DIRECTIONS IN DEVELOPMENT
Human Development

Capitalizing on the Demographic Transition

Tackling Noncommunicable Diseases in South Asia

Michael Maurice Engelgau, Sameh El-Saharty, Preeti Kudesia, Vikram Rajan, Sandra Rosenhouse, and Kyoko Okamoto

Conference Edition

THE WORLD BANK

Capitalizing on the Demographic Transition: Tackling Noncommunicable Diseases in South Asia

February 2011

Figures

Tables

Boxes

Preface

The prevention and control of noncommunicable diseases (NCDs) constitute a development issue that low-income countries in South Asia are already facing. Both country- and regional-level strategies are important because many of the issues and challenges of mounting an effective response to NCDs are common to most South Asian countries, even though their disease burden profiles vary.

Hence, the rationale for this book is that strategic decisions for prevention and treatment of NCDs can effectively address the future burden of disease, promote health aging, and increase the potential benefit from the demographic transition, thus contributing to economic development.

This book's goal is to encourage countries to develop, adopt, and implement effective and timely country and regional responses that reduce the population-level risk factors and NCD disease burden. Its main objectives are to develop the following:

- An NCD burden and risk factor profile for all countries and the region as a whole
- A rationale for public policy and action for NCDs
- A framework to guide the formulation of public policies and strategies for NCDs
- Country profiles for each country, including capacity and ongoing NCD activities, as well as policy options and actions for NCDs that will help stimulate policy dialogue within and among countries
- A regional strategy for NCD prevention and control where regional collaboration offers added value.

The main target readership comprises policy makers in the governments of South Asia, both inside and outside the health sector. The book will be also useful for professionals working in development in South Asia and beyond. Using a framework for policy options developed for this book as a discussion platform, policy makers and others will be able to identify priorities areas that are feasible, affordable, and appropriate for their country context. This framework can serve as a tool to promote and facilitate informed, high-level policy dialogue among governments, civil society, development partners, and identify World Bank roles where it has a comparative advantage, as outlined in *Healthy Development: The World Bank Strategy for Health, Nutrition, and Population Results* (World Bank 2007). Once national policy makers identify country-level issues, they can consider issues common to several countries for regional approaches.

The World Bank team involved in the genesis of this book made several key decisions. First, the team and contributors drew heavily on the WHO Global Burden of Disease Study (http://www.who.int/healthinfo/global_burden_disease/en/), which has generated mortality and disability-adjusted life year (DALY) burden estimates for virtually all countries. New studies are needed in this area. In addition, they reviewed published and unpublished literature, reports, secondary data, and other information sources, and generated country-specific disease burden profiles. (Representative data on most NCD risk factors are scant for many countries. When country-level studies are available, different methods and variable quality make comparisons difficult.)

Second, the main points of focus at country level were to be country burden and capacity assessments to respond to NCDs, countries' current activities for NCDs, and development of policy options and strategies. Capacity assessments can help predict solutions as to what can be done and to highlight efforts that can be built on. Since policy options form the output of this book, grasping country capacity becomes critical. Indeed, World Bank (2009) recommended that, to improve implementation, impact,

and responsiveness to health, nutrition, and population strategies, project design should match country context and capacity.

In terms of the country burden and capacity assessments, conducted during March–September 2009, USAID's *Health Systems Assessment Approach: A How-to Manual* (2007) was adapted as the assessment tool (Chapter 6 and Appendix 1). It was modified to emphasize the components that were most import for responding to NCDs. In addition, the WHO NCD capacity survey tools used for global surveys in 2000 and 2005 (Appendix 1) were extensively reviewed, adapted, and incorporated into the assessment tool. All country-based consultants used this same tool, which included both objective measures and descriptive measures of capacity. The plan was not to describe the entire system's capacity but, rather, to focus on finding the strengths that might be enhanced and deficits that could be addressed.

Finally, as the topic of NCDs is broad, the team adopted the World Health Assembly's *2008–2013 Action Plan* and the focus on the four types of NCDs and their major risk factors (as noted above). Other NCDs are of course important, but here the effort is to assist countries in making strategic decisions, rather than to provide a comprehensive overview or set of recommendations. Hence some readers may want to focus on the framework for policy options (Chapter 5) and the policy options for countries and regional strategies (Chapters 6 and 7).

Acknowledgments

This book was prepared by a core team consisting of Michael Engelgau (team leader), Sameh El-Saharty, Preeti Kudesia, Vikram Rajan, Sandra Rosenhouse, and Kyoko Okamoto.

Several others made important contributions. Source documents for Chapters 1 and 4 were by Gerard Anderson and Silvia Robles (Johns Hopkins University, United States) and for Chapter 2 by Marc Suhrcke (University of East Anglia, United Kingdom). Country reports used as source documents for Chapter 3 and Appendix 1 were contributed by Shanti Dalputadu, Rumanthi Elwalagedara, and Achana Obris for Sri Lanka (Institute for Health Policy, Sri Lanka), by Dorairaj Prabhakaran and Vamadevan Ajay for India and Nepal (Centre for Chronic Disease Control, India), by Tracey Koelhmoos for Bangladesh, Bhutan, and Maldives (International Centre for Diarrhoeal Diseases, Bangladesh), and by Tazeen H. Jafer for Afghanistan and Pakistan (Aga Khan University, Pakistan). Eliezer Orbach (consultant) helped develop the modified capacity assessment tool used for these country reports.

Very helpful comments on early drafts were obtained from Pablo Gottret, Gerard La Forgia, Tekabe Belay, Sundararajan Gopalan, Kumari Vinodhani Navaratne, Ghulam Sayed, Inaam Haq, Dinesh Nair, and Karar Ahsan of the World Bank and from Poonam Singh and Jerzy Loeowski of WHO's Regional Office for South-East Asia.

Comments on the draft country reports were obtained from Mustafa Lais (Afghan Public Health Institute) Mashkoo Ashraf (Afghan Ministry of Public Health); Shenna Moosa, Aishath Samiya, and Thoufeeq Ubeydulla (Maldives Ministry of Health and Family) and Jorge Luna (WHO Maldives); Sudhir Gupta (Ministry of Health and Family Welfare, India), Sudhanshu Kar (WHO, India), D. Gururaj (National Institute of Mental Health and Neuro Sciences, Bangalore, India), D. Anand and Nikhil Tandon (All Indian Institute for Medical Sciences), and Srinath Reddy (Public Health Foundation of India); B.R. Marasini and L.B. Thalpa (Ministry of Health, Nepal); Assad Hafeez and Raza Zaidi (Ministry of Health, Pakistan); Wangchuk Dupka (Ministry of Health, Bhutan); Terrance De Silva, Palitha Mahipala, Susie Perera, Lal Panapatiya, Palitha Kurunapeme (Ministry of Health, Sri Lanka); and Mustafa Zamen (WHO Bangladesh).

The core team is grateful to the peer reviewers for the report, including Patricio Marquez, Joana Godinho, Owen Smith, John Langenbrunner, and Montserrat Meiro-Lorenzo from the World Bank and Ala Alwan (WHO-Geneva) and David Peters (Johns Hopkins University).

Operational support was provided by Silvia Albert, Elfreda Vincent, Gertrude Cooper, Alejandro Welch, and Kerima Thilakesena, all of the World Bank. Assistance in editing the report was provided by Jonathan Aspin (consultant).

Abbreviations and Acronyms

AFG	Afghanistan
BGD	Bangladesh
BTN	Bhutan
CEA	Cost-effectiveness analysis
COPD	Chronic obstructive pulmonary diseases
CVD	Cardiovascular disease
DALY	Disability-adjusted life year
EAP	East Asia and Pacific
ECA	Europe and Central Asia
FCTC	Framework Convention on Tobacco Control
GDP	Gross domestic product
GNI	Gross national income
HNP	Health, Nutrition, and Population
HRH	Human resources for health
IHD	Ischemic heart disease
IND	India
LAC	Latin America and the Caribbean
LKA	Sri Lanka
MCH	Maternal and child health
MDGs	Millennium Development Goals
MDV	Maldives
MENA	Middle East and North Africa
MOH	Ministry of Health
NCD	Noncommunicable disease
NPL	Nepal
PAK	Pakistan
PPP	Purchasing power parity
SAR	South Asia
SSA	Sub-Saharan Africa
THE	Total health expenditures
UN	United Nations
U.S.	United States
WHO	World Health Organization

Executive Summary

Introduction

Increasing life expectancy in South Asia is resulting in a demographic transition that can, under the right circumstances, yield dividends through more favorable dependency ratios for a time. With aging, the disease burden shifts toward noncommunicable diseases (NCDs)[1] which can threaten healthy aging. However, securing the gains expected from the demographic dividend—where developing countries' working and nondependent population increases and per capita income thus rises— is both achievable and affordable through efficiently tacking NCDs with prevention and control efforts.

This book looks primarily at cardiovascular disease (CVD) and tobacco use since they account for a disproportionate amount of the NCD burden—the focus is strategic, rather than comprehensive. It considers both country- and regional-level approaches for tackling NCDs as many of the issues and challenges of mounting an effective response are common to most South Asian countries. For some efforts, especially with prevention, regional cooperation offers additional advantages.

The goal of this book is to encourage countries to develop, adopt, and implement effective and timely country and, where appropriate, regional responses that reduce both population-level risk factors and the NCD burden. The work aims to develop (i) an NCD burden and risk factor profile for all countries and the region as a whole; (ii) a rationale for public policy and action for NCDs; (iii) a framework to guide the formulation of public policies and strategies for NCDs; (iv) a country profile, including capacity and ongoing NCD activities, as well as policy options and actions for NCDs that will help stimulate policy dialogue within and among countries; and (v) a regional strategy for NCD prevention and control where regional collaboration offers added value.

The book is organized into seven chapters that analyze three key themes. Chapters 1 and 2 tackle "What is Happening and Its Implications," and examine the demographic shift toward aging and the impact of the epidemiological shift toward NCDs. Chapters 3 and 4 address "Why the Need to Act Now" and develop the rationale for urgent actions to prevent and control NCDs. Chapters 5–7 focus on "How to Respond". In this theme, Chapters 5 and 6 examine the evidence base for prevention and control strategies, assess country-level capacity and key accomplishments, and develop policy options for individual countries. Chapter 7 identifies key areas for regional approaches.

It is hoped that the achievements of this book will be seen as (i) developing a framework for policy options to identify key areas for strategic country- and regional-level policy and actions; (ii) bringing together demographic and aging trends, disease and risk factor burden data, alongside analyses of capacities and accomplishments to tackle NCDs; and (iii) using these inputs to develop policy options for country and regional strategies.

What is Happening and Its Implications

Chapters 1 and 2 address the South Asian context, aging and the shifting disease pattern, country-level contexts, and the implications of these health transitions.

1 The World Health Organization (WHO) defines noncommunicable diseases as including chronic disease (principally cardiovascular disease, diabetes, cancer, and asthma/chronic respiratory disease), injuries, and mental health. This does not include all chronic diseases, such as those of an infectious nature (HIV/AIDS, for instance).

Context

South Asia is home to a large, fast-growing population with a substantial proportion living in poverty. In terms of the demographic transition, it is still relatively young, while the regional average life expectancy at birth, 64 years, is rising. Most people live in rural areas (71 percent).[2] Despite annual average 6 percent gross domestic product (GDP) growth in the last 20 years and declines in poverty rates, growth has not been inclusive or fast enough to reduce the number of the poor. Inequality has risen, reflecting deep distortions in access to markets, and in access to and quality of health, education, and infrastructure. These factors have contributed to mixed progress on the health-related Millennium Development Goals, as has the failure of health systems to adjust to people's changing needs. There is tremendous variation in population size among countries, yet all countries have similar proportions living in rural areas and significant pockets of poverty—an important point, not only for considering the challenges of addressing social determinants and NCDs but also the challenges of delivering services.

Aging and the Shifting Disease Pattern

Aging is occurring rapidly but often without the social changes such as improved living conditions, better nutrition, gains in wealth, and better access to health services that accompanied aging in most developed countries decades ago. Aging due to this transition will, alone, increase NCDs because they are more common with increasing age. However, population aging in South Asia is associated with a rapid increase in health problems such as heart diseases, cancers, diabetes, and obesity—in other words, unhealthy aging—putting new pressure on health systems. Other factors—including lifestyle changes that are often associated with urbanization and globalization—can also increase the risk factors and disease onset at younger ages.

South Asia is at a crossroads. Over half of the disease burden (55 percent including injuries) is now attributable to NCDs, *and therefore a larger share than* communicable diseases, maternal and child health issues, and nutritional causes combined. This pattern is similar to that of high-income countries decades ago. Ischemic heart disease (IHD) is the leading cause of both deaths and forgone disability-adjusted life years (DALYs) in working-age adults (15–69 years). By contrast, communicable diseases (e.g., tuberculosis, respiratory infections, and water- and vectorborne disease) still remain prominent in the total population creating what is referred to as a "double-disease burden."

Country-level Contexts

Various country-level contextual factors need consideration for developing effective responses. Country NCD disease burdens are quite variable. Of the total DALYs forgone attributed to NCDs, the proportion ranges from 87 percent in Sri Lanka to 43 percent in Afghanistan. Where trend data are available, they indicate that the prevalence of NCDs is increasing (for example, diabetes in Sri Lanka). In contrast to the disease burden, some NCD risk factors (for example, tobacco use) vary relatively little across the region. It is among the poor where the combination of NCD risk factors and infectious diseases are more common, leading to worse outcomes. For instance, the risk of dying from tuberculosis is 2.3 times as high for smokers as nonsmokers, while both tuberculosis incidence and tobacco use are higher among the poor.

This regional pattern of a *similar* NCD risk factor burden and *variable* country disease burden, occurs for two related reasons. First, the period between chronic NCD risk factor exposure and its related morbidity and mortality is long, especially compared to most infectious diseases. Second, in countries with lower life expectancy, people die from other causes (that is, infectious diseases) at younger ages

2 All source references for this executive summary are given in the main part of the book.

before the full impact of exposure to NCD risk factors occurs. Thus, in countries where infectious diseases remain a significant cause of mortality, smokers may succumb to other causes before tobacco's ill effects manifest themselves. By contrast, in countries with longer life expectancies and where tobacco users smoke for many years, the ill effects of tobacco may ultimately cause significant morbidity or even death.

Low birth weight, still common in South Asia, is an important risk factor for NCDs. The fetal origins hypothesis of adult diseases postulates that fetal undernutrition, reflected by low birth weight, is associated with susceptibility to development of IHD and other chronic NCDs in later life.

In socioeconomic terms, the poor face multiple obstacles in preventing NCDs. Tobacco use rates tend to be higher among men with less or no education and tobacco expenditure among the poor frequently crowds out spending on food and education. Furthermore, as noted, it is among the poor where infectious diseases, such as tuberculosis, concomitant with NCDs can result in worse outcomes.

Clustering of NCD risk factors is common. While data limitations do not allow examination of South Asia, multiple risk factors, such as high blood pressure, high cholesterol, high glucose, and obesity, frequently occur in the same individual.

The economic impact of NCDs is significant. In terms of macroeconomic costs, if NCDs were completely eliminated, estimated GDP could increase by 4–10 percent. While elimination is not feasible nor a current, realistic goal, these finding give a sense of the impact that interventions might have. In terms of microeconomic costs, about 40 percent of household expenditures for treating NCDs are financed by household borrowing and sales of assets, indicating significant levels of financial vulnerability to NCDs. The odds of incurring catastrophic hospitalization expenditures are nearly 160 percent higher with cancer, than the odds of incurring catastrophic spending when hospitalization is due to a communicable disease. Because of the chronic nature NCDs compared to communicable diseases, recurrent health events increase the risk of more frequent catastrophic spending. Thus, governments' efforts to reduce impoverishment due to illness may be influenced heavily by policies related to NCDs.

Implications

These findings have major implications for South Asia. Aging will not only increase NCDs, but with it occurring rapidly and without associated economic gains nor social support systems, it can lead to unhealthy aging, characterized by disability and premature death—resulting more quickly in less favorable dependency ratios. The shift of the disease burden toward NCDs—while a significant burden remains of maternal and child health and nutrition issues—will increase demand on the health system because of the need to address this double-disease burden. With most health care currently financed with private out-of-pocket resources, this burden on households will make it harder for many to escape poverty while more will be driven into poverty. Many households may well forgo treatment and suffer excessively, or skew their expenditure patterns from other human development investments such as education (or adopt a combination of the two approaches).

As rural populations shift toward urban areas they will experience changes in lifestyles that may increase their NCD risks. Extreme poverty and fetal and early childhood undernutrition, both from the current situation and from past exposures, will create a large pool of those at elevated risk.

Why the Need to Act Now

Chapters 3 and 4 examine the rationale for action and the opportunities for prevention and control.

Rationale for Action

Several compelling reasons are pushing countries toward tackling NCDs. From both a social and political standpoint, action is warranted. Compared to the rest of the world, South Asians are 6 years younger at their first heart attack. This unfair burden is especially tough on the poor, who after a heart attack, face a lifelong major illness, the need to finance substantial portions of their care out of pocket, and live at great risk for catastrophic spending and worsened impoverishment. Social determinants also play an important role. Dramatic differences in health are closely linked to the degree of social disadvantage and poverty found within countries, and these inequities arise because of the circumstances in which people live, work, and age, and the systems put in place to deal with health and illness.

Several issues support a strong economic rationale for public policies for NCDs, which is formulated on both efficiency and equity grounds: the former, when private markets fail to function efficiently; the latter, when the social objectives of equity in access or outcomes are unlikely to be attained. Examples of inefficiencies include: (i) market failures that have occurred, such as with tobacco consumption and public goods in the form of inaccurate (imperfect) information to citizens for making decisions about the harms of certain behaviors, lifestyles, environments, and unhealthy foods; (ii) externalities, that is, when a consumer does not bear all the costs or harms associated with a behavioral choice; (iii) nonrational behaviors, such as when children and adolescents do not consider the future consequences of their choices, irrespective of whether they are informed of the future consequences; and (iv) time-inconsistent preferences, that is, for some situations, individuals accept instant gratification at the expense of their long-term best interests, and would be better off if actively stimulated to act differently, as is the case with delaying smoking cessation—their choices conflict with their long-term best interests.

In terms of equity, treatment of chronic NCDs, even with inexpensive treatments available, can be expensive to individuals. Chronic NCDs, by definition, require treatment over a much longer period than acute communicable diseases. Given existing health financing patterns in many low- and middle-income countries (the poorer a country is, the more regressive the health care financing system tends to be and the higher the fraction of health costs borne by patients themselves through out-of-pocket payments) the costs associated with chronic NCDs are likely to weigh more heavily on those least able to afford them.

NCDs can hold back development and poverty reduction efforts in low-income countries. Empirical evidence is scant, but earlier projections suggested that over the following 10 years from 2005, deaths from heart disease, stroke, and diabetes might have been likely to lower GDP in India and Pakistan by 1 percent from what it would have been without that burden. At the microeconomic level, if those affected are the main income earners or those rearing children, NCD-related short- or long-term disability, or premature death, can change consumption patterns hugely, including drastic reductions in nonmedical-related household expenditures on food and education and liquidation of accumulated assets to pay for care.

From the health sector perspective, the future increase in burden and risk factors will both put a strain on services delivery and stress budgets. Programs and services need to be reoriented toward efficiently tackling NCD prevention and control while also addressing the substantial remaining burden from communicable diseases as well as maternal and child health, and nutrition issues. To efficiently deliver services for NCDs, the health system infrastructure will need retooling, and human resources will need training and new skills. In addition, health financing strategies for many people needing lifelong treatment will be required.

Fetal and childhood undernutrition is now recognized a major long term-risk factor in the development of adult chronic diseases including heart disease, diabetes, and hypertension. The legacy of this risk factor will be generational and closely linked to social determinants.

In the face of these NCD challenges, many opportunities for their prevention and control are available. Experience from developed countries indicates that the increase in CVD during a similar phase of the epidemiologic transition could be blunted and even substantially reduced by changes in risk levels within the population and through primary care for NCDs.

Opportunities for Prevention and Control

The main finding from studying major declines in CVD mortality seen in several developed countries during the 1960s and 1970s was that nearly half the reduction can be attributed to population-level changes in risk factors, such as tobacco use, and the rest to treatment of disease and its complications—with most of the treatment effect due to early diagnosis and initiation of pharmacological interventions, rather than medical or surgical interventions. Clearly, both prevention and treatment are needed—the challenge is determining the appropriate mix.

Many interventions have been proposed for preventing or reducing the NCD burden. Cost-effective interventions that address CVD, tobacco use, alcohol abuse, consumption of unhealthy fats, and excessive salt intake are now comparatively well understood.

For this current book, interventions were categorized using a policy orientation: population-based interventions in the community, and individual-based interventions within the clinical setting. In terms of population-based interventions, the effects of key tobacco measures and a reduction in salt intake of 15 percent modeled in 23 low- and middle-income countries found that over 10 years, 13.8 million deaths could be averted, at a cost of less than US$0.40 per person a year in low-income and lower middle-income countries, and US$0.50–1.00 per person a year in upper middle-income countries (as of 2005). For Bangladesh, India, and Pakistan (the three South Asian countries among the 23), the model predicts deaths averted in a range of 50–70 per 100,000 of the at-risk population (the population over age 30).

With regard to individual-based interventions, fairly strong effectiveness evidence from randomized control trials supporting the use a number of drugs to prevent (or manage) CVD by reducing blood pressure or cholesterol now exists. This evidence has been used to model the cost-effectiveness of pharmacological interventions among high-risk individuals in the same set of 23 low- and middle-income countries. When scaling up the above current coverage levels, the model estimated that that over a 10-year period, a multidrug regimen for the prevention of CVD could avert 17.9 million deaths from CVD in these 23 countries. The 10-year average yearly cost per person would be US$1.08 (US$0.75–1.40), ranging from US$0.43 to US$0.90 across low-income countries and from US$0.54 to US$2.93 across middle-income countries.

How to Respond

Chapters 5–7 introduce a framework for promulgating policy options, use its structure to examine country-level capacity and key accomplishments, and develop policy options for individual countries as well as strategies for the region as a whole.

Developing and Applying a Framework for Policy Options

While the health sector bears most of the burden for treating NCDs, preventive interventions lie both inside and outside the health sector. A "policy options framework" provides policy makers with a tool for making broader systemic decisions that aim at balancing interventions and providing the optimal strategic mix of population-based interventions in the community to reduce risk factors and of individual-based interventions within the clinical setting to treat risk factors and morbidity.

From a policy perspective, this framework is useful because population- and individual-based interventions mobilize different parts of the non-health and health sectors and require very different inputs in terms of infrastructure, capacity, and skill sets; they also yield very different outputs and outcomes. Harmonizing both intervention modes is necessary to ensure that population-based interventions complement those delivered within the clinical care system.

Different countries are at different stages of development of their NCD programs and it is therefore important to integrate this aspect in the framework. The framework analyzes NCD program management in four stages: *Assess*, *Plan*, *Develop and Implement*, and *Evaluate*.

The framework was used as a basis to assess country capacity and achievements in program implementation for NCDs that are necessary to formulate and implement policy options. Rather than a comprehensive assessment, the focus was on finding strengths that might be enhanced and deficits that could be addressed. Inevitably, gaps in progress were revealed. In the *Assess* stage, surveillance and burden assessments are receiving generally low levels of efforts and no country is reviewing the evidence base. In the *Plan* stage, some countries have NCD cells and national overarching policies. In the *Develop and Implement* stage, some countries have policies and measures in place, but often their implementation and enforcement has been slow or stalled. For community-based interventions, activity is evident in all countries but efforts and the adoption of explicit policies, especially those for tobacco, are highly variable. For individual-based interventions, less progress is evident. In the *Evaluate* stage, the least progress was noted with little commitment directed in this area.

Country-level policy options align with the needs and the capacity and accomplishments made by each country. There were areas where countries are struggling with common issues including developing surveillance systems and assessing the evidence base for interventions.

Developing Regional Strategies

Harmonizing health policies and strategies at a regional level enhances NCD prevention and control efforts, especially for tobacco and food. Indeed, failure to harmonize on tobacco may cause harm, because the tobacco industry tends to target its marketing efforts at countries with fewer restrictions, and where tobacco is taxed less and is easier to buy. Marketing from countries with fewer restrictions can therefore penetrate into countries with more restrictive policies. Also, countries with low cigarette prices relative to their neighbors increase the incidence of smuggling.

Three types of situations may benefit from cross-country or regional collaboration: first, when such collaboration generates positive or negative externalities; second, when it secures economies of scale and scope; and third, when it renders far more effective the production (or prevention) of a good.

On the basis of some guiding principles for regional collaboration, rationales for a regional approach for various areas were identified. Some policy options and actions are specific for risk factors, while some strategies are broader and target the wider health system, yet are critical to strengthening the overall NCD response.

NCD Risk Factors

Expand and Harmonize Tobacco Advertising Bans. Collective bargaining with media entities for advertising and industry for tobacco labeling would give countries more leverage. Most countries ban tobacco advertising for national media, though rarely do they try to with international media that are viewed within their own borders.

Increase and Harmonize Tobacco Taxation. The potential is for negative externalities (increased consumption due to access to cheaper tobacco products in neighboring countries and increased risk of smuggling resulting from such cost variations). Tax policies vary widely across countries and for different tobacco products within countries.

Strengthen Tobacco Anti-Smuggling Measures. Unchecked, smuggling will undermine advertising and tax policies designed to reduce demand and consumption.

Standardize and Mandate Food Labeling Policy. Such a policy would provide a much stronger negotiating position for countries vis-à-vis the food industry, as well as economies of scale (similar labels can be used for several countries). Regional food labeling can also assist national efforts in the growing problem of obesity, through increasing awareness of calorie content (and, possibly, complement awareness campaigns for healthy foods).

Improving Health Systems

Collaborate on Group Purchasing of Essential Medications. Increasing access and affordability of essential medications means that the negotiating power of procurement units would increase (especially in smaller countries), and bulk purchasing would reduce costs and help assure adequate supplies.

Establish a Health Technology Assessment Institution. Such a body is unsustainable in terms of resources or expertise for a single country, yet the outputs will provide critical guidance on policy development for intervention and treatment at country level.

Synergize Regional Education and Training Capacity. With the human resource gaps that most countries face, and the considerable migration around the region among health professionals, the economies of scale of sharing education and training capacity are attractive, particularly given the incipient knowledge base and education opportunities related to the management of NCDs.

Establish a Regional Network of Surveillance and Burden Assessment. Such a network would benefit from cross-country learning. It would also see economies of scale from implementing a range of similar surveys across the region and from the collective bargaining with institutions that conduct such surveys.

Chapter 1: Regional Aging and Disease Burden

Key messages

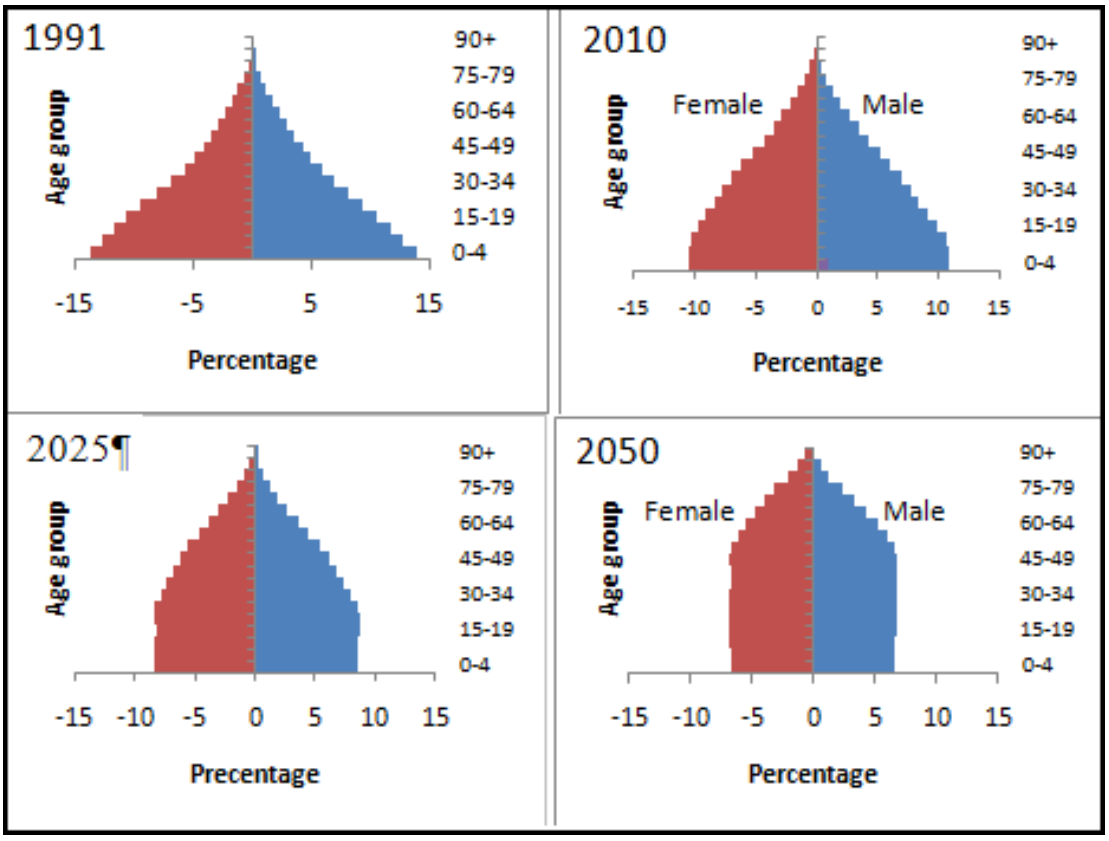
- The demographic and epidemiologic transitions in South Asia are resulting in an increasing share of the disease burden related to noncommunicable diseases (NCDs).
- The impact of these two transitions can either allow countries to benefit from the *demographic dividend* or miss the opportunity due to increased morbidity, disability, and mortality among the working-age population, and to increased expenses related to care and treatment of NCDs.
- Aging is occurring rapidly but often without the social changes that accompanied aging in developed countries decades ago, resulting in unhealthy aging.
- South Asia is now at a crossroad with over half the disease burden attributable to NCDs, in a pattern similar to that of high-income countries decades ago; this proportion is expected to rise significantly. The persisting burden of communicable diseases and maternal and child health (MCH) and nutrition issues creates a "double-disease burden."
- Demographic trends, current levels of undernutrition and their future legacy, NCD risk factors (such as tobacco use) and unhealthy lifestyles (adopted from global trends), as well as poverty and its associated risk factors including early disease, all point toward future increases in the NCD burden in South Asia.
- Ischemic heart disease (IHD) is the leading cause of both deaths and forgone healthy years of life among working-age adults (15–69 years) in South Asia.
- Country-level NCD disease burdens are variable.
- Some risk factor levels are quite similar across countries. Tobacco use among adults is uniformly high among males and is generally low among women. Low birth weight, another risk factor for adult NCDs, is also still common.
- A consequence of high levels of risk factors among men, in particular tobacco consumption and alcohol abuse, is that stagnation in the reduction or even an increase in premature adult mortality may be expected in the years ahead.
- The poor face multiple obstacles in preventing NCDs. Tobacco use rates tend to be higher among poor men and tobacco expenditure among the poor frequently crowds out spending on food and education.
- Out-of-pocket expenditures for services and for medicines are high, highlighting the need to consider equity issues and how such health care should be financed.

Regional Demographic and Epidemiologic Transitions

South Asia is home to a large, quickly growing, and predominantly poor population. The emergence of NCDs in South Asia was, in fact, predictable because of the demographic and epidemiologic transitions (Figure 1.1, Box 1.1, and Table 1.2 below). In the demographic transition the characteristically large, young population of developing countries enters adulthood, but due to reduced fertility rates is not replaced by an equal share of children. The population also experiences longer life expectancy (Figure 1.1). The epidemiologic transition is characterized by a shift in the composition of the disease

burden, reflecting a lower share of communicable diseases and MCH and nutrition problems, and an increasing share of NCDs (Figure 1.3 below).[3]

Figure 1.1 Age structure in South Asia, 1991, 2010, 2025, and 2050



Source: U.S. Census Bureau, http://www.census.gov/ipc/www/idb/informationGateway.php, accessed July 8, 2010.

3 The disease burden can be measured many ways. In this document it most often refers to disability-adjusted life years (DALYs), which measure the number of years a person would lose due to disability and premature mortality.

Box 1.1 Demographic and epidemiologic transitions

The demographic transition results in lower proportions of children, an adult population growing faster than the entire population, and an emerging elderly population. Developed countries made this transition decades ago. The epidemiologic transition, first described by Omran in 1971, begins with a phase of pestilence and famine and a low life expectancy of 20–30 years, then shifts to a phase of receding pandemics and an increase in life expectancy of 40–50 years, then progresses to a phase where life expectancy is 60 years and above, and chronic diseases become the leading cause of death. South Asia is shifting from the second to the third phase.

A fourth phase of the epidemiologic transition has been described as the age of "delayed chronic diseases" reflecting new science and understanding that chronic diseases with aging are not inevitable. In developed countries where people are living longer than they used to, there is a compression of morbidity, that is, longer-living people do not spend more years in poor health. The reasons for this trend seem to include better nutrition, sanitation, and hygiene, as well as the spread of medical knowledge and its application.

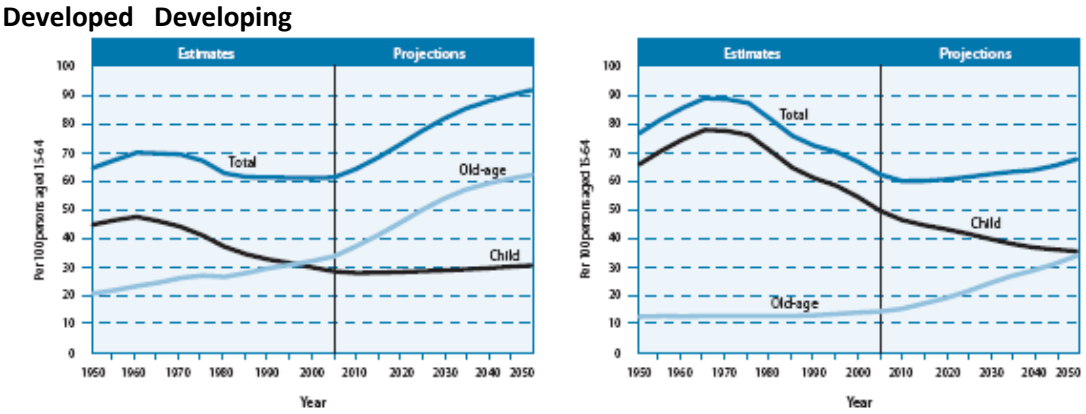
In most developing countries, population aging is happening much faster than it did in developed countries earlier. The result is that, compared to developed countries, increased longevity has not been accompanied by increased personal income; there are also less extensive social welfare and public health provision, leaving the aging process unaccompanied by compression of morbidity. In addition, NCDs moving into younger adult population groups in developing countries can result in premature disability and withdrawal from the labor market. Both unhealthy aging and premature disability, in turn, may result in less favorable dependency ratios and dampen the potential demographic dividend.

While progression of both transitions is predictable, the rate of progression is not, and can be highly variable—as evident in the South Asia region. These transitions are unfolding at a pace where a substantial residual burden remains from communicable diseases, MCH issues, and nutrition causes—an important point from at least two angles. First, evidence is emerging that links MCH and nutrition issues to NCD risk later in life. For example, undernutrition during fetal gestation and early childhood, and low rates of consistent breastfeeding, both common in South Asian populations, are associated with increased risk for chronic NCDs in adult life. Second, individuals with both an NCD and an infectious disease tend to have worse outcomes compared to having either alone.

Aging as a result of these transitions will in itself increase the prevalence of NCDs because they are more common with increasing age. Other factors—including lifestyle changes that may be associated with urbanization and globalization—can also increase the risk of NCD onset at younger ages.

In the context of development, the impact of these two transitions is substantial because of the demographic dividend, that is, where developing countries' working and nondependent population increases and per capita income thus rises (Figure 1.2).

Figure 1.1 Dependency ratios in developed and developing countries



Source: UN 2007.

Many implications from these transitions are evident. First, the burden will grow in the future, overwhelming the health sector and making it less responsive. If unaddressed, the impact of NCDs on individuals in terms of short- and long-term disability and premature death and forgone wages will be significant and worsen dependency ratios.[4] Second, with most health care financed with private out-of-pocket resources, some people may never escape poverty or be driven into poverty, some will forgo treatment and suffer excessively, and some will skew their expenditure patterns from other human development investments. Finally, at the country level, while empirical data are scant, it is expected that productivity will decline, impacting economic growth.

South Asia's mainly rural (71 percent) population is young, but already less so than in Sub-Saharan Africa (Table 1.1). Life expectancy at birth, at 64 years, has been rising but remains below the levels observed in other regions (except Sub-Saharan Africa). Aging is occurring rapidly but often without the social changes such as improved living conditions, better nutrition, gains in wealth and access to health services that accompanied aging in developed countries decades ago. This can result in unhealthy aging.

Demographic, Economic, and Health Profiles South Asia has experienced average annual 6 percent GDP growth in the last 20 years, despite conflict and instability. This performance has pushed down poverty rates, but growth has not been inclusive or fast enough to reduce the number of poor. Indeed, South Asia has the largest concentration of poor people in the world, with over 1 billion—some two-thirds—living on less than US$2 a day. More than two-fifths of the population live in extreme poverty, on less than US$1.25 a day.

Inequality has risen, reflecting deep distortions in access to markets, and in the availability and quality of health, education, and infrastructure services.

