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

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# Contents

*Preface*  \( xi \)

*Acknowledgments*  \( xv \)

*Abbreviations*  \( xvii \)

- **Overview**  \( 1 \)
- **Introduction**  \( 1 \)
- **What Is Happening and Its Implications**  \( 2 \)
- **Why the Need to Act Now**  \( 5 \)
- **How to Respond**  \( 8 \)
- **Conclusion**  \( 11 \)
- **Notes**  \( 11 \)

**PART I**  \( 13 \)

**Chapter 1**  \( 15 \)

- **Regional Aging and Disease Burden**  \( 15 \)
- **Regional Demographic and Epidemiologic Transitions**  \( 15 \)
- **NCDs in South Asia**  \( 24 \)
- **Economic Burden**  \( 31 \)
- **Notes**  \( 36 \)
- **References**  \( 37 \)
**Chapter 2**  
Country-Level Aging and Disease Burden  
Afganistan  
Bangladesh  
Bhutan  
India  
Maldives  
Nepal  
Pakistan  
Sri Lanka  
Implications for South Asia  
Notes  
References

**PART II**  
**Why the Need to Act Now**

**Chapter 3**  
Rationale for Action  
Social and Political Perspective  
Economic and Development Perspective  
Health Sector Perspective  
References

**Chapter 4**  
Opportunities for Prevention and Control  
Global and National Policy Context for NCDs  
What Can Governments Do?  
Prevention of NCDs  
Defining the Focus of NCD Interventions: Prevention versus Treatment  
Cost-Effectiveness Evidence on Prevention, Control, and Treatment of NCDs  
Notes  
References

**PART III**  
**How to Respond**

**Chapter 5**  
Developing a Policy Options Framework for Prevention and Control of NCDs  
Introducing the Policy Options Framework  
Common Challenges for Tackling NCDs  
Reference
## Chapter 6  Country Capacity and Accomplishments and Application of the Policy Options Framework

<table>
<thead>
<tr>
<th>Country</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>97</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>98</td>
</tr>
<tr>
<td>Bhutan</td>
<td>99</td>
</tr>
<tr>
<td>India</td>
<td>100</td>
</tr>
<tr>
<td>Maldives</td>
<td>101</td>
</tr>
<tr>
<td>Nepal</td>
<td>103</td>
</tr>
<tr>
<td>Pakistan</td>
<td>103</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>105</td>
</tr>
<tr>
<td>Notes</td>
<td>106</td>
</tr>
<tr>
<td>References</td>
<td>106</td>
</tr>
</tbody>
</table>

## Chapter 7  Regional Strategies for NCD Prevention and Control

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guiding Principles for Regional Collaboration</td>
<td>110</td>
</tr>
<tr>
<td>Strategies for NCD Risk Factors</td>
<td>112</td>
</tr>
<tr>
<td>Strategies to Improve Health Systems</td>
<td>117</td>
</tr>
<tr>
<td>Regional Institutional Capacity and Past Collaboration</td>
<td>123</td>
</tr>
<tr>
<td>Conclusions</td>
<td>124</td>
</tr>
<tr>
<td>Notes</td>
<td>125</td>
</tr>
<tr>
<td>References</td>
<td>125</td>
</tr>
</tbody>
</table>

## Appendix A  Country Capacity Assessments and Accomplishments

<table>
<thead>
<tr>
<th>Reference</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>131</td>
</tr>
</tbody>
</table>

## Appendix B  Economic Rationale for Public Policy to Address NCDs

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Efficiency-Based Rationales</td>
<td>134</td>
</tr>
<tr>
<td>Nonstandard Economic Rationales: Behavioral Economics</td>
<td>136</td>
</tr>
<tr>
<td>Conclusion</td>
<td>137</td>
</tr>
<tr>
<td>Notes</td>
<td>137</td>
</tr>
<tr>
<td>References</td>
<td>138</td>
</tr>
</tbody>
</table>
1.3 Burden of Disease as a Proportion of Total Forgone DALYs by Cause, 2004  
1.4 DALYs Attributable to 10 Leading Risk Factors by Sex, Adults 15–69 Years, 2004  
1.5 Proportion of Total Deaths and Forgone DALYs Due to NCDs, 2004  
1.6 Age-Adjusted Prevalence of Current Smoking of Any Tobacco Product Among Men and Women 15 Years Old and Above  
1.7 Prevalence of Current Smoking of Any Tobacco Product Among Youth 13–15 Years Old  
1.8 Duration of Illness for Hospitalized Surviving Persons and for Outpatients, India, 2004  
1.9 Annual Income Loss from Missed Work, Time for Caregiving, and Premature Death Among Households with a Member Having an NCD, India, 2004  
2.1 Age Structure in Afghanistan  
2.2 Age Structure in Bangladesh  
2.3 Age Structure in Bhutan  
2.4 Age Structure in India  
2.5 Age Structure in Maldives  
2.6 Age Structure in Nepal  
2.7 Age Structure in Pakistan  
2.8 Age Structure in Sri Lanka  
3.1 Social Determinants, NCDs, and Their Relationship to Poverty  
3.2 Illustration of the Macroeconomic Effects of NCDs  
4.1 Heart Disease Death Rates Among Men Ages 30 Years and Older in Australia, Canada, the United Kingdom, and the United States  
5.1 Program Management Stages in the Policy Options Framework  
7.1 Share of Total and Excise Taxes in the Prices of 20-Piece Packs, 2008  
7.2 Range of Prices of Tobacco Products, 2008  
D.1 Country Standing Based on Standardized Public Expenditures as a Percentage of Total Health Expenditures and Effectiveness and Regulatory Quality Index Compared with Country NCD Burden
Tables
1.1 Demographic, Economic, and Health Profiles for Low- and Middle-Income Regions 19
1.2 Demographic, Economic, and Health Profiles for South Asian Countries 22
1.3 Deaths and DALYs Attributable to the 10 Leading Diseases, Conditions, and Injuries, Adults 15–69 Years, 2004 26
1.4 DALYs Forgone by Sex, Age, and Cause, 2004 27
4.1 Reduction in Secular Trend of CVD Mortality Attributed to Population-Level Risk Reduction and to Treatment with Medication and Surgery 70
4.2 Effects of Tobacco-Control Interventions, 2006–15 73
4.3 Effects of Interventions to Reduce Salt Intake, 2006–15 74
5.1 Policy Options Framework for Prevention and Control of NCDs 86
6.1 NCD Capacity Profile of Selected Indicators 96
7.1 Tobacco Prevention and Control Policies 113
7.2 Regional Institutions Important for Policy Development, Implementation, and Technical Assistance 124
C.1 Neglected Low-Cost Opportunities 142
C.2 Selected Population-Based Interventions for NCDs 143
C.3 Selected Individualized Interventions for NCDs 146
D.1 Governance Indicators Used to Develop Government Capacity and Burden of Disease Indicators 151
D.2 Policy Options Framework for Prevention and Control of NCDs and Its Application in the South Asia Region 153
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 healthy 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 also be 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 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, and development partners, and identify roles in which the World Bank 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 World Health Organization (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 and highlight efforts that can be built on. Since policy options form the output of this book, understanding country capacity becomes critical. Indeed, the World Bank (2009) recommended that in order 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 capacity assessments, conducted during March–September 2009, USAID’s *Health Systems Assessment Approach: A How-to Manual* (Islam 2007) was adapted as the assessment tool (chapter 6 and appendix A). It was modified to emphasize the components that were most important for responding to NCDs. In addition, the WHO NCD capacity survey tools used for global surveys in 2000 and 2005 (appendix A) 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 the 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* (WHO 2008) 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).

**References**


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Abbreviations

CEA  cost-effectiveness analysis
COPD  chronic obstructive pulmonary diseases
CVD  cardiovascular disease
DALY  disability-adjusted life year
FCTC  Framework Convention on Tobacco Control
GDP  gross domestic product
GNI  gross national income
HNP  Health, Nutrition, and Population
HRH  human resources for health
ILO  International Labour Office
IHD  ischemic heart disease
MCH  maternal and child health
MDGs  Millennium Development Goals
NPDCS  National Program on Diabetes, Cardiovascular Diseases and Stroke
NRHM  National Rural Health Mission
NCD  noncommunicable disease
PPP  purchasing power parity
Abbreviations

SEAR  South-East Asian Region (WHO)
THE  total health expenditures
WHO  World Health Organization

All dollar amounts are U.S. dollars unless otherwise indicated.
Overview

Introduction

Increasing life expectancy in South Asia is resulting in a demographic transition that can, under the right circumstances, yield dividends for a time through more favorable dependency ratios. 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 non-dependent population increases and per capita income thus rises—is both achievable and affordable through efficiently tackling NCDs with prevention and control efforts.

