source: *Preventing chronic diseases: a vital investment, WHO, 2005, Summary of the part 4 – Chapter 1*

# End notes

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