Weak governance and conflict have been serious impediments to inclusive growth, and on average conflict-prone areas have grown one third less rapidly than the rest of the region.[5] Security in some areas has been deteriorating through war, insurgency, terrorism, and other forms of organized violence. Weak governance and conflict have also limited the delivery of public services such as health care. (In

4 In economics, the dependency ratio is an age–population ratio of those typically not in the labor force (dependent part) and those typically in the labor force (productive part). The dependent part covers children (aged 0–14) and the elderly (those 65 years and older).

5 World Bank. 2010. "South Asia Regional Strategy: An Update." Informal Board Presentation, March.

the last few years, though, for the first time, all countries in the region have democratically elected their governments.)

Table 1.1 Demographic, economic, and health profiles for low- and middle-income regions

Category	Indicator	Year	EAP	ECA	LAC	MENA	SAR	SSA
Population	Total (millions)	2008	1,929.6	443.3	566.1	325.2	**1,545.1**	819.3
	Rural (%)	2008	56	36	21	43	**71**	64
	Over 65 yrs (%)	2008	7	11	7	4	**5**	3
	Dependency ratio (% of working-age population)	2008						
	Young		33	28	44	49	**52**	79
	Old		10	16	10	7	**7**	6
Economy	GNI per capita	2008	2,644	7,350	6,768	3,237	**963**	1,077
	PPP GNI per capita	2008	5,421	11,953	10,312	7,343	**2,695**	1,949
	Annual growth GDP (%)	2007-08	8.0	4.1	4.3	5.5	**5.6**	5.1
	Labor force participation rate	2008						
	% male 15 yrs and older		79	67	79	73	**82**	80
	% female 15 yrs and older		64	50	52	26	**35**	60
	Extreme Poverty (%<US$1.25 PPP)	2005	16.8	3.7	8.2	3.6	**40.3**	50.9
Health Indicators	Infant mortality rate (per 1,000 live births)	2008	23	19	20	29	**58**	86
	Maternal mortality ratio (per 100,000 live births, modeled estimates)	2005	150	45	130	200	**500**	900
	Crude death rate (per 1,000 people)	2008	7	11	6	6	**7**	14
	Life expectancy at birth	2008	72	70	73	71	**64**	52
Health Financing	Total expenditure (% GDP)	2007	4.1	5.6	7.1	5.5	**4.0**	6.4
	Public % of total	2007	46.3	65.7	48.5	50.8	**27.5**	41.1
	Total per capita US$	2007	95	396	473	151	**36**	69

Sources: World Bank, *World Development Indicators 2010*. Original data sources include: ILO, *Key Indicators of the Labour Market*, 6th edition (labor force participation rate); WHO, UNICEF, UNFPA, and World Bank, *Maternal Mortality in 2005* (maternal mortality ratio); WHO, *World Health Statistics 2009* (hospital beds and physicians); and WHO *National Health Accounts* (health financing data).

Note: Purchasing power parity (PPP) gross national income (GNI) per capita for the MENA region is not from 2008 (year not specified in the data source).

As a result, the region's performance on meeting the Millennium Development Goals (MDGs) has been mixed. Looking beyond consumption and poverty, the region has had encouraging success in some areas: for instance, infant mortality rates have dropped from about 120 in 1980 to 58 in 2008. However, challenges remain in key areas such as child malnutrition, maternal mortality, and gender balance in education and health outcomes. The resurgence of tuberculosis and the threat of HIV/AIDS are also cause for concern.

Mixed progress on the MDGs is also grounded in health systems' failure to adjust to people's changing needs. Population aging is associated with a rapid increase in health problems such as heart diseases, cancers, diabetes, and obesity, putting new pressure on health systems. Total expenditure levels on health as a share of GDP or per capita remain the lowest among lower- and middle-income regions. Close to three-fourths of this spending is from private sources (mostly out of pocket) suggesting financial vulnerability among the poor.

Down from a regional perspective, several country-level contextual factors need consideration for developing effective responses. Table 1.2 profiles the basic indicators for population and health of South Asian countries. Of course, there is tremendous variation in population size from the small countries of

Bhutan and Maldives to India. Yet all countries have similar proportions living in rural areas—an important point, not only for considering the challenges of addressing social determinants and risk factors for NCDs but also the challenges of delivering care.

Table 1.2 Demographic, economic, and health profiles for South Asian countries

Category	Indicators	AFG	BGD	BTN	IND	MDV	NPL	PAK	LKA
Population	Total (million)	29.0	160.0	0.7	1140.0	0.3	28.8	166.1	20.2
	Rural (% of total)	NA	73	66	71	62	83	64	85
	Over 65 years (% of total)	2	4	5	5	4	4	4	7
	Dependency ratio (% of working-age population)								
	Young	90	50	49	50	44	63	63	35
	Old	4	6	7	8	6	7	7	11
Economy	GNI/capita	370	520	1,900	1,040	3,640	400	950	1,780
	PPP GNI/capita	1,100	1,450	4,820	2,930	5,290	1,110	2,590	4,460
	Annual growth GDP (%)	2.3	6.2	13.8	6.1	5.2	5.3	2.0	6.0
	Labor force participation rate								
	% male 15 yrs and older	89	84	72	81	77	76	85	74
	% female 15 yrs and older	33	58	54	33	58	63	21	35
	Extreme Poverty (% <US$1.25 PPP)	NA	49.6	26.2	41.6	NA	55.1	22.6	14.0
Health Indicators	Mortality rate, infant (per 1,000 live births)	165	43	54	52	24	41	72	13
	Maternal mortality ratio (per 100,000 live births)	1,800	570	440	450	120	830	320	58
	Crude death rate (per 1,000 population)	20	7	7	7	5	6	7	6
	Life expectancy (years)	44	66	66	64	72	67	67	74
Health Services[a]	Hospital beds	4	3	16	7	23	2	10	29
	Physicians	2	3	0.2	6	9	2	8	6
Health Financing	Total expenditure on health (% of GDP)	7.3	3.5	3.9	4.0	11.2	4.9	2.9	4.0
	General government expenditure on health (% of total)	21.2	35.7	80.3	28.0	69.6	39.0	29.7	42.9
	Per capita total expenditure on health (US$)	48	17	75	43	462	20	24	81

Sources: World Bank, *World Development Indicators 2010* except for data for Bhutan, Maldives, and health services. Data for Bhutan and Maldives are from the World Bank's Development Data Platform (DDP). Data for health services are from *World Health Statistics 2009*. Original data sources include: ILO *Key Indicators of the Labour Market*, 6th edition (labor force participation rate); WHO, UNICEF, UNFPA, and World Bank, *Maternal Mortality in 2005* (maternal mortality ratio); and WHO *National Health Accounts* (health financing data).

Note: Data are for 2008 except for extreme poverty (2002–2005), maternal mortality ratio (modeled estimates, 2005), hospital beds (2000–2008), and physicians (2000–2007).

a. Per 10,000 population.

Life expectancy ranges hugely, from 44 years in Afghanistan to 74 years in Sri Lanka, where approximately 7 percent of the population is 65 years or older, much higher than the proportion for other countries. This is an important point when one considers that NCDs become more common with age. Physician and hospital bed density both tend to be low across the region, with exceptions in

Maldives and Sri Lanka. These two indicators reflect national averages and do not allow an appreciation of the heterogeneity within large countries. Treating NCD may require heavy use of health services and new initiatives will need to consider strains on the current systems as they gear up for future efforts.

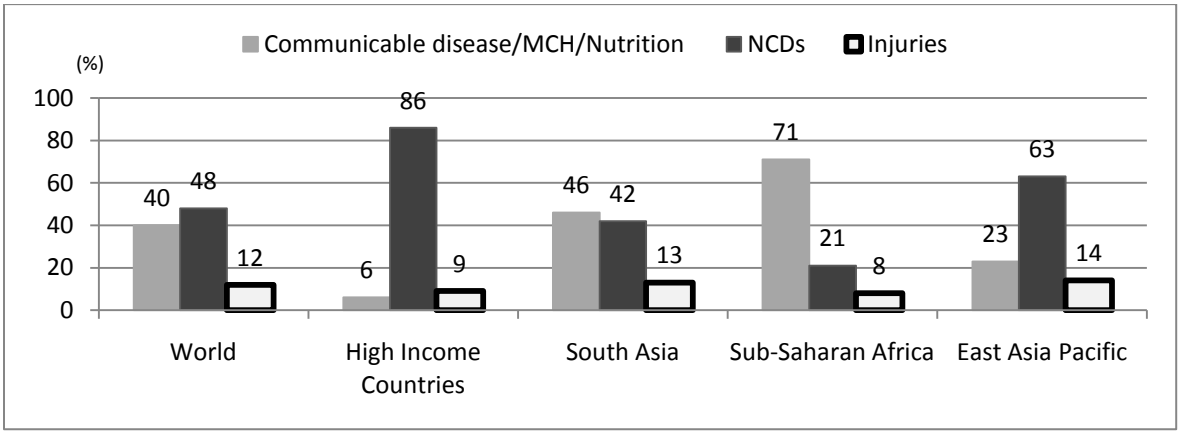
A broad look at current financing finds that total health expenditures range from 2.9 percent of GDP in Pakistan to 11.2 percent in Maldives. Half the countries are spending annually less than US$34 total per capita on health—the level considered essential to secure basic services (WHO 2008a). Out-of-pocket expenditures (which account for most of the nonpublic expenditures) are generally high, representing about a half or more of total health expenditures in most countries. When data are available, the proportion of the out-of-pocket expenditures used to purchase medicines is also uniformly high (van Doorslaer et al. 2007)—of great significance because medicines play an important role in providing individual-based prevention and treatment for NCDs. The level of out-of-pocket expenditures for services and medications highlights the need to address financing and equity issues.

NCDs in South Asia

Regional Disease Burden and Risk Factors

In South Asia the disease burden is shifting: the burden of NCDs (55 percent including injuries) is now more than that of communicable diseases, MCH issues, and nutrition causes combined (46 percent) (Figure 1.3).

Figure 1.3 Burden of disease as a proportion of total forgone DALYs by cause, selected regions, 2004



Source: WHO revised 2004 Global Burden of Disease estimates, http://www.who.int/healthinfo/bodgbd2002revised/en/index.html, accessed July 2009.

This pattern is similar to that of high-income countries decades ago. They are now well advanced into their demographic and epidemiologic transitions, with most of their disease burden due to NCDs which account for 95 percent of forgone DALYs (Box 1.2).

While the proportion of the total burden from NCDs is larger in South Asia than in Sub-Saharan Africa, where the transitions are not as far along, it is smaller than in East Asia and the Pacific. Future estimates of the NCD burden are not currently available. However, the demographic trends noted above suggest that the burden in South Asia will grow significantly. One implication of having significant burdens of both communicable diseases and NCDs is that for individuals with both (e.g., tuberculosis and diabetes) their clinical courses and treatment can be more complicated than having either alone. This underscores

the need for countries to consider addressing NCDs and infectious diseases simultaneously. Crucially, though, the countries in South Asia have a unique opportunity to act now to curb growth in the NCD disease burden.

Box 1.2 Methods to describe the health situation in South Asia

Mortality data in the region are limited. Therefore, to describe the health situation, we use age-standardized undiscounted disability-adjusted life years (DALYs), which measure the number of years a person would lose due to disability and premature mortality. Death rates are presented where possible. A number of health surveys have been carried out in the region; they are very useful at the country level, but often not comparable at the regional level (Chapter 3). Because of the methodology used to estimate DALYs, the death of a child contributes more DALYs than the death of an older person. An advantage of using DALYs to measure the burden of disease is that it considers years with disability and thus includes conditions that, although not fatal, can be a large economic and social burden.

South Asian researchers have raised concern over the weights used in DALYs to measure disability, since these have not been fully validated in the region. In addition, for countries with no data, DALYs have been calculated by extrapolating the level and composition of death and disability from countries of similar epidemiologic and economic profiles, allowing assessment only by broad groups of diseases and leading conditions within those groups.

Yet despite these caveats, DALY estimates have been reasonably close when compared to new data, such as those from surveys or special studies. Other benefits of using DALYs are that this indicator has been used around the world and that there is a global commitment to continue providing and adjusting these estimates. However, more work is need on collecting and analyzing NCD data in South Asia.

IHD is the leading cause of both deaths and forgone DALYs among working-age adults (15–69 years) in South Asia (Table 1.3). The forgone DALYs pattern is somewhat different from the pattern for deaths and reflects the chronic debilitating nature of many conditions.[6]

6 An additional measure for determining the impact of NCDs is healthy life expectancy (HALE). This is the average number of years that a newborn can expect to live in "full health." and is a calculation used by statisticians and demographers by adjusting life expectancy of time spent in poor health. In South Asia the range is from 36 years in Afghanistan to 62 years in Sri Lanka.

Table 1.3 Deaths and DALYs Attributable to the 10 Leading Diseases and Injuries, Adult 15-69 years, South Asia, 2004

Rank	Cause	Total deaths	Total %	Rank	Cause	Total DALYs	Total %-
1	Ischemic heart disease	1,018,869	16.2	1	Ischemic heart disease	28,782,078	8.9
2	Cerebrovascular disease	417,870	6.7	2	Tuberculosis	16,373,869	5.1
3	COPD	415,215	6.6	3	Unipolar depressive disorders	13,833,204	4.3
4	Tuberculosis	407,593	6.5	4	Lower respiratory infections	12,546,419	3.9
5	Lower respiratory infections	362,723	5.8	5	Hearing loss, adult onset	11,902,501	3.7
6	Self-inflicted injuries	213,644	3.4	6	COPD	11,746,661	3.7
7	Road traffic accidents	199,871	3.2	7	Self-inflicted injuries	11,129,697	3.5
8	Fires	146,068	2.3	8	Cerebrovascular disease	10,681,431	3.3
9	Cirrhosis of the liver	133,945	2.1	9	Road traffic accidents	9,935,226	3.1
10	Diabetes mellitus	118,175	1.9	10	Refractive errors	9,224,506	2.9
	All Causes	6,280,515	100%		*All Causes*	321,635,048	100%

Source: WHO Global Burden of Disease, disease and injury regional estimates for 2004, http://www.who.int/healthinfo/global_burden_disease/estimates_regional/en/index.html.

Table 1.4 profiles the forgone DALYs by age, sex, and cause. Adults account for most of the DALYs forgone to NCDs, while children account for most of the DALYs attributed to communicable diseases, MCH issues, and nutrition causes.

Table 1.4 DALYs forgone in the South Asia Region by sex, age, and cause, 2004

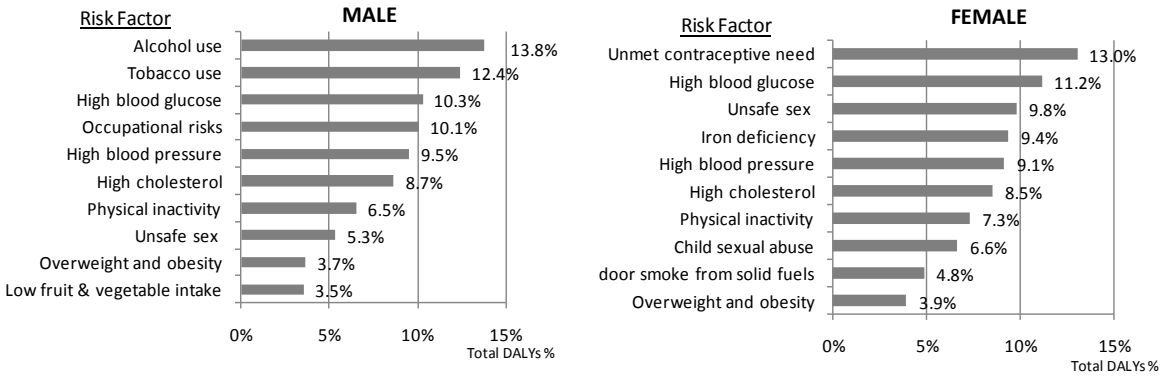
	Proportion of disease-specific DALYs by age (%)				Total DALYs (thousands)	
	under 5	5–14	15–69	70+		
Males						
CD/MCH/Nutrition	64.9	8.6	24.8	1.5	92,695	*(100%)*
Noncommunicable Diseases	8.7	6.7	77.1	8.0	88,198	*(100%)*
Injuries	8.2	16.8	72.7	1.3	29,481	*(100%)*
Females						
CD/MCH/Nutrition	59.3	8.2	32.9	1.5	98,215	*(100%)*
Noncommunicable Diseases	9.5	6.9	72.0	9.4	85,494	*(100%)*
Injuries	12.3	21.8	64.1	1.8	22,730	*(100%)*

Source: WHO Global Burden of Disease, 2004, http://www.who.int/healthinfo/global_burden_disease/en/.

Additional research is finding that cardiovascular risk is highest for South Asians among the world's regions (Goyal and Yusuf 2006). A recent study of 52 countries from all over the world, including Bangladesh, India, Nepal, Pakistan, and Sri Lanka, found that South Asians were 6 years younger (53 vs. 59 years) than those in the rest of the world at their first heart attack, had high levels of risk factors for CVD such as diabetes and high lipids, and had low levels of protective factors such as physical activity and healthy dietary habits. With South Asians, therefore, appearing to have a greater susceptibility to CVD, it may have an even greater impact in the future than previously appreciated (Goyal and Yusuf 2006; Ramaraj and Chellappa 2008).

In terms of DALYs forgone to risk factors, Figure 1.4 (for men and women) shows very different risk profiles. However, for both sexes, most of the risk factors are related to NCDs. The profile for women reflects the contributions to premature disability and mortality from high cholesterol (an NCD risk factor) to be similar to that of iron deficiency (an MCH issue). Among males, with the exception of unsafe sex, all the other risk factors associated with forgone DALYS are related to NCDs, including tobacco consumption and alcohol use, high cholesterol, high blood pressure, and low consumption of fruits and vegetables. A consequence of high levels of risk factors among men, in particular tobacco and alcohol, is that stagnation in the reduction or even increase in premature adult mortality may be expected in the years ahead. These risk factors and trends are similar to the situation seen in the Russian Federation and Eastern Europe (Marquez et al. 2005).

Figure 1.4 DALYs attributable to 10 leading risk factors by sex, adults 15–69 years, South Asia, 2004



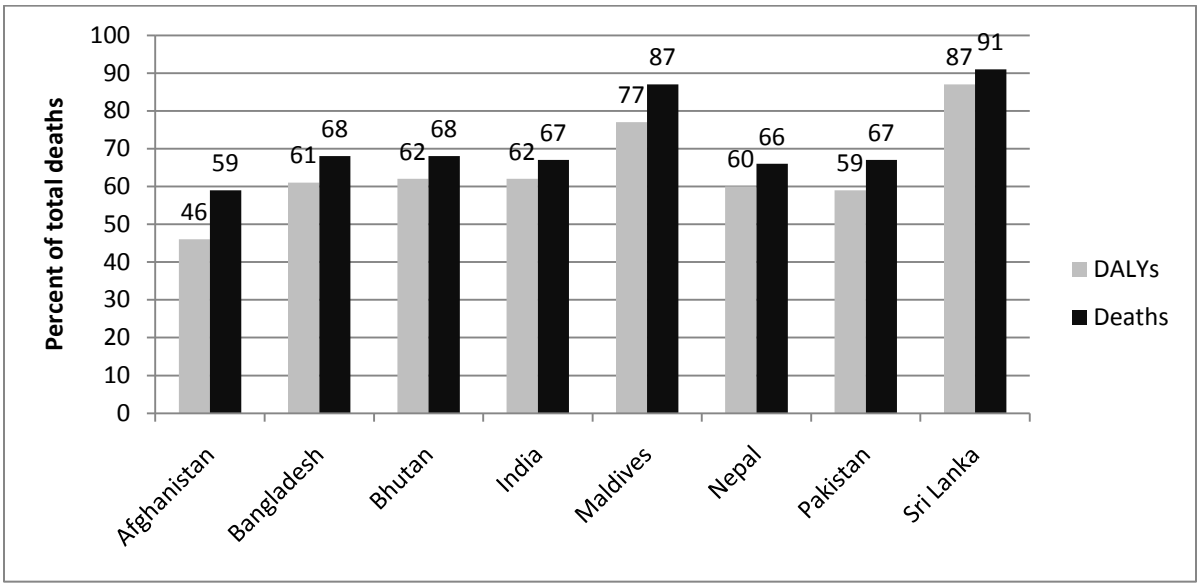
Source: WHO Global Burden of Disease, Risk Factors Estimates for 2004, http://www.who.int/healthinfo/global_burden_disease/risk_factors/en/index.html.

Clustering of NCD risk factors is common. While data limitations do not allow examination, multiple risk factors such as high blood pressure, high cholesterol, high glucose, and obesity can all occur in the same individual. Intervention design and policies can take advantage of this pattern.

Country-level Disease Burdens and Risk Factors

Country-level NCD disease burdens are quite variable. Of the total forgone DALYs attributed to NCDs, the proportion ranges from 87 percent in Sri Lanka—similar to the pattern found in middle- and high-income countries—to 43 percent in Afghanistan (Figure 1.5).

Figure 1.5 Proportion of total deaths and forgone DALYs due to NCDs, South Asia, 2004

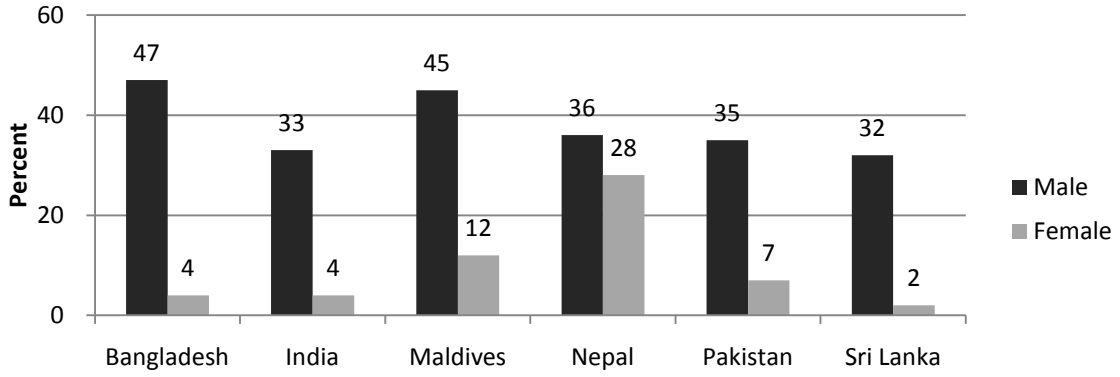


Source: WHO Global Burden of Disease, 2004 update, http://www.who.int/healthinfo/global_burden_disease/estimates/en/index.html.

Where data are available, the prevalence of NCDs is increasing. In Sri Lanka, where some of the better secular morbidity data are available, successive population-based surveys indicate upward trends in the prevalence of diabetes. The prevalence of diabetes was estimated at around 3–6 percent in adults in the 1990s; surveys in 2005 and 2008 reveal a prevalence rate of above 10 percent in adults (Illangasekera et al. 1993; Mendis and Ekanayake 1994; Fernando et al. 1994; Malavige et al. 2002; Illangasekera et al. 2004; Wijewardene 2005; Katulanda et al. 2008).

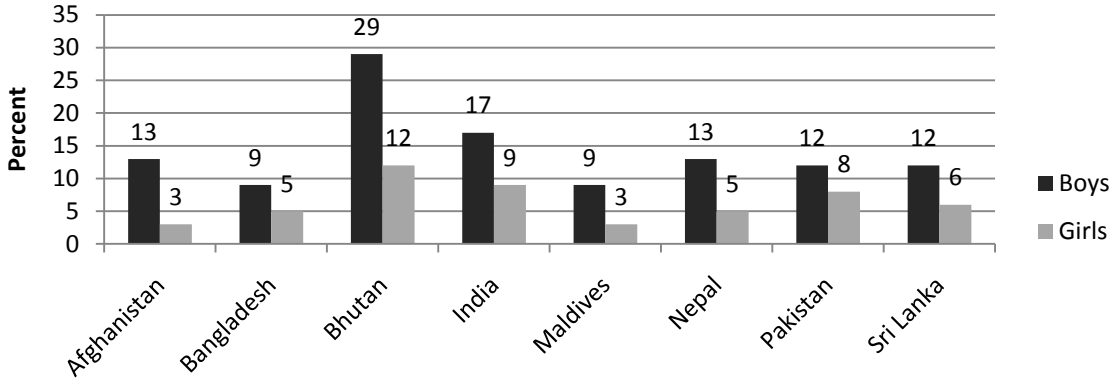
This regional pattern is characterized by similar country-level NCD risk factor burdens and variable country disease burdens. As said, tobacco use among adults is uniformly high among males (30–50 percent use rate with any form) and is low among women with the exception of Maldives and Nepal (Figure 1.6). (Lack of data among adults from both Afghanistan and Bhutan highlight the need for better surveillance across the region.) Even more concerning than these profiles among adults are the rates of tobacco use in youth (13–15 years for both boys and girls) ranging from 20 percent in Bhutan to 6 percent in Maldives (Figure 1.7).

Figure 1.6 Age-adjusted prevalence of current smoking of any tobacco product among men and women 15 years old and above, South Asia



Source: WHO 2008b.

Figure 1.7 Prevalence of current smoking of any tobacco product among youth 13–15 years old, South Asia



Source: WHO Global Youth Tobacco Survey implemented between 1999 and 2008.

The poor face multiple obstacles in preventing NCDs. Tobacco use rates tend to be higher among men with less or no education and tobacco expenditure among the poor frequently crowds out spending on food and education (John 2008a). Furthermore, it is among the poor where NCD risk factors (tobacco use) and infectious diseases (tuberculosis) are more common leading to worse outcomes, as already noted. For example, the risk of dying from tuberculosis is 2.3 times as high for smokers than for nonsmokers (Gupta et al. 2005; Jha et al. 2008).

Another risk factor for NCDs is low birth weight, still common in South Asia. The fetal origins hypothesis of adult diseases postulates that fetal undernutrition, as reflected by low birth weight, is associated with susceptibility to development of IHD and other chronic NCDs in later life (Barker et al. 1989). Breastfeeding practices may contribute to an increase in NCDs. A recent meta-analysis of the world's literature by WHO examined breastfeeding practices associated with important NCD outcomes (Horta et

al. 2007). Allowing for methodological difficulties, this review concluded that infants who were breastfed had lower mean blood pressure and cholesterol, and better performance on intelligence tests later in life.

This regional pattern of a similar NCD risk factor burden with a variable country disease burden occurs for two related reasons. First, the period between risk factor exposure and its related morbidity/mortality is long, especially compared to most infectious diseases. Second, in some countries people die from other causes (infectious diseases) at younger ages before the full impact of exposure to NCD risk factors has occurred. Thus in countries where infectious diseases remain a significant cause of mortality, smokers may succumb to other causes before tobacco's ill effects manifest themselves. By contrast, in countries with longer life expectancies and where smokers smoke for many years, the ill effects of tobacco use may ultimately cause significant morbidity or even death.

Economic Burden

The economic consequences of NCDs includes three cost types (Suhrcke et al. 2008):

- Social welfare costs—the value that people place on better health
- Macroeconomic costs—the GDP losses countries incur due to ill health in the population.
- Microeconomic costs—household financing of care, changes in consumption patterns, and forgone earnings of individuals and households due to the ill health among members.

Social Welfare Costs

To arrive at a health value, analyzing either how people act or how they answer certain questions related to real or hypothetical situations involving a trade-off between money and health can be done. This value also captures the intrinsic value of health. One study (Mahal et al. 2010), attempting to estimate the expected welfare benefits from a reduction in CVD mortality in India by 1 percent a year over 2000–2030, suggested an annual welfare gain equal to about three times that country's GDP in 2000. Such high numbers reflect the substantial value that people attribute to reduced mortality and better health, a value that well exceeds any narrower economic cost measures.

Macroeconomic Costs

Careful recent studies have called into question the positive contribution of health to economic growth, an idea that earlier had been put forth strongly by the Commission on Macroeconomics and Health (WHO 2001). However, overcoming the econometric challenges in establishing causality, recent work using country-level data has brought a relatively new focus on NCD-related health proxies. Suhrcke and Urban (in press) have shown that high CVD mortality rates slowed economic development, especially among high-income countries, between 1960 and 2000. Results are less convincing for developing countries.

Rocco and Suhrcke (forthcoming) used another approach and, addressing data limitations, conclude that a reduction in global CVD deaths by 10 (out of 100,000 population) added 7 percent to per capita income over the observation period 1970–2000. In addition, analyses by Mahal et al. (2010), estimated that in India if NCDs were completely eliminated, estimated GDP would increase by 4–10 percent. While elimination is not feasible nor a current, realistic goal, these findings give a sense of the impact that reductions might have. This new work provides support for the hypothesis that reducing NCDs is good for economic growth, but more work is needed to substantiate the evidence.

Microeconomic Costs

Financing of Care

Treating chronic diseases, once they are expressed clinically, can be expensive to those affected. Chronic NCDs, by definition, require drug, inpatient, and outpatient treatment over a much longer period than acute communicable diseases. Given existing health financing patterns in many low- and middle-income countries, the costs associated with chronic NCDs are likely to weigh more heavily on those least able to afford them, increasing the risk of economic loss and impoverishment. The poorer a country is, the more regressive the health care financing system tends to be and the higher the fraction of health costs borne by patients themselves (Gottret and Schieber 2006).

Still, direct quantitative evidence of specific chronic NCDs, pushing households or individuals below the poverty line in a strict causal sense is missing. However, several studies have assessed whether medical expenditures for chronic NCD are high in proportion to overall household expenditures.

In India, the risk of distress borrowing and distress selling of assets increases significantly for hospitalized patients if they are smokers (Bonu et al. 2005). Surprisingly, the risk is even higher for those who do not smoke themselves but belong to households in which other people smoke or drink (or both). A potential explanation might be that smokers who are hospitalized are more likely to stop smoking (thereby saving money), while household members who are not hospitalized are less likely to relinquish their habits (but continue to expose others).

A recent cross-country study including Bangladesh, Nepal, and Sri Lanka found that while many of the poor are pushed further into poverty, on the whole it is the better-off who are more likely to spend a large fraction of total household resources on health care (van Doorslaer et al. 2005). This somewhat surprising result may be explained by the inability of the poor to divert resources from basic needs (thereby simply forgoing health care), and by some protection of the poor from user charges. O'Donnell et al. (2008) give a similar analysis of the same set of countries, showing that in most Asian low- and middle-income countries, the better-off not only pay more, they also get more health care.

The finding that better off households spend a larger fraction of their resources than the poor was confirmed by the recent findings of Mahal et al. (2010) who estimated the amount of out-of-pocket expenditures attributable to NCD treatment in India in 12 months in 1995–96, and again in 2004. They also found that between the two study periods the share of NCDs in total out-of-pocket health expenditures increased from 31.6 percent to 47.3 percent in 2004, suggesting a growing importance of NCDs in India in terms of their financial impact on households. The authors also found that NCDs generally incurred significantly higher treatment costs (about double) in terms of out-of-pocket expenditures than other conditions and diseases, and hence implied a higher financial risk burden on affected individuals and households. Interestingly, Mahal et al. (2010) found that about 40 percent of household expenditures for treating NCDs were financed by household borrowing and sales of assets, strengthening the evidence for significant levels of financial vulnerability to NCDs.

Mahal et al. 2010 investigated further detail of the financial burden imposed by health care payments for NCD treatment and found that the odds of incurring catastrophic hospitalization expenditures[7] were nearly 160 percent higher with cancer than when hospitalization is due to a communicable disease. The odds of incurring catastrophic hospital spending due to CVD or injuries turned out to be about 30 percent greater than for communicable conditions that result in hospital stays. The authors also

7 Mahal et al. (2010) defined health care spending for hospitalization as "catastrophic" when such spending exceeded 30 percent of their measure of ability to pay, that is, household consumption spending less combined survival income for all household members. Survival income was defined as the poverty-line level of expenditure multiplied by household size.

estimated the impoverishing effect[8] of hospitalization due to NCDs, for which the results were broadly similar to the catastrophic expenditure evidence. In short, governments need to consider financial vulnerability carefully when setting financing policy.

Consumption Patterns

One study considered the opportunity costs of smoking for poor households in Bangladesh by comparing the amount of money spent on tobacco to the calories that could be "bought" with the forgone money (Ali et al. 2003). The average amounts spent on tobacco each day would generally be enough to make the difference between at least one family member having just enough to eat to keep from being malnourished (Ali et al. 2003, p. 12).

John (2008a) found that in India, households with tobacco users had lower consumption of certain commodities such as milk, education, clean fuels, and entertainment, which may have a more direct bearing on women and children in the household than on men, suggesting that tobacco spending also had negative effects on per capita nutrition intake.

Similar results are likely to apply to heavy alcohol consumption, although the evidence appears to be more qualitative than that for smoking.[9] One study compared two groups of 98 families living in Delhi, India (Saxena et al. 2003). In the first group, at least one adult from each family consumed three or more drinks per week over the course of a month. In the second group, no one consumed more than one drink over a month-long period. Families in the first group spent almost 14 times as much on alcohol each month than those in the second group, resulting in fewer financial resources available for items such as food, education, and daily consumables. In addition, 54 families in the first group were in debt, compared with 29 in the second. Benegal et al. (2000) had similar findings for the costs associated with heavy alcohol consumption.

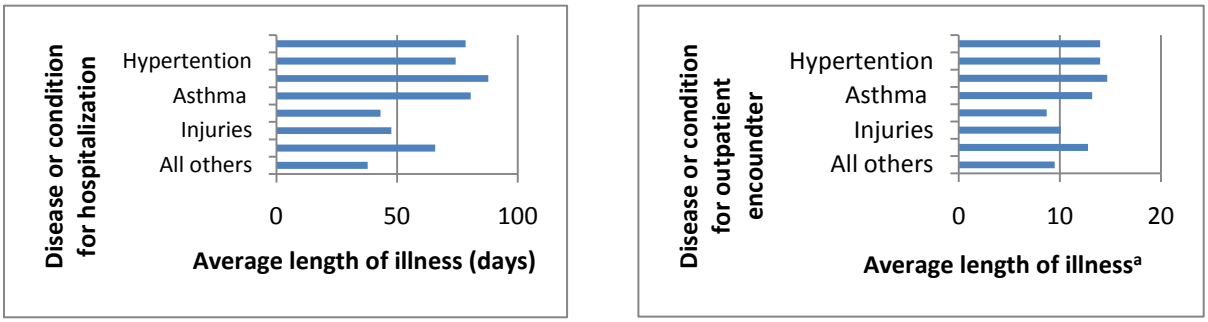
Lost Income

When ill with NCDs, most people cannot continue working and so forgo personal and household income. A study in India found that duration of illness, defined as days when people could not work, was in the range of about 50–70 days for some NCDs, or greater than from other conditions (Mahal et al. 2010) (Figure 1.8). The annual income loss from missed work, time given for care taking, and premature death are also significant (Figure 1.9).

8 Hospitalization spending was considered "impoverishing" if, after subtracting it from total household spending, a household would fall below the poverty line.

9 Data are from a small set of respondents, selected without representative sampling criteria.

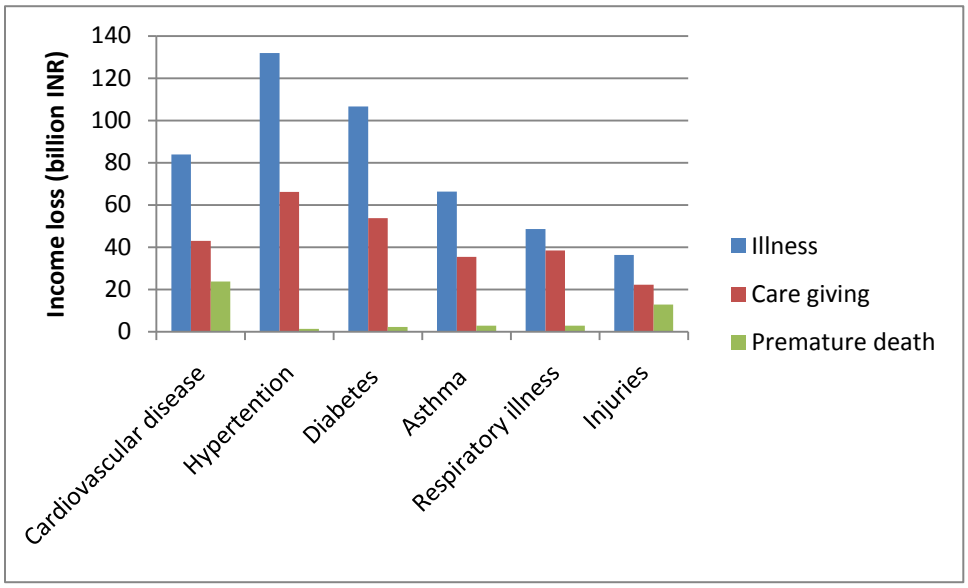
Figure 1.8 Duration of illness[a] for hospitalized surviving persons and for outpatients, India, 2004



Sources: Mahal et al. 2010; National Sample Survey Organization 2004.

a. Days when could not work.

Figure 1.9 Annual income loss[a] from missed work, time for care giving, and premature death among households with a member having an NCD, India, 2004



Sources: Mahal et al. 2010; National Sample Survey Organization 2004.

a. Assumes that wages for all working and nonworking adults.

Chapter 2: Country-level Aging and Disease Burden

Key Messages

- Among South Asia countries, Afghanistan is at the earliest stage and Sri Lanka and the latest stage of the demographic transition.
- Among all countries, CVD, diabetes, cancer, chronic respiratory diseases, and injuries are important causes of morbidity and mortality. In addition, mental health is an important issue, particularly for Afghanistan and Pakistan.
- All countries are experiencing the double-disease burden.
- Implications of this aging and disease pattern shift are a larger NCD burden. This in turn will further strain health sector budgets, service delivery, and household budgets financing care, and reduce household income due to disability and early mortality among wage earners. All these aspects will diminish the potential for reaping a demographic dividend.