This book looks primarily at cardiovascular disease (CVD) and tobacco use because 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 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 (a) an NCD burden and risk factor profile for all countries and the region as a whole; (b) a rationale for public policy and action for NCDs; (c) a framework to guide the formulation of public policies and strategies for NCDs; (d) 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 (e) 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 action 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 (a) developing a framework for policy options to identify key areas for strategic country- and regional-level policy and actions; (b) bringing together demographic and aging trends, and disease and risk factor burden data, alongside analyses of capacities and accomplishments, to tackle NCDs; and (c) 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.*

**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, although the regional average life expectancy at birth, 64 years, is rising. Most people live in rural areas (71 percent). Despite 6 percent average annual growth in gross domestic product (GDP) in the past 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 the disease burden (55 percent including injuries) is now attributable to NCDs, 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 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 vector-borne 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 effective responses to be developed. 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 higher for smokers than 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 that of most infectious diseases. Second, in countries with lower life expectancy, people die from other causes (such as infectious diseases) at younger ages, 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 disease postulates that fetal undernutrition, reflected by low birth weight, is associated with susceptibility to development of ischemic heart disease 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 little or no education and tobacco expenditures among the poor frequently crowd out spending on food and education. Furthermore, it is among the poor that infectious diseases, such as tuberculosis, concomitant with NCDs can result in worse outcomes.

Clustering of NCD risk factors is common. Although 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. Although elimination is neither feasible nor a current, realistic goal, these findings 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 when hospitalization is due to a communicable disease. Because of the chronic nature of 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 when aging occurs rapidly and without associated economic gains or social support systems, it will be unhealthy aging, characterized by disability and premature death—resulting more quickly in less favorable dependency ratios. The shift of the disease burden toward NCDs—at a time when a significant burden of maternal and child health (MCH) and nutrition issues remains—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 expenditures 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 lifestyle that may increase their NCD risks. Extreme poverty and fetal and early childhood undernutrition, from both the current situation and past exposure, will create a large pool of people 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 social and political standpoints, action is warranted. South Asians are six years younger than those in the rest of the world at the time of their first heart attack. This unfair burden is especially heavy on the poor: after a heart attack, they 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 because of the systems put in place to deal with health and illness.

Several issues support a strong economic rationale for public policies for NCDs, a rationale 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 (a) market failures, such as those 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 unhealthful foods; (b) externalities, that is, when a consumer does not bear all the cost or harm associated with a behavioral choice; (c) irrational behaviors, such as when children and adolescents do not consider the future consequences of their choices, irrespective of whether they are informed of those consequences; and (d) time-inconsistent preferences, for example, when individuals, who would be better off if actively stimulated to act differently, accept instant gratification at the expense of their long-term best interests, as is the case with delaying smoking cessation.

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 care 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 10 years following 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 drastically, including huge 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 of communicable diseases, as well as issues of maternal and child health and nutrition. 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 as 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 unhealthful fats, and excessive salt intake are now comparatively well understood.

For this book, interventions were categorized using a policy orientation: population-based interventions in the community and individualized 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 $0.40 per person a year in low-income and lower middle-income countries, and $0.50–$1.00 per person a year in upper middle-income countries (as of 2005). For Bangladesh, India, and Pakistan (the 3 South Asian countries among the 23), the model predicts deaths averted in a range of 50–70 per 100,000 members of the at-risk population (the population over age 30).

With regard to individualized interventions, relatively strong evidence from randomized control trials supports the effectiveness of the use of a number of drugs to prevent (or manage) CVD by reducing blood pressure or cholesterol. 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 current coverage levels were increased, the model estimated 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 $1.08 ($0.75–$1.40), ranging from $0.43 to $0.90 across low-income countries and from $0.54 to $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

Although 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 individualized interventions within the clinical setting to treat risk factors and morbidity.

From a policy perspective, this framework is useful because population-based and individualized interventions mobilize different
parts of the nonhealth 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; it is therefore important to integrate these differences
into the framework. The framework analyzes NCD program manage-
ment in four stages: Assess, Plan, Develop and Implement, and Evaluate.

The framework was used as a basis to assess the 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
generally receiving a low level 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 implemen-
tation and enforcement have been slow or stalled. For community-based
interventions, activity is evident in all countries but efforts and the adop-
tion of explicit policies, especially those for tobacco, are highly variable.
For individualized interventions, less progress is evident. In the Evaluate
stage, the least progress was noted, with little commitment directed to
this area.

Country-level policy options align with the needs and the capacity and
accomplishments made by each country. 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, the incidence of smug-
gling increases when some countries have low cigarette prices relative to
their neighbors.
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 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 NCD 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**
Of all the NCD-specific risk factors, tobacco use and food policies most benefit from a regional approach.

*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 with international media that are viewed within their own borders.

*Increase and Harmonize Tobacco Taxation.* The goal is to avoid 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 Antismuggling 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 relative to 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 healthful foods).

**Improving Health Systems**
Of all the health system issues, a few key areas were identified that offered the greatest advantage.

*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 the 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.

**Conclusion**

Regional strategies will not be without their challenges. However, their benefits, if effective, may be large and accelerate gains not only within countries but across the region.

**Notes**

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, omitting, for example, chronic infectious diseases such as HIV/AIDS.
2. All source references for the Overview are given in the main part of the book.
PART I

What Is Happening and Its Implications
Regional Demographic and Epidemiologic Transitions

South Asia is home to a large, quickly growing, and predominantly poor population. The emergence of noncommunicable diseases (NCDs) in South Asia was, in fact, predictable because of demographic and epidemiologic transitions (figure 1.1 and box 1.1; see also table 1.2). In the demographic transition, the characteristically large, young population of developing countries enters adulthood, but, because of 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 problems related to maternal and child health (MCH) and nutrition and an increasing share of NCDs (refer to figure 1.3).\(^1\)

Although the progression of both transitions is predictable, the rate of progression is not, and can be highly variable—as evident in the South Asia region, where even as these transitions are unfolding, a substantial residual burden remains from communicable diseases, MCH issues, and poor nutrition—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 will increase the prevalence of NCDs because they become 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, the point at which developing countries’ working and nondependent population increases and per capita income rises (figure 1.2).

Many implications from these transitions are evident. First, the burden of NCDs 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 in terms of forgone wages will be significant and will worsen dependency ratios. Second, because most health care is financed with private out-of-pocket resources, some people may never escape poverty or may

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**Figure 1.1  Age Structure in South Asia**

be driven into poverty, some will forgo treatment and suffer excessively, and some will skew their expenditures away from other human development investments. Finally, at the country level, although 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 that of 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.

South Asia has experienced 6 percent average annual growth in gross domestic product (GDP) in the past 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 $2 a day. More than two-fifths of the population live in extreme poverty, on less than $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 (World Bank 2010b). Security in some areas has deteriorated 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 the past few years, however, for the first time, all countries in the region have democratically elected their governments.)

As a result, the region’s progress toward meeting the Millennium Development Goals 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 per 1,000
### Table 1.1 Demographic, Economic, and Health Profiles for Low- and Middle-Income Regions

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicator</th>
<th>Year</th>
<th>East Asia and Pacific</th>
<th>Europe and Central Asia</th>
<th>Latin America and the Caribbean</th>
<th>Middle East and North Africa</th>
<th>South Asia</th>
<th>Sub-Saharan Africa</th>
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<td>Total (millions)</td>
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<td>566.1</td>
<td>325.2</td>
<td>1,545.1</td>
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<td>Rural (%)</td>
<td>2008</td>
<td>56</td>
<td>36</td>
<td>21</td>
<td>43</td>
<td>71</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Over 65 yrs (%)</td>
<td>2008</td>
<td>7</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Dependency ratio (% of working-age population)</td>
<td>2008</td>
<td>33</td>
<td>28</td>
<td>44</td>
<td>49</td>
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<td>79</td>
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<td>Economy</td>
<td>GNI per capita</td>
<td>2008</td>
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<td>7,350</td>
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<td>Annual growth GDP (%)</td>
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<td>5.1</td>
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<td>Labor force participation rate</td>
<td>2008</td>
<td>% male 15 yrs and older</td>
<td>79</td>
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<td>79</td>
<td>73</td>
<td>82</td>
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<td>% female 15 yrs and older</td>
<td>64</td>
<td>50</td>
<td>52</td>
<td>26</td>
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<td></td>
<td>Extreme poverty (%&lt;1.25 PPP)</td>
<td>2005</td>
<td>16.8</td>
<td>3.7</td>
<td>8.2</td>
<td>3.6</td>
<td>40.3</td>
<td>50.9</td>
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<td>Infant mortality rate (per 1,000 live births)</td>
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<td>23</td>
<td>19</td>
<td>20</td>
<td>29</td>
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(continued on next page)
### Table 1.1 (continued)

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<th>Sub-Saharan Africa</th>
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<td>Maternal mortality ratio (per 100,000 live births, modeled estimates)</td>
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<td>150</td>
<td>45</td>
<td>130</td>
<td>200</td>
<td><strong>500</strong></td>
<td><strong>900</strong></td>
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<td>Crude death rate (per 1,000 people)</td>
<td>2008</td>
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<td>6</td>
<td>6</td>
<td><strong>7</strong></td>
<td><strong>14</strong></td>
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<td></td>
<td>Life expectancy at birth</td>
<td>2008</td>
<td>72</td>
<td>70</td>
<td>73</td>
<td>71</td>
<td><strong>64</strong></td>
<td><strong>52</strong></td>
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<td>Health financing</td>
<td>Total expenditure (% GDP)</td>
<td>2007</td>
<td>4.1</td>
<td>5.6</td>
<td>7.1</td>
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<td><strong>4.0</strong></td>
<td><strong>6.4</strong></td>
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<td></td>
<td>Public share of total (%)</td>
<td>2007</td>
<td>46.3</td>
<td>65.7</td>
<td>48.5</td>
<td>50.8</td>
<td><strong>27.5</strong></td>
<td><strong>41.1</strong></td>
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<tr>
<td></td>
<td>Total per capita $</td>
<td>2007</td>
<td>95</td>
<td>396</td>
<td>473</td>
<td>151</td>
<td><strong>36</strong></td>
<td><strong>69</strong></td>
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</tbody>
</table>

**Sources:** World Bank 2010b. Original data sources include ILO 2009 (labor force participation rate); WHO 2007 (maternal mortality ratio); WHO 2009 (hospital beds and physicians); and WHO 2008b (health financing data).

**Note:** Purchasing power parity (PPP) gross national income (GNI) per capita for the Middle East and North Africa region is not from 2008 (year not specified in the data source).
live births 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 Millennium Development Goals 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.

At the country level, several contextual factors need consideration for the development of 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, ranging from the small countries of Bhutan and Maldives to India. Yet each country has a similar proportion of its population living in rural areas—an important point for considering not only the challenges of addressing social determinants and risk factors for NCDs but also the challenges of delivering care.

Life expectancy ranges widely, from 44 years in Afghanistan to 74 years in Sri Lanka, where approximately 7 percent of the population is 65 years or older, a proportion much higher than that of 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 the exceptions of Maldives and Sri Lanka. These two indicators reflect national averages and therefore do not allow an appreciation of the heterogeneity within large countries. Treating NCDs may require heavy use of health services, and as new initiatives are developed in preparation for future efforts, strains on the current systems will need to be taken into account.

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 less than $34 per capita annually 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 half or more of total health expenditures in most countries. According to available data, the proportion of out-of-pocket expenditures used to purchase medicines is also uniformly high (van Doorslaer et al. 2007)—of
### Table 1.2  Demographic, Economic, and Health Profiles for South Asian Countries

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
<th>Afghanistan</th>
<th>Bangladesh</th>
<th>Bhutan</th>
<th>India</th>
<th>Maldives</th>
<th>Nepal</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
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</thead>
<tbody>
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<td><strong>Population</strong></td>
<td>Total (million)</td>
<td>29.0</td>
<td>160.0</td>
<td>0.7</td>
<td>1140.0</td>
<td>0.3</td>
<td>28.8</td>
<td>166.1</td>
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<tr>
<td></td>
<td>Rural (% of total)</td>
<td>—</td>
<td>73</td>
<td>66</td>
<td>71</td>
<td>62</td>
<td>83</td>
<td>64</td>
<td>85</td>
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<tr>
<td></td>
<td>Over 65 years (% of total)</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
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<td>7</td>
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<td>Dependency ratio (% of</td>
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<td>working-age population)</td>
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<td></td>
<td>Young</td>
<td>90</td>
<td>50</td>
<td>49</td>
<td>50</td>
<td>44</td>
<td>63</td>
<td>63</td>
<td>35</td>
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<tr>
<td></td>
<td>Old</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>11</td>
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<td><strong>Economy</strong></td>
<td>GNI per capita</td>
<td>370</td>
<td>520</td>
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<td>1,040</td>
<td>3,640</td>
<td>400</td>
<td>950</td>
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<td>PPP GNI per capita</td>
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<td>5.3</td>
<td>2.0</td>
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<tr>
<td></td>
<td>Labor force participation</td>
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<tr>
<td></td>
<td>% male 15 yrs and older</td>
<td>89</td>
<td>84</td>
<td>72</td>
<td>81</td>
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<td>85</td>
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<td>% female 15 yrs and</td>
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<td>33</td>
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<td>63</td>
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<tr>
<td></td>
<td>Extreme poverty</td>
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</tr>
<tr>
<td></td>
<td>(%&lt;1.25 PPP)</td>
<td>—</td>
<td>49.6</td>
<td>26.2</td>
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<td>43</td>
<td>54</td>
<td>52</td>
<td>24</td>
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<td></td>
<td>Maternal mortality ratio (per 100,000 live births)</td>
<td>1,800</td>
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<td>440</td>
<td>450</td>
<td>120</td>
<td>830</td>
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<td>5</td>
<td>6</td>
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<td>6</td>
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<td>Health financing</td>
<td>Total expenditure on health (% of GDP)</td>
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<td>General government expenditure on health (% of total)</td>
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<td>80.3</td>
<td>28.0</td>
<td>69.6</td>
<td>39.0</td>
<td>29.7</td>
<td>42.9</td>
</tr>
<tr>
<td></td>
<td>Per capita total expenditure on health ($)</td>
<td>48</td>
<td>17</td>
<td>75</td>
<td>43</td>
<td>462</td>
<td>20</td>
<td>24</td>
<td>81</td>
</tr>
</tbody>
</table>

Sources: World Bank 2010a, except for data for Bhutan, Maldives, and health services. Data for Bhutan and Maldives are from the World Bank’s Development Data Platform and the MMR for Bangladesh is country data. Data for health services are from WHO 2009. Original data sources include: ILO 2009 (labor force participation rate); WHO 2007 (maternal mortality ratio); and WHO 2008b (health financing data). Bangladesh MMR from Bangladesh Maternal Mortality and Health Care Survey, 2010.


a. Per 10,000 population.
great significance because medicines play an important role in providing individualized 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**

As countries develop from low- to middle- to high-income states, the disease patterns tend to shift in parallel. Here, we will examine the global and South Asian trends.

**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 poor nutrition combined (46 percent) (figure 1.3).

This pattern is similar to that of high-income countries decades ago. Their demographic and epidemiologic transitions are now well advanced, with most of their disease burden the result of NCDs, which account for 95 percent of forgone disability-adjusted life years (DALYs) (box 1.2).

Although 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.

**Figure 1.3  Burden of Disease as a Proportion of TotalForgone DALYs by Cause, 2004**

![Bar chart showing the percentage of total forgone DALYs by cause for different regions in 2004.](chart.png)

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 those for individuals 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 burden.

Ischemic heart disease 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.
Table 1.3 Deaths and DALYs Attributable to the 10 Leading Diseases, Conditions, and Injuries, Adults 15–69 Years, 2004

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

Table 1.4 profiles the forgone DALYs in South Asia by sex, age, 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 poor nutrition.