Introduction

The major findings in Chapter 1 were from the WHO *Global Burden of Disease Study* and global tobacco use studies, both of which used standard methods across countries. However, further regional comparisons are challenging for two reasons: few other NCD studies are available across the region in all the countries, and studies that are available often use different methods and analyses that limit valid comparisons.

Several design and analytical issues come into play that can affect both the reported disease burden and risk factors. These including urban and rural status, age range (NCDs are more common with aging); institution-based studies (hospital and clinics) that do not represent the entire population (participants tend to be less healthy); measurement protocols for anthropometrics, blood pressure, glucose, and lipid levels; and cut-off points and thresholds used to define disease or risk.

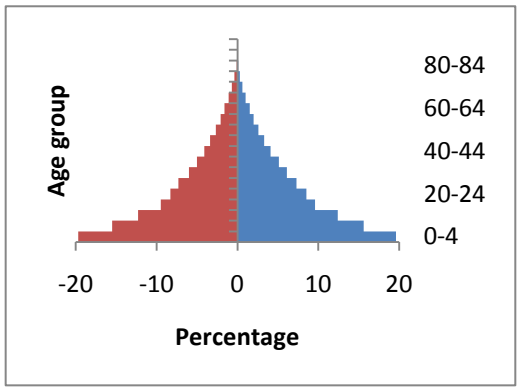
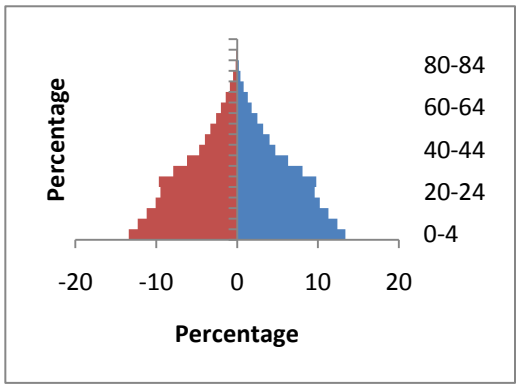
However, despite these limitations, available studies provide valuable country-level data that can be very useful in shedding more light on the extent of the problem and in focusing prevention and control efforts. The approach here has been to briefly summarize important demographic and NCD burden trends for each South Asian country.[10]

Afghanistan

Afghanistan is yet to start the demographic transition that will just start to be evident in 2025 (Figure 2.1). The proportion of the population 65 years and older will move from 2.1 percent in 2000 to 2.9 percent in 2025.

10 These are summaries from country reports compiled between March and September 2009 by a team of South Asia–based consultants (see *Acknowledgements* for details). The reports included burden, risk factors, capacity assessment, and accomplishments. The country reports themselves contain the citations for the findings given here.

Figure 2.1 Age structure in Afghanistan, 2000 and 2025

2000	2025
Female Male	Female Male
	

Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

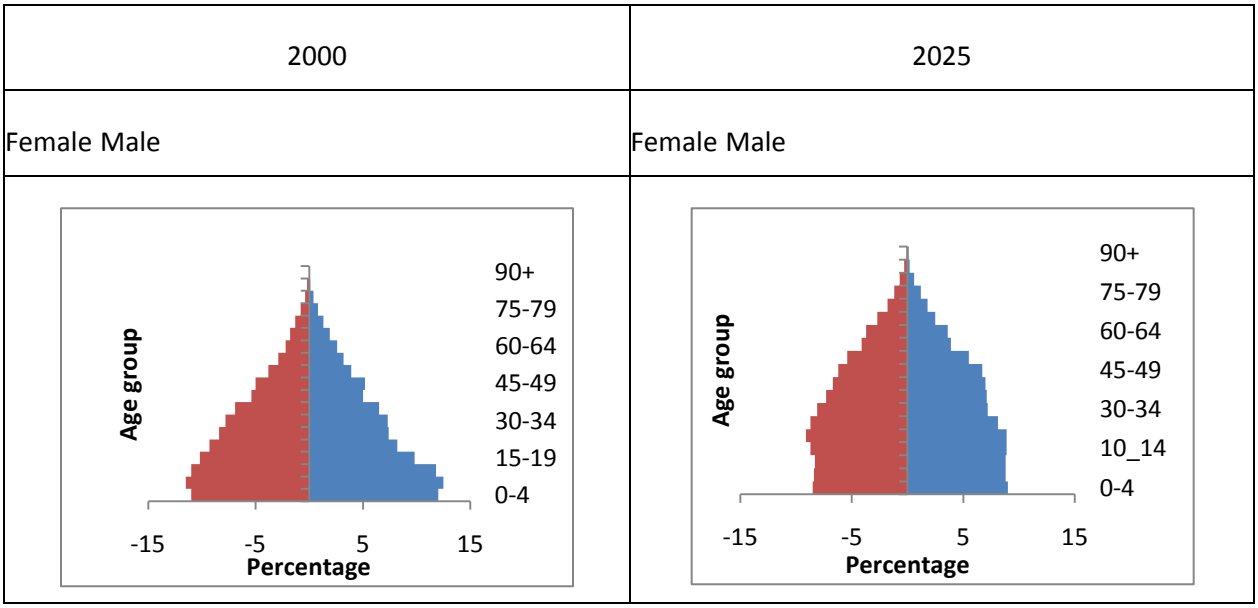
In 2004, NCDs accounted for 43 percent of the total forgone DALYs, with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 14.0 percent, mental health 6.7 percent, cancer 4.0 percent, respiratory diseases 2.3 percent, diabetes 0.6 percent, and injuries 6.4 percent.

- **CVD:** This is the leading cause of overall forgone DALYs with the most from IHD (47 percent).
- **Stroke:** Accounts for 2.8 percent of the total DALY burden.
- **Respiratory diseases:** These account for 3.4 percent of all deaths, of which 34 percent were due to COPD and 31 percent due to asthma. Indoor air pollution from burning solid biomass fuel for cooking and outdoor dust are major problems. Most rural households (85 percent) use animal dung as fuel for cooking and over 70 percent of roads are unpaved and dusty.
- **Hypertension** and **diabetes:** No data are available.
- **Cancer:** The leading cause of cancer deaths among women is breast followed by esophageal cancer. Among men, the leading cause of cancer deaths were mouth and oropharynx, followed by esophageal and lung. Approximately 22,000 people died from cancer in 2005.
- **Injuries:** The second leading cause of overall forgone DALYs. Of the total DALY burden road traffic injuries account for 1.6 percent of DALYs and deaths.
- **Mental health:** A nationally representative survey found that half of the population aged 15 or older suffers from mental disorder (depression, anxiety, or post-traumatic stress disorder). Women had significantly poorer mental health status than men, in part due to their worse social indicators.
- **Smoking:** Prevalence data among adults are not available; among youth prevalence is similar to other South Asia countries (boys 13 percent, girls 3 percent).

Bangladesh

Bangladesh is in the early stages of the demographic transition, which is expected to advance in the future (Figure 2.2). The proportion of the population 65 years and older will move from 4.5 percent in 2000 to 6.6 percent in 2025.

Figure 2.2 Age structure in Bangladesh, 2000 and 2025



Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

In 2004, NCDs account for 61 percent of the forgone DALYs, with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 13.4 percent, mental health 11.2 percent, cancer 3.9 percent, respiratory diseases 4.0 percent, diabetes 1.2 percent, and injuries 10.7 percent.

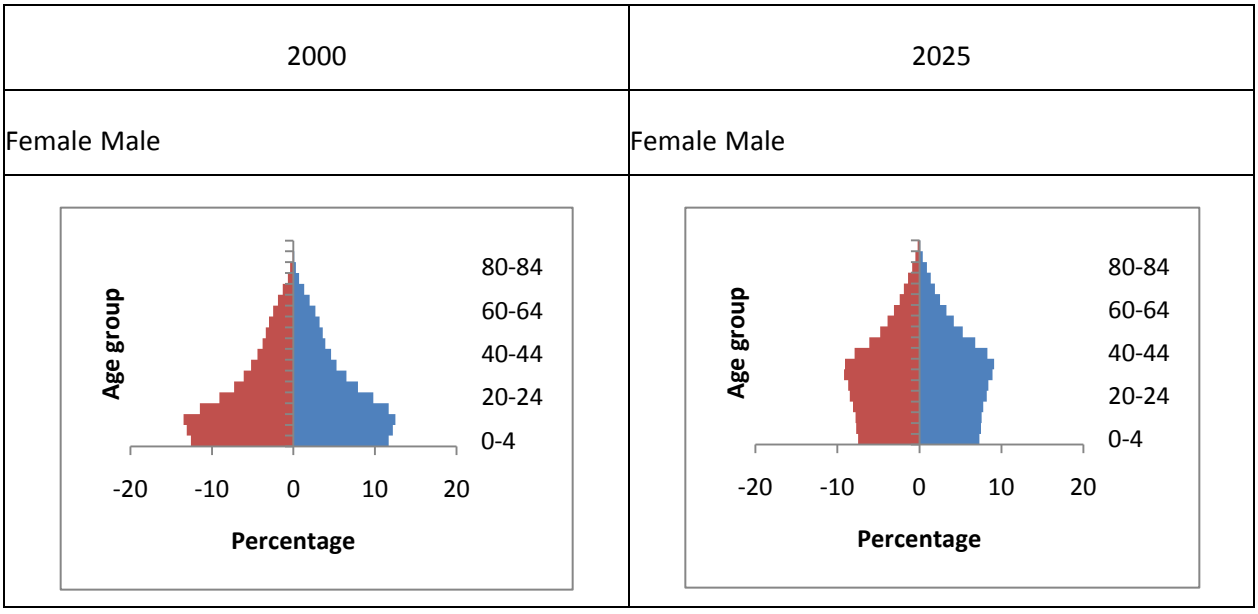
- **CVD:** Estimated to be the main cause in 25.1 percent of deaths and is projected to be the main cause in 37.2 percent of deaths in 2030. IHD is the leading cause of death and is responsible for 12 percent of all mortality while cerebrovascular disease (or stroke) is the sixth leading cause of death (in 2005).
- **Diabetes:** The prevalence is estimated to be 6.9 percent (7.5 percent male and 6.5 percent female). Urban-area studies find higher prevalence than in rural areas (urban approximately 8–10 percent).
- **Cancer:** This causes 7.5 percent of deaths; 70.7 percent of all cancer deaths were among men in 2008. By 2030, cancer deaths are projected to constitute 12.7 percent of the total. Among men, the leading cancer is mouth/oropharynx, followed by lung, and then esophagus; for women, mouth/oropharynx cancer is followed by cervical and breast cancer.
- **Asthma** and **respiratory diseases:** A small national sample estimated 6.9 percent prevalence of asthma. For those over 30 years, the estimated prevalence of COPD is about 3 percent. Nearly 90 percent of the population use solid fuels, including biomass such as dung and wood or coal for routine cooking and heating. In 2002, the disease burden due to indoor air pollution related to solid fuel caused some 46,000 deaths, of which 13,620 were from COPD and an estimated 32,330 from acute lower respiratory infection in children under the age of 5 years.

- **Hypertension:** Approximately 25 percent of slum dwelling women and 38 percent of non-slum women had hypertension compared to 18 percent and 25 percent among men, respectively.
- **Injuries:** Road traffic injuries are the most common cause of serious injuries among men (40–45 percent among urban men). The leading cause of injury-related death among children (1–17 years) is drowning (59.3 percent) followed by road traffic accidents (12.3 percent). Among women, 57 percent reported serious injuries due to domestic accidents, including domestic violence.
- **Smoking:** Prevalence is higher than in other South Asian countries (males 47 percent, females 4 percent) while smoking prevalence among youth is similar (boys 9 percent, girls 5 percent).

Bhutan

Bhutan is in the early stages of the demographic transition, but, because of significant reductions in fertility in the last 20 years, its expected to age more rapidly than some of its neighbors (Figure 2.3). The proportion of the population 65 years and older will move from 4.4 percent in 2000 to 7.3 percent by 2025. The prevalence of NCDs increases with age and thus the burden of disease caused by NCDs will also rise.

Figure 2.3 Age structure in Bhutan, 2000 and 2025



Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

In 2004, NCDs accounted for 62.3 percent of total forgone DALYs, with the remainder stemming from communicable diseases and MCH issues. Of the total DALY burden, CVD accounted for 13.7 percent, mental health 12.1 percent, cancer 3.7 percent, respiratory diseases 4.3 percent, diabetes 1.1 percent, and injuries 11.1 percent. NCDs accounted for 68 percent of all deaths, with CVD (19 percent), cirrhosis of the liver (8 percent), and COPD/bronchial asthma (7 percent) being the three leading causes of death.

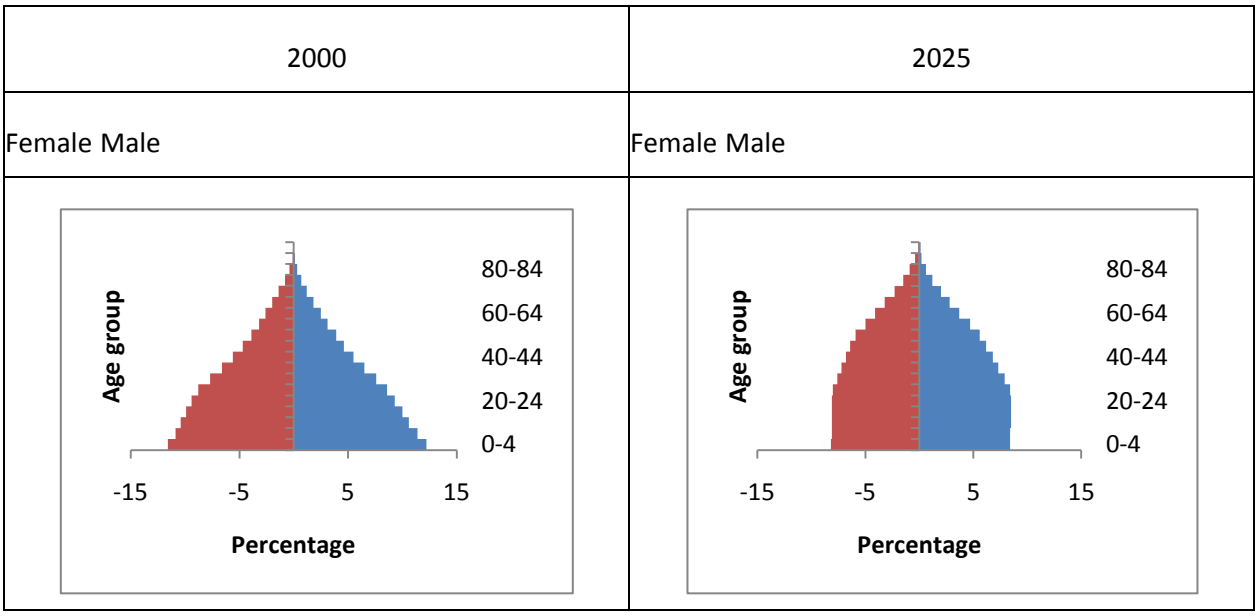
No country-level study has been conducted on NCDs or their major risk factors such as tobacco among adults. In 2007, a survey of risk factors of non-communicable diseases was carried out in Thimphu found

only 7 percent of the population over 25 years of age smoke tobacco but 10 percent among those 25-34 years old. In 2006, a tobacco use survey carried out among youth (13–15 years) found the prevalence at 29 percent and 12 percent for boys and girls, respectively—these are the highest rates among youth in South Asia. The 2007 study also found that 31 percent of the population over 25 had consumed alcohol in the last 30 days and 8 percent of men drank almost every day compared with 3 percent of women. Cancers, chronic rheumatic heart disease, and renal failure were the top three conditions referred abroad for tertiary care. MoH assessments using primarily institution-based patient diagnoses find increasing trends for hypertension, diabetes, and cancer. Circulatory disease deaths were the leading cause of inpatient mortality with 88 deaths. In 2006–7, road traffic injuries included 724 nonfatal and 111 fatal cases (93 percent of which were among men).

India

India is in the early stages of the demographic transition, which is expected to advance in the future (Figure 2.4). The proportion of the population 65 years and older will move from 4.4 percent in 2000 to 7.6 percent in 2025.

Figure 2.4 Age structure in India, 2000 and 2025



Source: U.S. Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

In 2004, NCDs accounted for 62 percent of the total burden of forgone DALYs, with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 12.7 percent, mental health 11.6 percent, cancer 3.5 percent, respiratory diseases 4.6 percent, diabetes 1.1 percent, and injuries 12.5 percent. Particular trends are as follows:

- **CVD:** Expected to emerge by 2030 as the main cause of death (36 percent). It is characterized by early occurrence compared to the rest of the world, higher case fatality rates, and disease onset at lower risk factor thresholds, particularly for those who are overweight or obese.

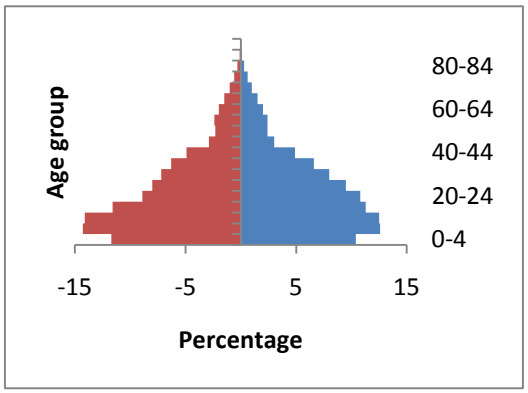
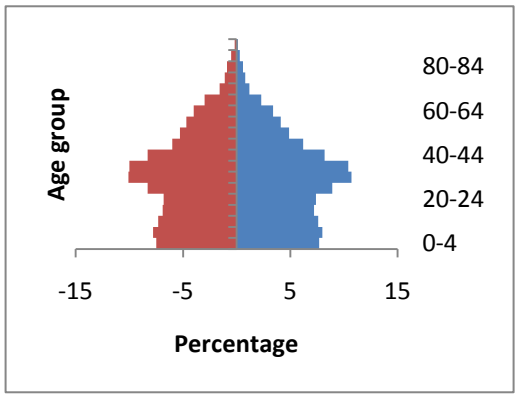
- **Diabetes:** Prevalence, increasing in both urban and rural areas, is in the range of 5–15 percent among urban populations, 4–6 percent in semi-urban populations, and 2–5 percent in rural populations. Diabetes is particularly increasing among the marginalized and the poor.
- **Hypertension:** Present in 25 percent of the urban and 10 percent of the rural population. The number of people with hypertension will rise from 118.2 million in 2000 to 213.5 million by 2025.
- **COPD:** Prevalence among men is in a range of 2–9 percent in north India and 1–4 percent in south India. Among males, tobacco smoke is the major cause of COPD, while smoke from indoor combustion of solid fuels is the major cause for women.
- **Cancer:** Over 70 percent of cases are diagnosed during the advanced stages of the disease, resulting in poor survival and high case mortality rates. Tobacco use is the major cause of cancer for both lung and oral cavity diseases.
- **Smoking:** Prevalence is similar to other South Asian countries (males 33 percent, females 4 percent) while smoking prevalence among youth is higher (boys 17 percent, girls 9 percent). Smoking accounts for 1 in 5 deaths among men and 1 in 20 deaths among women, accounting for an estimated 930,000 deaths in 2010.
- **Alcohol:** A study on CVD risk factors in industrial populations found higher alcohol consumption conferred a higher risk for CVD.[11] The reasons for the lack of protective effect found in other populations could include (i) unfavorable enzymatic metabolism of alcohol in Indians that is known to impact CVD, (ii) harmful drinking patterns with irregular heavy or binge drinking that is associated with CVD, and (iii) consumption mostly among the disadvantaged and poor who carry a higher risk of CVD than others.
- **Injuries:** Road traffic injuries and deaths are on the increase along with the rapid economic growth. Annually, they result in more than 100,000 deaths, 2 million hospitalizations, and 7.7 million minor injuries. Nonfatal road traffic injuries are highest among pedestrians, motorized two-wheeled vehicle users, and cyclists. This is a major problem among young populations, with three-quarters occurring among 15—45 year olds, predominantly among men. If the present pace of increase continues, in 2010 150,000 deaths and 2.8 million hospitalizations are likely and, in 2015, these numbers will rise to 185,000 and 3.6 million.
- **Diet:** Exact data on consumption of oils/fats at the individual and household level are missing. However, national aggregate statistics show high consumption of unhealthy oils. The share of raw oil, refined oil, and vanaspati oil (hydrogenated oil) in the total edible oil market is estimated at 35 percent, 55 percent, and 10 percent, respectively. Trans fats are added to vanaspati oil, which is widely used in the commercial food industry to lengthen shelf life.

Maldives

Maldives is in the mid to later stages of the demographic transition, which is expected to advance in the future (Figure 2.5). The proportion of the population 65 years and older will move from 3.5 percent in 2000 to 6.3 percent in 2025.

11 Although moderate consumption of alcohol appears to be protective for heart attacks in western populations, it appears to be either neutral or confer higher risk among South Asians.

Figure 2.5 Age structure of Maldives, 2000 and 2025

2000	2025
Female Male	Female Male
	

Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

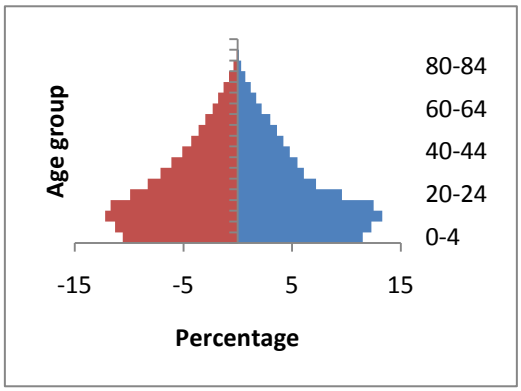
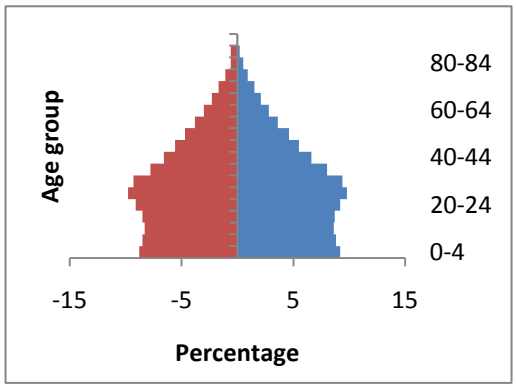
In 2004, NCDs accounted for 77.4 percent of the total burden of forgone DALYs, with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 9.7 percent, mental health 18.7 percent, cancer 10.6 percent, respiratory diseases 2.7 percent, diabetes 2.4 percent, and injuries 14.6 percent. NCDs account for 74.5 percent of all deaths with CVD (26.1 percent) the leading cause followed by cancer (24.0 percent), respiratory diseases (6.4 percent), and diabetes (5.2 percent). Injuries account for 12.9 percent of total deaths.

- **CVD:** This is the leading cause of mortality and contributed to 45 percent of all deaths in 2003.
- **Diabetes:** Affects 7.1 percent of men and 6.8 percent of women.
- **Obesity:** Approximately 13 percent are obese (body mass index >30 kg/m^2) and its prevalence is twice as high in women (17 percent) as in men (9 percent). The prevalence of obesity increases with age: approximately 50 percent of women over 35 years are overweight or obese.
- **Injuries:** Among all injuries, road traffic injuries account for 2.3 percent of total deaths and 2.8 percent of total DALYs.
- **Thalassaemia:** It is major public health problem. One out of every six persons is a carrier for thalassaemia, and the country has the highest incidence of the disease in the world.
- **Smoking:** Prevalence is among the highest in South Asia (males 45 percent, females 12 percent) while smoking prevalence among youth is lower than in most other countries (boys 9 percent, girls 3 percent).

Nepal

Nepal is in the early stages of the demographic transition, which is expected to advance in the future (Figure 2.6). The proportion of the population 65 years and older will move from 4.2 percent in 2000 to 5.8 percent in 2025.

Figure 2.6 Age structure in Nepal, 2000 and 2025

2000	2025
Female Male	Female Male
	

Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

In 2004, NCDs accounted for 60.1 percent of the total age-standardized burden of forgone DALYs with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 13.1 percent, mental health 11.0 percent, cancer 4.2 percent, respiratory diseases 3.6 percent, diabetes 1.2 percent, and injuries 11.6 percent. NCDs account for 65.7 percent of all deaths with CVD the leading cause (31.1 percent) followed by cancer (8.6 percent), respiratory diseases (6.7 percent), diabetes (2.2 percent), and mental illness (1.5 percent). Injuries account for 8.8 percent of total deaths. Key NCD trends include:

- **Service utilization for NCD:** In the public sector, NCDs accounted for 81.5 percent of outpatient department cases and 88 percent of inpatient morbidity.
- **CVD:** Of all deaths, those from CVD are expected to increase to 34.9 percent by 2030.
- **Cancer:** Of all deaths, those from cancer are expected to increase to 12 percent by 2030.
- **Diabetes:** Prevalence is 10.8 percent among adults.
- **Hypertension:** Prevalence is 21.5 percent among adults.
- **Obesity:** The prevalence of overweight and obesity is highest in the 25–34 year age group among males, while among women the prevalence of overweight and obesity is highest in the 45–54 year age group.
- **Alcohol:** The prevalence of hazardous and harmful drinking[12] (combined) in the last seven days among current drinkers is more common among males (38.9 percent) than females (30.3 percent).

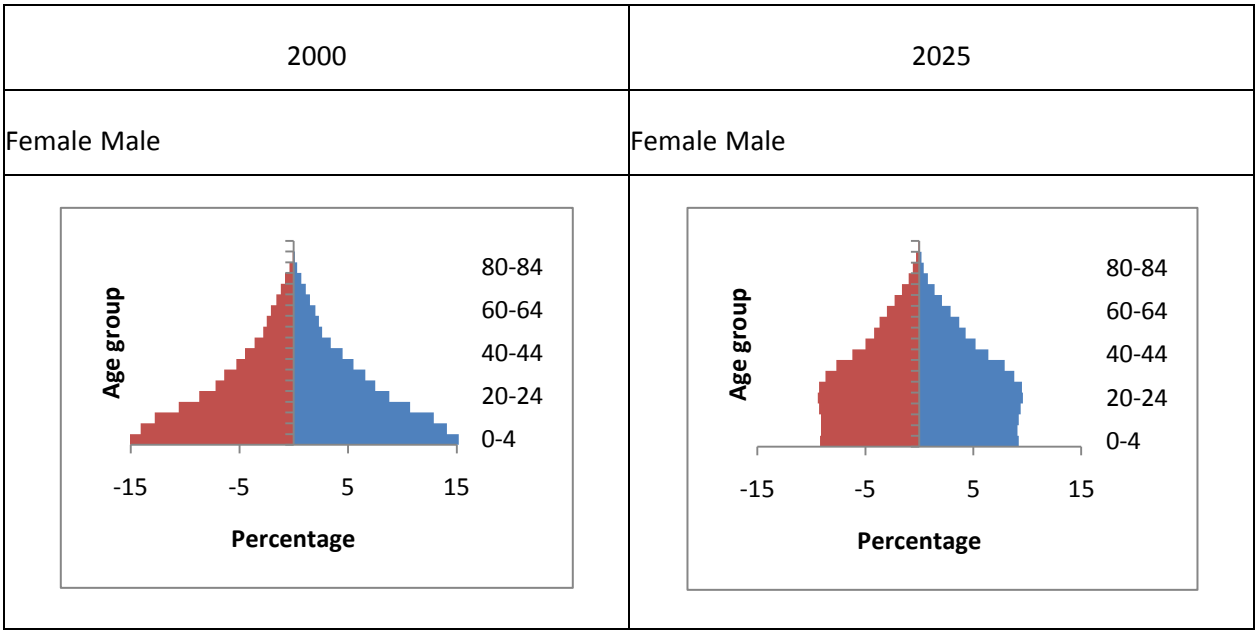
12 WHO defines hazardous drinking as the consumption of 40–59.9 grams of pure alcohol for males, and of 20–39.9 grams of pure alcohol for females, on an average day; and harmful drinking as the daily consumption of ≥60 grams of pure alcohol by males, and of ≥40 grams of pure alcohol by females.

- **Smoking:** Overall prevalence is in the regional midrange for males but is highest in women among South Asian countries (males 36 percent, females 28 percent) while smoking prevalence among youth is among the highest (boys 13 percent, girls 5 percent). Tobacco use increases with age, with the highest rates at age 45–54 (approximately 85 percent among men and 45 percent among women).

Pakistan

Pakistan is in the early stages of the demographic transition, which is expected to advance in the future (Figure 2.7). The proportion of the population 65 years and older will move from 3.9 percent in 2000 to 5.4 percent in 2025.

Figure 2.7 Age structure in Pakistan, 2000 and 2025



Source: U.S Census Bureau. www.census.gov/ipc, accessed July 1, 2010.

In 2004, NCDs accounted for 59 percent of the total forgone DALYs, with the remainder from communicable diseases and MCH issues. Of the total DALY burden, CVD accounts for 12.7 percent, mental health 11.9 percent, cancer 3.5 percent, respiratory diseases 3.9 percent, diabetes 1.4 percent, and injuries 9.3 percent.

- **CVD:** Accounts for 34 percent of all deaths. A population-based study among persons 40 years and older found prevalence at 25 percent (using both clinical and ECG criteria) with higher rates in urban than rural populations. A third of the population was classified as having metabolic syndrome—a risk factor for CVD.
- **Diabetes:** Pakistan ranks sixth globally in the number of persons with diabetes. A high prevalence of diabetes was noted in all provinces especially in urban and rural Sindh (16.5 percent and 13.9 percent, respectively). Approximately half those with diabetes were unaware of their condition. Future projections indicate a two- to threefold increase in diabetes over the next decades.

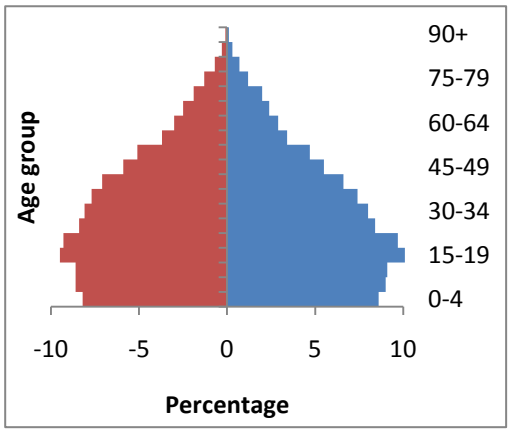
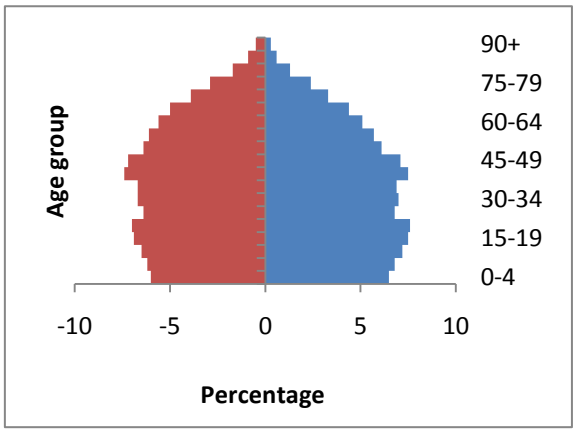
- **Cancers:** The most common among men are lung and oropharynx, and in women, breast and oral cavity.
- **Respiratory diseases:** Smoking is one of the most significant risk factors. Other environmental pollutants such as biomass fuel, commonly used in villages, have been associated with symptoms of COPD in rural areas. A recent survey found physician-diagnosed asthma present in 15.8 percent of school children.
- **Injuries**. In Karachi, about 42 percent of vehicle crashes involved public transport or heavy goods vehicles. About half the fatal cases were among motorbike riders. Despite a motorcycle helmet law, only 8 percent of riders wear helmets.
- **Hypertension:** During 1990–1994 the prevalence was 17.9 percent among those 15 years or above. The odds for hypertension were 20 percent lower in literates versus illiterates, indicating higher risk in those socially deprived. In 2004, in Karachi, the prevalence of hypertension was 40 percent in those aged 40 years or over.
- **Mental health**: Of the general population, 10–16 percent suffer from mild to moderate psychiatric illnesses. Suicide rates have surged in recent years from a few hundred pre-1990s to almost 7,000 in 2008.
- **Obesity:** In the past 10 years, a twofold increase in prevalence of overweight and obesity among school going children in urban Pakistan has occurred.
- **Smoking:** Prevalence is in the midrange among South Asian countries for adults (males 35 percent, females 7 percent) and for youth (boys 12 percent, girls 8 percent).

Sri Lanka[13]

In combination with substantial declines in fertility since the 1970s, advances in human development have led to rapid demographic aging (Figure 2.8). The proportion of the population 65 years and older will increase from 6.7 percent in 2000 to 13.6 percent in 2025. This demographic transition has been accompanied by an epidemiologic transition, that is, a growing NCD burden.

13 See World Bank (2010).

Figure 2.8 Age structure in Sri Lanka, 2000 and 2025

2000	2025
Female Male	Female Male
	

Source: U.S Census Bureau www.census.gov.ihp, accessed July 1, 2010.

In 2004, NCDs accounted for 87.5 percent of the total burden of forgone DALYs, with communicable diseases and MCH issues the remainder. Of the total DALY burden, CVD accounted for 9.3 percent, mental health 11.5 percent, cancer 4.7 percent, respiratory diseases 5.1 percent, diabetes 1.9 percent, and injuries 35.9 percent.

- **CVD:** Approximately 82,000 admissions in government hospitals were IHD cases, equivalent to a rate of 410 admissions per 100,000 population, which is comparable to the rate in Organisation for Economic Co-operation and Development (OECD) countries (330–1,200).
- **Diabetes:** Among those 18 years and older, 10.3 percent have diabetes, similar to that found in the United States.
- **Lipids:** Mean total cholesterol and low-density lipoprotein-cholesterol levels in the population are 203 and 133 mg/dl, respectively. Levels are significantly higher in females than in males.
- **Hypertension:** A national survey in 1998–2002 reported a prevalence of hypertension in adults of 13 percent in men and 14 percent in women
- **Respiratory diseases:** Since 1991, the annual number of deaths from asthma has doubled from under 2,000 a year to more than 4,000 in 2003, to account for 4 percent of all deaths.
- **Injuries**: Traumatic injuries are the leading cause of inpatient morbidity. NCDs account for 36 percent of all admissions, of which half are injuries.
- **Smoking:** Prevalence is lower than in other South Asian countries (males 32 percent, females 2 percent) while smoking prevalence among youth is similar (boys 12 percent, girls 6 percent).

Implications for South Asia

Population aging is a major feature in South Asia and will result in a demographic dividend due to favorable dependency ratios. However, as noted in Chapter 1, aging is occurring rapidly and without the social changes that accompanied aging in developed countries decades ago. In addition, the

international health community has become increasingly concerned with the shift of the disease burden toward NCDs while a residual burden for MCH remains. This shift is not only because NCDs are more common with aging, but also due to changes in lifestyles and environments (especially diet, physical activity, and tobacco use) associated with globalization and development. NCD-related illness, disability, and unhealthy aging all threaten gains from the demographic dividend. Countries such as the Russian Federation, where little attention was given to NCD for decades, are already experiencing the impact in multiple dimensions (Box 2.1).

Many implications from these transitions are evident. First, the NCD burden will grow with continued aging and strain health sectors that will struggle to be more responsive to these additional demands. With most health care financed with private out-of-pocket resources, some people may never escape poverty or be driven into poverty, some will forgo treatment and suffer excessively, and household consumption patterns will be switched from other human development investments such as education. The impact on individuals in terms of short- and long-term disability, premature death, and forgone wages will be significant. At the macroeconomic level there will be adverse impacts on labor productivity and while empirical data are scant, productivity declines and reduced economic growth may occur.

South Asian countries all face a double-disease burden. Most people in rural populations moving to urban areas will experience changes in lifestyles that may increase their NCD risks. Extreme poverty and fetal and early childhood undernutrition account for a sizable part of the total burden.

While the variation in the disease burden is large across the region, risk factors such as tobacco use are similar, suggesting that regional approaches may add value. Less is known about diet and physical inactivity but, where there are data, these are also likely issues.

Because all countries have low total expenditures on health and a substantial share of health financing comes out of pocket, all people, especially the poor, are at great financial risk, making financing a common issue in the region. Finally, unfavorable social determinants are common, such as poverty, poor education, and low social position. Addressing these determinants requires broad, multisector approaches.

Part 2 argues the case for the need to act now.

Box 2.1 The Social and Economic Impact of NCDs in the Russian Federation

The Russian Federation's unprecedented mortality upsurge due to noncommunicable diseases (with cardiovascular disease the main cause) and injuries in the last two decades, coupled with fertility rates that are well below replacement level, has several implications beyond the sociodemographic makeup of the country.

Shrinking population: Since the beginning of the 1990s, the population has declined by 6 million to an estimated 143 million. Continued high mortality and declines in fertility are expected to lead to a further population decline.

Fewer workers: Female life expectancy (72 years) is close to the level of 1955 while male life expectancy (59 years) is four years less than that year. If these trends persist, the size of the Russian labor force will continue to shrink. A healthy population aged 65–75 could represent a sizable untapped workforce. However, the high burden of ill health among surviving older Russians may limit what can be achieved.

Adverse economic effects include:

- The cost of absenteeism due to ill health.
- Adverse impact on labor supply.
- Adverse impact on labor productivity.
- Job losses due to harmful alcohol use.
- The impact of NCD on early retirement.
- Adverse impact on the family.

Source: Marquez et al. 2005.

Why the Need to Act Now

Chapter 3: Rationale for Action

Key Messages

- Compelling reasons to address NCDs in South Asia now include social and political factors (South Asians experience a disproportionate burden of noncommunicable disease), economic factors (costs and efficiency), equity factors, and health sector factors (unprevented and unmanaged NCDs are straining services and budgets).
- From a social and political perspective, South Asians suffer from a relatively heavy CVD burden that is especially tough on the poor; unfavorable social determinants add to this burden.
- From an economic perspective, a solid rationale for public policy and investment is based on both efficiencies and equity.
- Diminished health from NCDs can lead to lower economic growth and to increased poverty.
- Delaying the prevention and treatment of NCDs will strain services and budgets, and further exacerbate poverty.
- Many feasible and affordable strategies and interventions for NCD prevention and control are available.

Introduction

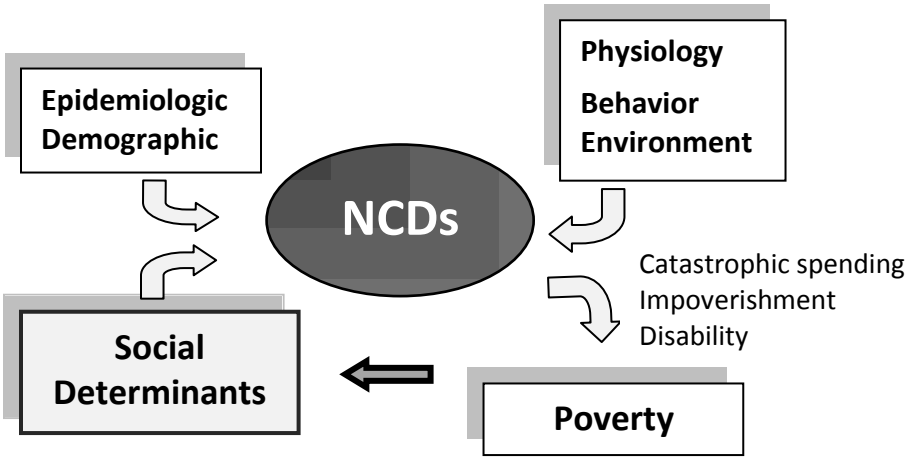
Many compelling reasons are pushing countries toward tackling NCDs. This section summarizes the key issues for South Asia including social, political, economic, and development aspects, as well as health sector perspectives.

Social and Political Perspective

From both a social and political standpoint, a very strong case can be made that action is warranted. As noted in Chapter 1, South Asians are 6 years younger than those in the rest of the world at their first heart attack. This burden is especially hard on the poor, who after a heart attack, face a lifelong major illness, the need to finance substantial portions of their care out of pocket, and live at great risk for catastrophic spending and worsened impoverishment. Even for those who have escaped severe poverty, faced with large, lifelong out-of-pocket expenses, impoverishment can reoccur.

Social determinants also play an important role. Dramatic differences in health are closely linked with the degree of social disadvantage and poverty within countries (CSDH 2008). These inequities arise because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with health and illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces. In addition, the relationship between NCDs and poverty is bidirectional via social determinant forces (Figure 3.1).

Figure 3.1 Social determinants, NCDs, and their relationship to poverty



Source: Authors.

In developed countries the poor and disadvantaged experience a larger NCD burden of risk factor and disease than do the rich. In South Asia, the disease burden may currently be greater in the rich, but it will be shifting and concentrating in the poor. Risk factors, such as tobacco use, are already more common among the poor. Addressing social determinants requires not only health policies that are sensitive to the situation but also efforts from many other sectors. Education and social protection are the key human development areas alongside health. Most of the development agenda—economic opportunities; the distribution of power, money, and resources; and living conditions—all influence social determinants.

Economic and Development Perspective

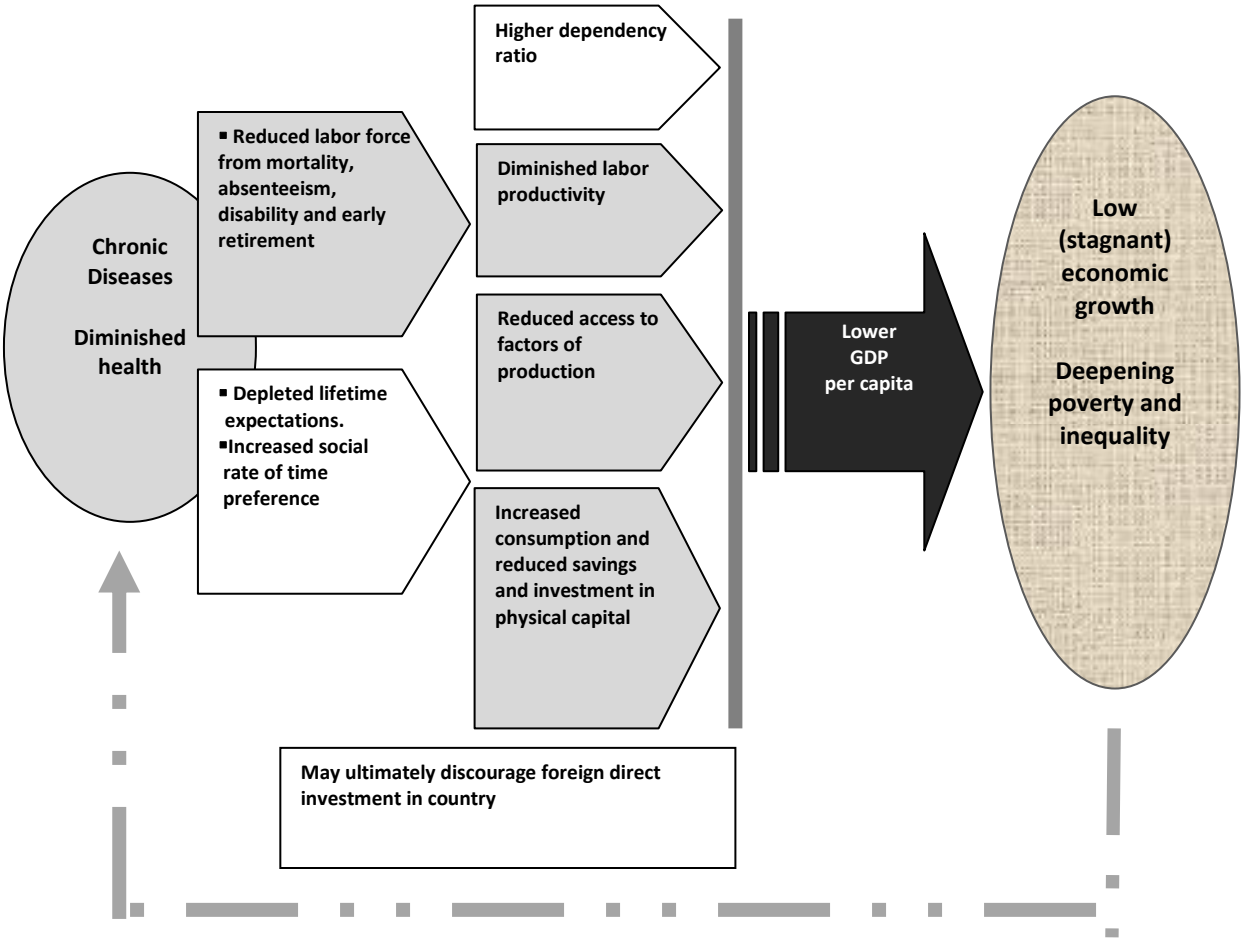
Several issues support a strong economic rationale for public policies for NCDs (Appendix 2 gives further details). The economic rationale for public policy for health can be formulated on both efficiency and equity grounds—the former, when private markets fail to function efficiently; the latter, when the social objectives of equity in access or outcomes are unlikely to be attained. Examples of the former include:

- *Market failures* as with tobacco consumption where public goods in the form of accurate information to citizens for making decisions are needed. Additionally, information on the harms of certain lifestyles, environments, and unhealthy foods is required to make informed decisions.
- *Externalities*, that is, when a consumer does not bear all the costs or harms associated with a behavioral choice (such as second-hand tobacco smoke, social problems from harmful alcohol use, and unhealthy foods). These go beyond tobacco to include involuntary exposure to environmental pollution, unsafe living conditions, and poor food quality, where vulnerable populations (women, children, and the elderly) are at greatest risk.
- *Nonrational behaviors* such as when children and adolescents do not consider the future consequences of their choices, irrespective of whether they are informed of future consequences (e.g., these acts are “myopic” and, hence, nonrational).

- *Time-inconsistent preferences.* In some situations, individuals accept instant gratification at the expense of their long-term best interests, and would be better off if actively stimulated to act differently, as is the case with delaying smoking cessation—their choices conflict with their long-term best interests.

NCD can hold back development and poverty reduction efforts in low-income countries. At the macroeconomic economic level, Figure 3.2 provides an illustration of diminished health from NCDs ultimately leading to lower economic growth and poverty. In South Asia, while empirical evidence is scant, projections suggest that over the next 10 years deaths from heart disease, stroke, and diabetes may lower GDP in India and Pakistan by 1 percent (WHO 2005). In Sri Lanka, where life expectancy has increased the most in the region, chronic illness is an important cause of withdrawal from the labor market (World Bank 2008a).

Figure 3.2 Illustration of the macroeconomic effects of NCDs



Source: Abegunde and Stanciole 2006.

The World Economic Forum's *Global Risks Report* for both 2009 and 2010 (WEF 2009 and 2010) put chronic NCDs and their impact on both advanced and developing economies high on its Global Risk Matrix because of their connection to other global risks such as financial crises and underinvestment in infrastructure.

At the microeconomic level, if those affected are the main income earners or those rearing the children, *NCD-related short- or long-term disability or premature death can change consumption patterns dramatically*. This may result in dramatically reducing nonmedical related consumption on food and education and lead to liquidation of accumulated wealth and assets to pay for care. As noted in Chapter 1, risk behaviors such as tobacco use may also change household consumption patterns, where tobacco purchases can also displace purchases for schooling and food.

Health Sector Perspective

The future increase in the disease burden and risk factors will both put a strain on services delivery and stress budgets. Programs and services need to be reoriented toward efficient NCD prevention and control while also tackling the substantial remaining burden from communicable diseases, and MCH and nutrition issues. In order to efficiently deliver services for NCD, the health system infrastructure will need retooling and human resources will need training and new skills. In addition, health financing suitable for many people requiring ongoing lifelong treatment will be needed.

Fetal and childhood undernutrition is a lagging regional problem that is leaving a legacy of NCDs. It is recognized as a major long term-risk factor in the development of adult chronic diseases including heart disease, diabetes, hypertension, and stroke (Barker 1992; Barker and Clark 1997). All countries in South Asia, including those with more favorable health indicators, are struggling with undernutrition. In addition, many among the current adult population were exposed to undernutrition when they were young, creating a large pool of those at elevated risk. The legacy of this risk factor will be generational and closely linked with social-determinant risk factors noted already. This reinforces the need for continuing efforts to address this risk factor, which will fall on the health sector.

To fully capitalize on the demographic dividend, healthy aging is necessary, which in turn, requires tackling NCDs. But many opportunities for their prevention and control are available. Experience from developed countries indicates that the increase in CVD during a similar phase of the epidemiologic transition could be blunted and even dramatically reduced by changes in risk levels within the population and through primary care for NCDs. In the United States, as in other developed countries, disability rates among the surviving elderly population have been declining by 0.5–1.5 percent annually (Cutler and Sheiner 1998; Maton and Gu 2001). More recent examples are also evident. In Poland in the decade following the collapse of the Soviet Union, a shift from subsidized dietary saturated fats derived from animal sources to more unsaturated fats from plant sources resulted in a dramatic reduction in CVD deaths. In Chapter 4, these opportunities are more carefully examined.

Chapter 4: Opportunities for Prevention and Control

Key messages

- The global NCD policy of WHO, a policy that focuses on strategic NCDs, is well established, and the role of government efforts depends on the disease burden; on health and non-health sector capacity, priorities, and resources; and on the policy environment.
- Many opportunities for NCD prevention and control are available and affordable. Feasible strategies exist.
- Both prevention and treatment of NCDs are needed. The challenge is determining the strategic mix with the goal of keeping those people at low or moderate risk from becoming high risk through population-level reduction of risk factors (prevention); and to keep those at high risk from developing disease-related complications and disability through individual clinic-based efforts (treatment).
- For population-based interventions, one study of 23 low- and middle-income countries estimated that, if tobacco control measures and salt interventions were implemented together, 13.8 million deaths could be averted, at a cost of less than US$0.40 per person a year in low-income and lower middle-income countries.
- For individual-based interventions, one study of the same 23 countries showed that, over 10 years, scaling up a multidrug regimen could avert 17.9 million deaths from CVD. The 10-year average annual cost per head would be US$1.08, ranging from US$0.43–0.90 in low-income countries to US$0.54–2.93 in middle-income countries.

Global and National Policy Context for NCDs

In 2000, the World Health Assembly adopted a resolution (WHA/53.17) endorsing a WHO Global Strategy for the prevention and control of NCDs. The Director-General of WHO was requested to continue giving priority to the prevention and control of NCDs and the member states were requested to develop national policy frameworks and to promote initiatives.

In 2003 and 2004, the World Health Assembly adopted the *Framework Convention on Tobacco Control* (Box 4.1) and the *Global Strategy on Diet, Physical Activity and Health*. In 2008, it endorsed the *2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases*. The plan focuses on four types of NCDs—CVD, cancers, chronic respiratory diseases, and diabetes—because current evidence indicates that these make a large contribution to mortality in the majority of low- and middle-income countries. These diseases are also largely preventable by means of effective interventions that tackle their risk factors, that is, tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol. As said, as CVD accounts for a large toll in South Asia, they are the major focus of this book.

Box 4.1 Framework Convention on Tobacco Control

The Framework Convention on Tobacco Control (FCTC) marked its fifth anniversary in 2010. It is unique for two reasons: it is the first international health treaty and it has become one of the most widely and rapidly ratified treaties in the history of the United Nations. The FCTC represents a new approach to international health cooperation and is a model for a global response to the harm that tobacco causes to health. International cooperation and assistance remain critical for its success as do leadership, commitment, and political will among all stakeholders. The FCTC focuses on six strategic areas with efforts to:

- Enact (if consistent with each country's constitution) comprehensive bans on tobacco advertising, promotion, and sponsorship within 5 years of becoming a party to the Convention.
- Obligate, within 3 years of becoming a party, placement of health warnings on tobacco packages that cover at least 30 percent of the principal display areas.
- Ban the use of misleading and deceptive terms such as "low tar", "light", "mild," or "ultra-light" within 3 years of becoming a party.
- Protect citizens from exposure to tobacco smoke in workplaces, public transport, and indoor public places. There is no set time for this.
- Combat smuggling, including placing origin and final destination markings on packs. There is no set time for this.
- Increase tobacco taxes (no quantitative or time-bound targets).

Source: http://www.who.int/fctc/en/.

What Can Governments Do?

Moving to the role of governments, the World Bank Human Development Network document, *Public Policy* and *the Challenge of Chronic Noncommunicable Diseases* (Adeyi et al. 2007) had two key messages. First, public policies are needed to prevent NCDs, to promote healthy aging, and to avoid premature death. Second, with governments recognizing that the financial burden will increase in the future, public policies need to respond to the pressures that NCDs will impose on future public and private health care delivery systems.

The role of governments and the economic rationale for them to spend public resources on NCD prevention and control require careful examination (Adeyi et al. 2007). In terms of public goods (such as health burden information, health promotion, and health system governance), there is a clear government role for stewardship to ensure that population strategies and policies are effective, and that the care delivered is of high quality and safe. Because NCD care can be expensive for patients—and a major portion of health treatment is paid out of pocket in South Asia—equity issues arise and health

decision makers need to carefully consider catastrophic and impoverishing health costs (discussed in Chapter 1) in developing public policies.

For each country, the focus and prioritization of efforts depend on the disease burden, health and non-health sector capacity, government priorities and resources, and the policy environment. Policy makers need to consider the role of the public sector in the following (and see Chapters 6 and 7):

- Population-based NCD burden assessments and surveillance to monitor change and improve policy decisions
- Strategy development and coordination within and outside the health sector
- Implementation of population-based health promotion laws and campaigns in the community, to reduce modifiable risk factors
- Improvement in access to individual-based prevention and treatment within the clinical setting
- Implementation of activities including setting human resource and health facility standards; assessing the quality of care, treatments, drugs, and technology; developing and enforcing a regulatory framework; and providing and/or regulating health financing, which should address allocation of services, equity, risk sharing, and consumption smoothing.

Even though most of these functions apply to far wider diseases and health conditions than NCDs, they highlight the need to improve the health system infrastructure for addressing NCDs. Such improvement will also result in benefits for other disease prevention and control measures.

Some countries are already taking action. They have developed policies and are launching programs, but most of these moves are still in their very early stages, and implementation and scaling up are slow. However, although few empirical data exist, as national budgets become stressed and health budgets shrink, low- and middle-income country governments are often encouraged to focus on addressing the Millennium Development Goals (MDGs), which still have many health challenges, but which as a set or international targets do not take into account the increasing impact of NCDs. Development partners, in focusing their efforts on issues that will more readily elicit support from their constituents, have largely funded the MDGs. Another challenge is that NCD prevention policies (such as tobacco taxation) are largely implemented outside the health sector and require the health sector to develop new relationships both with non-health sector stakeholders and with public–private partnerships.

Prevention of NCDs

The commonly used construct for combating NCDs—primary, secondary, and tertiary prevention (Box 4.2)—is useful, especially for health workers considering the range of interventions within populations for which they provide care. It also conforms to the different levels of health services, which are relevant to health care providers and policy makers.

Box 4.2 Construct for NCDs

Primary prevention is directed toward entire populations or subgroups at high risk. The interventions fall into three broad categories: personal behavior change, control of environmental hazards, and population-based medical interventions such as immunization. The aim of primary prevention is to reduce the level of one of more identified risk factors that will result in lowering the probability of the initial occurrence of a disease. Smoking cessation in the population due to a higher tax for cigarettes is an example.

Secondary prevention consists of ongoing interventions (chronic care) aimed at decreasing the severity and frequency of recurrent events or complications of chronic diseases. Treating blood pressure to prevent heart attacks or blood glucose to prevent ketoacidosis and development of diabetic retinopathy are examples.

Tertiary prevention generally consists of the prevention of disease progression and attendant suffering after the disease is clinically obvious and a diagnosis established. This activity also includes the rehabilitation of disabling conditions. Examples include preventing recurrence of heart attack with anticlotting medications and physical modalities to regain function among stroke patients.

For many common chronic illnesses, protocols to promote secondary and tertiary preventive interventions have been developed, often called "disease management." Disease treatments are not usually included, but the boundary with tertiary prevention is not always clear.

Various operational definitions are used for primary, secondary, and tertiary level prevention. Also, depending on the condition or disease, treatment can be consider primary prevention for one condition but secondary prevention for another condition—making the terminology less useful. Thus this book focuses on *where* policies will be implemented (such as outside or inside the sector, or the clinic).

Sources: World Bank 2006; www.enotes.com, accessed December 15, 2009.

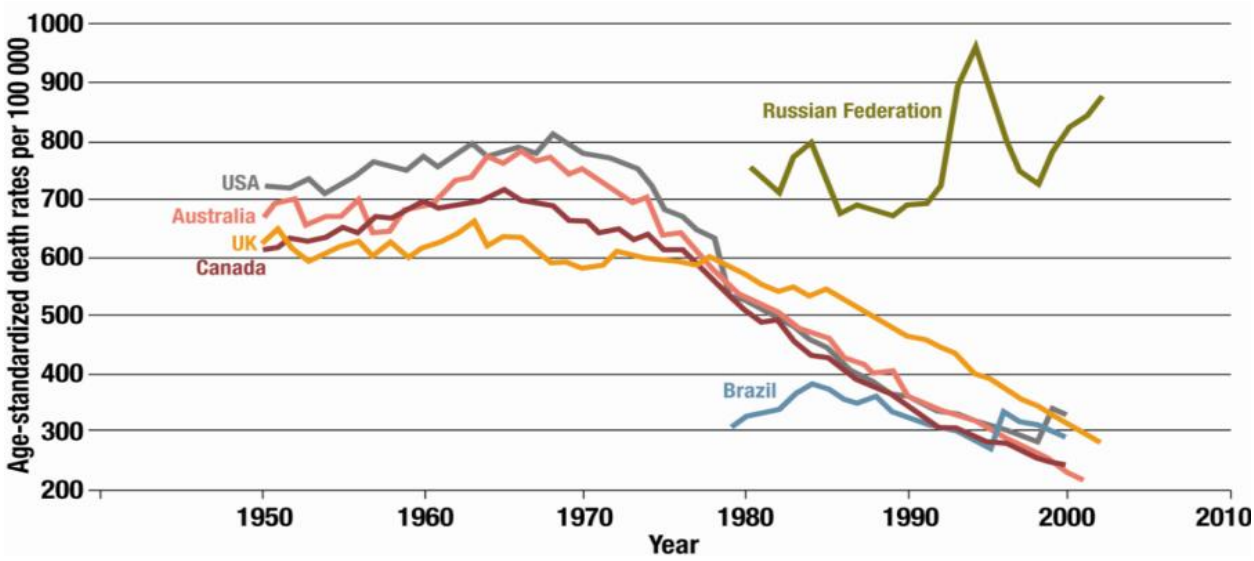
However, policy makers are concerned not only with prevention but also treatment of NCDs, which is an equally important intervention that needs to be considered in any framework of policy options.

Defining the Focus of NCD Interventions: Prevention vs. Treatment

An early and important policy question that concerns government decision makers, universally, is how much focus should be on prevention of disease and how much on treating those already affected while tackling NCDs.

In parallel, whether governments should focus more on populations or more on individuals requires careful consideration of the burden, capacity, and many other country-level factors. Developed-country experiences can lend important insight into making this decision. Major declines in CVD mortality have been seen in several developed countries from about the early 1970s (Figure 4.1). These findings received considerable attention and much effort was made to understand the underlying reasons.

Figure 4.1 Heart disease death rates among men aged 30 years and older in Australia, Canada, United Kingdom, and United States, 1950–2002



Source: WHO 2005.

During the last few decades, knowledge of pathophysiology, of risk factors and their role in causing disease, and of the impact of reducing risk factors on developing disease, has increased dramatically. In addition, many effective treatments to lower the risk of complications have been developed. Several studies have examined these secular trends to determine the factors accounting for these declines (see the sources at Table 4.1 for a nonexhaustive listing). The main finding was that nearly half the reduction can be attributed to population-level changes in risk factors, such as tobacco use, diet, and physical activity, and the rest to treatment of disease and its complications—with most of the treatment effect due to medication use (Table 5.1). This makes a case that both prevention and treatment are needed and that the challenge is determining the strategic mix. For mental health and injury, the situation is similar and calls for consideration of both prevention and treatment.

Table 4.1 Reduction in secular trend of CVD mortality attributed to population-level risk reduction and to treatment with mediation and surgery (%)

Country and period	Population-level risk factor	Treatment with medication and surgery
Scotland 1975–94	60	40
New Zealand 1982–93	54	46
Finland 1982–97	48	31
Ireland 1985–2000	48	44
United States 1980–2000	47	44

Sources: Bennett et al. 2006; Capewell 1999; Capewell et al. 1999; Capewell, Beaglehole et al. 2000; Capewell, Livingston et al. 2000; Ford et al. 2007; Vartiainen et al. 1994.

The distribution of risk in the population must also be considered. Currently, most people will be of low or moderate risk for developing disease and its complications (possibly 75–80 percent). The remaining

20–25 percent are at high risk and have already had (or soon will) have disease onset. The goal for the former group is to keep them from moving to high risk, or, optimally, to move them toward lower risk for disease onset. This is primarily accomplished through population-level risk factor reduction supplemented with individual-level health promotion reinforcement during routine clinic encounters. The goal for the latter category is to reduce the risk of developing disease-related complications and disability through individual clinic-based efforts. Additionally, those at high risk will also benefit from population-based measures since they are also community members.

Cost-effectiveness Evidence on Prevention, Control, and Treatment of NCDs

Policy makers and others use cost-effectiveness studies (among others) to help decide on interventions to improve public health. Cost-effectiveness analysis (CEA) compares the costs of the intervention to the resulting change in health.[14]

A systematic review on CEA evidence to address NCDs in low- and middle-income countries found few of them have been analyzed to determine how much health improvement can be gained per dollar spent (Mulligan et al. 2006). Since then, more efforts have been undertaken both to review the available evidence and to build new evidence, partly through modeling approaches (rather than evidence from actual interventions).

World Bank (2006) broadly addressed many health conditions and attempted to determine cost-effectiveness of interventions in low- and middle-income countries. In the following year, the World Bank (Adeyi et al. 2007) published a book containing a comprehensive review of evidence based on cost-effective interventions. WHO has developed its approach on generalized CEA via its CHOICE project.[15] CHOICE reports results for 14 global subregions, including the South-East Asian Region of WHO.[16] Building on work for both World Bank (2006) and CHOICE, a 2007 *Lancet* series on chronic disease has calculated the cost-effectiveness both for selected population-based interventions (Asaria et al. 2007) and for drug-based reduction of individual susceptibility to CVD among high-risk individuals (Lim et al. 2007). The results of all these studies noted here form the basis of the findings in the rest of this chapter.

While there will probably always remain a certain tension in the debate between prevention and treatment of chronic NCDs, most experts would agree that a comprehensive approach that is balanced across all levels and facets of intervention is the only appropriate way to tackle them. (Chapter 5 expands on this point.)

14 Cost-benefit analysis (CBA) is another method of determining cost-effectiveness, widely applied in public policy evaluation on other areas. In contrast to CEA, it monetizes both the benefits and costs associated with an intervention and would in principle allow for a more appropriate assessment of whether any intervention has the potential to improve social welfare. To date it has commonly not been applied widely in the health field.

15 See www.who.int/choice (accessed May 15, 2009). Generalized CEA aims to allow policy makers to evaluate the efficiency of the mix of health interventions available and to maximize the generalizability of results across settings. The scarcity of cost-effectiveness studies worldwide means that essentially all countries need to borrow results of cost or effectiveness studies from other settings, but the fact that most published studies are very specific to a particular setting makes this problematic.

16 In the Global Burden of Disease project as well as in CHOICE, the South-East Asian Region of WHO (SEAR) is split into SEAR-D (comprising Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, and Nepal) and SEAR-B (comprising Indonesia, Sri Lanka, and Thailand), with “D” and “B” indicating different adult vs. child mortality strata.

The majority of studies discussed below looked at one single intervention at a time, comparing it to an alternative of no intervention. Murray et al. (2003) have made an effort to evaluate different combinations of various levels of interventions, primarily through a modeling approach. They examined 17 population-based and individual-based health service interventions or combinations of the two, for 14 WHO subregions (including SEAR-D and SEAR-B). Population-based interventions included health education through the mass media (focusing on blood pressure, cholesterol concentration, and body mass), and either legislation or voluntary agreements on salt content to ensure appropriate labeling and stepwise decreases in the salt content of processed foods. Individual-based health-service interventions included detection and treatment of people with high concentrations of cholesterol for two thresholds; treatment of individuals with high systolic blood pressure with two thresholds; treatment of individuals for both these risk factors; and treatment of individuals based on their absolute risk of a cardiovascular event in the next 10 years with four thresholds.

According to Murray et al. (2003), the optimum overall strategy is a combination of the population-based and individual-based interventions. Interestingly, they find that if resources are extremely scarce, the population-based nonpersonal interventions will be chosen first.

Population-based Interventions

In terms of population-based interventions specifically, few public health experts would question the benefits of evidence-based tobacco control measures, as contained in WHO's Framework Convention on Tobacco Control (FCTC). Asaria et al. (2007) model the effects of a key set of tobacco measures contained in the FCTC (increases in the price of tobacco, enforcement of smoke-free workplaces, packaging and labeling changes, public awareness campaigns, and a comprehensive ban on advertising, promotion, and sponsorship) in 23 low- and middle-income countries, including three South Asian ones (Bangladesh, India, and Pakistan), over a period of 10 years (2006–2015).[17] The estimated effects are given in Table 4.2.

Table 4.2 Effect sizes for tobacco-control interventions by country and sex, 2006–2015

	Bangladesh		India		Pakistan	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
Increase (%) in real price of tobacco products required to reduce smoking prevalence by 10%	24.7	24.7	26.1	26.1	24.7	24.7
Predicted decrease (%) in smoking prevalence as a result of non-price interventions	12.9	11.7	11.2	11.2	12.7	10.3
Predicted decrease (%) in smoking prevalence as a result of price and non-price interventions combined	21.6	20.6	20.1	20.1	21.4	19.3

Source: Asaria et al. (2007).

Asaria et al. also model the likely impact of a reduction in salt intake by 15 percent. According to the authors this reduction should be achieved by a voluntary reduction in the salt content of processed foods and condiments by manufacturers, plus a sustained mass-media campaign aimed to encourage

17 Other research has shown the significant potential health gains to be derived from tobacco taxation in Southeast Asia; see Guindon et al. (2003).

dietary change within households and communities. The effects for the three South Asian countries are given in Table 4.3.[18]

Table 4.3 Effect sizes for interventions to reduce salt intake by country, sex, and age, 2006–2015

		Bangladesh		India		Pakistan	
		Male	**Female**	**Male**	**Female**	**Male**	**Female**
Reduction in salt intake (g per day)	30–44 years	2.0	1.8	2.0	1.8	2.1	1.7
	45–59 years	2.0	1.7	2.0	1.7	2.1	1.7
	60–69 years	2.0	1.7	2.0	1.7	2.1	1.7
	70–79 years	2.0	1.7	2.0	1.7	2.1	1.7
	80–100 years	2.0	1.7	2.0	1.7	2.1	1.7
Associated reduction in mean systolic blood pressure by 2015 (mm Hg)	30–44 years	1.3	1.1	1.6	1.4	1.8	1.5
	45–59 years	1.7	1.6	2.0	1.7	2.1	1.9
	60–69 years	2.3	2.2	2.5	2.3	2.6	2.4
	70–79 years	2.8	2.8	3.1	2.8	3.1	2.9
	80–100 years	3.5	3.5	3.8	3.5	3.8	3.5

Source: Asaria et al. (2007).

If the tobacco and the salt interventions are implemented jointly, the authors estimate that over the entire 23 countries, 13.8 million deaths could be averted, at a cost of less than US$0.40 per person a year in low-income and lower middle-income countries, and US$0.50–1.00 per person a year in upper middle-income countries (as of 2005). In terms of absolute population numbers, the biggest gains are expected in the countries with the largest population sizes, that is, mainly China and India. In terms of mortality reductions expressed as deaths averted per 100,000 population, the biggest gains are in the high CVD countries in Eastern Europe (Russian Federation and Ukraine). For Bangladesh, India, and Pakistan, the deaths expected to be averted are in a range of about 50–70 per 100,000 of the relevant population (aged 30 or more).[19]

World Bank (2006) identifies a limited set of what it calls "neglected low-cost opportunities" for the South Asian region to address CVD (Table A3.1, Appendix 3). At the population level this is again first of all tobacco taxation, leading to an increase in the price of cigarettes by 33 percent, but also non-price interventions of the kind proposed by Asaria et al.

Beyond tobacco control measures and salt regulations, the cost-effectiveness evidence appears to be comparatively scarce in low- and middle-income countries, and there are hardly any studies directly from South Asia. The relative lack of CEA evidence hinges on the lack or absence of effectiveness studies for many types of interventions in a developing-country context.

As briefly noted in Chapter 3, some encouraging effectiveness evidence for population-based interventions to lower saturated fat intake have come from two countries. In the first intervention, a

18 Similarly favorable cost-effectiveness ratios have been found in Murray et al. (2003) for efforts at salt legislation.

19 Arunatilake and Opatha (2003) provide a specific analysis on the economics of tobacco in Sri Lanka. They analyze the relationship between demand for cigarettes and prices and incomes, looking at different socioeconomic groups. They also use the estimated elasticities to simulate the likely impact of a tax increase on prices, on government revenue, and on demand, expenditures, and tax burdens of different socioeconomic groups. See Karki et al. (2003) for a similar analysis on the economics of tobacco control in Nepal.

government-led program in Mauritius (Hodge et al. 1996) changed the main cooking oil from a predominantly saturated-fat palm oil to a soybean oil high in unsaturated fatty acids. As a result, total cholesterol concentrations fell by 14 percent during the 5-year study period from 1987 to 1992. Changes in other risk factors were mixed, with reductions in blood pressure and smoking rates, yet increases in obesity and diabetes.

The second is a natural experiment in Poland. In the early 1990s, subsidies for animal products such as butter and lard were reduced, resulting in large-scale substitution from saturated to polyunsaturated fats (Zatonski et al. 1998; Zatonski and Willett 2005). Based on observational data the research argued that this substitution caused the decrease in mortality due to coronary heart disease of greater than 25 percent between 1991 and 2002, as it could not be explained by increased fruit consumption or decreases in smoking. In light of the ecological nature of this conclusion, concerns about its validity do, however, remain (Ebrahim and Smith 1998).

Based on the above encouraging findings on the potential for fiscal policy to change behavior (and in light of the success of tobacco taxation), more research along these lines for low- and middle-income countries would be highly worthwhile (Nugent and Knaul 2006). One obvious further application of fiscal policy would be alcohol taxation, where an extensive literature documents the effectiveness of taxes in reducing drinking and drinking-related harm (Wagenaar et al. 2009).[20]

Moving from the population-based level to a more focused higher-risk approach, there is some evidence from India where a behavior change program has achieved a 28.5 percent reduction in the diabetes incidence among high-risk Asian Indians (Ramachandran et al. 2006). A recently published worksite health promotion intervention in India also has shown significant reductions in cardiovascular risk factors and intermediate CVD outcomes in India (Prabhakaran et al. 2009).

Similarly positive results from lifestyle modification to reduce diabetes onset in high-risk groups come from China (Pan et al. 1997), Finland (Tuomilehto et al. 2001), and the United States (Knowler et al. 2002), with a high share of these effects being sustained beyond the end of the intervention (Lindström et al. 2006). Economic evaluations of the Indian and U.S. studies find favorable cost-effectiveness. However, it remains unclear if implementation would be feasible in the South Asia context.

Individual-based Interventions

There is fairly strong effectiveness evidence from randomized control trials supporting the use a number of drugs to prevent (or manage) CVD by reducing blood pressure or blood cholesterol (Jackson et al. 2005). This evidence has been used by Lim et al. (2007) to model the cost-effectiveness of pharmacological interventions among high-risk individuals in the same set of 23 low- and middle-income countries as Asaria et al. (2007).

In particular, Lim et al. model the financial costs and the mortality effects from scaling up, above current coverage levels, a multidrug regimen for the prevention of CVD (a statin, aspirin, and two blood-pressure-lowering medicines). Over a 10-year period, their average estimate suggests that this multidrug regimen could avert 17.9 million deaths from CVD in these 23 countries. Approximately 56 percent of

20 Wagenaar et al. have conducted a systematic review of 112 studies examining relationships between measures of beverage alcohol tax or price levels and alcohol sales or self-reported drinking. Meta-analytical results document the highly significant relationships ($P < 0.001$) between alcohol tax or price measures and indexes of sales or consumption of alcohol (aggregate-level $r = -0.17$ for beer, -0.30 for wine, -0.29 for spirits, and -0.44 for total alcohol). Price/tax also affects heavy drinking significantly, but slightly less than overall drinking. For a similar review of elasticities of tobacco taxation to demand for smoking, see Gallet and List (2003).

deaths averted would be in those younger than 70 years, with more deaths averted in women than in men owing to larger absolute numbers of women at older ages. The 10-year average yearly cost per head would be US$1.08 ($0.75–1.40), ranging from US$0.43 to US$0.90 across low-income countries and from US$0.54 to US$2.93 across middle-income countries. For Bangladesh the annual financial costs of the package correspond to close to 5 percent of the annual health budget, while in India costs would account for more than 4 percent and in Pakistan about 3 percent.

While promising, it is an open question whether and how the interventions can be implemented in a real-life developing-country context. Concerns do remain in that health services for chronic NCDs tend to be fragmented and too weakly organized to be able to confront the challenge of preventing or managing chronic NCDs (Miranda et al. 2008). A key point is that risk factors tend to cluster (obesity, hypertension, and diabetes, for example, can occur in a single individual) and strategies should target multiple common ones. A recently published trial—the Indian Polycap Study—has, however, demonstrated a significantly reduced CVD risk in a sample from India, suggesting that different versions of a polypill could be conveniently used to reduce multiple risk factors and cardiovascular risk (Yusuf et al. 2009). Other trials in developing-country contexts are also under way.

Combined Population- and Individual-based Interventions

World Bank (2006) recommends a set of combined population- and individual-based interventions to tackle part of the CVD burden in low- and middle-income countries (Appendix 3, Tables A3.2 and A3.3):

- Management of acute myocardial infarction with aspirin and beta-blockers
- Primary prevention of coronary artery disease with legislation substituting 2 percent of trans fat with polyunsaturated fat
- Secondary prevention of congestive heart failure with angiotensin-converting enzyme inhibitors and beta-blockers incremental to diuretics
- Secondary prevention of myocardial infarction and stroke with a polypill containing aspirin, beta-blocker, thiazide diuretic, angiotensin-converting enzyme inhibitor, and statin.

How to Respond

Chapter 5: Developing a Policy Options Framework for Prevention and Control of NCDs

Key messages

- The policy options framework helps countries to develop or improve their programs for prevention and treatment of NCDs. It has four stages: Assess, Plan, Develop and Implement, and Evaluate.
- In repurposing the framework to their own context, health policy makers will need to consider their disease burden, health capacity, and other country-specific factors in order to determine how much to focus on preventing disease versus treatment of those already affected.
- Population-level prevention policies are implemented by both the health sector and key non-health sector stakeholders, and are generally financed publically. By contrast, most policies related to treatment are implemented within the health sector for both public and private providers, and are financed with both public and private resources.
- Common challenges to tackling NCDs in South Asian countries include a low level of awareness and competing priorities among policy makers, the strain on budgets, and lack of institutional units and expertise to lead efforts.
- South Asian countries might explore how, in developed countries, the private sector has been enlisted to play a major role in prevention with the goal of keeping the workforce healthy.