Additional research is finding that among the world’s regions, cardiovascular risk is highest for South Asians (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 versus 59 years) than those in the rest of the world at the time of their first heart attack, had high levels of risk factors for cardiovascular disease (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, CVD may have an even greater impact in the future than previously appreciated (Goyal and Yusuf 2006; Ramaraj and Chellappa 2008).

Table 1.4 profiles the forgone DALYs in South Asia by sex, age, 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 poor nutrition.

Table 1.4: DALYs Forgone by Sex, Age, and Cause, 2004

<table>
<thead>
<tr>
<th>Proportion of disease-specific DALYs by age (%)</th>
<th>Total DALYs (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5</td>
<td>5–14</td>
</tr>
<tr>
<td>Males</td>
<td></td>
</tr>
<tr>
<td>Communicable diseases/MCH/nutrition</td>
<td>64.9</td>
</tr>
<tr>
<td>Noncommunicable diseases</td>
<td>8.7</td>
</tr>
<tr>
<td>Injuries</td>
<td>8.2</td>
</tr>
<tr>
<td>Females</td>
<td></td>
</tr>
<tr>
<td>Communicable diseases/</td>
<td>59.3</td>
</tr>
<tr>
<td>MCH/nutrition</td>
<td>Noncommunicable diseases</td>
</tr>
<tr>
<td>Injuries</td>
<td>12.3</td>
</tr>
</tbody>
</table>

Capitalizing on the Demographic Transition 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 use, is that stagnation in the reduction of, or even an increase in, premature adult mortality may be expected in the years ahead. These risk factors and trends are similar to those seen in the Russian Federation and Eastern Europe (Marquez et al. 2005).

Clustering of NCD risk factors is common. Although 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 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).

Where data are available, they show that 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 et al. 2005; Katulanda et al. 2008).

This regional pattern is characterized by similar country-level NCD risk factor burdens and variable country disease burdens. As indicated in figure 1.6, tobacco use among adults is uniformly high among males.

**Figure 1.5  Proportion of Total Deaths and Forgone DALYs Due to NCDs, 2004**

![Bar chart showing the proportion of total deaths and forgone DALYs due to NCDs in different countries in 2004.](image-url)

(30–50 percent use rate with any form) and is low among women with the exception of Maldives and Nepal. (Lack of data among adults from both Afghanistan and Bhutan highlights the need for better surveillance across the region.) Of even more concern 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).

The poor face multiple obstacles to preventing NCDs. Tobacco use rates tend to be higher among men with little or no education, and tobacco expenditures among the poor frequently crowd out spending on food and education (John 2008). Furthermore, it is among the poor that NCD risk factors (such as tobacco use) and infectious diseases (such as tuberculosis) are more common, leading to worse outcomes. For example, the risk of dying from tuberculosis is 2.3 times higher 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 ischemic heart disease 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
Aging and Disease Burden

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 that of most infectious diseases. Second, in some countries people die from other causes (such as 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 include three types of costs (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 ill health among members
Social Welfare Costs
To arrive at a health value, an analysis can be done of either how people act or how they answer certain questions related to real or hypothetical situations involving a trade-off between money and health. This value also captures the intrinsic value of health. One study (Mahal et al. 2009), attempting to estimate the expected welfare benefits from a reduction in CVD mortality in India by one percent a year over 2000–30, 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 (2010) 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. (2009) estimated that if NCDs were completely eliminated in India, estimated GDP would increase by 4–10 percent. Although elimination is neither 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
Microeconomic costs include financing of care by individuals, consumption patterns, and lost income. Here, we will examine each of the components.
**Financing of Care.** Treating chronic diseases, once they are expressed clinically, can be expensive for those affected. Chronic NCDs, by definition, require much longer periods of drug, inpatient, and outpatient treatment than do 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 care 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 NCDs 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, although 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 do the poor was confirmed by the recent findings of Mahal et al. (2009) 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
NCDs' share of total out-of-pocket health expenditures increased from 31.6 percent to 47.3 percent, suggesting a growing financial impact on households of NCDs in India. The authors also found that NCDs generally required 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. (2009) 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. 2009 investigated further details of the financial burden imposed by health care payments for NCD treatment and found that the odds of incurring catastrophic hospitalization expenditures were nearly 160 percent higher with cancer than with a communicable disease. The odds of incurring catastrophic hospital expenses 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 estimated the impoverishing effect 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 taking the amount of money spent on tobacco and calculating the number of 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 up the difference between at least one family member’s having just enough to eat or being malnourished (Ali et al. 2003, 12).

John (2008) 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. 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 as 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 that from other conditions (Mahal et al. 2009) (figure 1.8). The annual income loss from missed work, time taken for caregiving, and premature death is also significant (figure 1.9).

Figure 1.8 Duration of Illness for Hospitalized Surviving Persons and for Outpatients, India, 2004

Sources: Mahal et al. 2009.
a. Days unable to work.
Notes

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

2. 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 (ages 0–14) and the elderly (those 65 years and older).

3. An additional measure for determining the impact of NCDs is healthy life expectancy (HALE). HALE 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 to adjust life expectancy to reflect time spent in poor health. In South Asia the range is from 36 years in Afghanistan to 62 years in Sri Lanka.

4. Mahal et al. (2009) 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.

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

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

References


The major findings in chapter 1 were derived from the World Health Organization (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 noncommunicable disease (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 include urban and rural status, age range (NCDs are more common with aging); institution-based studies (from 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.  

CHAPTER 2

Country-Level Aging and Disease Burden
Afghanistan

Afghanistan has yet to start the demographic transition that will begin 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.

In 2004, NCDs accounted for 43 percent of the total forgone disability-adjusted life years (DALYs), with the remainder from communicable diseases and maternal and child health (MCH) issues. Of the total DALY burden, cardiovascular disease (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. Key NCD trends include the following:

- **CVD.** This is the leading cause of overall forgone DALYs, with the most from ischemic heart disease (IHD) (47 percent).
- **Stroke.** 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 chronic obstructive pulmonary disease (COPD) and 31 percent were 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 cancer, followed by esophageal cancer. Among men, the leading causes of cancer, deaths were mouth and oropharynx, followed by esophageal and lung. Approximately 22,000 people died from cancer in 2005.

**Figure 2.1  Age Structure in Afghanistan**

![Age Structure in Afghanistan](image)

Injuries. Injuries are 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 the population aged 15 or older suffers from a mental disorder (depression, anxiety, or post-traumatic stress disorder). Women had significantly poorer mental health statuses 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 Asian 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.

In 2004, NCDs accounted for 61 percent of 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. Key NCD trends include the following:

CVD. CVD is 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

Figure 2.2  Age Structure in Bangladesh

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 for males and 6.5 percent for females). Studies find higher prevalence in urban areas than in rural areas (for urban areas, approximately 8–10 percent).

- **Cancer.** Cancer 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 total deaths. 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 a 6.9 percent prevalence of asthma. For those over 30 years of age, the estimated prevalence of COPD is about 3 percent. Nearly 90 percent of the population uses 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 nonslum-dwelling women had hypertension compared to 18 percent and 25 percent of 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), and smoking prevalence among youth is similar (9 percent for boys, 5 percent for girls).

**Bhutan**

Bhutan is in the early stages of the demographic transition, but, because of significant reductions in fertility in the past 20 years, it is 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 NCD burden will also rise.

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) constituting the three leading causes of death.

No country-level study has been conducted among adults on NCDs or their major risk factors, such as tobacco. In 2007, a survey of risk factors for noncommunicable diseases carried out in Thimphu found that, although only 7 percent of the population over 25 years of age smoked tobacco, among those 25–34 years old the rate of use was 10 percent. 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 past 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. Ministry of Health 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 2006–07, 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.

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. Key NCD trends include the following:

- **CVD.** CVD is 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 increasing particularly among the marginalized and the poor.

- **Hypertension.** Hypertension is 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. The reasons for the lack of protective effect found in other populations could include (a) unfavorable enzymatic metabolism of alcohol in Indians that is known to impact CVD, (b) harmful drinking patterns with irregular heavy or binge drinking that is associated with CVD, and (c) consumption mostly among the disadvantaged and poor who carry a higher risk than others of CVD.

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. Non-fatal 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 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, respectively.

Diet. Exact data on consumption of oils and fats at the individual and household level are missing. However, national aggregate statistics show high consumption of unhealthful 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.
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. Key NCDs trends include the following:

- **CVD.** This is the leading cause of mortality and contributed to 45 percent of all deaths in 2003.
- **Diabetes.** Diabetes affects 7.1 percent of men and 6.8 percent of women.
- **Obesity.** Approximately 13 percent are obese (body mass index \( >30 \text{ kg/m}^2 \)) 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 old 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.** Thalassaemia is a 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 (9 percent for boys, 3 percent for girls).
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.

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 the following:

- **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 among males is highest in the 25–34 year age group, while among women the

![Figure 2.6 Age Structure in Nepal](source: US Census Bureau, http://www.census.gov/ipc/www/idb/ (accessed February 20, 2011).)
prevalence of overweight and obesity is highest in the 45–54 year age group.

- **Alcohol.** The prevalence of hazardous and harmful drinking (combined) in the last seven days among current drinkers is more common among males (38.9 percent) than females (30.3 percent).

- **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.

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. Key NCD trends include the following:

- **CVD.** 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 electrocardiogram criteria), with urban

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**Figure 2.7  Age Structure in Pakistan**

![Age Structure in Pakistan](image)

populations having higher rates 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 1990–94, the prevalence was 17.9 percent among those 15 years and 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 ages 40 years and older.

- **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 prior to the 1990s to almost 7,000 in 2008.

- **Obesity.** In the past 10 years, a twofold increase in the 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 (35 percent for males, 7 percent for females) and for youth (12 percent for boys, 8 percent for girls).

**Sri Lanka**

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.

In 2004, NCDs accounted for 87.5 percent of the total burden of forgone DALYs, with the remainder from communicable diseases and MCH issues. 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. Key NCD trends include the following:

- **CVD.** Approximately 82,000 admissions in government hospitals were for IHD, 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 countries (330–1,200).
- **Diabetes.** Among those 18 years and older, 10.3 percent have diabetes, similar to the rate 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.

![Figure 2.8 Age Structure in Sri Lanka](http://www.census.gov/ipc/www/idb/ (accessed February 20, 2011).)

Source: U.S. Census Bureau.
• **Smoking.** Prevalence is lower than in other South Asian countries (32 percent for males, 2 percent for females), while smoking prevalence among youth is similar (12 percent for boys, 6 percent for girls).

**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 at a time when a residual burden for MCH remains. This shift has occurred not only because NCDs are more common with aging, but also because of 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 may 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 although empirical data are scant, productivity declines and reduced economic growth may occur.

South Asian countries all face a double-disease burden. Most people moving from rural to urban areas will experience changes in lifestyle 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.

Notes

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

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

3. 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; harmful drinking is defined as the daily consumption of ≥60 grams of pure alcohol by males and of ≥40 grams of pure alcohol by females.

4. Data for Sri Lanka were drawn from World Bank 2010.

References


PART II

Why the Need to Act Now
Many compelling reasons are pushing countries to tackle noncommunicable diseases (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 six years younger than those in the rest of the world at the time of 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, large, lifelong out-of-pocket expenses can cause impoverishment to recur.

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 through social determinant forces (figure 3.1).

In developed countries, the poor and disadvantaged experience a larger NCD burden of risk factors and disease than do the rich. In South Asia, the disease burden may currently be greater in the rich, but it will shift and be concentrated 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—influences social determinants.

Economic and Development Perspective

Several issues support a strong economic rationale for public policies for NCDs (appendix B 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 and outcomes are unlikely to be attained. Examples of the former include the following:

- 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 harm of certain lifestyles,
environments, and unhealthful foods is required to make informed decisions.

- **Externalities**, that is, when a consumer does not bear all the cost or harm associated with a behavioral choice (such as second-hand tobacco smoke, social problems from harmful alcohol use, and unhealthful 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 consequences of their choices, irrespective of whether they are informed of those consequences (i.e., 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. One example is delaying smoking cessation—their choice conflicts 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, although empirical evidence is scant, projections suggest that over the next 10 years deaths from heart disease, stroke, and diabetes may lower gross domestic product 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 2008).

The World Economic Forum’s *Global Risks Report* for both 2009 and 2010 (WEF 2009 and WEF 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 are rearing the children, NCD-related short- or long-term disability or premature death can change consumption patterns dramatically. Nonmedical-related consumption on food and education may be dramatically reduced, and accumulated wealth and assets may be liquidated to pay for care. As noted in chapter 1, risk behaviors such as tobacco use
may also change household consumption patterns if tobacco purchases 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, maternal and child health, and nutrition issues. In order 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 suitable for many people requiring 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 the social-determinant risk factors noted previously. 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 cardiovascular disease 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 cardiovascular disease deaths. In chapter 4, these opportunities are more carefully examined.

References


Global and National Policy Context for NCDs

In 2000, the World Health Assembly adopted resolution WHA/53.17 endorsing a World Health Organization (WHO) Global Strategy for the prevention and control of noncommunicable diseases (NCD)s. 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—cardiovascular disease (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, unhealthful diet, physical inactivity, and harmful use of
alcohol. Because CVD takes a large toll in South Asia, it is the major focus among the NCDs addressed in 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 the 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 five years of becoming a party to the Convention;
- obligate, within three 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 three 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); and
- increase tobacco taxes (no quantitative or time-bound targets).


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 nonhealth 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 individualized prevention and treatment within the clinical setting
- Implementation of activities such as 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 regulating health financing, which should address allocation of services, equity, risk sharing, and evening out rates of consumption.

Even though most of these functions apply to a range of diseases and health conditions far wider 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, which contain many health challenges, but which, as a set of 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 Millennium Development Goals. 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 nonhealth-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.

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 versus Treatment**

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

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 insights 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.
Opportunities for Prevention and Control

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 or more identified risk factors, which will result in lowering the probability of the initial occurrence of a disease. Smoking cessation in the population as a result of 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 the 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 prevention. Also, depending on the condition or disease, treatment can be considered 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 in the clinic).


During the past few decades, knowledge of pathophysiology, of risk factors and their role in causing disease, and of the impact of reducing risk factors on the development of disease has increased dramatically. In addition, many effective treatments to lower the risks of complications have been developed. Several studies have examined these secular trends to determine the factors accounting for these declines (see the sources at
Capitalizing on the Demographic Transition

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 4.1). 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.

The distribution of risk in the population must also be considered. Currently, most people will be of low or moderate risk for developing

Table 4.1: Reduction in Secular Trend of CVD Mortality Attributed to Population-Level Risk Reduction and to Treatment with Medication and Surgery

<table>
<thead>
<tr>
<th>Country and period</th>
<th>Population-level risk factor</th>
<th>Treatment with medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland 1975–94</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>New Zealand 1982–93</td>
<td>54</td>
<td>46</td>
</tr>
<tr>
<td>Finland 1982–97</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>Ireland 1985–2000</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>United States 1980–2000</td>
<td>47</td>
<td>44</td>
</tr>
</tbody>
</table>

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.

Figure 4.1: Heart Disease Death Rates among Men Ages 30 Years and Older in Australia, Canada, the United Kingdom, and the United States

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 individualized 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, because they are also community members, those at high risk will also benefit from population-based measures.

**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.¹

A systematic review of CEA evidence to address NCDs in low- and middle-income countries found that 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 the 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 through its CHOICE project.² CHOICE reports results for 14 global subregions, including the South-East Asian Region of WHO.³ 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 the 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.)

The majority of studies discussed below looked at one intervention,
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 individualized health service interventions or
combinations of the two, for 14 WHO subregions (South-East Asian
Region-D and South-East Asian Region-B). Population-based interven-
tions 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.
Individualized health-service interventions included detection and treat-
ment of people with high concentrations of cholesterol for two thresh-
olds; treatment of individuals with high systolic blood pressure with two
thresholds; treatment of individuals for both these risk factors; and treat-
ment 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 individualized interventions.
Interestingly, they find that if resources are extremely scarce, the popula-
tion-based 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 3 South Asian ones (Bangladesh, India, and Pakistan),
over a period of 10 years (2006–15). The estimated effects are given in
table 4.2.
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 at encouraging dietary change within households and communities. The effects for the three South Asian countries are given in table 4.3.