Introducing the Policy Options Framework

While the health sector bears most of the burden in the prevention and treatment of NCDs, many of the interventions to control NCDs lie outside the health sector. This book introduces a policy options framework that applies to any country. It provides policy makers with a framework to make broader systemic decisions that aim at balancing interventions and providing the optimal strategic mix of population-based interventions in the community, and of individual-based interventions within the clinical setting. For purposes of exposition, these two broad intervention modes are given below.

Population-based interventions reduce the risk factors for NCDs and avoid or delay onset of disease and are delivered in community and/or population-based settings outside the clinical care system. A relatively small number of behavior risk factors, tobacco use, poor diet, physical inactivity (the latter two leading to obesity) are risk factors common to the major chronic NCDs—CVD, diabetes, cancer, and chronic respiratory disease. The dual goals of population-based interventions are first to avoid development of risk factors and second, when present, to reduce or eliminate them. Examples of this mode are tobacco tax policies and community-level behavior change for health lifestyles (diet, exercise, and helmet and seat belt use to prevent injury).

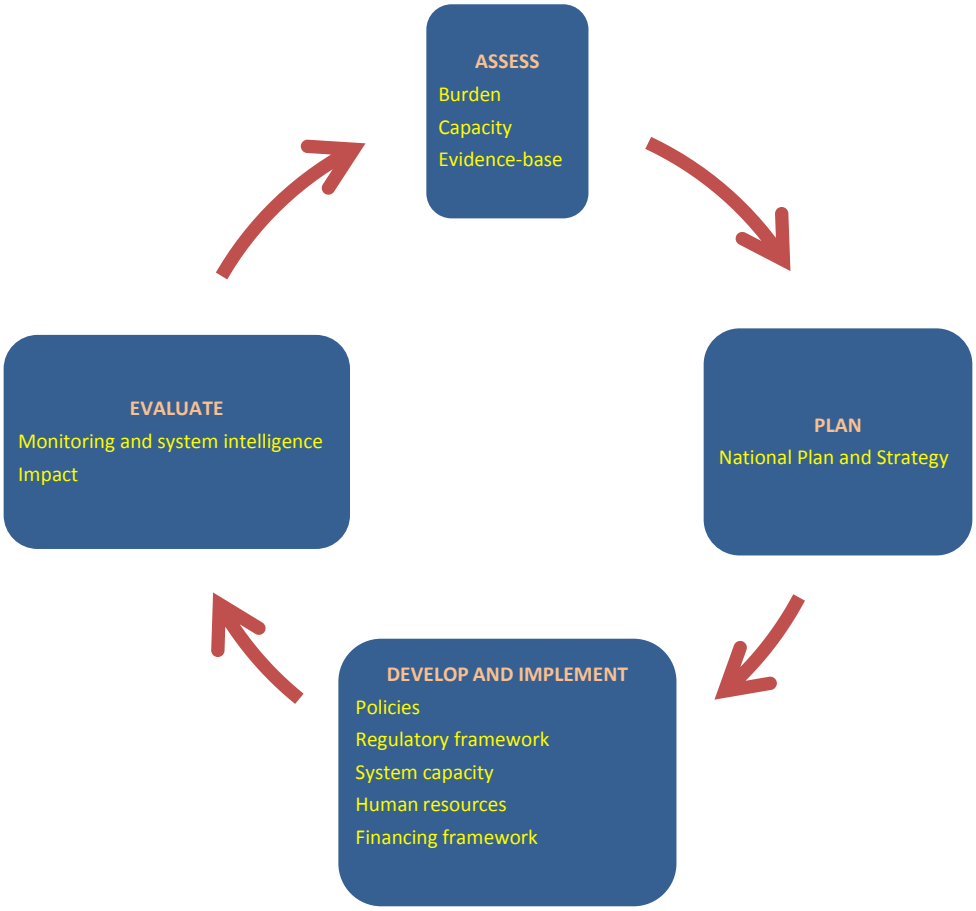
Individual-based interventions include preventive and treatment services delivered to individuals within the clinical care system. Treatment services include screening to detect undiagnosed cases, clinical management, and addressing complications among persons with disease. Preventive clinical services can and should be delivered by the health care system and include (but are not limited to) clinic-based

health workers delivering individual education and counseling to reduce risk factors and to prevent disease onset.

From a policy perspective, this framework is useful because population-based and individual-based interventions mobilize different parts of the non-health and health sectors and require very different inputs in terms of infrastructure, capacity, and skill sets; they also yield very different outputs and outcomes. Harmonizing both intervention modes is necessary to ensure the right mix and that population-based interventions complement those delivered within the clinical care system.

Different countries however, are at different stages of development of their NCD programs and therefore it is important to integrate this aspect in the framework. Generally, the cycle has the following four program management stages: Assess, Plan, Develop and Implement, and Evaluate (Figure 5.1).

Figure 5.1 Program management stages in the policy options framework



Source: Authors.

Some important points emerge. First, this sequence is not unidirectional and it contains many feedback loops and iterations. For example, *Plan* efforts (at right in the figure) may identify new areas where assessments are needed and *Evaluate* activities will identify program successes and failures where *Develop and Implement* efforts need further consideration. Thus, understanding progress at each stage and its relevance to other stages is needed.

Second, facilitating interaction between different components of the health system (e.g. service delivery, human resources) and across levels of the health sector (e.g. central, regional) is also important because many different actors may be responsible for activities at different stages.

Finally, many countries are at different stages of implementation of their NCD prevention, control, and treatment programs. In such cases they can use the framework to integrate future actions and balance efforts between population-based and individual-based interventions.

In each of the four program management stages, action areas that play an important role in both modes of intervention for prevention and control of NCDs are identified (Table 5.1). The population-based interventions are divided into policy options that lie within the control of the non-health and health sector. Similarly, the individual-based interventions are divided into preventive services at the clinical level and treatment options at the primary and secondary levels of care. Tertiary-level care options are not discussed in the framework as the evidence on cost-effectiveness from Chapter 4 indicates that provision of financial protection to the poor against catastrophic expenditure is the main area where government should intervene.

In the policy context, the two intervention modes are not always mutually exclusive. Several areas are cross-cutting, including assessing system capacity, developing national plans and strategies and expanding human resources. Considering both modes is important and practical—although the balance depends on the situation.

Table 5.1 Policy options framework for prevention and control of NCDs

Program management stage	Action areas	Population-based interventions		Individual-based interventions	
		Non-health sector	Health sector	Prevention (clinical)	Treatment (primary and secondary care and financial risk for tertiary care)
Assess	Burden of NCDs and their risk factors	Analysis of NCD risk factor determinants in non-health sectors	Assessment of NCD mortality, morbidity, BOD, risk factors, and high-risk populations		
	System capacity	Assessment of the non-health sector capacity in policy development and regulation	Assessment of current and future public health spending and public health system capacity, including institutional and management capacity and system intelligence and information technology	Assessment of health service delivery capacity (facilities, human resources, drugs, etc.) and current utilization of ambulatory and inpatient care	
	Evidence base for prevention, control, and treatment	Review of evidence-based public policies in non-health sectors (including in other similar countries)	Review of risk reduction studies and population-based interventions (including in other similar countries)	Review of available studies on effectiveness/cost-effectiveness prevention interventions (including those in other similar countries)	Review of effectiveness/ cost-effectiveness of clinical treatments (including those in other similar countries)
Plan	National plan and strategy	Development (by MOH) of a national policy and multisectoral strategy plan for the prevention and treatment of NCDs in consultation with different stakeholders			
Develop and Implement	Develop policy and regulatory framework	Enforcement mechanisms related to non-health sectors	Population and health promotion and risk reduction within the health sector	Implementation of basic public health programs for reducing risk factors and prevention of NCDs in clinic	Strengthening facility-based curative care protocols for control and treatment of NCDs
	Service delivery capacity (infrastructure, drugs, human resources)	Development and implementation of the institutional and human capacity for non-health sector to address NCD risk factor determinants and to manage population-based health promotion and risk reduction within health sector		Strengthening of institutional and human resources capacity to provide facility-based health promotion, behavior change, and risk-reduction services	Strengthening of health service delivery to provide high-quality and effective treatment services in both public and private sectors
	Financing framework	Mobilizing additional resources. Finance and other sectors in support of NCDs prevention and control	Mobilizing additional financial resources for the health sector, expanding risk pooling arrangements, and budget reallocation within the health sector in support of NCDs prevention and treatment	Development of strategic purchasing mechanisms to motivate public and private service providers to provide preventive services	Development of strategic purchasing mechanisms to motivate public and private service providers to provide quality treatment services
Evaluate	Monitoring and system intelligence	Development of effective system intelligence and information technology system for monitoring NCD risk factor determinants	Development of effective system intelligence and information technology systems for NCDs including monitoring of trends in risk factors and analyses of epidemiologic data from non-health sector	Development and monitoring of indicators related to prevention of NCDs in health facilities	Development and monitoring of indicators related to the treatment of NCDs in health facilities
	Impact evaluation	Development and implementation of impact evaluation studies			

Source: Authors' conclusions. The above is a guide to focus policy discussion and actions in key areas. The context of the setting will dictate final options and decisions.

The rationale and activities for each program management stage are as follows.

At the *Assess* stage information is collected that will facilitate efficient and effective planning and preparation, and help strategically target actions and prevention and control efforts.

The *Plan* stage entails analyzing information collected from assessments, engaging key stakeholders for prevention from inside and outside the health sector (e.g., transportation, agriculture, commerce, urban planners, and business leaders) for treatment in both public and private sectors. NCD stakeholders extend from government and ministries of health to private sector providers, from individuals to communities, nongovernmental organizations (NGOs), health care providers, academia, and donor partners. Consensus and ownership are all needed for plans to be widely advocated, adopted, financed, and eventually institutionalized.

The *Develop and Implement* stage is where broad implementation of prevention policies and scaling up clinical interventions strain all health sectors and, potentially, non-health sectors. Developed-country experiences provide some grounding. However, major revamps, and in many cases innovation, will be needed to develop effective policies for both individual- and population-based health promotion in developing countries. Currently, in terms of clinical services, only a few care delivery models exist and their effectiveness remains unclear. Health services delivery will need retooling, clinical quality assessment procedures require development and implementation, and drug policies need to assure quality, availability, and affordability of essential medications.

Other major challenges in the *Develop and Implement* stage are human resources and financing population-based policies as well as clinical prevention and treatment services. These measures can impose a substantial cost burden on governments.

The importance of the *Evaluate* stage becomes clear when one understands that countries are currently spending substantial resources on NCDs, especially on individual-based treatment. As capacity rises, programs launch, and investments grow, evaluating progress at all levels is essential to assure that goals are reached. For NCDs, the track record is short, experience is limited, but some new initiatives have already been launched or are being planned. Decision makers will greatly benefit from evaluating progress and health systems performance as utilization patterns evolve in the future.

For some stages, such as *Assess* and *Plan*, the framework will produce country-level policy options and actions, as well as strategies, which will be similar for each country across the region. However, *Develop and Implement* and *Evaluate* will tend to be more country-specific, depending on the burden and capacity.

Some important elements may lie beyond the capacity of a country acting alone and are not feasible at the country level, such as efforts in comparative effectiveness assessments for new service delivery interventions. Big-country lifestyle messages and food and tobacco policies, such as those emanating from India, can have a large influence on small countries, also suggesting regional approaches for some elements. Chapter 7 explores when regional strategies may be a feasible alternative.

Other key points include:

- Prevention policies are implemented by both the health sector and key non-health sector stakeholders such as ministries of finance (tobacco tax) and of transportation (injury prevention). By contrast, most treatment policies are implemented within the health sector.
- Prevention policies apply to the general public with spin-off applications in the private sector. Treatment policies apply equally to both the public and private sectors.

- Financing for burden assessment and population-based prevention efforts are mostly publicly funded while that for treatment is both public and private with most (currently) coming from private sources.
- Applying the framework to a lower-capacity country setting can then highlight the subset of options for population- and individual-based interventions that are strategic (Appendix 4). For example, with limited capacity, planning and human resource development constitute the focus and an emphasis within the population-based mode—within the health sector, as compared to clinical mode efforts. Risk factor and health sector capacity assessment, policy for risk factor reduction, and financing to support these activities are also strategic starting points in low-capacity settings.

Common Challenges for Tackling NCDs

The policy options framework provides a guide to strategic decisions. However, the country context and past experiences and traditions are major factors that must also be considered. In South Asia, four main areas of common challenges are as follows:

Political

- There are low levels of awareness and lack of urgency. Many governments seem to have poorly understood the overall disease burden until recently, and even today they can often access only cursory information. Burden assessments are both challenging and resource intensive.
- Challenges remain with gaining buy-in and commitment from multisectoral stakeholders—especially those which do not have a tradition of working together.
- Some governments—as well as providers, patients, and the general population—may consider NCDs part of the normal aging process and may assume that they can do nothing. Because of NCDs' insidious nature at onset with minimal or no symptoms, they do not call attention to themselves and even rather advanced stages may not be appreciated by those affected or diagnosed until a catastrophic event occurs (e.g., heart attack, stroke, or kidney failure).
- Some leaderships are concerned that NCD efforts may divert resources from unfinished MCH and infectious disease and nutrition issues.
- Few new resources are available and other issues such as climate change, which is an emerging issue for the entire region, are competing for limited funds.
- While some health policies may be justified in discouraging behaviors such as smoking where inadequate of inaccurate information is prevalent, for other behaviors, a government role in "dictating" a lifestyle to constituents needs more careful consideration as to its ramifications surrounding personal informed choice.

Economic

- Costs of NCDs put strains on budgets of government and other financiers of care because treatments use some expensive private goods and services.
- High catastrophic spending and impoverishment among individuals is too common. This exacerbates equity issues because most health financing is private and out of pocket.

Institutional

- Institutional units are lacking (such as government units to develop and implement policy, oversight, evaluation, and research) or are inadequate for the scope of their responsibilities. Adding NCDs to an existing unit's responsibility (e.g., nutrition or environmental health) is a limited solution but may reveal weaknesses as its responsibilities increase.
- Experienced cadres to fill NCD leadership roles are in short supply, and professional training and postgraduate training tracks are limited.
- There is no tradition of NCD work and little institutional memory.

Technical

- Government, academic, and private institutions have limited experience in conducting burden assessments, risk factor surveillance, developing NCD prevention and health promotion policies, reviewing the current evidence base for interventions, evaluating new technology, or regulating and monitoring public and private health services delivery.
- Delays in setting priorities and launching initiatives stem from limited experience and expertise with NCDs among government staff.
- Diagnosis may require a level of technology that simply is not available, accessible, or affordable.
- Ongoing care is needed to prevent complications and may require health system and policy retooling.

From the individual perspective, two important factors come into play. First, patients need some knowledge about their disease, the ability to provide self care, and attend clinics, and, in many cases, put forth substantial funds to finance their care—usually out of pocket. Second, common risk factors involve personal choices about behaviors and, in some situations, individuals may find the information about these choices unclear or conflicting, or they may be overwhelmed by commercial marketing campaigns serving other goals, as with tobacco.

Finally, engaging the business community and the private sector is important yet challenging. The poor health of a company's workforce can quickly affect its profits and reduce its investment in human capital. Because of the employer–employee relationship and its vested interest to increase productivity, the private sector can have a strong influence on employee behavior in ways that the public sector cannot. In developed countries many successful lifestyle models have been produced for employer- and employee-based health promotion that targets chronic NCDs. As the formal labor sector expands it will be important to tap private sector capacity to tackle NCDs (Box 5.1).

Box 5.1 The private sector and NCDs

The concept of employers playing a larger role in improving employee fitness and health is not new. The U.S. government is encouraging employers to invest in workplace health promotion, and about 95 percent of its large employers and one third of its smaller ones offer wellness programs. A growing awareness of the costs linked to risk factors provides the grounds for government promotion of workplace-based initiatives.

Johnson & Johnson launched a frequently cited model of employer-based health promotion in the 1970s and reports having saved US$38 million in health care costs between 1995 and 1999 by promoting healthy lifestyles (Zeidner 2004). During the 1990s, the firm attributed annual savings of US$225 per employee to intervention programs aimed at exercise, smoking, fiber, cholesterol, and blood pressure.

Citibank offered employees modest financial compensation for completing a health risk appraisal. Participants with risk factors were selected to receive educational materials and were monitored by a health counselor. The program saved US$5 for each one spent.

PacifiCare recently offered US$390 a year to employees to encourage them to eat better, exercise, and reduce smoking or drinking. Participants record their daily food intake and exercise routine. The company expects the program, not yet evaluated, to return more than it costs within two years.

Chapter 6: Country Capacity and Accomplishments and Application of the Policy Options Framework

Key Messages

- South Asian countries are generally putting a low level of effort in surveillance and NCD burden assessments, and no country is reviewing the evidence base.
- Some countries have NCD units and national overarching policies, but only Maldives has explicit national targets.
- Some countries have NCD policies and measures in place but often their implementation has been slow or stalled. Anti-tobacco activity is evident in all countries although the amount of effort and policies are highly variable. Clinical quality, regulatory issues, human resource planning, and financing have received little attention.
- Few gains have been made with impact-evaluation efforts.

Introduction

This chapter presents, for each country, key policy options and strategic actions for NCDs (Table 6.1 and Appendix 1; more detailed information of key accomplishments and a situational analysis for each country are included in Appendix 5.)[21] The options and actions adopt the program management cycle of the policy options framework (*Assess*, *Plan*, *Develop and Implement*, *Evaluate*) developed in Chapter 5. As noted, the aim is to be strategic rather than comprehensive.

In applying the policy options framework, it is evident that some areas show progress, and some, gaps. In the *Assess* stage, surveillance and burden assessments are receiving generally low levels of efforts and no country is doing reviews of the evidence base. In the *Plan* stage, efforts are more mixed. Some countries have NCD cells and national overarching policies but only one has national targets. Given the large and growing NCD burden, it is important for all countries to have a focal point for NCDs that can interact with country stakeholders and international agencies. Because NCDs are influenced by many different factors, many different components of government and the economy will need to be involved: education, agriculture, food processing, rural development, urban planning, transportation, commerce, environment, and communications. As a result, it is important to have a wide range of expertise and scope.

21 These reports were compiled between March and September, 2009 by a team of South Asia regional-based consultants (see *Acknowledgements* for details).

Table 6.1 NCD capacity profile of selected indicators by country

Category	Indicator	AFG	BGD	BTN	IND	MDV	NPL	PAK	LKA
Assess	Risk factor survey	No	L	L	L	L	L	No	L
	Morbidity survey	No	L	L	L	L	No	No	L
	Service utilization	No	No	No	L	L	No	No	L
	Review of evidence base	No	No	No	No	No	No	No	No
Plan	NCD cell	No	M	L	M	M	No	L	M
	Overarching NCD policy	No	H	No	No	H	No	M	H
	National NCD targets	No	No	No	No	M	No	No	No
Develop/ Implement	Tobacco policy	L	M	M	M	M	L	M	M
	Diet and physical activity policy	No	No	No	L	M	No	No	L
	Injury policy	No	No	No	L	No	No	No	No
	NCD treatment guidelines	No	No	No	M	H	No	No	H
	Quality of care assessment	No	No	No	No	No	No	No	No
	Institution regulation	L	No	No	L	No	No	No	L
	HRH needs assessment	No	No	No	No	No	No	No	No
	Financing framework	No	No	No	No	L	No	No	M
Evaluate	System intelligence	No	No	No	L	L	No	No	L
	Impact evaluation	No	No	No	L	No	No	No	No

Source: Authors.

Key: No = no activity or not present, L = Low activity/effort or development, M = Moderate activity/effort or development, H = high activity/effort or development.

In the *Develop and Implement* stage, some countries have policies and measures in place but often their implementation and enforcement have been slow or stalled. Anti-tobacco activity is evident in all countries but the amount of effort and policies in place are highly variable. For individual-based interventions, less progress is evident. Care guidelines have been developed by a few countries. However, clinical quality, regulatory issues, HRH planning, and financing have received little attention. Finally, *Evaluate* has had little activity targeted at system intelligence and impact-evaluation efforts.

Focusing on common gaps, some key strategic areas for international collaboration could enhance efforts through coordinating these activities and fostering cooperation among researchers, data analysts, and policy makers. Chapter 7 examines the rationale for considering cross-country cooperation and develops regional strategies. The remainder of this chapter highlights key policy options and actions for each South Asian country.

Afghanistan

Key Policy Options and Strategic Actions

Assess

- *Move towards integrated surveillance which includes communicable diseases and then phase in behavioral NCD surveillance that includes tobacco and mental health.* The way forward for broader surveillance will be to take stock of public and private institutions that may play key roles, including NGOs that are services providers and that track morbidity and mortality. Basic data are needed to develop sound policy and prevention efforts. Adult tobacco use is uncharacterized, although small studies suggest that use is high as is found among youth. Mental health is a major issue yet poorly characterized.

Plan

- *Identify a central node to coordinate NCD efforts*. Much mental health activity is under way. Strategic assessment, policy development, and implementation can be led or coordinated by this unit.
- *Convene stakeholders and consider a strategic NCD plan*. Stock taking among major stakeholders is needed. While competing priorities for many other issues are likely to displace NCDs, there are still opportunities to start in a few key areas.

Develop and Implement

- *Strengthen tobacco control policies*. Taxation of tobacco is much lower than in other South Asian countries. Harmonizing with other countries would increase impact.
- *Strengthen service delivery for NCDs*. Key issues are increasing skills for NCD diagnosis and treatment among human resources, and increasing the level of infrastructure for basic NCD management. Also, special attention is warranted for mental health. MoPH should consider inclusion of NCDs in the Basic Package of Health Services and the Essential Package of Health Services, keeping national priorities in mind.
- *Develop financing strategies to assure access and protect the poor*. A high proportion of care is out of pocket, as throughout the region. Simple, inexpensive, and highly effective treatments are likely being forgone by some people.

Bangladesh

Key Policy Options and Strategic Actions

Assess

- *Develop a national NCD surveillance system*. Much has been done toward a national system. The national risk factor survey under way needs to be institutionalized and a strategy for injury surveillance is needed. Public and private institutions must be tapped and coordinated in support of NCD surveillance efforts. In addition, enhanced morbidity and mortality surveillance in subpopulations such as Matlab and BanNet are critical.

Develop and Implement

- *Strengthen tobacco control policies*. Much progress has been made with a national tobacco policy. However, tobacco use is still high among both adults and children. Expanding on the core FCTC activities is needed.
- *Strengthen injury control policies*. Road traffic and childhood injuries have preventable fractions, yet little policy attention has been directed toward their prevention.
- *Retool health services delivery for NCDs*. The physician and non-physician workforce need the treatment guidelines, knowledge, and skills to diagnose and treat NCD within the primary care system. Pilots to understand best practices and those appropriate for the Bangladesh setting need to be studied. In addition, adequate supply and access to essential medications is needed, especially for the poor. Finally, sensitization of the population to the use of allopathic medicine and its benefits is needed.

Evaluate

- *Strengthen evaluate capacity*. Policies now in place, pilot studies, and interventions tested will all need solid evaluation. This will be especially the case for tobacco and injury policies.

Bhutan

Key Policy Options and Strategic Actions

Assess

- *Develop a national NCD surveillance system*. While some initial efforts are evident, little has been done toward a national system. Vital registration for mortality needs to be expanded beyond hospital, and morbidity and risk factors need institutionalization. In addition, a strategy for injury surveillance is needed. Public and private institutions must be tapped to support surveillance efforts. The risk factor surveillance system needs to expand to cover alcohol and betel nut use.

Plan

- *Adequately resource the recently adopted national NCD policy*. Resources, both financial and trained human resources, will be needed.

Develop and Implement

- *Strengthen tobacco control efforts*. A very strong policy is in place but needs more effective enforcement.
- *Enforce the numerous existing alcohol use and sale regulations*.
- *Retool health services delivery*. Both the number of worker and the type of skill sets need to be expanded to improve outcomes. Facilities need to be equipped with basic diagnostic and management infrastructure and essential NCD drugs should be available and accessible, especially for the poor.

Evaluate

- *Create capacity to evaluate programs and policy*. The tobacco policy and the two NCD pilots need evaluation to develop an evidence base. Likewise, the new NCD policy needs to be monitored and evaluted.

India

Key Policy Options and Strategic Actions

Assess

- *Create a national NCD surveillance system*. A national surveillance system is needed for strategic planning and policy development. The IDSP is a good effort to develop a national ongoing risk factor surveillance system but is now stalled. Using a state-based approach is reasonable but national and regional funding and technical support will be needed. In addition, systematic surveillance of morbidity and mortality will be needed. With regional variations in disease burden likely an issue, assessments can be done in representative subsamples. Surveillance must be designed to meet planning and policy development needs. It will be important to link institutions with NCD research capacity to create a disease burden evidence base but also one for population- and individual-based interventions. Expanding surveillance outside the health sector for exposure to harmful products and foods (tobacco, processed foods, edible oils, etc.), will be needed for health policy planning.

Plan

- *Coordinate national NCD efforts*. India already has many NCD policies and stakeholders, and much progress has been made. The current challenge is coordinating efforts in many areas to improve efficiencies and to assure that resources will have the largest impact. Currently, there is no overarching policy, strategy, or coordinating body to make sure that key opportunities are taken.

Develop and Implement

- *Strengthen tobacco control policies*. Prevention efforts for tobacco are reasonably well developed and planned for integration into the NRHM and NPDCS. However, prevention and control efforts outside the health sector, while substantial, could be enhanced. Specifically, considering a tax framework that includes all major tobacco products (including *bidis*) could have a large impact. This strategy would need to include the tax impact outside the sector on finance, agriculture, commerce, and labor.
- *Strengthen injury control policies with a focus on road traffic injuries*. This is an area where surveillance data are still not well developed. However, prevention policy, especially for road traffic injuries, is badly needed.
- *Implement clinical standards and guidelines developed under the India Public Health Standards and integrate NCD training into human resources for health (HRH) curricula.* With the NRHM and the NPDCS both coming on line, this aspect will be critically important.

- *Develop financing strategies for NCD prevention and control efforts*. Most clinical prevention and treatment services are from private out-of-pocket sources, and impose a large burden on the poor and lead to both poverty induction and catastrophic spending. The priority is for financing schemes to protect the poor. However, a substantial proportion of the total population will also be susceptible to financial stress from health care costs from NCDs. Thus, schemes suitable for those with some means that can use risk pooling and expenditure smoothing will be of great benefit. Some models are currently being examined but a strategic plan is not evident. Finally, a strategy to finance population-based prevention interventions within and outside the health sector is needed.

Evaluate

- *Evaluate NCD programs and policy initiatives*. Few evaluations have been done and there is little demand for them. As more and more resources are targeted toward NCDs and policies and programs are scaled up, understanding the benefits of such programs and initiatives provides critical input. Areas that might greatly benefit from evaluations include tobacco control, NRHM, and NPDCS.

Maldives

Key Policy Options and Strategic Actions

Assess

- *Create a national NCD surveillance system*. A national system is needed to inform strategic planning and policy development. Limited efforts for subnational behavior risk factor surveillance for tobacco and youth have been undertaken. However, the system should also include NCD mortality, morbidity, health services utilization, and economic burden data (available from national health accounts). This information will be critical as decentralization evolves. Core public health institutions are needed to provide technical support along with international institutions (such as WHO).

Develop and Implement

- *Coordinate national efforts.* It would be necessary to build the sections capacity and provide sufficient resources and authority to meet its objectives It is also important to address social, economic and environmental determinants that underlie NCDs. Cross-sector and collaborative mechanisms need to be expanded and strengthened to address the latter.
- *Strengthen tobacco control policies.* Control efforts have made a good start. However, full implementation and enforcement are lagging.
- *Develop a competent workforce to tackle NCDs.* Assets include the national guidelines and standard practices that need full implementation, and they will need periodic updating. Human resources require assessment for current and near-future needs, and that assessment must account for the large use of expatriate providers. Human resource for key areas such as mental health need to be addressed urgently.

- *Strengthen financing for NCD care.* Much progress has been made with social health insurance, but equity and access need to be addressed. The restructuring of the health system should not compromise on the public expenditure for health, especially preventive health. New avenues for health financing such as earmarking of taxes from tobacco and other unhealthy goods towards preventive health should be explored.

Evaluate

- *Create capacity to evaluate programs and policy*. As policies are developed and more resources committed to NCD efforts, evaluation will help fine tune or redirect activities.
- *Electronic medical record system needs institutionalization*. The recently developed system for chronic NCDs needs to be developed and incorporated broadly into service delivery.

Nepal

Key Policy Options and Strategic Actions

Assess

- *Create a national NCD surveillance system.* Initial efforts should focus on risk factors including tobacco (especially among women), alcohol use, and injuries. The core public and private institutions with experience and capacity should be tapped for capacity development and technical assistance.

Plan

- *Finalize National NCD Policy.* The policy is drafted and needs to engage stakeholders and to be adopted by the government.

Develop and Implement

- *Strengthen tobacco control policies.* Current efforts need to be built on. A broad focus, as outlined in the FCTC (which has been adopted) is needed with a specific focus on taxes to reduce consumption.
- *Retool the heath workforce for NCD prevention and control.* The health workforce is in short supply and is likely not skilled in management of NCDs. Two major areas of change required are to increase the workforce and to increase its skills. Concomitantly, the health infrastructure, with primary care, will need to be equipped with basic diagnostic and management capacity. Financing strategies should also be developed, which assure access to services and medications, especially among the poor.

Evaluate

- *Develop monitoring and evaluation capacity*. As the national NCD policy is adopted and policies developed, and evaluation plan will be need to fine tune and redirect efforts and resources.

Pakistan

Key Policy Options and Strategic Actions

Assess

- *Create a national NCD surveillance system.* Needed to inform strategic planning and policy, this will allow implementation of the national NCD policy to have more immediate impact. Initial efforts can be built on. In 2003, a pilot was implemented in one district (population 1 million) for developing a model for population based surveillance of NCDs.[22] Results of the initial round of surveillance have been published.[23] A World Bank/CDC/WHO joint study in 2004 recommended that it be replicated and taken to nationwide scale.[24] The system should include mortality, morbidity, utilization of services, and risk behaviors. In addition, there should be early focus on tobacco, road traffic injuries, mental health, youth, and high-risk ethnic groups. Special studies in representative subsamples will also help understand the burden. The core public and private institutions with experience and capacity should be tapped for capacity development and technical assistance.

Plan

- *Develop and adopt and national NCD policy.* The National Action Plan for the Prevention and Control of Non-communicable Diseases and Health Promotion has been in existence for the last 7 years.[25] Its recommendations can be updated with the outputs of the more recent rounds of planning which were conducted in anticipation that an NCD commission will be created. Implementation of the recommendations needs to be tasked to a unit with the capacity and resources adequate for implementation.

Develop and Implement

- *Strengthen tobacco control policies.* While some early efforts have been made, implementation and enforcement lag.
- *Strengthen injury control policies with a focus on road traffic injuries.* The ongoing surveillance can help target efforts. Policy should be oriented initially toward prevention (seat belt and helmet use).
- *Retool the heath workforce for NCD prevention and control.* NCD management is not institutionalized into training on NCDs for either physicians or non-physicians. For the current workforce, in-services and skills training is needed. A primary care NCD training track implementing evidence-base interventions is a priority. In addition, assuring availability and access to NCD services and drugs for the poor with NCDs and financing to achieve this is key.

---

[22] Nishtar S, Bile KM, Ahmed A, Amjad S, Iqbal A. Integrated population-based surveillance of non-communicable diseases—the Pakistan model. Am J Prev Med. 2005 Dec;29(5 Suppl 1):102-6.

[23] Nishtar S. Health Indicators of Pakistan—Gateway Paper II. Islamabad: Heartfile, Health Policy Forum, Statistics Division, Government of Pakistan, World Health Organization and Ministry of Health, Government of Pakistan; 2007. http://www.heartfile.org/pdf/GWP-II.pdf (accessed April 07, 09).

24 The World Bank. Public health surveillance system: a call for action. Islamabad, Pakistan: Ministry of Health, World Bank, Centres for Disease Control, World Health Organization; 2005.

[25] Ministry of Health, WHO and Heartfile. National Action Plan for the Prevention and Control of Non-communicable Diseases and Health Promotion in Pakistan. 2003 http://www.heartfile.org/nap.htm (accessed Jan. 4, 2011)

Evaluate

- *Develop monitoring and evaluation capacity* A health management information system is in place and will be a major asset, although it needs to be retooled for NCDs. In addition, as the national NCD plan is implemented, an evaluation plan will be needed to fine tune and redirect efforts and resources. Indicators and monitoring mechanism of the Integrated Framework for Action of the National Action Plan can guide this process.

Sri Lanka[26]

Key Policy Options and Strategic Actions

Assess

- *Develop a NCD surveillance system*. A national ongoing NCD surveillance system is required for strategic planning. It should include behavioral risk factors, NCD morbidity, mortality, health services utilization, and special population-based registries for cancer and injury.

Plan

- *Finalize nation NCD policies*. Sri Lanka has made good progress in developing key NCD policies, which are near adoption by government. A push to finalize these policies and to resource them, as well as to engage stakeholders in implementation, is needed.

Develop and Implement

- *Create an intensified national NCD program*. Currently, the responsibility for NCDs is divided among at least three directorates. In order to get the best from this arrangement, an intensified national NCD program with sufficient resources and authority to make it effective is needed to develop, coordinate, and implement national prevention and control policies.
- *Increase use of lower-level facilities to treat NCDs*. Inefficiencies in health services delivery are occurring with the overuse of higher-level facilities. Lower facilities for NCD care need to be utilized where appropriate. In addition, integration of preventive and curative services at the primary care level to manage NCDs would improve efficiency. Currently, the capacity for diagnosis and treatment within primary care is limited. Human resource development upgrading facilities will be needed.
- *Develop financing strategies to assure access and protect the poor*. A substantial proportion of health services is currently financed with private resources, mostly out of pocket—and this proportion is increasing. Financing strategies for health services to assure access to diagnostics and to simple, inexpensive, and effective medications is badly needed. In addition, these policies need to be sensitive to the poor who may currently be forgoing basic treatment since they cannot pay for it.
- *Develop public–private partnerships*. The public sector now provides a significant proportion of health services. However, the private sector remains poorly understood. Public–private partnerships that link the two systems would allow for better coordination and efficiencies.

26 See World Bank (2010).

Evaluate

- *Develop monitoring and evaluation capacity*. Evaluation of the process and outcome of health services is currently a critical issue and will only become more important as the burden of NCDs and services use increase. Thus, health information systems need to be refined. In addition, as national policies are implemented, evaluation will need to assess progress and to direct resources to where they will have the largest impact. While some of the surveillance effort (see *Assess* above) will assist with this task, more detailed evaluation will be required for some aspects of policy evaluation.

Chapter 7: Regional Strategies for NCD Prevention and Control

Key messages

- Regional strategies could enhance NCD prevention, especially for tobacco and food.
- Three main situations lend themselves to regional cooperation: when there are positive or negative externalities, there are economies of scale and scope, and the production (or prevention) of a good is only possible if all countries participate.
- Potential areas for regional collaboration include tobacco control (including harmonizing tobacco taxes and strengthening anti-smuggling measures); standardizing and mandating food labeling; purchasing essential medications for treatment of NCDs; and developing a shared evidence base for intervention, training, and surveillance.
- Institutions to lead and manage supranational coordination need to be identified.

Introduction

The NCD burden, using any of the comparable measures available, is highly variable across South Asia (as noted in Chapter 1). However, by contrast, NCD risk factors are similar, especially for tobacco—which has the best data, and to a more limited degree with available data, for diet and alcohol use. Thus, NCD prevention may benefit from harmonizing health policies and strategies at a regional level for tobacco control and healthy dietary practices.

The centerpiece of tobacco control efforts include policies that restrict advertising to adults and marketing to children, and that increase tax rates of cigarettes and tobacco products to reduce consumption, especially among the poor, who tend to use more tobacco than the rich (Ross and Chaloupka 2006). The tobacco industry tends to target its marketing efforts at countries with fewer restrictions, where tobacco is taxed less and is easier to buy. Media advertising for tobacco products in countries with fewer restrictions can therefore penetrate into countries with more restrictive policies. Also, low cigarette prices increase the risk of smuggling back into countries with restrictive policies, higher taxes, and higher tobacco prices.

Thus, harmonization of tobacco policy is not only important—its absence may cause harm. One response at a global level was the FCTC (Box 4.1 above), which has been adopted by all countries in South Asia. However, implementation worldwide has been slow or stalled because of several complexities, including weak international collaboration.

Food-exporting countries' policies can heavily influence health dietary practices through the quality of food consumed in food-importing countries. For both tobacco use and food consumption, the poor are the most susceptible to domestic and international policies because they have higher smoking rates and make food purchases based on cost, not quality.

Several other situations may benefit from international collaboration. For example, smaller countries may not—alone—be able to carry out important activities efficiently, including training health professionals; purchasing, manufacturing, and regulating drugs; and conducting research. (Chapter 5

showed common county-level gaps in human resource supply and skills for NCDs, medication availability and affordability, an evidence base for interventions, and surveillance systems.)

In addition, some countries may be reluctant to undertake certain initiatives because they are concerned that they will lead to increased levels of smuggling across international borders, lowering tax revenues. This is especially true for tobacco and alcohol, but also applies to pharmaceuticals and other health products where a secondary market for drugs exists (if one country, for example, negotiates a better price than another).