If the tobacco and 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 $0.40 per person a year in low-income and lower middle-income countries, and $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 populations, that is, 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 (the Russian Federation and Ukraine). For Bangladesh, India, and Pakistan, the deaths expected to be averted are in a range of about 50–70 deaths per 100,000 members of the population ages 30 or more.

World Bank (2006) identifies a limited set of what it calls “neglected low-cost opportunities” for the South Asian region to address CVD (appendix C, table C.1). At the population level this is again first of all tobacco taxation, leading to an increase in the price of cigarettes by

<table>
<thead>
<tr>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Increase in real price of tobacco products required to reduce smoking prevalence by 10%</td>
<td>24.7</td>
<td>24.7</td>
</tr>
<tr>
<td>Predicted decrease in smoking prevalence as a result of nonprice interventions</td>
<td>12.9</td>
<td>11.7</td>
</tr>
<tr>
<td>Predicted decrease in smoking prevalence as a result of price and nonprice interventions combined</td>
<td>21.6</td>
<td>20.6</td>
</tr>
</tbody>
</table>

Source: Asaria et al. 2007.
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 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 has come from two countries. In the first intervention, a 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, because it could not be explained by increased fruit consumption or decreases in smoking. In light of the “ecological”

---

### Table 4.3 Effects of Interventions to Reduce Salt Intake, 2006–15

<table>
<thead>
<tr>
<th>Reduction in salt intake (g per day)</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 30–44 years</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 30–44 years</td>
<td>1.8</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Male 45–59 years</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 45–59 years</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Male 60–69 years</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 60–69 years</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Male 70–79 years</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 70–79 years</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Male 80–100 years</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 80–100 years</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associated reduction in mean systolic blood pressure by 2015 (mm Hg)</th>
<th>Bangladesh</th>
<th>India</th>
<th>Pakistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 30–44 years</td>
<td>1.3</td>
<td>1.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Female 30–44 years</td>
<td>1.1</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Male 45–59 years</td>
<td>1.7</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Female 45–59 years</td>
<td>1.6</td>
<td>1.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Male 60–69 years</td>
<td>2.3</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Female 60–69 years</td>
<td>2.2</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Male 70–79 years</td>
<td>2.8</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>Female 70–79 years</td>
<td>2.8</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Male 80–100 years</td>
<td>3.5</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Female 80–100 years</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

*Source: Asaria et al. (2007).*
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). 7

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 South Asia.

**Individualized Interventions**

There is fairly strong effectiveness evidence from randomized control trials supporting the use of 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 those studied by Asaria et al. (2007).

In particular, Lim et al. (2007) model the financial costs and the mortality effects of increasing 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 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 person would be $1.08 ($0.75–$1.40), ranging from $0.43 to $0.90 across low-income countries and from $0.54 to $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.

Although the interventions are promising, it is an open question whether and how they can be implemented in an actual developing-country context. Concerns do remain in that health services 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 risks. 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-Based and Individualized Interventions**

The World Bank (2006) recommends a set of combined population-based and individualized interventions to tackle part of the CVD burden in low- and middle-income countries (appendix C, tables C.2 and C.3):

- Management of acute myocardial infarction with aspirin and beta-blockers
- Primary prevention of coronary artery disease with legislation requiring the substitution of 2 percent of trans fat with polyunsaturated fat

**Notes**

1. Cost-benefit analysis is another method of determining cost-effectiveness, widely applied in public policy evaluation in 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 not been applied widely in the health field.

2. See http://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 ability to generalize results across settings. The scarcity of cost-effectiveness studies worldwide means essentially that 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.

3. 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, the 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 versus child mortality strata.

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

5. Similarly, favorable cost-effectiveness ratios are found in Murray et al. (2003) for efforts at salt legislation.

6. 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.

7. 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 and tax also affect 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).

References


PART III

How to Respond
CHAPTER 5

Developing a Policy Options Framework for Prevention and Control of NCDs

Introducing the Policy Options Framework

Although the health sector bears most of the burden in the prevention and treatment of noncommunicable diseases (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 for making broader systemic decisions that balance interventions and provide the optimal strategic mix of population-based interventions in the community and individualized 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, avoid or delay onset of disease, and are delivered in community 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—cardiovascular disease (CVD), diabetes, cancer, and chronic respiratory disease. The dual goals of population-based intervention 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).

Individualized 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 prevent disease onset.

From a policy perspective, this framework is useful because population-based and individualized interventions mobilize different parts of the nonhealth 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 both 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; therefore, it is important to integrate these differences into the framework. Generally, the cycle has the following four program management stages: Assess, Plan, Develop and Implement, and Evaluate (figure 5.1).

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 (such as service delivery and human resources) and across levels of the health sector (such as central and 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 individualized 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 nonhealth and health sectors. Similarly, the individualized 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 in which 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.

The rationale and activities for each program management stage are as follows.
<table>
<thead>
<tr>
<th>Program management stage</th>
<th>Action areas</th>
<th>Nonhealth sector</th>
<th>Health sector</th>
<th>Individualized interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assess</strong></td>
<td>Burden of NCDs and their risk factors</td>
<td>Analysis of NCD risk factor determinants in nonhealth sectors</td>
<td>Assessment of NCD mortality, morbidity, burden of disease, risk factors, and high-risk populations</td>
<td>Assessment of health service delivery capacity (facilities, human resources, drugs, and so on) and current utilization of ambulatory and inpatient care</td>
</tr>
<tr>
<td></td>
<td>System capacity</td>
<td>Assessment of the nonhealth sector capacity in policy development and regulation</td>
<td>Assessment of current and future public health spending and public health system capacity, including institutional and management capacity and system intelligence and information technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evidence base for prevention, control, and treatment</td>
<td>Review of evidence-based public policies in nonhealth sectors (including in other similar countries)</td>
<td>Review of risk reduction studies and population-based interventions (including in other similar countries)</td>
<td>Review of available studies on effectiveness/cost-effectiveness prevention interventions (including those in other similar countries)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review of available studies on effectiveness/cost-effectiveness prevention interventions (including those in other similar countries)</td>
<td></td>
<td>Review of effectiveness/cost-effectiveness of clinical treatments (including those in other similar countries)</td>
</tr>
<tr>
<td>Plan</td>
<td>National plan and strategy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development (by Ministry of Health) of a national policy and multisectoral strategy plan for the prevention and treatment of NCDs in consultation with different stakeholders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop and Implement</td>
<td>Develop policy and regulatory framework</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enforcement mechanisms related to nonhealth sectors</td>
<td>Population and health promotion and risk reduction within the health sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of basic public health programs for reducing risk factors and prevention of NCDs in clinic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthening facility-based curative care protocols for control and treatment of NCDs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service delivery capacity (infrastructure, drugs, human resources)</td>
<td>Development and implementation of the institutional and human capacity for nonhealth sector to address NCD risk factor determinants and to manage population-based health promotion and risk reduction within health sector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthening of institutional and human resources capacity to provide facility-based health promotion, behavior change, and risk-reduction services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthening of health service delivery to provide high-quality and effective treatment services in both public and private sectors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financing framework</td>
<td>Mobilizing additional resources, finance, and other sectors in support of NCD prevention and control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobilizing additional financial resources for the health sector; expanding risk pooling arrangements; and budget reallocation within the health sector in support of NCD prevention and treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of strategic purchasing mechanisms to motivate public and private service providers to provide preventive services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of strategic purchasing mechanisms to motivate public and private service providers to provide quality treatment services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(continued next page)*
### Table 5.1 (continued)

<table>
<thead>
<tr>
<th>Program management stage</th>
<th>Action areas</th>
<th>Nonhealth sector</th>
<th>Health sector</th>
<th>Prevention (clinical)</th>
<th>Treatment (primary and secondary care and financial risk for tertiary care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate</td>
<td>Monitoring and system intelligence</td>
<td>Development of effective system intelligence and information technology systems for monitoring NCD risk factor determinants</td>
<td>Development of effective system intelligence and information technology systems for NCDs, including monitoring of trends in risk factors and analyses of epidemiologic data from nonhealth sector</td>
<td>Development and monitoring of indicators related to prevention of NCDs in health facilities</td>
<td>Development and monitoring of indicators related to the treatment of NCDs in health facilities</td>
</tr>
<tr>
<td></td>
<td>Impact evaluation</td>
<td>Development and implementation of impact evaluation studies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Authors.

**Note:** The table above is a guide for focusing policy discussions and actions in key areas. The context of the setting will dictate final options and decisions.
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 and engaging key stakeholders from inside and outside the health sector (such as transportation, agriculture, commerce, urban planners, and business leaders) for their roles in prevention in both the public and private sectors. NCD stakeholders extend from government and ministries of health to private sector providers, from individuals to communities, nongovernmental organizations, health care providers, academia, and donor partners. Consensus and ownership are all needed for plans to be widely advocated, adopted, financed, and eventually institutionalized.

In the Develop and Implement stage, broad implementation of prevention policies and increased clinical interventions strain all health sectors and, potentially, nonhealth sectors. Developed-country experiences provide some grounding. However, significant revamping and, in many cases, innovation will be needed to develop effective policies for both individualized and population-based health promotion in developing countries. Currently, there are only a few models for delivery of clinical services, 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 of both population-based policies and 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 individualized treatment. As capacity rises, programs are launched, and investments grow, evaluating progress at all levels is essential to assure that goals are reached. For NCDs, the track record is short and 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 to generate 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 the following:

- Prevention policies are implemented by both the health sector and key nonhealth 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 highlight the subset of options for population-based and individualized interventions that are strategic (appendix D). 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 challenge are as follows.

Political

- There are low levels of awareness and lack of urgency. Many governments seem, until recently, to have poorly understood the overall disease
burden, and even today they can often access only cursory information. Burden assessments are both challenging and resource-intensive.

- Challenges remain with achieving buy-in and commitment from multisectoral stakeholders—especially those that 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 NCDs are insidious 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 maternal and child health, infectious disease, and nutrition issues.
- Few new resources are available, and issues such as climate change, which is an emerging issue for the entire region, are competing for limited funds.
- Although some health policies may be justified in discouraging behaviors such as smoking where inadequate or inaccurate information is prevalent, for other behaviors a government role in “dictating” a lifestyle to constituents needs to be carefully considered for its ramifications surrounding personal informed choice.

**Economic**

- The costs of NCDs strain 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 (for areas such as nutrition or environmental health) is a limited solution, but may reveal weaknesses as the unit’s 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 and 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.

**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 $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 $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 $5 for each $1 spent.

PacifiCare recently offered $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.
• 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, must put forth substantial funds to finance their care—usually out-of-pocket. Second, common risk factors involve personal choices about behavior, 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 in increasing 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).

Reference

This chapter presents, for each country, key policy options and strategic actions for noncommunicable diseases (NCDs) (table 6.1 and appendix A; more detailed information of key accomplishments and a situational analysis for each country are included in appendix E.)¹ 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 effort, 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 factors, 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.
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Source: Authors.

Note: 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. Antitobacco activity is evident in all countries but the amount of effort and number of policies in place are highly variable. For individualized interventions, less progress is evident. A few countries have developed care guidelines. However, clinical quality, regulatory issues, human resources for health planning, and financing have received little attention. Finally, *Evaluate* has had little activity targeted at system intelligence and impact-evaluation efforts.

In the focus on common gaps, efforts could be enhanced by coordinating key strategic areas for international collaboration 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**

- *Develop a surveillance strategy.* Move toward integrated surveillance that includes communicable diseases and then phase in behavioral NCD surveillance that includes tobacco and mental health. Implementing broader surveillance will require evaluating public and private institutions that may play key roles, including nongovernmental organizations that are service 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 as high as that found among youth. Mental health is a major issue also as 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.* Stocktaking among major stakeholders is needed. Although 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. The Ministry of Public Health 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. Some people are likely forgoing simple, inexpensive, and highly effective treatments.

**Bangladesh**

**Key Policy Options and Strategic Actions**

**Assess**

- **Develop a national NCD surveillance system.** Much has been done toward developing 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 those provided by Matlab District Survey and Bangladesh Network for Non-Communicable Disease Surveillance and Prevention are critical.

**Develop and Implement**

- **Strengthen tobacco control policies.** Much progress has been made in developing a national tobacco policy. However, tobacco use is still high among both adults and youth. Expanding on the core activities of the Framework Convention on Tobacco Control is needed.

- **Strengthen injury control policies.** Road traffic and childhood injuries have preventable components, yet little policy attention has been directed toward their prevention.

- **Retool health services delivery for NCDs.** The physician and nonphysician workforces need the treatment guidelines, knowledge, and skills to
diagnose and treat NCDs within the primary care system. Pilot programs to determine 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 evaluation capacity.* Policies now in place, pilot studies, and interventions tested will all need solid evaluation. This will be the case especially for tobacco and injury policies.

**Bhutan**

**Key Policy Options and Strategic Actions**

**Assess**
- *Develop a national NCD surveillance system.* Although some initial efforts are evident, little has been done toward developing a national system. Vital registration for mortality needs to be expanded beyond hospitals, 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**
- *Provide adequate resources for the recently adopted national NCD policy.* Resources, both financial and trained human resources, will be needed.

**Develop and Implement**
- *Strengthen tobacco control efforts.* The very strong policy in place needs more effective enforcement.
- *Enforce the numerous existing alcohol use and sale regulations.*
- *Retool health services delivery.* Both the number of workers and the types of skills 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 pilot programs need evaluation to develop an evidence base. Likewise, the new NCD policy needs to be monitored and evaluated.

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 Integrated Disease Surveillance Project is a good effort to develop a national ongoing risk factor surveillance system, but it 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 an evidence base not only for the disease burden but also for population-based and individualized interventions. Expanding surveillance outside the health sector for exposure to harmful products and foods (tobacco, processed foods, edible oils, and so on) 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 National Rural Health Mission and the National Program on Diabetes, Cardiovascular Diseases and Stroke. 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.** 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 curricula.** With the National Rural Health Mission and the National Program on Diabetes, Cardiovascular Diseases and Stroke both coming on line, this will be critically important.
- **Develop financing strategies for NCD prevention and control efforts.** Most clinical prevention and treatment services are paid from private out-of-pocket sources and impose a large burden on the poor, which leads to both impoverishment and catastrophic spending. Financing schemes to protect the poor should be a priority. However, a substantial proportion of the total population will also be susceptible to financial stress from health care costs from NCDs. Thus, schemes that pool risk and smooth expenditures will be of great benefit to those with some means. 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, the National Rural Health Mission, and the National Program on Diabetes, Cardiovascular Diseases and Stroke.

**Maldives**

**Key Policy Options and Strategic Actions**

**Assess**

- **Create a national NCD surveillance system.** A national system is needed for 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 the World Health Organization).

Develop and Implement

- **Coordinate national efforts.** NCD units have been created for comprehensive prevention and control. It is now necessary to build the units’ capacity and provide sufficient resources and authority to meet their objectives. It is also important to address the social, economic, and environmental determinants that underlie NCDs. Cross-sectoral 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 will then 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 resources for key areas such as mental health urgently need to be addressed.

- **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 taxes from tobacco and other unhealthful goods for preventive health should be explored.

Evaluate

- **Create capacity to evaluate programs and policy.** As policies are developed and more resources are 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 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 use (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 the national NCD policy.* The policy is drafted, but it needs to engage stakeholders and 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 Framework Convention on Tobacco Control (which has been adopted), is needed, with a specific focus on taxes to reduce consumption.
- *Retool the health workforce for NCD prevention and control.* The health workforce is in short supply and is likely not skilled in management of NCDs. Both the size of the workforce and its skills must be increased. Concomitantly, the health infrastructure, with primary care, will need to be equipped with basic diagnostic and management capacities. Financing strategies should also be developed, which will ensure access to services and medications, especially among the poor.

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

**Pakistan**

**Key Policy Options and Strategic Actions**

**Assess**
- *Create a national NCD surveillance system.* A national system is needed for strategic planning and policy development and will enable the national NCD policy to have a more immediate impact. Initial efforts can be built on. In 2003, a pilot program designed to develop a model
for population-based surveillance of NCDs was implemented in one district with a population of one million (Nishtar et al. 2005). Results of the initial round of surveillance have been published (Nishtar 2007). A joint study in 2004 by the World Bank, Centres for Disease Control, and World Health Organization recommended that the pilot program be replicated and taken on nationwide scale (World Bank 2005). The system should include mortality, morbidity, utilization of services, and risk behaviors. In addition, there should be an early focus on tobacco, road traffic injuries, mental health, youth, and high-risk ethnic groups. Special studies in representative subsamples will also enable a greater understanding of the disease burden. The core public and private institutions with experience and capacity should be tapped for capacity development and technical assistance.