Examples where regional approaches have been employed include those for HIV/AIDS in Africa, Central Asia, and the Caribbean (World Bank 2008b; Godinho et al. 2005).[27] With commonalities among countries, these two reports describe how a regional approach has focused on developing national policies, using evidence-based interventions, prioritizing strategies, targeting multisector and civil society responses, enhancing capacity for monitoring and evaluation, and harmonizing donor collaboration.

Guiding Principles for Regional Collaboration

Policy makers use the concept of public goods to define the role of government and international agencies in policy implementation. But as globalization gathers pace, goods—as well as diseases—cannot be kept within national borders.

Experiences inside and outside public health can provide guidance on where collaboration may have advantages. For example, the International Task Force on Global Public Goods, convened by European governments, defined global public goods as "issues that are broadly conceived as important to the international community, that for the most part cannot or will not be adequately addressed by individual countries acting alone and that are defined through a broad international consensus or a legitimate process of decision-making" (International Task Force 2006).

A similar approach could be taken for nonpublic goods as well. The International Task Force also calls for the intervention of global institutions, such as the United Nations and the World Bank (International Task Force 2006). The report stops short of recommending how these global institutions could establish mechanisms to finance and provide those global goods.

Guiding principles developed by the World Bank (Development Committee 2007) established the following criteria where global collaboration should be considered: (i) there should be an emergent consensus in the international community that global action is required; (ii) there should be an institutional gap that international agencies could help fill to encourage global action; (iii) international agencies should have the requisite capabilities and resources to be effective; and (iv) global action by international agencies could catalyze other resources. Governments in South Asia could use these principles to decide what activities they want to pursue regionally. Some of the very practical factors (such as which international agency is willing to take the lead in developing an agenda) may direct the focus on and resolution of a specific issues. Assuming that there is consensus, capacity, resources, and feasibility (see *Common Challenges for Tackling NCDs* in Chapter 5), three types of situation can justify a regional approach. The first is when positive or negative externalities may occur. Examples of the former are knowledge management for addressing NCDs that leads to better prevention and control policy resulting in lower NCDs burdens; the latter might include smuggling and inconsistent tobacco taxation

27 And see web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT accessed July 7, 2010.

among countries with common borders such that exposure to tobacco increases secondary to the tax policy.

The second is when there are economies of scale and scope in working regionally. For example, this may occur when the marginal cost of supplying the good to multiple countries in the region is negligible. Group purchasing is an especially relevant issue for small countries, which do not have the purchasing power of larger nations. Also, in South Asia, a few countries (mainly Bangladesh and India where the pharmaceutical industry is rapidly developing) may be well positioned to supply the good and could do it more efficiently through regional agreements.

The third type of situation is when the production (or prevention) of a good is more effective if all countries participate, including collective bargaining for group purchase of drugs, food labeling, tobacco labeling, comparative effectiveness studies, and research. An example is food labeling and regulated contents of processed foods where it may be less costly for industry to have a uniform approach to the entire region than to label and process a product differently for each country (Roos et al. 2002).

Using the above guiding principles, the following potential areas for collaboration within the region are outlined. Some of these regional strategies are specific to NCD risk factors; others are broader and affect the health system as a whole, yet are critical to strengthening the overall NCD response. A rationale for each strategy is also presented.

Strategies for NCD Risk Factors

Expand and Harmonize Tobacco Advertising Bans to Reduce Demand

Tobacco is a major NCD risk factor common to the region. Most countries' tobacco policies have advertising bans for national TV, radio, magazines, and newspapers, although most of these bans do not extend to international media (Table 7.1). Only half have policies for warning labels on tobacco packaging. These inconsistent policies take away from their potential impact, and synergies among them may be lost. This also can lead to big countries, India for example, which can dominate regional culture and politics resulting in large influences, good or bad, in smaller countries that share common borders. Thus, harmonizing and expanding ban policies would fill country level gaps in policies and address inconsistencies across the region.

The rationale for a regional strategy and collaboration is that collective bargaining with media for advertising and industry for tobacco labeling would give smaller countries greater leverage. In addition, wider bans would have the positive externality of limiting second-hand smoke exposure in public spaces.

Table 7.1 Tobacco prevention and control policies in South Asia

Category	Indicator	AFG	BGD	BTN	IND	MDV	NPL	PAK	LKA
Advertising bans	National TV and radio	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
	International TV and radio	No	No	No	Yes	No	No	No	No
	Local magazines and papers	Yes	Yes	No	Yes	Yes	No	No	Yes
	International magazines and papers	No	No	No	Yes	No	No	No	No
Public smoking ban	Government facility	No	No	Yes	Yes	Yes	No	No	Yes
	Public transport	No	No	Yes	No	No	No	Yes	Yes
Package labeling	Warning on package	No	Yes	No	Yes	Yes	No	Yes	No

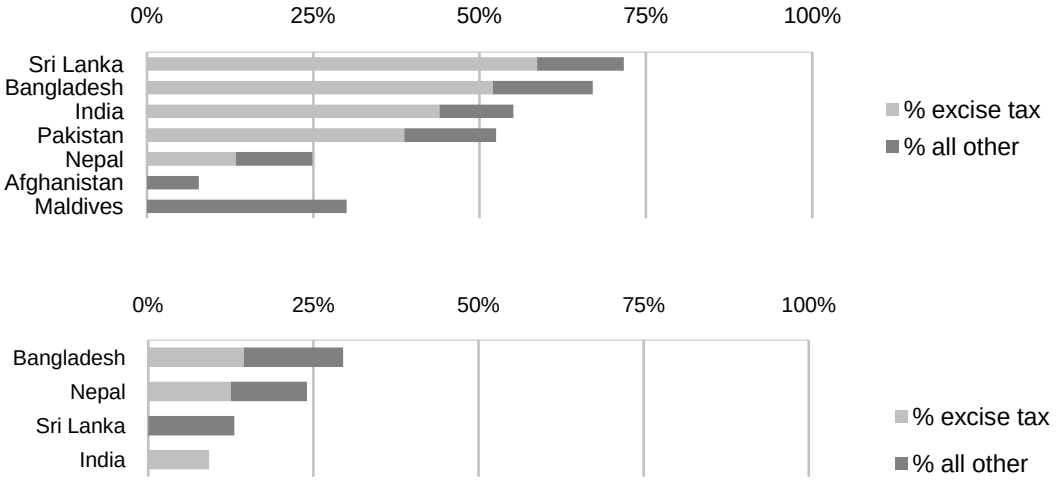
Source: WHO 2008b.

Increase and Harmonize Tobacco Taxation to Reduce Consumption

The most cost-effective policy tool for tobacco control is taxation of tobacco products. It has been highly effective in reducing prevalence of smoking in both developed and developing countries (World Bank 2006), and FCTC signatories are committed to levy excise taxes on tobacco products. Studies have estimated that for every 10 percent increase in the price of tobacco, consumption of tobacco products can be expected to decrease by 2.7 percent in Bangladesh, 8.8 percent in Nepal, and 5.3 percent in Sri Lanka (Adeyi et al. 2007) and by 4–9 percent in India, depending on the type of tobacco product (John 2008b). While raising tobacco taxes may increase government revenues and may reduce the number of smokers, it can also prompt smokers to switch to cheaper products, such as *bidis*, a much less expensive—but equally harmful—form of smoked tobacco, and it can provide an incentive for smuggling if the price of cigarettes is lower in neighboring countries.

Tax policies vary widely across countries, and across different tobacco products within the same country. The excise tax combined with all other taxes ranges from nearly 75 percent in Sri Lanka for a 20 piece pack of the most sold brand of cigarettes to under 10 percent in Afghanistan (Figure 7.1). In addition, tax on *bidis* is only a fraction of that on cigarettes.

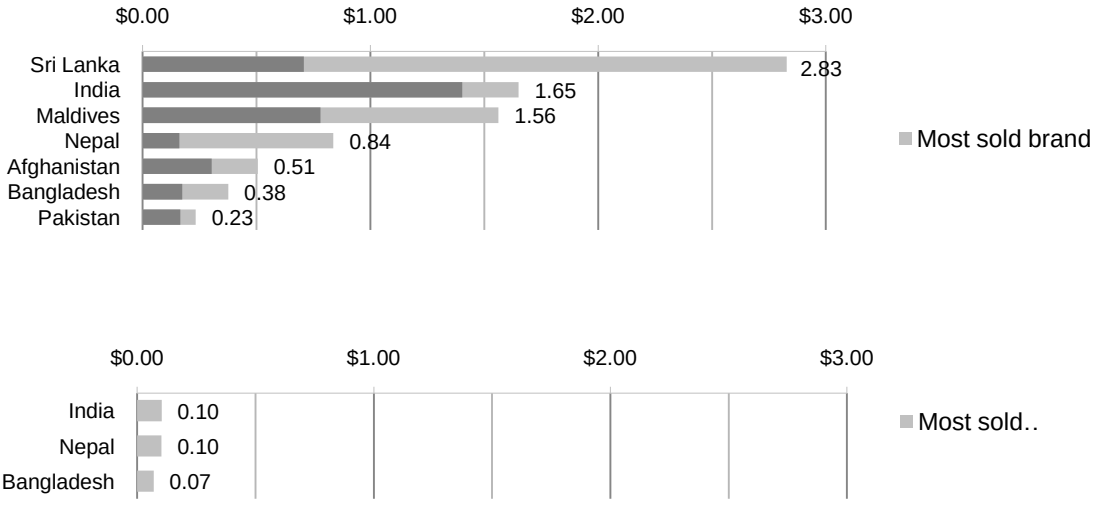
Figure 7.1 Share of total and excise taxes in the price of 20 piece pack of the most sold brand of cigarettes (top) and for the most sold brand of *bidis* (bottom), South Asia, 2008



Source: WHO 2008b.

To reduce consumption, the tax level should increase the actual retail price. This is an area where the tobacco industry can reduce profit margins to maintain consumption rates by keeping prices low. For the most sold brand, an almost 10-fold variation in price is found between countries (Figure 7.2).

Figure 7.2 Price of the most sold and cheapest brand of cigarettes (top) and most sold 20 pack of *bidis* (bottom), (US$), 2008



Source: WHO 2008b.

The rationale for regional harmonization of tax policy is the potential for negative externalities associated with increased consumption due to access to cheaper tobacco products in neighboring countries and the increased risk of smuggling that such large cost variations create.

Harmonize Tobacco Taxes and Strengthen Anti-Smuggling Measures

Recognizing that smuggling can undermine FCTC implementation, in March, 2010, an FCTC working group (which includes South Asian countries) developed a draft protocol to control illicit tobacco trade (Intergovernmental Negotiating Body 2009).[28] Areas the protocol covers are its relationship to other international agreements, such as the UN Convention against Transnational and Organized Crime, the development of an international tracking and tracing system, and requirements for wholesale customer identification and verification. This protocol is expected to aid the implementation of the FCTC and is currently under consideration by the FCTC's Conference of Parties.

While many countries struggle to control tobacco smuggling, others are more successful. The experience in Spain, for example, demonstrates the effectiveness of focusing on the supply chain. From 1996 through 2000, Spain increased its resources dedicated to track cigarette smuggling from €4 million to €44 million. Through systematic detection of traffic routes and seizure of containers, fines and penalties on smugglers, as well as strong law enforcement mechanisms, Spain reduced the market share of smuggled cigarettes from 16 percent to 2 percent, and boosted tax revenues from tobacco products from €2,300 million to €5,200 million—a significant return on investment (Joossens and Raw 2008).

Europe and South America present good examples of regional cooperation on tobacco control. The European Commission (EC), based on the Racketeer Influenced and Corrupt Organization Legislation, filed a suit against the tobacco companies in a U.S. court after European courts had found the tobacco industry liable for indirectly participating in smuggling across Europe. Tobacco companies immediately attempted to settle out of court. They had been negotiating, country by country, a memorandum of understanding that was unenforceable and non-binding, while offering to donate funds for health and other social programs, as they had previously done with several other countries (BAT 2009; Gilmore et al. 2006; Samet et al. 2006). The EC, acting as a regional entity, negotiated a more stringent agreement on behalf of all its member countries, and dropped the suit only after the tobacco industry accepted it. This agreement, which includes tracking mechanisms financed by tobacco companies, has served as a model for other regions.

In 2003, several countries in South America began harmonizing tobacco product taxes to reduce susceptibility to illicit trade. This move also made them less vulnerable to ad hoc agreements with the tobacco industry (Iglesias and Nicolau 2006). These same South American countries also created a common database of the various types of warnings on cigarette packages to support the implementation of the FCTC at country level (Mercosur 2003).

The rationale for a regional approach to taxation and smuggling is that, unchecked, smuggling will undermine advertising and tax policies designed to reduce consumption.

Standardize and Mandate Food Labeling Policy to Improve Knowledge and Awareness of Food Composition

Food-importing countries—especially the smaller ones—have little control over the exporting countries' food quality and can suffer some adverse consequences. Food labeling is becoming more common, and accurate information is a first step to increase awareness of the nutritional components and calorie

[28] http://www.who.int/fctc/inb/en/

content for consumers. As most of these food labels are established for larger countries, the smaller countries need to accept that it is not economically viable for their industry to label food.

Trans fats are an example where labeling may assist health promotion efforts to improve the quality of dietary fats. Multinational food companies have created products that have advantages for them but are harmful to the population. While each country could tackle these issues alone, it is likely to be more effective for countries in South Asia to work together to develop strategies with multinational food companies to eliminate trans fats, and reduce unsaturated fats and salt in their products. However, the first step is awareness of the trans fat content.

Food labeling can also assist national efforts to reduce obesity, a growing problem in South Asia among adults and, in some cases, children, through increasing awareness of calorie content. A major challenge for this effort is that significant chronic energy deficit and underweight persist at the same time. Many of the initiatives to tackle obesity will require consideration of sociocultural contexts specific to each country while addressing nutritional content of foods and the importance of increasing the level of exercise. In addition, food labeling will complement awareness campaigns for healthy foods.

The rationale for a regional strategy and collaboration for food labeling is that it provides both a much stronger negotiating position for countries vis-à-vis the food industry, as well as economies of scale (in that that similar labels can be used for several countries).

Strategies to Improve Health Systems

Collaborate on Group Purchasing of Essential Medications to Increase their Access and Affordability

Because medications play a key role in achieving improved clinical outcomes among people with NCDs, assuring that patients have access to the appropriate medication is important. However, the context in South Asia makes this goal hard to achieve. All countries in the region spend a considerable proportion of total health expenditures on drugs, and much of this is paid by patients themselves, including the poor. This is largely due to the unavailability of essential drugs in the public sector because of inadequate public purchasing practices, and large mark-ups in the private sector (Cameron et al. 2009), and public policies that may not provide drugs.

Most of the countries in the region lack the expertise and facilities to produce a wide range of pharmaceuticals. As a result, essential drugs for NCDs are likely to be imported. India, however, has an extensive drug manufacturing program that caters both to internal and external markets, the latter mainly within South Asia. Bangladesh also has an extensive manufacturing industry for some medications, but nearly all are consumed domestically. Quality control and good manufacturing practices for medications are both issues that challenge these two markets.

While the market place is likely to develop drugs that respond to demand from people who can pay for them, many institutions and individuals cannot afford to. Country collaboration (to gain better bargaining power and affordability to drugs for NCDs) is likely to help provide real gains on this preventable burden.

Most countries in South Asia have developed essential drug lists to determine what drugs governments should purchase. Yet if countries were able to decide on a common essential drug list and to have a commonly agreed-on set of regulations, their procurement units could negotiate with drug companies collectively instead of individually, strengthening their bargaining position and securing lower prices. Countries should therefore compare their lists and rationalize them, to eliminate country differences.

International cooperation may well result in lower prices in those South Asian countries where they are high. In Bangladesh, Nepal, and Pakistan, for example, drugs provided by public facilities are free of charge, but when a list of 32 essential medicines for chronic conditions was examined, less than 8 percent were actually available in the public sector. Therefore, patients have to buy drugs in private outlets where only 30 percent of the lowest-price generics are available (Mendis et al. 2007). When compared with international reference prices the lowest price generics are 2.05, 1.64 and 1.14 times more expensive in Nepal, Pakistan, and Bangladesh respectively; whereas in Sri Lanka the prices of the lowest-price generic and the most commonly sold generics are equivalent to the international reference price.

Over the past 20 years, both developed and developing countries have attempted various models to improve drug availability and reduce their price. There are several examples of aggregated pooled procurements at state, country, and intercountry levels that have led to lower prices and improved quality control (Huff-Rousselle and Burnett 1996; Murakami et al. 2001; WHO 2007). In some instances, pooled procurement is used with subsidies that both encourage participation of private pharmacies and improve access for the poor—a potential approach that could be adopted regionally instead of just one country at a time.

Some European and Latin American countries use reference pricing, where the insurance plan or government takes as a reference for reimbursement the lowest priced generic (Schneeweiss 2007). Adopting the same system would give countries in South Asia greater bargaining power with drug companies. Another approach is comparative effectiveness (discussed in the next section).

All South Asian countries have some type of regulation of pharmaceuticals, although the resources and level of regulation vary extensively. While a country like India could undertake reforms on its own, and some Indian states have already done so, the situation is more difficult for smaller countries that do not have adequate regulatory infrastructure. Regional support to evaluate options according to the needs of each country could make it possible to establish common systems that may include quality control, purchasing support, and monitoring drug availability. WHO has already developed a methodology for putting in place regulations and monitoring the availability and prices of drugs, but it needs to be carried out by countries (Cameron et al. 2009; Niens and Brouwer 2009).

Thus, the rationale for increasing access and affordability of essential medications is that the negotiating power of procurement units would increase (especially in smaller countries), and bulk purchasing would reduce costs and help assure adequate supplies. This approach would be most feasible for neighboring countries with similar health systems and good cross-border collaboration. However, the transaction costs may be significant,[29] and would need to be weighed against the benefits.

Establish a Regional Health Technology Assessment Institution to Improve the Comparative Effectiveness of Interventions for NCDs and other Conditions

Although accurate data are scant, Chapter 2 showed that significant resources are spent on NCDs in South Asia. Thus, assuring that these resources have the best chance of achieving the desired outcomes is a high priority. The fast-growing global knowledge base for NCDs is an important asset to help countries channel resources where they will have the largest impact but is not currently be used much by countries. However, there are major challenges in tapping this base.

29 These include the costs of additional people, additional warehouse space and equipment to handle larger volumes, and transport costs. These are real incremental costs that need to be financed before the volume of drugs can be scaled up. While these costs may not be known, they may be significant.

First, the volume of new research makes it difficult for any single entity to keep track of it all. It is not possible for institutions—and certainly not for individuals—to keep abreast of the nearly 100,000 new papers published in the health sciences literature every year (NLM 2009). The technical solution has been the emergence of specialized entities that conduct systematic literature reviews. Some of these entities are academic centers and government agencies that either contract out or directly conduct these reviews; others are self-standing not-for-profit organizations, such as the Cochrane Collaboration, probably the best-known of these entities.

Second, many research studies use different approaches and methods, leaving the advantage of one treatment relative to another unclear. In an attempt to tackle this challenge, comparative effectiveness assessments of interventions and treatments examine the efficiency (the outcome yielded from the inputs) by examining two or more treatment options and deciding which has (i) the greatest efficacy (the outcome in a carefully controlled study setting), (ii) the greatest effectiveness (the outcome in a typical clinic or community setting), and (iii) the greatest cost-effectiveness (the cost per outcome achieved). Countries may use different assessment methods and acceptability thresholds that are not necessarily standard and would fit other countries objectives.

Comparative effectiveness is also used to improve allocative efficiency (targeting resources where they will be the most effective and likely have the largest impact). Many countries have a legacy of heavy investment in hospitals and much less investment in ambulatory services where highly cost-effective interventions can be delivered (Chapter 2). This is true in some South Asian countries.

Third, the cost, especially the fixed cost, of establishing an institution to rate comparative effectiveness can be high. Also the number of drugs, devices, and procedures that need evaluation is huge. All this suggests there is an advantage in having a regional body rather than national institutions. South Asia has several different models to choose from. The United Kingdom has one of the oldest and most respected bodies, the National Institute for Clinical Effectiveness. For policy decisions and resource allocation, it relies on synthesis and critical appraisal of available evidence, including cost-effectiveness, to develop practice guidelines that provide technical support to the country's publicly funded National Health Service. It develops guidelines with professional organizations, but not with private industry. The government also funds audits of the implementation of guidelines and information gathering of emerging clinical innovations.

In Germany, where there are multiple payers, the German Institute for Quality and Efficiency in Healthcare (IQWiG), a not-for-profit nongovernmental entity, collates and presents a structured assessment of comparative clinical effectiveness of different medical interventions to inform negotiations between insurers and professionals. This entity has an advisory capacity only; final decisions are made by the Joint Federal Committee, which is made up of health care providers and insurance funds.

There are also models from low- and middle-income countries that may be more relevant to countries in South Asia, and the most relevant is perhaps Brazil. Brazil has entered into an agreement with the United Kingdom to use guidelines from the National Institute for Clinical Effectiveness as a starting point. The Ministry of Science in Brazil then reviews the guidelines and proposes adaptations to the Brazilian context; Brazilian economists conduct cost analyses based on the costs in Brazil; the final presentation is then made to the decision maker, the MOH. The information presented to the minister of health includes these recommendations, physicians' requests, and opinions of hospital managers and patient advocacy groups. Once included in the benefits package, the drug or device is fully funded and available throughout the system.

The rationale for regional collaboration to establish a comparative effective institution is that such a body is unsustainable in terms of resources or expertise for a single country, yet the outputs will provide critical guidance on policy development for prevention and treatment at the country level.

Use Regional Education and Training Capacity to Complement the National Needs for Human Resources in order to Improve both Staffing and Skill Levels

Health professionals play a vital role in the prevention and, especially, treatment of people with NCDs, yet most countries in South Asia are significantly short of health professionals. The larger countries are investing in additional training, and the smaller ones heavily depend on them for training their own nationals. There is considerable migration across regional countries among health professionals in addition to out-migration to more prosperous countries beyond the region. Thus several aspects involving labor, training, and migration of health professionals could be addressed from a regional perspective. A better understanding of the country-level dynamics of HRH within and outside the region would lend insight to where efforts might be strategically placed to address shortages and needed skills.

For small countries, cross-national training of health professionals would offer benefits, including lower costs and a higher-quality education in settings with greater clinical expertise and a population with an adequate case load for training.

One possibility is to have the initial years of training carried out in one country and then have formal clinical rotations to other countries. In the United States, for example, an HRH training program has all the initial training for physicians and nurses from rural western states in Washington state, which has a large urban center; then the clinical rotations are to the trainees' home states. These rural states do not have the funds or the population to support a medical or nursing school, but they help support the medical school in Washington state and, in return, are allowed to admit their students to Washington state medical school for basic training and then continue the clinical training in their home state.

This is a model that could benefit the smaller countries in the region, and has multiple advantages. It allows more training of health professionals from smaller countries; it does not require larger countries to fill gaps smaller countries health professionals needs; and means that people in smaller countries can be treated by people from their own country.

The rationale for adopting a regional approach for the HRH gaps that most countries are facing stems from the economies of scale achievable.

Establish a Regional Network of Surveillance and Burden Assessment to Improve National Capacity through Knowledge Sharing and Experience Exchange

Surveillance—a challenge across the region—is critical not only for policy formation but for the development of efficient programs that will reach the target population. This is a country-level activity and countries have made much progress recently with technical support from WHO and financing support from development partners. However, international cooperation—in creating information systems both to identify the prevalence and economic burden of NCDs and to determine how the care for NCDs is being financed and delivered—would provide momentum and be of great benefit for planning and potentially jumpstarting efforts in the area of surveillance.

Most regional countries already use international data-collection forms for surveillance efforts. It will be important for countries to review the information that is being collected and look for gaps in it. Most countries still rely on Global Burden of Disease study estimates. That methodology seldom has country-specific data, leaving most estimates based on regional numbers, especially for the smaller countries. To the extent that countries need to collect data that are unique to their own country for policy

formulation, using common data instruments may have the advantage that it allows for intercountry comparisons, at least for elements of comparative interest.

The rationale for a regional approach for establishing a surveillance network includes economies of scale from implementing similar surveys across the region, and the collective bargaining of governments with the institutions that will conduct the surveys and studies.

Regional Institutional Capacity and Past Collaboration

Efforts have already been targeted toward a number of the above strategies. For example, WHO is leading efforts in tobacco, surveillance, health policy development, creating an evidence base for intervention, and NCD training. Much progress has been made. The goal of this chapter has been to highlight the common issues where justification for a regional strategy is strong and build on what has been done.

A critical element for a regional policy or activity to get off the ground, as noted in *Guiding Principles For Regional Collaboration*, is having institutions that can lead and manage supranational coordination. Some South Asian institutions that could play this role are shown in Table 7.2. The organization and structure of regional programs can take several forms, which the countries need to decide on, keeping in mind the roles and responsibilities of the regional coordinating institution. In the most successful regional programs, the coordinating institution has the financial and political capacity to facilitate participation of all members, to monitor progress toward goals, and to manage conflicts. Using an evidence-based approach, initial regional programs should start with a stakeholder analysis, in order to analyze the strengths and weaknesses of different organizational options and to formulate the first topics to address.

Table 7.2 Some regional institutions important for policy development, implementation, and technical assistance

Category	Institution	Location	Role
Health	WHO United Nations Agencies	Global, regional, country	Policy development, technical assistance, leadership, convening, training
	WHO Collaborating Centers	Regional, country	Technical assistance, subject expertise
	Centers of Excellence supported by UnitedHealth/National Institutes of Health (United States)	International and regional, located in Bangladesh (one), and two in India (Bangalore, Delhi) and linked with U.S. and U.K. academic institutions	Translation research, surveillance, burden studies, and training
	South Asia Network for Chronic Disease	India	Research on causes, prevention, and management of chronic diseases
	Public Health Foundation of India	India	Policy development, broad research capacity, convening capacity, leadership
	International Centre for Diarrhoeal Diseases, Bangladesh	Bangladesh	Research on mortality, systematic reviews
	Global Alliance for Chronic Diseases	Australia, Canada, China, India, United Kingdom, and United States	Funding of global research for chronic diseases
Non-health	South Asian Association for Regional Cooperation	Regional centers in South Asia (except Afghanistan)	Economic and social development

Source: Authors.

Conclusions

The key areas identified for regional collaboration have a clear rationale and deserve careful consideration. A consensus among countries that action is needed is the first step. An example of progress can be found with tobacco. All South Asia countries have signed the FCTC and most already have some taxation policy in place. Moving toward harmonization of tobacco taxation in the region will remain a challenging task, although it can use the existing base of advertising bans and tax policy, to build on. In other areas less progress has been made, and leadership, commitment, and resources from countries and development partners will be needed.

Varying difficulties in implementing these policies and actions are likely. Developing most policies and strategies will entail engaging stakeholders outside the health sector (such as the finance ministry for tobacco tax policy, the education ministry for HRH training and skill building), and in many cases stakeholders from outside government (such as the food industry for labeling food products). Other actions, such as health technology assessment and surveillance, come mostly from within the health sector but will need to engage both public and private sectors and health professionals from many disciplines.

References

Abegunde, D., and A. Stanciole. 2006. *An Estimation of the Economic Impact of Chronic Noncommunicable Diseases in Selected Countries.* WHO: Geneva. www.who.int/chp.

Adeyi, O, O. Smith, and S. Robles. 2007. *Public Policy and the Challenge of Chronic Noncommunicable Diseases.* Washington, DC: World Bank.

Arunatilake, N., and M. Opatha. 2003. "The Economics of Tobacco in Sri Lanka." HNP Discussion Paper, Economics of Tobacco Control Paper 12, Washington DC, World Bank.

Asaria, P. et al. 2007. "Chronic Disease Prevention: Health Effects and Financial Costs of Strategies to Reduce Salt Intake and Control Tobacco Use." *Lancet* 370 (9604): 2044–2053.

Barker, D.J. 1992. "The Fetal Origins of Diseases of Old Age." *Eur J Clin Nutr*. Oct. 46 Suppl 3: S3-9.

Barker, D.J., P.D. Winter, C. Osmond, B. Margetts, and S.J. Simmonds. 1989. "Weight in Infancy and Death from Ischaemic Heart Disease." *Lancet* 2: 577-80.

Barker, D.J., and P.M. Clark. 1997. "Fetal Undernutrition and Disease in Later Life." *Rev Reprod*. May. 2 (2): 105-12.

Benegal, V. et al. 2000. "Social Costs of Alcoholism: A Karnataka Perspective." *NIMHANS Journal* 18 (1&2): 67.

BAT (British American Tobacco). 2009. "WHO Protocol on Illicit Trade." http://www.bat.com/group/sites/uk__3mnfen.nsf/vwPagesWebLive/DO6ZYC4S?opendocument&SKN=1, accessed May 6, 2009.

Bennett, K., Z. Kabir, B. Unal, E. Shelley, J. Critchley, I. Perry, J. Feely, and S. Capewell. 2006. "Explaining the Recent Decrease in Coronary Heart Disease Mortality Rates in Ireland, 1985–2000." *Epidemiol Community Health* 60: 322-7.

Bonu, S., et al. 2005. "Does Use of Tobacco or Alcohol Contribute to Impoverishment from Hospitalization Costs in India?" *Health Policy Plan*. 20 (1): 41-49.

Cameron, A., et al. 2009. "Medicine Prices, Availability, and Affordability in 36 Developing and Middle-income Countries: A Secondary Analysis." *Lancet* 373 (9659): 240-9.

Capewell, S. 1999. "Survival Trends, Coronary Event Rates, and the MONICA project. Monitoring Trends and Determinants in Cardiovascular Disease." *Lancet* 354: 862-3.

Capewell, S., C.E. Morrison, and J.J. McMurray. 1999. "Contribution of Modern Cardiovascular Treatment and Risk Factor Changes to the Decline in Coronary Heart Disease Mortality in Scotland between 1975 and 1994." *Heart* 81: 380-6.

Capewell, S., R. Beaglehole, M. Seddon, and J. McMurray. 2000. "Explanation for the Decline in Coronary Heart Disease Mortality Rates in Auckland, New Zealand, between 1982 and 1993." *Circulation* 102: 1511-6.

Capewell, S., B.M. Livingston, K. MacIntyre, J.W. Chalmers, J. Boyd, A. Finlayson, A. Redpath, J.P. Pell, C.J. Evans, J.J. McMurray. 2000. "Trends in Case-fatality in 117 718 Patients Admitted with Acute Myocardial Infarction in Scotland." *Eur Heart J* 21: 1833-40.

CSDH (Commission on Social Determinants of Health). 2008. "Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health." Final Report. WHO, Geneva.

Cutler, D.M., and L. Sheiner 1998. “Demographics and Medical Care Spending: Standard and Non-standard Effects.” NBER Working Paper Series 33: 21.

Development Committee. 2007. “Global Public Goods: A Framework for the Role of the World Bank.” IMF and World Bank, Washington, DC.

Ebrahim, S., and G. Smith 1998. "Ecological Studies are a Poor Means of Testing Aetiological Hypotheses." *BMJ* 317: 678.

Economic Times,The. 2010. “Govt to Spend Rs 1,231 cr to Promote Health Lifestyle.” http://economictimes.indiatimes.com, accessed July 7, 2010.

Fernando, D.J., S. Siribaddana, and D. de Silva. 1994. “Impaired Glucose Tolerance and Diabetes Mellitus in a Suburban Sri Lankan Community.” *Postgrad Med J* 70 (823): 347-9.

Ford, Earl S., Umed A. Ajani, Janet B. Croft, Julia A. Critchley, Darwin R. Labarthe, Thomas E. Kottke, Wayne M.D., H. Giles, and Simon Capewell. 2007. “Explaining the Decrease in U.S. Deaths from Coronary Disease, 1980–2000.” *N Engl J Med* 356 (23): 2388-98.

Gallet, C.A., and J. A. List 2003. "Cigarette Demand: A Meta-analysis of Elasticities." *Health Economics* 12 (10): 821-835.

Gilmore, A.B., et al. 2006. "British American Tobacco's Erosion of Health Legislation in Uzbekistan." *BMJ* 332 (7537): 355-8.

Godinho, J., et al. 2005. *Reversing the Tide: Priorities for HIV/AIDS Prevention in Central Asia*. World Bank: Washington, DC.

Gottret, P., and G. Schieber. 2006. *Health Financing Revisited: A Practitioner's Guide*. Washington, DC: World Bank.

Goyal, A., and S. Yusuf. 2006. "The Burden of Cardiovascular Disease in the Indian Subcontinent." *Indian J Med Res* 124 (3): 235-44.

Guindon, G. E., et al. 2003. "Higher Tobacco Prices and Taxes in South East Asia: An Effective Tool to Reduce Tobacco Use, Save Lives and Generate Revenue." HNP Discussion Paper, World Bank, Washington, DC.

Gupta, P. C., et al. 2005. "Tobacco Associated Mortality in Mumbai (Bombay) India. Results of the Bombay Cohort Study." *Int J Epidemiol* 34 (6): 1395-402.

Hodge, A. M., et al. 1996. "Incidence, Increasing Prevalence, and Predictors of Change in Obesity and Fat Distribution over 5 years in the Rapidly Developing Population of Mauritius." *International Journal of Obesity* 20 (2): 137–146.

Horta, B.L., et al. 2007. *Evidence of the Long-term Effects of Breastfeeding*. Geneva: WHO.

Huff-Rousselle, M., and F. Burnett. 1996. "Cost Containment through Pharmaceutical Procurement: A Caribbean Case Study." *Int J Health Plann Manage* 11 (2): 135-57.

Iglesias, R., and J. Nicolau. 2006. *A Economia do Controle do Tabaco nos países do Mercosul e associados*. A. Peruga. Brasilia, Pan American Health Organization. http://www.paho.org/Spanish/AD/SDE/RA/Tab_Mercosur_BRA.pdf.

Illangasekera, U., D.B. Nugegoda, and L.S. Perera. 1993. “Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in a Rural Sri Lankan Community.” *Ceylon Med J* 38 (3): 123-6.

Illangasekera, U., S. Rambodagalla, and S. Tennakoon. 2004. “Temporal Trends in the Prevalence of Diabetes Mellitus in a Rural Community in Sri Lanka.” *J R Soc Promot Health* 124 (2): 92-4.

Intergovernmental Negotiating Body on a Protocol on Illicit Trade in Tobacco Products. 2009. Revised Chairperson's text for a protocol on illicit trade in tobacco products. WHO, Geneva. http://www.who.int/fctc/inb/inb4/en/index.html, accessed May 20, 2010.

International Task Force on Global Public Goods. 2006. "Meeting Global Challenges: International Cooperation in the National Interest." Stockholm.

Jackson, R, C.M. Lawes, D.A. Bennett, R.J., Milne, and A. Rodgers. 2005. "Treatment with Drugs to Lower Blood Pressure and Blood Cholesterol Based on an Individual's Absolute Cardiovascular Risk." *Lancet* 365: 434-41.

Jha, P., et al. 2008. "A Nationally Representative Case-control Study of Smoking and Death in India." *N Engl J Med* 358 (11): 1137-47.

John, R. M. 2008a. "Crowding-out Effect of Tobacco Expenditure and its Implications on Household Resource Allocation in India." *Soc Sci Med* 66 (6): 1356-67.

———. 2008b. "Price Elasticity Estimates for Tobacco Products in India." *Health Policy Plan* 23 (3): 200-9.

Joossens, L., and M. Raw 2008. "Progress in Combating Cigarette Smuggling: Controlling the Supply Chain." *Tob Control* 17 (6): 399-404.

Jusuf, A., et al. 1993. "Implikasi ekonomis kanker paru pada pekerja perusahaan" ["Economic implications of lung cancer on workers"]. *Majalah Paru* 13 (1): 2-8.

Karki, Y. B., et al. 2003. "The Economics of Tobacco in Nepal." HNP Discussion Paper, Economics of Tobacco Control Paper, Washington DC, World Bank.

Katulanda, P., G.R. Constantine, J.G. Mahesh, R. Sheriff, R.D. Seneviratne, S, Wijeratne, M. Wijesuriya, M.I. McCarthy, A.I. Adler, and D.R. Matthews. 2008. "Prevalence and Projections of Diabetes and Pre-diabetes in Adults in Sri Lanka—Sri Lanka Diabetes, Cardiovascular Study (SLDCS)." *Diabet Me* 25 (9): 1062-9.

Knowler, W. C., et al. 2002. "Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin." *N Engl J Med* 346 (6): 393-403.

Levintova, M., and T. Novotny. 2004. "Noncommunicable Disease Mortality in the Russian Federation: From legislation to Policy." *Bull World Health Organ* 82 (11). http://www.scielosp.org/scielo.php?pid=S0042-96862004001100013&script=sci_arttext.

Lim, S.S., et al. 2007. "Prevention of Cardiovascular Disease in High-risk Individuals in Low-income and Middle-income Countries: Health Effects and Costs." *Lancet* 370 (9604): 2054–2062.

Lindström, J., et al. 2006. "Sustained Reduction in the Incidence of Type 2 Diabetes by Lifestyle Intervention: Follow-up of the Finnish Diabetes Prevention Study." *Lancet* 368 (9548): 1673–1679.

Mahal, A., et al. 2010. "The Economic Implications of Non-communicable Diseases for India." World Bank Discussion Paper. January.

Malavige, G.N., N.M. de Alwis, N. Weerasooriya, D.J. Fernando, and S.H. Siribaddana. 2002. "Increasing Diabetes and Vascular Risk Factors in a Sub-urban Sri Lankan Population." *Diabetes Res Clin Pract* 57 (2): 143-5.

Marquez, P., et al. 2005. *Dying Too Young. Addressing Premature Mortality and Ill Health Due to Non-Communicable Diseases and Injuries in the Russian Federation*. Washington, DC: World Bank.

Maton, K.G., and X. Gu. 2001. "Changes in the Prevalence of Chronic Disability in the United States Black and Non-Black Population above Age 65 from 1982 to 1999." *PNAS USA* 98: 6354-9.

Mendis, S., and E.M. Ekanayake. 1994. “Prevalence of Coronary Heart Disease and Cardiovascular Risk Factors in Middle Aged Males in a Defined Population in Central Sri Lanka.” *Int J Cardiol* 46 (2): 135-42.

Mendis, S., et al. 2007. "The Availability and Affordability of Selected Essential Medicines for Chronic Diseases in Six Low- and Middle-income Countries." *Bull World Health Organ* 85 (4): 279-88.

Mercosur. 2003. *Estrategia Regional para el Control del Tabaco en el Mercosur.* CMC/DEC No. 20/03. Montevideo.

Miranda, J.J., S. Kinra, J.P. Casas, G. Davey Smith, and S. Ebrahim. 2008. “Non-communicable Diseases in low- and Middle-income Countries: Context, Determinants and Health Policy. *Trop Med Int Health* 13 (10): 1225-34.

Mulligan, J.-A., et al. 2006. "Economic Evaluations of Non-communicable Disease Interventions in Developing Countries: A Critical Review of the Evidence Base." *Cost Effectiveness and Resource Allocation* 4 (1): 7.

Murakami, H., et al. 2001. "Revolving Drug Funds at Front-line Health Facilities in Vientiane, Lao PDR." *Health Policy Plan* 16 (1): 98–106.

Murray, C.J.L., et al. 2003. "Effectiveness and Costs of Interventions to Lower Systolic Blood Pressure and Cholesterol: A Global and Regional Analysis on Reduction of Cardiovascular-disease Risk." *Lancet* 361 (9359): 717-725.

NLM (National Library of Medicine). 2009. "Medline: Indexing," accessed May 14, 2009.

Niens, L. M., and W. B. Brouwer. 2009. "Better Measures of Affordability Required." *Lancet* 373 (9669): 1081; author reply 1081–2.

Nugent, R., and F. Knaul. 2006. “Fiscal Policies for Health Promotion and Disease Prevention.” In *Disease Control Priorities in Developing Countries*, ed. D.T. Jamison, J.G. Breman, and A.R. Measham. New York: Oxford University Press, 211–224.

Omran, A.R. 1971. “The Epidemiologic Transition: A Theory of the Epidemiology of Population Change.” *Milbank Memorial Fund Quarterly*, 29: 509–538.

O'Donnell, O., et al. 2008. "Who Pays for Health Care in Asia?" *Journal of Health Economics* 27 (2): 460-475.

Pan, X. R., et al. 1997. "Effects of Diet and Exercise in Preventing NIDDM in People with Impaired Glucose Tolerance: The Da Qing IGT and Diabetes study." *Diabetes Care* 20 (4): 537-544.

Prabhakaran, D., et al. 2009. "Impact of a Worksite Intervention Program on Cardiovascular Risk Factors: A Demonstration Project in an Indian Industrial Population." *J Am Coll Cardiol* 53 (18): 1718–1728.

Ramachandran, A., et al. 2006. "The Indian Diabetes Prevention Programme Shows that Lifestyle Modification and Metformin Prevent Type 2 Diabetes in Asian Indian Subjects with Impaired Glucose Tolerance (IDPP–1)." *Diabetologia* 49 (2): 289–297.

Ramaraj, R., and P. Chellappa. 2008. "Cardiovascular risk in South Asians." *Postgrad Med J* 84 (996): 518–23.

Rocco, L., and M. Suhrcke. Forthcoming. "The Macroeconomic Costs of Cardio-vascular Disease."

Roos, G., et al. 2002. "Dietary interventions in Finland, Norway and Sweden: Nutrition policies and strategies." *J Hum Nutr Diet* 15 (2): 99–110.

Ross, H., and F.J. Chaloupka. 2006. “Economic Policies for Tobacco Control in Developing Countries.” *Salud Publica de Mexico* 48 Supplement 1.

Samet, J., et al. 2006. "Mexico and the Tobacco Industry: Doing the Wrong Thing for the Right Reason?" *BMJ* 332 (7537): 353-4.

Saxena, S., et al. 2003. "Impact of Alcohol Use on Poor Families: A Study from North India." *Journal of Substance Use* 8: 78–84.

Schneeweiss, S. 2007. "Reference Drug Programs: Effectiveness and Policy Implications." *Health Policy* 81 (1): 17–28.

Shibuya, K., C. Ciecierski, et al. (2003). "WHO Framework Convention on Tobacco Control: Development of an Evidence-based Global Public Health Treaty." *BMJ* 327 (7407): 154-7.

Suhrcke, M., et al. 2008. *The Economic Costs of Ill Health in the European Region*. Copenhagen: WHO.

Suhrcke, M., and D. Urban (in press). "Are Cardiovascular Diseases Bad for Growth?" *Health Economics*.

Tuomilehto, J., et al. 2001. "Prevention of Type 2 diabetes Mellitus by Changes in Lifestyle among Subjects with Impaired Glucose Tolerance." *N Engl J Med* 344 (18): 1343–1350.

UN (United Nations). 2007. Department of Economic and Social Affairs. *World Economic and Social Survey.*

USAID (United States Agency for International Development). 2007. *Health Systems Assessment Approach: A How-to Manual.* Ed. M. Islam. Arlington, VA: Management Sciences for Health. http://www.who.int/pmnch/topics/continuum/hsassessmentapproach/en/index.html.

van Doorslaer, E., et al. 2005. “Paying Out-of-pocket for Health Care in Asia: Catastrophic and Poverty Impact.” EQUITAP Project Working Paper No. 2.

van Doorslaer, E., et al. 2007. "Catastrophic Payments for Health Care in Asia." *Health Econ* 16 (11): 1159-84.

Vartiainen, E., P. Puska, J. Pekkanen, J. Tuomilehto, and P. Jousilahti. 1994. “Changes in Risk Factors Explain Changes in Mortality from Ischaemic Heart Disease in Finland.” *BMJ* 309: 23-7.

Wagenaar, A., et al. 2009. "Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies." *Addiction* 104 (2): 179–190.

Wijewardene, K., M.R. Mohideen, S. Mendis, D.S. Fernando, T. Kulathilaka, D. Weerasekara, and P. Uluwitta. 2005. “Prevalence of Hypertension, Diabetes and Obesity: Baseline Findings of a Population-based Survey in Four Provinces in Sri Lanka.” *Ceylon Med J* 50 (2): 62-70.

World Bank. 2006. *Disease Control Priorities in Developing Countries*, ed. D.T. Jamison, J.G. Breman, and A.R. Measham. 2nd ed. New York: Oxford University Press.

———. 2007. *Healthy Development: The World Bank Strategy for Health, Nutrition, and Population Results.* Washington, DC.

———. 2008a. “Sri Lanka: Addressing the Needs of an Aging Population.” Report No. 43396-LK. Human Development Unit, South Asia Region. Washington, DC. http://siteresources.worldbank.org/INTSRILANKA/Resources/LKAgingFullRep.pdf.

———. 2008b. *The World Bank’s Commitment to HIV/AIDS in Africa: Our Agenda for Action, 2007–2011*.

———. 2009. *Improving Effectiveness and Outcomes for the Poor in Health, Nutrition, and Population: An Evaluation of World Bank Group Support Since 1997.* Washington, DC.

———. 2010. “Prevention and Control of Selected Chronic NCDs in Sri Lanka: Policy Options and Strategic Actions.” Washington, DC. http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/NCDsSriLanka.pdf.

WEF (World Economic Forum). 2009. *Global Risks 2010*. http://www.weforum.org/pdf/globalrisk/globalrisks09/.

———. 2010. *Global Risks 2010.* http://www.weforum.org/pdf/globalrisk/globalrisks2010.pdf.

WHO (World Health Organization). 2001. Report of the Commission on Macroeconomics and Health. "Macroeconomics and Health: Investing in Health for Economic Development." Geneva. http://whqlibdoc.who.int/publications/2001/924154550x.pdf.

———. 2005. *Chronic Diseases: A Vital Investment.* http://www.who.int/chp/chronic_disease_report/contents/en/index.html. Geneva.

———. 2007. "Multi-country Regional Pool Procurement of Medicines." Meeting Report. Geneva.

———. 2008a. WHO Service Delivery Seminar Series, draft Technical Brief No. 2, July 3. "Essential Health Packages: What are they for? What do they change?" www.who.int/healthsystems/topics/delivery/technical_brief_ehp.pdf.

———. 2008b. *WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER Package*. Geneva.

Yusuf, S., et al. 2009. "Effects of a Polypill (Polycap) on Risk Factors in Middle-aged Individuals without Cardiovascular Disease (TIPS): A Phase II, Double-blind, Randomised trial." *Lancet* 373 (9672): 1341–1351.

Zatonski, W.A., et al. 1998. "Ecological Study of Reasons for Sharp Decline in Mortality from Ischaemic Heart Disease in Poland since 1991." *BMJ* 316 (7137): 1047–1051.

Zatonski, W.A., and W. Willett. 2005. "Changes in Dietary Fat and declining coronary heart disease in Poland: Population-based study." *BMJ* 331 (7510): 187–188.

Zeidner, R. 2004. "Fitness On the Job." Special to *The Washington Post*, August 17.

Appendix 1: Country Capacity Assessments and Accomplishments

A focus of this book was assessing country capacity and accomplishments for noncommunicable diseases (NCDs). Capacity assessments (Box A1.1) can be more challenging in some cases than disease burden assessments and may be conducted less frequently. However, they can be very useful by helping predict strategies as to what can be done and by highlighting ongoing efforts that can be scaled up and built on. Since policy options are the output of this book, understanding country capacity becomes critical.

Box A1.1. Country capacity

Health system capacity is a function of the specifications of the service package required, the mix of resources used to deliver it, the ability to fully use each resource, and the ability to use the resources efficiently.

Several critical factors must be present for maximum capacity. If they are not, they must be introduced for capacity development. They include:

- Optimal division of labor for the tasks with a unit that is appropriately staffed and has an organization home.
- Political and administrative leadership with management, technical, and professional expertise that has authority over the organization.
- Leadership to provide direction, develop key strategies, plan, mobilize people and resources, and articulate and communicate the direction to be taken.
- The ability to mobilize, allocate, and manage resources in line with the operational requirement and goals.
- The optimal number of human resources with the appropriate mix of skills and level of competency in the right organizational locations who are motivated to work at full efficiency.
- The ability of the information systems and survey units to systematically determine the types and sources of information needed by decision makers and managers and routinely collects and analyzes this information.
- Proper infrastructure in line with its mandate and suitable operating conditions.
- A regulatory and institutional environment that allows leadership to divide labor and resources optimally.

In 2000 and in 2005 WHO Headquarters in Geneva and the WHO Regional Offices conducted national NCD capacity assessment surveillance globally to benchmark and track the status of country-level NCD prevention and control efforts in a systematic manner. These surveys had four objectives: to assess the current situation in relation to existing capacity for NCD prevention and control; to identify constraints and needs; to set priorities; and to assist with planning, implementation, and evaluations of NCD programs. The surveys had quantitative and qualitative components and used a self-administered questionnaire and key informant interviews.

In the South-East Asian Region the surveys were administered in both timeframes. They tracked progress in several areas including infrastructure (e.g. whether a country had an NCD unit), financial allocations to NCD, policies and programs, target setting, legislation/regulation, surveillance, and national treatment guidelines. The major findings were a growing commitment to advocacy, more NCD policies and action plans, lack of capacity to develop an HRH workforce for NCDs and lack of public health institutions with leadership and expertise for planning and implementation, inadequate staffing in the government NCD lead unit, little legislation and minimal capacity to develop it, no national surveillance systems, few disease-management efforts, and few efforts in monitoring and evaluation.

This book has taken a health systems approach to describe health system capacity in general, with a focus on elements that are important to NCDs. Rather than a comprehensive assessment, it focused on finding accomplishment that might be enhanced and deficits that could be addressed. For this approach the *Health Systems Assessment Approach: A How-To Manual* from the United States Agency for International Development (USAID 2007) was adapted for the health sector capacity assessment, which was conducted during March–September 2009. The *Manual* covers governance, health financing, health service delivery, human resources, pharmaceutical management, and health information systems. The WHO NCD capacity tools used for global surveys in 2000 and 2005 and a new surveillance assessment tool under development/implementation in 2009 and 2010 were extensively reviewed; suitable components were adapted for the tool. All country-based consultants used the same assessment tool, which included both objective and descriptive measures of capacity. Examples of key health system indicators are as follows:

Assess

Risk behaviors
Mortality
Morbidity
Utilization
Economic burden

Plan

Adopted and overarching national NCD policy
Dedicated unit with staff and resources for policy development/implementation and to lead/coordinate effort and convene stakeholders
Reviews evidence base for policy development

Develop and Implement

National treatment protocols
Essential NCD medications available and accessible
NCD skills in workforce
Financing to protect poor from financial risk and to improve access and outcomes

Evaluate

Health information system
Capacity to evaluate policy

Appendix 2: Economic Rationale for Public Policy to Address NCDs

The economic rationale for public intervention in health can be formulated on both efficiency and equity grounds: the former, when private markets fail to function efficiently; the latter, when the social objectives of equity in access or outcomes are unlikely to be attained. This view does, however hinge on three critical assumptions: (i) this decision making is based on accurate—or "perfect"—information about the consequences of the decision; (ii) all the costs and benefits associated with the decision are carried by the person making the choice; and (iii) people act "rationally"—that they will always (consciously or unconsciously) weigh the costs and benefits of each decision they are to undertake and then choose the course of action that maximizes their expected net benefits (or "utility").

However, a traditional welfare economics' perspective also acknowledges that there may be exceptions if one or more of these assumptions are do not hold, which may result in market failure. Where markets have failed, people could in principle be made better off if government engaged with suitable measures. Government might either step in and produce or deliver the relevant good or service, or—in a less interventionist manner—it may incentivize other actors to do so. Which of the measures governments should opt for within that range depends on the market failure as well as the institutional capacity of the government (Jack 1999).

Related to each of the three critical assumptions, there are at least three potential sources of market failures for the risk factors that give rise to chronic noncommunicable diseases (NCDs): insufficient and asymmetric information, externalities, and nonrational behavior. Such market failures are known as "standard" efficiency-based market failures because they have commonly been discussed in the traditional welfare economics literature in all sorts of public policy contexts. Non-standard economic rationales are also discussed in more detail.

Standard Efficiency-based Rationales

Insufficient and Asymmetric Information

There are typically good reasons to believe that markets fail to produce optimal outcomes because of informational problems. Two key features of insufficient and asymmetric information are relevant in the context of chronic NCDs: insufficient *awareness* of the health risks involved in consumption choices; and inadequate *information* about the addictive qualities of unhealthy goods. The former potentially applies to all unhealthy behaviors, while the latter is more relevant to smoking and alcohol consumption than to diet and physical inactivity (see Cawley [1999] for a treatment of the "addictive" aspects of diet).

Empirical findings as to whether individuals are well informed appear mixed, even in high-income countries.[30] Yet it is not hard to imagine that knowledge about the health consequences of "poor health habits" increases as countries' living standards and general levels of education rise. Hence, one would

30 Viscusi (1993 and 1998) found that smokers in the United States over-estimated the health risks associated with smoking, while Schoenbaum (1997) found the opposite. Cutler and Glaeser (2006) concluded that higher smoking levels in Europe (compared to the United States) are largely explained by a continuing lack of information about the health consequences, even after a range of other determinants of smoking are taken into account.

expect that in South Asia (as in comparable low- and middle-income countries) the relevant health knowledge is still fairly limited.

In China, where about 70 percent of adult men smoke, there is clear evidence that many people lack even basic information about the hazards of smoking. A 1996 survey of Chinese adults revealed that half of smokers—and half of nonsmokers—believed that there was little harm in smoking (Chinese Academy of Preventive Medicine 1997). Less work has assessed whether low risk awareness is a predictor of obesity. The evidence, which is largely from high-income countries, suggests that such awareness is low compared to that of smoking.[31]

On the whole, government intervention in the form of the provision (and production) of NCD-related health information (e.g. on the health consequences of smoking) is in principle justifiable, as information is a public good and will therefore generally be undersupplied relative to the social optimum. This includes the role for government to engage in research about the health consequences of unhealthy behavior. The provision of information in itself, though, is unlikely to be a very effective driver of behavior change.

Externalities

The total or "social" costs associated with a disease or a risk factor, are made up of combined internal and external costs. By far the most costs associated with health behavior-related choices leading to ill health are paid by the consumer—internal costs. Situations arise, however, when a consumer does not bear all these costs. Then, some of the costs are borne by others or by society at large—external costs or "externalities". The market failure here manifests itself as a societal cost incurred by an individual choice, and it justifies, in principle, a public policy intervention seeking to improve social welfare by reducing the costs borne by that society.

Short of making a decision on where exactly to draw the line between internal and external costs, Sloan et al. (2004) have split the external costs into traditional external costs and quasi-external costs. That is, the costs borne by household members who are not participating in the choice are called "quasi-externalities" and may justify intervention since they tend to be larger than the external costs borne by the larger society.

In brief, there are obvious and substantial external costs resulting from second-hand smoke and from alcohol-induced traffic fatalities, but probably less so in the case of obesity. Those external costs are likely to be even higher (at least in the case of smoking) when intra-household effects are also considered as external. In addition, NCDs impose costs on the social insurance system and hence on third parties, but these costs may be "compensated" by the premature death of the person with the NCD.

Nonrational Behavior

The assumption that people act rationally (i.e., maximize their expected utility) represents a core pillar of economic thought and most economists would not approve of dismissing the rationality assumption altogether, not least because doing so would open the way to paternalism in a broad range of areas.

However, children and adolescents tend not to take the future consequences of their choices into account, irrespective of whether they are informed of them. They act myopically (in the sense of

31 See e.g. Burton et al. (2006) for evidence from the United States.

impatiently) and, hence, nonrationally.[32] Their choices may well conflict with their long-term best interests. This provides—in principle—a justification for government intervention: to prevent them from harming themselves when they do not fully appreciate the consequences. Here are privately borne costs that are relevant to public policy.

On this justification, governments in many (mainly high-income) countries have banned the sale of cigarettes and alcohol to minors to prevent their harm.

Non-standard Economic Rationales: Behavioral Economics

A new paradigm of behavioral economics is slowly emerging, with a realization that the traditional concept of the sovereign, rational, and always well-informed consumer may not in all instances help in understanding and predicting people's decisions and behavior. It holds that there are situations in which people act with *bounded* rationality.[33]

One important feature is the idea of "time-inconsistent preferences," which results in individuals accepting instant gratification at the expense of their long-term best interests. For example, a smoker asked today to stop smoking immediately will probably answer no, but might agree, now, to stop smoking in one year. One year from now, if asked again to quit smoking, he or she might prefer to continue smoking rather than adhere to the previous commitment to quit. As time progresses, each future date comes into the present and the preference for immediate enjoyment will prevail.

In other words, the present "self" of the individual disagrees with his or her future "self". Since the decisions of the present self do not take into account the consequences of that self's actions on the future self, it imposes a type of externality on the future self.

The United States provides some empirical evidence on time-inconsistent preferences. Eight out of 10 smokers express the desire to stop, but many fewer actually do. Gruber (2002) reported that over 80 percent of smokers try to quit annually, the average smoker tries to quit every eight months, and 54 percent of serious cessation attempts fail within a week.

Time-inconsistent preferences may justify an intervention (e.g., a tax) to induce people to do what they may want to but are unable to do alone. The size of the internal costs could suggest the size of an optimal tax, in addition to any tax that might be justified by the presence of external costs. Gruber (2002) estimated that external costs would convert to a tax of US$0.40 per pack of cigarettes or less—much less than the US$35 internal costs.

Time-inconsistency is easily confused with insufficient information, especially with addictive goods. The *outcomes* of these market failures may be identical, but the *causes*—and hence the policy implications—differ significantly. While the solution to time-inconsistency is to provide effective commitment devices, which are mechanisms that reinforce a previously adopted decision, the solution to limited information is to provide more of it, particularly to young people.

32 Consumers are considered "myopic" if they ignore the effects of current consumption on future utility when they determine the optimal or utility-maximizing quantity of an addictive good in the present. In technical terms, their discount rate is infinite. Some authors define myopic individuals as those that have a very high discount rate and attribute very little value to future consumption. In that definition, myopic behavior can still be rational (as long as the discount rate does not become infinitely high). Here we define myopia as irrational behavior, in line with for instance Pearce and Nash (1981).

33 O'Donoghue and Rabin (2006), representatives of the behavioral economic position, emphasize that "economists will and should be ignored if we continue to insist that it is axiomatic that constantly trading stocks or accumulating consumer debt or becoming heroin addict must be optimal for the people doing these things merely because they have chosen to do it".

Taxes can provide such commitment devices.[34] They increase the immediate cost of unhealthy behaviors, thereby lowering the individual's present benefit. Gruber (2002) suggests that taxes should be accompanied by other measures to reduce the present enjoyment of smoking, such as banning smoking in public places or the workplace.

Although more research is needed to establish an empirical basis in the case of chronic NCD risk factors, the concept of time inconsistency could justify some of the substantial internal costs incurred through poor health habits as relevant to public policy, significantly reinforcing the case for government intervention.

In summary, the presence of market failures by itself is in fact only one part of the full economic rationale for public policy intervention. If a market failure exists, an effective intervention is also needed to remedy the failure and justify government intervention.

In terms of equity, treatment of chronic NCDs can be expensive. Chronic NCDs, by definition, require treatment over a much longer period than acute communicable diseases. Given existing health financing patterns in many low- and middle-income countries—the poorer a country is, the more regressive the health care financing system tends to be and the higher the fraction of health costs borne by patients themselves through out-of-pocket payments—the costs associated with chronic NCDs are likely to weigh more heavily on those least able to afford them.

References

Burton, S., E.H. Creyer, J. Kees, and K. Huggins. 2006. "Attacking the Obesity Epidemic: The Potential Health Benefits of Providing Nutrition Information in Restaurants." *Am J Public Health* 96 (9): 1669-75. Epub 2006 Jul 27.

Cawley J. 1999. "Obesity and Addiction." PhD dissertation, Department of Economics, University of Chicago.

Chinese Academy of Preventive Medicine. 1997. *Smoking in China: 1996 National Prevalence Survey of Smoking Patterns.* Beijing.

Cutler, D.M. and E.L. Glaeser. 2006. "Why Do Europeans Smoke More than Americans?" NBER Working Paper No. W12124. March.

Gruber, J. 2002. "Smoking's 'Internalities'." *Regulation* 25 (4): 25–57.

Jack, W. 1999. *Principles of Health Economics for Developing Countries*. Washington, DC: World Bank.

O'Donoghue, T. and M. Rabin. 2006. "Optimal Sin Taxes." *Journal of Public Economics* 90 (10–11): 1825–1849.

Pearce, D. and C. Nash. 1981. *The Social Appraisal of Projects. A Text in Cost-Benefit Analysis*. London, MacMillan.

Schoenbaum, M. 1997. "Do Smokers Understand the Mortality Effects of Smoking? Evidence from the Health and Retirement Survey." *Am J Public Health* 87 (5): 755-9.

Sloan, F.A., J. Ostermann, G. Picone, C. Conover, and D.H. Taylor. 2004. *The Price of Smoking*. MIT Press: Cambridge, MA.

Viscusi, W.K. 1998. "Constructive Cigarette Regulation." *Duke Law J* 47 (6): 1095-131.

———. 1993. "The Value of Risks to Life and Health." *Journal of Economic Literature* 31 (4): 1912-1946.

34 Courts can also (indirectly) introduce a "tax." The U.S. courts, for instance, required the tobacco industry to pay large damages to deceased smokers' families, which raised the per-pack price by US$1.31 between 1997 and 2002, while the tax rose only US$0.21 (Gruber 2002).

Appendix 3: Disease Control Priorities in Developing Countries: Population-based and Individual-based Interventions for NCD Prevention and Control

Table A3.1 Neglected low-cost opportunities in South Asia

	Cost per DALY averted (US$)[35]	Thousands of DALYs averted per 20% increase in coverage	Burden of target diseases (millions of DALYs)
Cardiovascular disease			
Management of acute myocardial infarction with aspirin and beta-blocker	9–304	At least 0.1	25.9-39.1
Primary prevention of coronary artery disease with legislation substituting 2% of trans fat with polyunsaturated fat, at US$0.50 per adult			
Secondary prevention of congestive heart failure with 9–304 at least 0.1 25.9–39.1 angiotensin-converting enzyme inhibitors and beta-blockers incremental to diuretics			
Secondary prevention of myocardial infarction and stroke with polypill containing aspirin, beta-blocker, thiazide diuretic, angiotensin-converting enzyme inhibitor, and statin			
Tobacco use and addiction			
Tax policy to increase price of cigarettes by 33%	14–374	At least 2.5	15.7
Non-price interventions such as advertising bans, health information dissemination, tobacco supply reductions, and smoking restrictions			
Nicotine replacement therapy			

Source: Laxminarayan et al. 2006; World Bank 2006.

Note: DALY = disability-adjusted life year.

[35] Range of cost effectiveness depending on the context

Table A3.2 Selected population-based interventions for NCDs

Condition	Intervention	Intervention Description	Target Population	Cost-effectiveness (US$/DALY)
Alcohol abuse	Excise tax	25–50% increase in the current excise tax rate on alcoholic beverages	Adolescents and adults	1,377
	Advertising ban and reduced access to beverages, retail	Reduced access to alcoholic beverages at retail outlets by reducing the hours of sale or advertising bans on television, radio, and billboards	Adolescents and adults	404
	Excise tax, advertising ban, with brief advice	50% increase in the current excise tax rate on alcoholic beverages, combined with advice, education sessions, and psychosocial counselling; possible inclusion of random driver breath testing and advertising bans	Adolescents and adults	631
Coronary artery disease	Legislation substituting 2% of trans fat with polyunsaturated fat at US$0.50 per adult	Legislation replacing 2% of dietary trans fat from partial hydrogenation in manufactured foods with polyunsaturated fat, at a cost of US$0.50 per adult, and assuming a 7% reduction in coronary artery disease	Adults	48
	Legislation substituting 2% of trans fat with polyunsaturated fat at US$6 per adult	Legislation replacing 2% of dietary trans fat from partial hydrogenation in manufactured foods with polyunsaturated fat, at a cost of US$6 per adult, and assuming a 7–40% reduction in coronary artery disease	Adults	838
Diabetes, IHD, and stroke	Legislation with public education to reduce salt content	Legislated reduction in salt content of manufactured foods and an accompanying public education campaign	All ages	1,937
	Media campaign to reduce saturated fat	Media campaign to reduce saturated fat content in manufactured foods and replace part of the saturated fat with polyunsaturated fat	All ages	2,617
Tobacco addiction	Taxation causing 33% price increase	A 33% price increase due to tobacco taxes to discourage tobacco use, prevent initiation (and subsequent addiction) among youths, increase the likelihood of cessation among current users, reduce relapse among former users, and reduce consumption among continuing users	Adolescents and adults	22

Condition	Intervention	Intervention Description	Target Population	Cost-effectiveness (US$/DALY)
	Non-price interventions	Advertising bans on television, radio, and billboards; health information and advertising in the form of health warning labels on tobacco products; interventions to reduce tobacco supply, such as smuggling control; restrictions on smoking	Adolescents and adults	353
Traffic accidents	Increased speeding penalties, law enforcement, media campaigns, and speed bumps	Minimizing exposure to high-risk scenarios by installation of speed bumps at hazardous junctions, increased penalties for speeding and other effective road-safety regulations combined with media coverage and better law enforcement	Adults	21
	Enforcement of seat-belt laws, promotion of child restraints, and random driver breath testing	Mandatory seat-belt and child-restraint laws, enforcement of drunk-driving laws, and random breath testing of drivers	Adults	2,449

Source: Laxminarayan et al. 2006; World Bank 2006.

Note: DALY = disability-adjusted life year.

Table A3.3 Selected individual-based interventions for NCDs

Condition	Intervention	Intervention Description	Intervention Setting	Objective	Target Population	Cost-effectiveness (US$/DALY)
Alcohol abuse	Brief advice to heavy drinkers by primary health care providers	During primary health care visits, provision of advice by physicians through education sessions and psychosocial counseling	Clinic	Primary prevention	Adolescents and adults	642
Congestive heart failure	ACE inhibitor and beta-blocker, with diuretics	Use of ACE inhibitor and an optional beta-blocker (metoprolol), incremental to diuretics	District hospital	Secondary prevention	Adults	150
IHD	Aspirin, beta-blocker, and optional ACE inhibitor	Aspirin plus beta-blocker (atenolol) with optional ACE inhibitor (enalapril), with or without hospital availability	District or referral hospital	Secondary prevention	Adults	688
Myocardial infarction	Aspirin and beta-blocker	Aspirin with or without beta-blocker (atenolol)	District or referral hospital	Acute management	Adults	14
	Streptokinase, with aspirin and beta-blocker	Incremental use of streptokinase, in addition to aspirin and beta-blocker (atenolol)	District or referral hospital	Acute management	Adults	671
	Tissue plasminogen activator, with aspirin and beta-blocker	Incremental use of tissue plasminogen activator in addition to aspirin and beta-blocker (atenolol)	District hospital	Acute management	Adults	15,869
Myocardial infarction and stroke	Polypill	Combination treatment with aspirin, beta-blocker, thiazide diuretic, ACE inhibitor and statin, based on 10-year risk of CVD	District hospital	Secondary prevention	Adults	409
Stroke (ischemic)	Aspirin	Aspirin dose within 48 hours of onset of acute stroke	Clinic or district hospital	Acute management	Adults over 15	149
Stroke (recurrent)	Aspirin and dipyridamole	Daily aspirin dose or combination of aspirin and extended release dipyridamole	Clinic or district hospital	Secondary prevention	Adults over 15	81
Stroke and ischemic and hypertensive heart disease	Polypill by absolute risk approach	Combination treatment with aspirin, beta-blocker, thiazide diuretic, ACE inhibitor, and statin based on 10-year risk of CVD	District or referral hospital	Primary prevention	Adults	2,128
Tobacco addiction	Nicotine replacement therapy	Smoking cessation treatments in the form of nicotine replacement therapy	Clinic	Primary prevention	Adults	396

Source: Laxminarayan et al. 2006; World Bank 2006.

Note: ACE = angiotensin converting enzyme; CVD = cardiovascular disease; DALY = disability-adjusted life year; IHD = ischemic heart disease.

References

Laxminarayan, R., A.J. Mills, J.G. Breman, A.R. Measham, G. Alleyne, M. Claeson, P. Jha, P. Musgrove, J. Chow, S. Shahid-Salles, and D.T. Jamison. 2006. "Advancement of Global Health: Key Messages from the Disease Control Priorities Project." *Lancet*. 367 (9517): 1193-208.

World Bank. 2006. *Disease Control Priorities in Developing Countries*, ed. D.T. Jamison, J.G. Breman, and A.R. Measham. 2nd ed. New York: Oxford University Press.

Appendix 4: Aligning Policy Options with Burden and Capacity

Policy options in some key areas will vary among countries depending on country capacity and burden. For this, understanding the relationship between the country-level noncommunicable disease (NCD) burden and country health system capacity is useful for tailoring the policy options developed from this framework and prioritizing efforts that align with country capacity. Thus, a general estimate of country-level burden and capacity and a map of their relationship was developed (Box A4.1). Using this capacity index score and mapping it with the percentage of the total country burden due to NCDs (in forgone disability-adjusted life years [DALYs]), a generally increasing capacity with increasing NCD burdens is seen as a distribution, relative to South Asia, of countries from lower burden/capacity to higher burden and higher capacity).

Box A4.1 Mapping the relationship between burden and capacity

For country-level NCD health burdens across the region, we use the share of the total forgone DALYs that are lost to NCDs from Chapter 2 of the main text. Generating a simple, comparable, and internally consistent index of capacity is more difficult than a burden index. Here we use a composite index that measures two capacity aspects.

First is a measure of the level of resources available in the sector as reflected by the proportion of total expenditures on health from public sources. The second is a measure of how well these resources are generally used for which we used two standardized indicators of global governance: government effectiveness in delivering all services, and regulatory quality for all sectors. These latter two measures of governance, along with other governance indicators, were developed a decade ago and since then have been used globally to track country-level governance (Kaufmann 1999 and 2008). For South Asian countries, between five and 13 sources from four types of respondents (business, household surveys, nongovernmental organizations, and public sector data providers) are aggregated to estimate country-level performance on a comparable scale.

The logic behind the first capacity measure is that the extent to which many of the policies, strategies, and actions that will be carried out by the government will have to be commensurate with the level of public resources available for the health sector and its fiscal space.

Thus, in principle, within South Asia the more public spending on health the better the country is resourced for taking on more actions related to NCD prevention and control. However, governments may have a high share of total health spending but that is poorly spent due to different factors such as weak institutional capacity and corruption. Since we could not find an internationally recognized measure that reflects these aspects for the health sector in the region, we opted for the broader governance indicator that reflects the government's effectiveness and quality of regulation as a proxy for the health sector. This will potentially enable the public sector to be effective in providing services, regulatory efforts, and other activities relevant to NCDs (Table A4.1).

To support these findings, several other standard indicators were used, of (i) health system infrastructure (physicians/10,000 population, hospital beds/10,000 population, out-of-pocket expenditures for health as a proportion of total health expenditures (THE); (ii) service delivery (prenatal care services and vaccine coverage); and (iii) outcome indicators (such as life expectancy). Various combinations of these indicators to create a capacity index revealed similar trends (data not shown) as with these established financing and governance indictors.

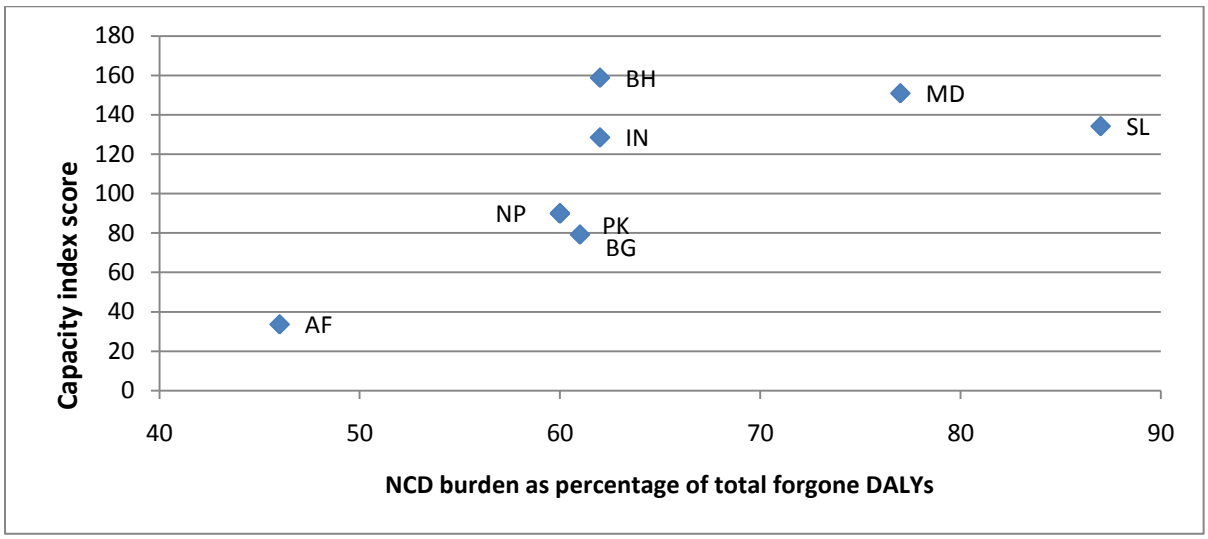
Table A4.1 Governance indicators used to develop country government capacity and burden of disease indicators for South Asia

Capacity Indicator	Country									
	Afghanistan	**Bangladesh**	**Bhutan**	**India**	**Maldives**	**Nepal**	**Pakistan**	**Sri Lanka**	**Rationale**	**Interpretation**
Government public sector effectiveness (percentile)	8.5	22.7	59.2	53.6	44.1	24.2	25.6	46.9	Global public sector performance that will be a standard surrogate for the capacity to respond within and outside the health sector and covers quality of: public services; civil service and its independence from political pressure; policy formulation and implementation; and government commitment to policies	Country global percentile rank (0=worst, 100=best)
Regulatory quality (percentile)	3.9	20.8	19.3	46.9	37.2	26.6	34.8	44.4	Many critical NCD functions will involve regulation of policy implementation	Country global percentile rank (0=worst, 100=best)
Public expenditures for health as percentage of THE	21.2	35.7	80.3	28.0	69.6	39.0	29.7	42.9	More public expenditures for health reflect the level of resources available to the public sector and may enable it to provide a range of services, both population- and individual-based	Country-specific rating with share of public funding of THE (public and private)
DALYs forgone to NCDs (% of total)	46	61	62	62	77	60	60	87	Captures morbidity, disability, and premature mortality. It is a standardized measure used globally. Since NCDs can lead to many years of disability and premature mortality, DALYs reflect the burden better than mortality	DALYs forgone to NCDs as share of total forgone DALYs (NCDs are maternal and child health issues, infectious diseases, nutritional deficiencies, and all other causes)

Sources: Governance Matters 2009, http://info.worldbank.org/governance/wgi/mc_countries.asp, accessed September 25, 2009. Global Burden of Disease, http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html, accessed September 25, 2009; *World Development Indicators 2010*.

"Capacity" is the sum of government effectiveness and regulatory quality percentiles and public expenditures as percentage of total expenditures on health (100 maximum) and of government effectiveness and regulatory quality (global) percentiles rating (100 maximum for each; the maximum index score is 300).

Figure A4.1 Country standing based on standardized public expenditures as a percent of THE and effectiveness and regulatory quality index compared with the country NCD burden, South Asia



Sources: WHO Global Burden of Disease 2004; Kaufmann 2008; and *World Development Indicators 2010*.

Note: The capacity index is the composite sum of public expenditures as percent of total expenditures on health (100 maximum) and of government effectiveness and regulatory quality (global) percentiles rating (100 maximum for each and the maximum index score is 300). Bangladesh and Pakistan have similar scores and in the figure are at the same point.

These categories of burden and capacity can help with prioritization of initial efforts. The aim here is not to rigorously categorize countries, but rather, to provide a range of strategies for different countries at different levels of development to adapt these strategies to their needs and capacity levels. Exceptions may occur. One example is Afghanistan (lower burden and lower capacity) in its success with tobacco policy and signing the Framework Convention on Tobacco Control, although global implementation remains a major challenge. This is also an example of how global (and regional) approaches can enhance individual country capacity.

Applying the framework to a lower capacity country setting can then highlight the subset of options for population-based and individual-based interventions that are strategic (Table 4.3 in main text). With limited capacity, planning and human resource development constitute the focus and an emphasis within the population-based mode—within the health sector, as compared to clinical mode efforts. Risk factor and health sector capacity assessment, policy for risk factor reduction, and financing to support these activities also are strategic starting points in this setting.

As one moves to a middle burden and middle/higher capacity context, broader efforts become strategic. Beyond capacity assessment, planning, and human resource development, prevention now includes identifying high-risk groups for targeting interventions, examining inpatient and outpatient utilization of services, more comprehensive reviews of the existing literature on burden and interventions, and development of some policies within and outside the sector, along with basic primary care programs. The need to develop a regulatory framework also emerges, as does strengthening the primary care setting's infrastructure to accommodate provision of NCD care. Finally, the importance of evaluation emerges with a focus on efforts for prevention.

Moving to the higher burden and higher capacity context, the framework is more expanded. Again, for both population- and individual-based interventions, capacity assessment, planning, and human resource development are common issues. Surveillance systems address both prevention and treatment. Policy development includes those implemented both within and outside the health sector and the development of clinical quality initiatives. The need for a regulatory framework and health financing emerge as major items. Monitoring and impact evaluation become critical to guide decisions for scaling up and for broader implementation.

Many countries have already launched efforts at various stages and can build on those efforts. In addition, large countries such as India and Pakistan have substantial NCD burden and capacity variation within their borders, and should consider tailoring policy for subnational regions.

In conclusion, many elements in this framework are not solely NCDs issues. However, these elements are critical for successful disease prevention and control. Because many individual-based interventions are delivered in a primary care setting, it is important that institutional issues that impede general health service delivery be addressed, as these would also impact delivery of NCD-related services.

The policy options framework can be applied to NCDs all taken together and for individual NCDs, such as CVD or diabetes, because the options are essentially the same. Also, this method of burden, capacity, and country assessment, then applying this framework, can be used in other regions to inform policy discussions.

References

Kaufmann, Daniel, Aart Kraay, and Pablo Zoido-Lobatón. 1999. “Aggregating Governance Indicators.” Policy Research Working Paper 2195. The World Bank, Development Research Group, Macroeconomics and Growth and World Bank Institute, Governance, Regulation, and Finance. http://info.worldbank.org/etools/docs/library/17588/agg_ind.pdf.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi. 2008. “Governance Matters VII: Aggregate and Individual Governance Indicators, 1996-2007.” World Bank Institute, Policy Research Working Paper 4654. http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=1148386.

Table A4.2 Policy options framework for prevention and control of NCDs and its application in the South Asia Region

Program management stage	Action areas	NCD/ capacity Index	Population-based interventions		Individual-based interventions	
			Non-health sector	Health sector	Prevention	Treatment
Assess	Burden of NCDs and their risk factors	- Lower - Middle - Higher	- Identify risk factors in non-health sectors - Economic burden		- Identify risk factors of NCDs - Assess mortality from NCDs - Assess morbidity from NCDs - Assess BOD of NCDs - Identify high-risk population	
	System capacity	- Lower - Middle - Higher	- Assess non-health sector capacity (governance, regulation, government effectiveness)	- Determine level of Public Health Spending - Assess Public Health capacity - Assess System Intelligence (routine and surveillance systems)	- Assess Health Service Delivery capacity (facilities, human resources, drugs, etc…) - Assess Health Service Delivery Utilization for ambulatory and inpatient care	
	Evidence base for prevention, control and treatment	- Lower - Middle - Higher	- Review of evidence based public policies in non-health sectors	- Review available risk reduction studies - Review population-based interventions	- Review available studies on effectiveness/ cost-effectiveness prevention interventions	- Review effectiveness/ cost-effectiveness of clinical treatments
Plan	National plan and strategy	- Lower - Middle - Higher	- Develop a national policy and multisectoral strategy plan for the prevention and treatment of NCDs - Convene stakeholders for consultation - Develop the financing strategy			
Develop/ Implement	Policy and regulatory framework	- Lower - Middle - High	- Develop policies related to non-health sectors (tobacco taxes, smoking ban in public areas, food processing [fat, salt], agriculture policy, air quality, built environment, injury prevention [community and worksite]) - Regulate compliance with policies in non-health sectors	- Develop policies for the health sector for tobacco control and risk reduction, health promotion, and mental health in schools worksites, community, and population-wide - Regulate compliance with policies within the health sector	- Develop and implement basic primary care programs for reducing risk factors and prevention of NCDs - Develop and implement regulations/certifications for individuals and institutions in both public and private sectors	- Develop and implement basic primary care programs for control and treatment of NCDs - Develop and implement clinical protocols for reducing complications from NCDs - Develop and monitor a set of clinical indicators to assure quality care services are delivery in public and private sectors

	Health service delivery capacity (facilities, drugs, human resources)	- Lower - Middle - High	- No activity	- Develop a central node to: (i) lead and coordinate prevention, treatment, and surveillance interventions; and (ii) manage resources - Develop capacity to implement health promotion and risk reduction programs - Develop capacity for behavior change and advocacy - Train new and current cadre of HRH in NCD management programs including promotion and prevention	- Strengthen health service delivery to provide quality promotion, behavior change, risk reduction, and prevention services - Train new and current cadre of HRH in NCD prevention and treatment and establish specialty training tracks in prevention	- Retool public facilities to deliver effective NCD services - Framework to establish comparative effectiveness of treatments and technology in context - Assure delivery of quality services - Assure adequate financing for public facilities - Train new and current cadre of HRH in NCD prevention and treatment and establish specialty training tracks in prevention
	Financing framework	- Lower - Middle - Higher	- Private financing schemes	- Determine level of public financing for public goods, information, and to reduce externalities	- Mobilize public and private resources and use risk pooling, to finance private goods and services for treatment that address context, access, and equity	- Mobilize public and private resources and use risk pooling, to finance private goods and services for treatment that address context, access, and equity
Evaluate	Monitoring and system intelligence	- Lower - Middle - Higher	- No activity	- Track development and implementation of prevention policies and risk factor trends	- Health information systems - Management information systems	
	Impact evaluation	- Lower - Middle - Higher	- No activity	- Policy/program-specific impact - Comprehensive health impact	- Clinical policy and program impact - Comprehensive health impact	

Source: Authors' conclusions. These are a guide to focus policy discussion and actions in key areas. The context of the setting will dictate final options and decisions.

Note: Lower burden and lower capacity …. (heavy shade); Middle burden and middle/higher capacity …… (heavy and light shade); Higher burden and higher capacity ……..(heavy, light, and no shade).

Annex 5: Capacity, Key Accomplishments and Situational Analysis for NCDs in South Asian Countries

Afghanistan

Capacity, Key Accomplishments, and Situational Analysis

The public health system was completely disrupted during the conflict years and is being rebuilt. Currently, the Ministry of Public Health does not directly provide health services. The private sector is the prominent source of outpatient services, especially in urban areas, and includes both not-for-profit nongovernmental organizations (NGOs) and for-profit providers and contractors. These services are either contracted through the Ministry of Public Health or external contractors. The for-profit sector provides mainly curative care.

The Basic Health Package Services (BHPS) were developed and introduced in 2003. Mental health services, currently a component of the BHPS, are fairly well developed. They include awareness, education, and case detection at the primary health post for depression, psychosis, anxiety disorder, and substance abuse, with appropriate referrals and rehabilitation plans. In addition, several capacity-building projects for mental health services have been initiated, including the Primary Mental Health Project, which focuses on training and increasing awareness of mental health issues; the Aga Kahn University Mental Health Project, which focuses on building mental health capacity and on training for health workers (community surveys are being conducted to assess impact); the Psycho Social and Health Project, which aims to provide psycho-social support to women traumatized by violence, through case supervision, monitoring, and referrals; and Medica Mondiale (Afghanistan), which supports women and girls through psycho-social support, legal assistance, advocacy, trauma training, and development of psycho-therapeutic treatment standards.

Treatment of hypertension and respiratory conditions are included at the district hospital level. However, symptomatic care of IHD and diabetes is only provided at the provincial level. The public sector lacks institutions with technical expertise in hypertension, diabetes, cancer, mental health, injury, and tobacco control.

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) was signed in 2004 but little implementation has occurred. All cigarettes are imported. A cigarette tax has been brought in, although it is the lowest in the region (8 percent). Cigarette smuggling is an issue but it is unclear how substantial. In addition, the country faces a tremendous challenge with narcotics and illicit drug use. In 2003, the National Security Alliance developed a National Drug Control Strategy to counter drug trafficking.

In terms of tracking the burden, NCD surveillance has been very limited. Behavior risk factor data are not available with the exceptions of tobacco use among youth and mental health.

There is currently no national NCD policy or strategy. The agenda for new health projects is guided by the Millennium Development Goals (MDGs), which also orient donor funding, on which the Ministry of Public Health relies to a large extent. Maternal and child health (MCH),

family planning, and communicable diseases have been the higher priority areas. Except for European Commission, none of the donor partners have prioritized NCD-related preventive or curative services in their programs. The World Bank has completed a review of Mental Health and exploring options to implement mental health interventions. The World Bank has completed a review of Mental Health and exploring options to implement mental health interventions.

Although supplies of essential drugs are included in the BHPS, the essential drug list lacks medications for prevention and treatment of several NCD conditions. For example, the list has no hypoglycemic agent for diabetes or statins for high cholesterol. Also, the range of cardiovascular drugs is limited. Such drugs are not necessarily stocked at basic health units and can only be dispensed by a physician. As a result, access to NCD-related drugs remains a major issue even for people using public health care infrastructure.

Many qualified professionals fled the country during the conflict. Currently, approximately 3,000–4,000 physicians are in the country but they are particularly scarce in rural areas. There is a severe shortage of medical specialists in NCDs (especially psychiatry). Training institutions were weakened and some collapsed during the conflict. However, neighboring countries are providing assistance. International agencies assisted with establishing a national Midwifery Education Accreditation Board in 2005. At least 19 schools had been accredited by early 2007.

The country's health system is mainly financed by private out-of-pocket expenditure and development partners. The estimated total expenditure on health was US$48 per capita in 2008, of which 79 percent is from private sources (out of pocket, development assistance, and NGOs). Public spending per capita was about US$10. Heavy reliance on external funding will pose a significant threat to the sustainability of the country's health system.

NGOs collect health information and most participate in the quality assessment evaluations to gain contract extensions/renewals for delivering services. However, none of the elements is particularly focused on NCDs or mental health and they are not aggregated at the population level.

Bangladesh

Capacity, Key Accomplishments, and Situational Analysis

The Health Nutrition and Population Sector Program is Bangladesh's five-year plan for health. It adopted a sectorwide approach to improve coordination and ownership and has identified three NCDs—cancer, CVD, and diabetes—as major public health problems. The current Strategic Investment Plan is notable for including prevention and control of major NCDs. The plan recommends that the public sector focuses on prevention and that investment in intensive care units and tertiary care services be left to the private sector. The plan proposes publicly financed insurance and health vouchers to protect the poor against the costs of emergency care and catastrophic illnesses. Efforts to include NCDs prevention and treatment have been lower priority in light of the current focus on MDGs.

The Strategic Plan for Surveillance and Prevention of Non-communicable Diseases in Bangladesh, 2007–2010, a comprehensive national NCD plan, has been adopted.

Implementation has been stalled, though, by several issues including lack of clear lines of responsibility, absence of dedicated financing, and competing priorities.

Several NCD preventive health policies have been adopted. Bangladesh has ratified the FCTC, and the Smoking and Tobacco Product Usage (Control) Act 2005 restricts smoking in public places and advertising. A National Strategic Plan of Action for Tobacco Control, 2007–2010, has been developed, as has the National Cancer Control Strategy and Plan of Action 2009–2015.

The public sector primary care system offers an essential services package. However, NCD prevention and treatment services are not included and health workers are not trained in NCD treatment. Most people, including the poor, use private practitioners for first-line clinical care. Clinical treatment is also sought from the informal sector and through pharmacies, both licensed and unlicensed. Diabetes, stroke, heart diseases, and their symptoms are routinely considered appropriate for treatment outside the formal health care system.

NCD treatment mostly comes at the tertiary level where there is a long tradition of specialty hospital and foundations in both public and private/NGO sectors that provide individual-based clinical treatment for NCDs, with less focus on preventive clinical care. A public–private Health Care Development Project is being undertaken by the Diabetic Association of Bangladesh to test a model of integrated care service delivery for NCDs in urban and rural areas. The integrated care in this project is the spectrum of services—not just diabetes care—and includes primary, secondary and, through referrals, tertiary care.

There is a low supply of health workers and few are trained in NCD prevention and management. The Diabetic Association of Bangladesh and Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM) opened the Bangladesh Institute for Health Sciences Academy to produce adequate qualified human resources for all medical institutions in the country. The National Institute of Cardiovascular Disease offers postgraduate courses on cardiology and training of nurses and paramedics for CVD. The National Institute of Diseases of Chest & Hospital offers postgraduate training on chest disease (medical and surgical).

Bangladesh has a national essential drugs policy and a list of essential drugs to be procured and used in the public health services system. Most of the essential drugs are generics. At present, drugs for treating NCDs are not included in the essential drug list.

Several gains have been made in surveillance. The Bangladesh Network for Non-Communicable Disease Surveillance and Prevention (BanNet) data network has been created and includes government and private clinical institutions. The recently formed Alliance for Community Based Surveillance (ACSNet) promotes periodic population-based surveys of NCDs and their risk factors. A national risk factor survey is planned for completion in 2010. The 2006 Bangladesh Urban Health Survey included NCD-related items in slum and non-slum areas of the country's six largest city corporations. The 2003 Bangladesh Health and Injury Survey (BHIS) was the largest injury survey conducted in a developing country.

The new Centre for Control of Chronic Diseases in Bangladesh (C3D) aims to bring scientific rigor to the study of the NCD burden; develop community-based prevention and management programs; and evaluate the link between NCDs and poverty in the country, as well as the health system's response to NCDs. In spite of this progress, there is no current surveillance of NCD-related morbidity and mortality, nor a cancer registry.

In 2008, total expenditures on health amounted to 3.5 percent of GDP. Household out-of-pocket expenditures at drug outlets account for 46 percent of total health sector expenditures, making such drug purchases by far the single largest expenditure item within the sector.

Bhutan

Capacity, Key Accomplishments, and Situational Analysis

The new NCD policy adopted in December of 2009 approaches prevention and control of NCDs through population-based and risk based approaches, focusing on health promotion and primary prevention. Thus, implementation will involve not just the health sector. It will work closely with Ministry of Education, Road and Transport, Agriculture and Information and Communication, amongst others. While treatment and care have been part of secondary and tertiary services, prevention and control are being incorporated into the primary care delivery system. In addition, two recent NCD pilots have been conducted. The World Diabetes Foundation supported a five-year pilot project (2005–2009) for diabetes, which aims to strengthen knowledge of diabetes among health care staff and improve access to proper diabetes care. WHO is supporting a six-month pilot in two districts for community and clinic-based NCD prevention and treatment using multiple locally adapted protocols from the Package of Essential NCD (PEN) interventions. The protocols cover CVD, diabetes, cancer, and COPD and were to be completed in 2010.

Progress has been made with some health policies. The FCTC has been adopted and a bill banning the import, sales, and advertising of tobacco products was enacted in December of 2004. The act also restricted smoking in some areas. Smoke-free institutions include offices, monasteries, transportation facilities, and all public gathering places. However, the Act lacked the legal framework to enforce the ban and was thus ineffective. A new Act was passed by Parliament in June 2010 that more clearly specifies violations and penalties for violators. A campaign to educate the population on the new act and its implications was carried out in the second half of 2010. Implementation is set to begin in January 2011. The Act is an attempt to control smuggling and commercial sales. It restricts smoking in offices, monasteries, transportation facilities, and all public gathering places. Pro-tobacco messages still come through advertising by foreign television programs and print.

The disability prevention program focuses on injury prevention and monitoring of injuries. The program trains health workers to educate and motivate the public on using seatbelts, motorcycle helmets, and blood alcohol tests for drivers. School children also receive information on road safety.

There is an overall shortage of health care professionals in the country, particularly for NCDs. In 2009, fewer than 10 physicians had specialized training in NCDs (training was obtained from India and Thailand). Currently there is neither an in-country training facility for NCDs nor institutionalized exchange programs with international experts on NCDs. Pathologists Overseas, a charity, along with the Los Angeles Society of Pathologists, has sponsored 15 months of postgraduate training for a Bhutanese pathologist in the United States. NCD training is not included in the Village Health Worker program.

Although an Essential Drugs Program was established in 1987 to monitor and evaluate the use of drugs, it was not adequately implemented. In response, the National Drug Policy was revised

in 2007 to address weaknesses. However, to date, a system is yet to be put in place to monitor use and stock levels of essential drugs, and thus data on use of NCD-related drugs are not available. Key NCD drugs are included in the Essential Drugs List.

The current vital registration system collects mortality information only from those who die within health care facilities. No data on NCDs and their risk factors are collected systematically and there is no information on complications, quality of health care, or health expenditures for NCDs. Nevertheless some surveys collecting data on alcohol, tobacco and other drugs associated with substance abuse have been collected. These include a Mental Health Survey in 2002, participation in the Global Youth Tobacco Survey, in 2004, a WHO STEPS survey of NCD risk factors and prevalence among Thimphu residents, in 2007, a General Population Survey in 2006, a National Knowledge, Attitudes and Practice Survey of Youth and Uniformed Services in 2009, and efforts to develop a cancer registry.

India

Capacity, Key Accomplishments, and Situational Analysis

Although no national overarching NCD plan with broad stakeholder inputs is evident, progress for NCD prevention and control efforts has been made on several fronts. The Directorate of Health Services has a dedicated NCD division that acts as the focal point for coordinating the NCD control programs in the country. The division's structure is currently under reorganization to accommodate the expansion of the National Program on Diabetes, Cardiovascular Diseases and Stroke (NPDCS), initially formed in 2007, which has recently received substantial funding (*The Economic Times* 2010). The Indian Council for Medical Research, National Institute of Communicable Diseases, All India Institute of Medical Sciences, and the Public Health Foundation of India are the major national institutions that act as resource centers for the Department of Health and Family Welfare to various NCD control programs. The India Public Health Standards for NCDs, now under development, will contain recommendations for services, human resources, drugs, investigations, and equipment that should be provided for NCDs at various health care levels for the NPDCS program, which is under the National Rural Health Mission (NRHM).

The NRHM, launched in 2005, provides an overarching umbrella, subsuming the existing programs of the MOH including all NCD control programs. The India Public Health Standards for NCDs, under development, will contain recommendations for services, human resources, drugs, investigations, and equipment that should be provided for NCDs at various health care levels for the NPDCS program. The National Cancer Control Program was initiated in FY1975-76 and now has 25 regional cancer centers. The National Trauma Control Program, supported by the 11th Five-Year Plan, intends to address the growing number of road traffic injuries in the country. Four components of the program are pre-hospital trauma care, hospital care, rehabilitation of the injured, and injury prevention.

India has adopted the FCTC and has prepared a tobacco action plan. A comprehensive law, The Cigarette and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act, 2003, has been enacted to reduce the exposure of people to tobacco smoke, prohibit advertisements, prohibit sale to minors, and regulate the contents of tobacco products. Prevention efforts for tobacco are reasonably well developed and planned for integration into the NRHM and NPDCS. However, prevention and

control efforts outside the health sector, while substantial, could be enhanced. Specifically, considering a tax framework that includes all major tobacco products (including *bidis*) could have large impact.

In terms of tracking the burden, surveillance is conducted by the states. The Integrated Surveillance Project (IDSP) NCD arm used WHO methodology and planned for population-based NCD risk factor surveys for all states in three phases. Phase 1 covered seven states and the field work is complete and reports are being finalized. These surveys collected risk factor and morbidity prevalence, but not information on mortality, complications, or health expenditures. However, in late 2009, due to delays and a reorganization of the overall IDSP, the NCD arm was dropped and phase 2 and 3 surveys are not currently planned.

The National Cancer Registry Program has population-based cancer registries in 13 different sites and calculates estimates of cancer incidence wherever feasible. Using registry data, an atlas has been published which highlights cancer incidence patterns across the country.

Currently, no data are collected for NCD complications, quality of health care, or health expenditures. Reliable and timely consolidation of health information from multiple agencies and multiple health programs at national level is seldom achieved. This paucity of high-quality data is seriously affecting NCD planning processes.

Human resources qualification standards have been established by the Medical Council of India, Pharmacy Council of India, and the Indian Nursing Council. However, training specifically for NCDs is not included. In addition, no clear system of projecting the future supply of human resources, specifically for NCDs, is available.

In 2008, India spent 4.0 percent of GDP on health care. Public expenditures totaled approximately 1.1 percent of GDP, leaving most funding coming from private sources. Of private resources, 80 percent are out of pocket. There is a large reliance of health infrastructure and services from the private sector. People with NCDs in India incurred significantly higher treatment costs (about double) in term of out-of-pocket expenses than those with other conditions and illnesses. Approximately 40 percent of household spending for NCDs took a distressed pattern, and the odds of catastrophic spending and impoverishment were much higher among those with hospitalization for NCDs than for communicable diseases. With the chronic nature of NCDs and the high cost of some medications, financial vulnerability often results, and this accounts for some of the distress financing of care.

The 11th Five-Year Plan includes development of a comprehensive health information system. It is planned for integrating information from various reporting elements into a system that will feed into program monitoring and evaluation.

Maldives

Capacity, Key Accomplishments, and Situational Analysis

Maldives has developed a Health Master Plan 2006–2015, which states that, among NCDs, those people with common risk factors such as CVD, diabetes, renal diseases, COPD, and selected cancers will be given the main focus. The plan includes specific national targets for these diseases by 2015, with nine NCD-related indicators. Thalassaemia and mental health will also receive priority attention. Services for the prevention and rehabilitation of physical and mental

disabilities will be developed in partnership with social services and the private sector. The Health Master Plan incorporates the FCTC. Maldives has also developed a Non-Communicable Diseases Strategic Plan 2008–2010, which outlines private and public roles in the management and care of priority NCDs.

Maldives has undertaken a number of measures to control tobacco in the past. However progress has been limited due to lack of legislation. Maldives ratified the WHO Framework Convention on Tobacco Control in 2004. The enabling national legislation (Tobacco Control Act) was passed and ratified in August 2010. As per the stipulations of the Act a national advisory body (Tobacco Control Board) has been formed and is currently working on formulation of Tobacco Control regulations. In parallel the Center for Community Health and Disease Control in collaboration with national stakeholders is conducting awareness and advocacy activities targeted to the population and to policy makers. Despite these recent progress Maldives has the highest prevalence of tobacco use in South Asia. Tobacco products are widely available and comparatively low-priced. Also progress towards effective policy (e.g. taxation, supply control) is hindered by the strong lobbying from the tobacco industry.

The MoH created the Center for Community Health and Disease Control with six divisions including Mental Health (which includes the Tobacco Prevention Program), Non-Communicable Diseases Control (leads individual education and counseling, advocacy, and workshops efforts in atolls with technical cooperation from WHO), Environmental & Occupational Health (leads the Injury and Disability Program), and Population Health and Health Promotion (promotes school health activities such as lifestyle education for children). This new structure has given higher priority to NCDs. All divisions are working with other government offices. For example, Mental Health is working with Trade in order to combat tobacco through increasing tariffs and improving labeling. In terms of human resources, the NCD division is still understaffed and existing staff need more training. Under the new policy health care services are being corporatized at provincial levels but oversight remains with Ministry of Health and Family.

The health system in Maldives consists of primary, secondary, and tertiary layers. The regional, atoll hospitals and health centers are located strategically among the islands to minimize access time. The public infrastructure is supplemented by the private sector. The government's current policy is to move service delivery from government services toward public–private partnerships. All curative facilities were consolidated under the Health Services Division (previously the Department of Medical Services). The Center for Community Health and Disease Control (started in 2009, formerly the Department of Public Health) is responsible for delivering all preventive health care programs, and for tackling communicable diseases.

Patients with NCDs are treated primarily at regular clinics. The full range of tests and medications are not available at all delivery sites. There is no policy for the referral of NCD patients to higher levels of care, so that the burden of pursuing care is on patients and their families. Telemedicine and e-health services are under development and should be available in 2011. Care guidelines and standard treatment protocols for the major NCDs have been developed for the major NCDs and are undergoing dissemination and implementation. In the private sector, there is one major tertiary hospital and approximately 50 different clinics throughout the country.

No systematic data collection for NCD morbidity, risk factors, or economic burden is established, nor is there a cancer registry. A subnational NCD Risk Factor Survey was conducted in 2004 and another subnational Survey is planned for mid 2011. Global Youth Tobacco Survey was conducted in 2003 and 2007. Global School Health survey was conducted in 2010. Demographic Health Survey conducted in 2009 also contained modules on NCD.

Pharmaceutical products are imported by the private or public sector. The private sector imports and distributes to private pharmacies in Malé and throughout the country. With few exceptions the government health facilities only stock medications for hospital and institutional use. Drugs for persons with NCD are purchased by patients from private pharmacies. Supply and access are issues, especially in remote areas and among the poor. A pilot is now under way to develop community pharmacies on less populated islands.

The number of physicians and nurses increased significantly between 1990 and 2005 (40 to 379 physicians, 137 to 974 nurses) with expansion of the existing health system and the opening of the Indira Gandhi Medical Hospital. There is a high dependence on short-term (most, 1-year) expatriate providers (approximately 73 percent), reducing the continuity of care that is important for NCDs.

Under the recently introduced universal social insurance scheme, MADHANA, services can be sought from private institutions, hospitals, clinics, and pharmacies linked to the scheme. Challenges facing MADHANA are inclusion of the unemployed and maximum one-time payment ceilings on catastrophic costs. In addition, important NCD-related tertiary services that cannot be accessed in Maldives include oncology, radiation therapy, cardiac bypass, and cardiac catheterization. However these schemes are still in its early stages and are likely to face challenges in its long term financial sustainability. Pharmacies are not present on most small islands. Leaving some unable to benefit from these schemes.

Nepal

Capacity, Key Accomplishments, and Situational Analysis

The MoH has developed a decentralized system of health subposts, health posts, and primary health care centers. Curative health service delivery is poorly developed (2 hospital beds per 10,000 population). The main focus is on NCD management through specialty hospitals at the tertiary level, with little effort at the primary health care level for prevention and control of NCD risk factors. Specialty tertiary care centers for NCDs include Shahid Gangala National Heart Center, the B.P.Koirala Memorial Cancer Hospital, the charitable Bhaktapur Cancer Hospital, the Suresh Wagle Memorial Cancer Center at Tribhvan University Teaching Hospital, and the Mental Hospital at Lagankhel (Lalipur), the only facility that provides mental health services. A National Essential Medicines List has been developed but specific NCD-related drug information is unavailable.

The Nepal Health Sector Program Implementation Plan 2004–2010 employs a sectorwide approach and has government and external development partners to implement the national

health strategy. It aims to implement the Second Long Term Health Plan, particularly by extending access to essential services. To this end, the government has been making such services at several facilities free of cost to the public since 2008. They do not categorically include services related to NCD although services for tobacco- and alcohol-related conditions are.

A national NCD policy and strategy has been drafted and awaits government review and adoption. In addition, a national policy and framework for injury and violence prevention is being considered. General health policies and plans feature NCD as a low priority although progress has been made in some areas. The FCTC had been adopted. The Smoking (Prohibition and Control) Act was drafted in 2001, although it has not yet been approved. The Ministry of Finance has levied taxes on tobacco products and there is a partial ban on tobacco advertising (applicable to electronic media only). Smoking has been banned in major public places. A tobacco control cell within the Ministry of Health and Population and the National Health Education Information and Communication Center is implementing anti-tobacco programs. The Ministry of Education includes in the curriculum elements on the ill-effects of tobacco consumption. The Nepal Health Research Council recently conducted a training program in alcohol and tobacco control.

An NCD awareness program is under preparation for implementation in three districts. Screening camps for the detection of breast and cervical cancer, hypertension, and diabetes have been held in three districts. The National Institute for Injury Prevention is playing a major role in assisting the government in its injury prevention program. In terms of other risk factors, the country has started implementing WHO's Global Strategy on Diet, Physical Activity and Health.

Structurally, the workforce is inadequate with only 2.1 physicians, 2.2 nurses, 2.4 midwives, and 0.1 pharmacists per 10,000 population and these providers are skewed toward urban areas. NCD training activities include continuing medical education in cardiology to doctors and medical students; training in NCD data management and analysis, policy briefings, and oral health; training in alcohol and tobacco control; mental health training and rehabilitation management training for highway injuries; and training programs in oral health care for health workers.

The proportion of the government budget allocated to NCD-related activities for FY2009–10 is negligible, at 0.73 percent. Taxation of tobacco and alcohol products constitutes the main funding source for NCD activities. NCD spending is mainly on tobacco control, nutrition, and cancer programs.

Using WHO STEPS methods, behavior risk factor surveys were conducted in 2004 in Kathmandu and nationally in 2006. Two cancer registries have been established, and a National Injury Surveillance Format is under development. National medical records are being analyzed to better understand the causes of violent deaths to facilitate an evidence-based injury prevention policy. Health information systems are being developed for health, logistics, and fiscal management.

Pakistan

Capacity, Key Accomplishments, and Situational Analysis

Pakistan's National Health Policy 1997 had an emphasis on non-communicable diseases. In 2003 the country was the first in the developing countries to develop an integrated national plan of action, which addressed the four diseases with common risk factors as well as Injuries and mental health: The National Action Plan for the Prevention and Control of Non-communicable disease and Health Promotion in Pakistan. Both the policy and plan could not be implemented due to change in government. In 2009, the MOH proposed the establishment of a National Commission for Prevention of NCDs, with public and private partnerships and volunteerism as its driving force. The process of creating the Commission has come under legal question and has been halted.

In 2002, Pakistan enacted the Prohibition of Smoking and Protection of Non-Smokers Health Ordinance 2002, which included measures to stop smoking in public places, and a ban on cigarette advertisements. However, implementation has been slow. In 2004, Pakistan adopted the FCTC. The MOH has taken several actions to implement control measures, though efforts to implement legislation for tobacco control remain weak. In 2009, the MOH announced that no tobacco company would be allowed to offer free goods, cash rebates, or discounts as marketing incentives to cigarette buyers. In 2010, all cigarette packs and the outlets should carry pictorial warnings. In spite of current excise tax levels, however, the price of cigarettes remains low and easily affordable.

Road safety legislation is minimal. Most drivers involved in serious road crashes escape criminal and civil penalties. Current fines are unhelpful in changing driver behavior because they are too low. Enforcement of existing laws is weak. For example, despite a helmet law, over 90 percent of all riders wear no helmet. Little headway has been made with urban planning and construction of roads that take into account pedestrians' needs.

The MoH has developed a public sector health system with four major levels: primary care facilities for outpatients (basic health units and dispensaries), district hospitals for basic inpatient and outpatient care, tertiary hospitals in urban areas, and vertical programs. The last level has programs for family planning and health care, MCH, immunization, tuberculosis, HIV/AIDS, malaria, hepatitis, nutrition, and blindness. The primary care level is not well programmed to delivery preventive or treatment services for NCDs. Public institutions lack core elements and capacity to manage integrated NCD programs.

The private sector dominates service delivery for outpatients. It is primarily geared toward provision of individual treatment and preventive care services. Services are delivered in parallel with public services and there is no formal integration, referrals, or contractual arrangements between the two sectors. Both provide mainly curative NCD care. Population-based prevention is not addressed, apart from tobacco. Promising pilots for community-based hypertension control have recently been conducted. Since the majority of people seek care from private general practitioners, it is essential to integrate the private sector into any strategy for successful outcomes of NCD prevention program. Currently, a primary care service delivery model for NCDs suitable for the context is missing.

Although the number of physicians may be sufficient for population coverage ratios for public service delivery, there is maldistribution with understaffing in rural areas, and 85 percent of physicians practicing in urban areas. General practitioners tend to be poor performers in

managing common medical conditions, such as hypertension, diabetes, and lipid lowering. In the area of mental health, the total number of psychiatrists is 250, insufficient for such a large population. Further, fewer than half of them have a postgraduate qualification in psychiatry. Lady health workers—health care providers trained for over two years in community health nursing and midwifery—are not trained in NCDs.

A National Essential Drugs List has been developed and contains 452 drugs (the largest in South Asia). It includes anti-hypertensive, lipid lowering, and anti-diabetic drugs, as well as bronchodilators and anti-depressants. However, stocking and availability of supplies are problematic, and only a quarter of primary health centers are stocked with aspirin and many lack bronchodilators.

The vast majority of private spending on health is out or pocket and most of that goes to purchase medications. The private health services are poorly regulated, thereby letting the market dictate prices to semi-literate consumers.

The MOH introduced a health management information system for first-level care facilities in 1992. Plans are to integrate monitoring of communicable and NCDs within the system at district level.

In 2003, a pilot was implemented in one district (population 1 million) for developing a model for population based surveillance of NCDs.[36] A World Bank/CDC/WHO joint study in 2004 recommended that it be replicated and taken to nationwide scale.[37] NCD mortality data are lacking in quality, only few morbidity data are available, and there are no systematic clinic- or hospital-based registries of public and private health facilities. One exception is the Road Traffic Injury Research & Prevention Center, a joint collaborative effort of several academic institutions and a hospital. It has collected road traffic injury–related data from five major trauma centers in Karachi, and a road traffic injury database has been created.

Sri Lanka[38]

Capacity, Key Accomplishments, and Situational Analysis

An extensive network of hospitals and preventive health offices for tertiary, secondary, and primary level care for providing health services has been developed. However, the bulk of both inpatient and outpatient curative care is provided by tertiary and secondary level facilities while a substantial proportion of these services could be delivered within primary care. The general trend for several decades has been for public sector patients to increasingly opt to access and use higher-level facilities because lower-level facilities are not equipped for basic diagnostics nor basic drugs for treatment. Consumption of drugs for NCDs in Sri Lanka is low compared to countries with similar NCD burdens.

Sri Lanka adopted the FCTC treaty in 2003. A ban on smoking in public places was unanimously passed by Parliament in 2006 with strong penalties for violators. The National Authority on Tobacco and Alcohol Bill (2007) and tobacco control policies developed since include tax

[36] Nishtar S, Bile KM, Ahmed A, Amjad S, Iqbal A. Integrated population-based surveillance of non-communicable diseases—the Pakistan model. *Am J Prev Med*. 2005 Dec;29(5 Suppl 1):102-6.

37 The World Bank. Public health surveillance system: a call for action. Islamabad, Pakistan: Ministry of Health, World Bank, Centres for Disease Control, World Health Organization; 2005.

38 See World Bank (2010).

increases on cigarettes and tobacco products, restrictions on sales to youth, and restrictions on public and mass media advertising of tobacco products. Local control efforts include the creation of district tobacco control cells with a lead role in implementing the provisions aimed at reducing tobacco use.

Three key directorates within the central MoH have been created that lead national NCD activities: NCD, Mental Health, and Cancer Control Directorates. The NCD Directorate plans and coordinates the national NCD response, the Mental Health Directorate plans and coordinates national mental health prevention and control efforts, and the Cancer Control Directorate plans and coordinates efforts to eliminate modifiable risk factors with public awareness. The NCD Directorate has recently developed national policies and strategic plans for injuries and for NCD prevention and management (2009 and 2010) that are in the process of being adopted by government. However, it is unclear if resources for their implementation will be forthcoming.

In terms of tracking the NCD disease burden, several small surveys by individual researchers and medical faculties have been conducted over the last decades. In addition, the recent Sri Lanka Diabetes and Cardiovascular Study characterized the burden (Katulanda et al. 2008). Mortality data are recorded by the Registrar General's Department using data from death certificate records from all provinces in the country. Death certification coverage is more than 90 percent but cause of death data quality is low. Currently, outpatient and inpatient data are inadequate to track disease trends or utilization patterns and no system exists for data from the private sector, which delivers about half the outpatient care.

Total health expenditures on health increased from 3.5 percent of GDP in 1995 to 4.0 percent in 2008, of which the share of public spending declined from 47 percent to 43 percent. For those with heart disease, diabetes, and asthma, most (more than 70 percent) of health services costs were financed out of pocket.

Reference

Katulanda, P., G.R. Constantine, J.G. Mahesh, R. Sheriff, R.D. Seneviratne, S, Wijeratne, M. Wijesuriya, M.I. McCarthy, A.I. Adler, and D.R. Matthews. 2008. "Prevalence and Projections of Diabetes and Pre-diabetes in Adults in Sri Lanka—Sri Lanka Diabetes, Cardiovascular Study (SLDCS)." *Diabet Me* 25 (9): 1062-9.