**Plan**

- *Develop and adopt a national NCD policy.* The National Action Plan for the Prevention and Control of Noncommunicable Diseases and Health Promotion has been in existence for the past seven years (Ministry of Health et al. 2004). The results of the recent rounds of planning that were conducted in anticipation of the creation of an NCD commission can be used to update its recommendations. The recommendations must be implemented by a unit with adequate capacity and resources.

**Develop and Implement**

- *Strengthen tobacco control policies.* Although 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, such as seat belt and helmet use.

- *Retool the health workforce for NCD prevention and control.* Neither physicians nor nonphysicians receive institutionalized training in NCD management. For the current workforce, in-service and skills training is needed. A primary care NCD training track implementing evidence-based interventions is a priority. In addition, assuring financing to achieve availability and access to NCD services and drugs for the poor with NCDs is key.

**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. The indicators and monitoring mechanisms of the Integrated Framework for Action of the National Action Plan can guide this process.

Sri Lanka

**Key Policy Options and Strategic Actions**

**Assess**

- *Develop an 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 national NCD policies.* Sri Lanka has made good progress in developing key NCD policies, which have been adopted by government. A push to fund these policies, 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-level 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 and upgrading of facilities will be needed to meet this challenge.

- *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 ensure 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 currently may be forgoing basic treatment they cannot pay for.

- **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 enable better coordination and efficiencies.

**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 service use increases. 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 where they will have the largest impact. Although some of the surveillance effort will assist with this task (see Assess), more detailed evaluation will be required for some aspects of policy evaluation.

**Notes**

1. These reports were compiled between March and September 2009 by a team of South Asia region–based consultants. See acknowledgments for details.

2. See World Bank (2010).

**References**


The noncommunicable disease (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 centerpieces of tobacco control efforts include policies that restrict advertising to adults and marketing to children and that increase tax rates on 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 penetrate into countries with more restrictive policies. Also, low cigarette prices increase the risk of smuggling 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
Framework Convention on Tobacco Control (FCTC) (chapter 4, box 4.1), 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 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 country-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 those products 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 2008; Godinho et al. 2005). 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, 2).

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 nonpublic goods.

Guiding principles developed by the World Bank (World Bank 2007) established the following criteria for consideration of global collaboration: (a) there should be an emergent consensus in the international community that global action is required; (b) there should be an institutional gap that international agencies could help fill to encourage global action; (c) international agencies should have the requisite capabilities and resources to be effective; and (d) global action by international agencies could catalyze other resources. Governments in South Asia could use these principles to decide which 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 issue. Assuming that there are consensus, capacity, resources, and feasibility (see Common Challenges for Tackling NCDs in chapter 5), three situations can justify a regional approach. The first occurs when there may be positive or negative externalities. An example of the former is knowledge management for addressing NCDs that leads to better prevention and control policies and lower NCD burdens; the latter might include smuggling and inconsistent tobacco taxation among countries with common borders such that exposure to tobacco increases despite the tax policy.

The second occurs 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 situation is one in which the production (or prevention of production or use) of a good is more effective if all countries participate, such as collective bargaining for group purchase of drugs, food labeling, tobacco labeling, comparative effectiveness studies, and research. In the case of food labeling and regulated contents of processed foods, 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).

Strategies for NCD Risk Factors

Using the above guiding principles, potential areas for collaboration within the region are outlined below. 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.

Expand and Harmonize Tobacco Advertising Bans to Reduce Demand

Tobacco is a major NCD risk factor common to the region. Most countries’ tobacco policies include 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 requiring warning labels on tobacco packaging. These inconsistent policies take away from their potential impact, and synergies among them may be lost. Furthermore, big countries such as India can dominate regional culture and politics, resulting in significant influences, good or bad, on smaller countries that share common borders. Thus, harmonizing and expanding tobacco policies would fill country-level gaps in policy 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 exposure to second-hand smoke in public spaces.

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 the prevalence of smoking in both developed and developing countries (World Bank
<table>
<thead>
<tr>
<th>Category</th>
<th>Indicator</th>
<th>Afghanistan</th>
<th>Bangladesh</th>
<th>Bhutan</th>
<th>India</th>
<th>Maldives</th>
<th>Nepal</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising bans</td>
<td>National TV and radio</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>International TV and radio</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Local magazines and newspapers</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>International magazines and</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>newspapers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package labeling</td>
<td>Warning on package</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Source: WHO 2008b.*
2006), and FCTC signatories are committed to levying 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 2008). Although raising tobacco taxes may increase government revenues and 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 to under 10 percent in Afghanistan for a 20-piece pack of the most sold brand of cigarettes (figure 7.1a). In addition, the tax on bidis is only a fraction of that on cigarettes (figure 7.1b).

Figure 7.1  Share of Total and Excise Taxes in the Prices of 20-Piece Packs, 2008

<table>
<thead>
<tr>
<th>Country</th>
<th>Most sold brand of cigarettes</th>
<th>Most sold brand of bidis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Lanka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afghanistan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO 2008b.
To reduce consumption, the tax should increase the actual retail price; otherwise the tobacco industry can maintain consumption rates by keeping prices low and reducing profit margins. For the most sold brand, an almost 10-fold variation in price is found between countries (figure 7.2a).

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 Antismuggling 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). The protocol covers its relationship to other international agreements, such as the United Nations Convention against Transnational and Organized Crime, the development

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**Figure 7.2  Range of Prices of Tobacco Products, 2008**

*a. Most sold and cheapest brands of cigarettes*

<table>
<thead>
<tr>
<th>Country</th>
<th>Cheapest Brand</th>
<th>Most Sold Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sri Lanka</td>
<td>2.83</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>1.65</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td>1.56</td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Afghanistan</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.23</td>
<td></td>
</tr>
</tbody>
</table>

*b. Most sold 20-pack of bidis*

<table>
<thead>
<tr>
<th>Country</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>0.10</td>
</tr>
<tr>
<td>Nepal</td>
<td>0.10</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*Source: WHO 2008b.*
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.

Although 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 the resources dedicated to tracking cigarette smuggling from €4 million to €44 million. Through systematic detection of traffic routes and seizure of containers, fines and penalties on smugglers, and 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 filed a suit against tobacco companies in a U.S. court based on the U.S. Racketeer Influenced and Corrupt Organizations Act after European courts had found the tobacco industry liable for indirectly participating in smuggling across Europe. The tobacco companies immediately attempted to settle out of court. They had been negotiating, country by country, a memorandum of understanding that was unenforceable and nonbinding, 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 European Commission, 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 the 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 Policies 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 adverse consequences as a result. Food labeling is becoming more common, and accurate information is a first step toward increasing awareness of the nutritional components and calorie 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.

In the case of trans fats, 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 that are harmful to the population. Although 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 the nutritional content of foods and the importance of increasing the level of exercise. In addition, food labeling will complement awareness campaigns for healthful foods.

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

Strategies to Improve Health Systems

So far we have focused on strategies specific to NCDs. Here, we move to broader health system strategies, whose implementation would greatly benefit efforts toward prevention and control of NCDs.

Collaborate on Group Purchasing of Essential Medications to Increase their Accessibility 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 the cost is paid by patients themselves, including the poor. The level of expenditure is high because of the unavailability of essential drugs in the public sector, which results from inadequate public purchasing practices, large mark-ups in the private sector (Cameron et al. 2009), and public policies that do 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. Both quality control and good manufacturing practices for medications challenge these two markets.

Although 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 of drugs for NCDs) is likely to help provide real gains against 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, under which 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. Although 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 for the evaluation of options according to the needs of each country could make it possible to establish common systems that include quality control, purchasing support, and monitoring of drug availability. The World Health Organization has already developed a methodology for putting in place regulations and for 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 to and affordability of essential medications is that, as a result of the increased negotiating power of procurement units (especially in smaller countries), bulk purchasing would reduce costs and help ensure 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 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, ensuring 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 that can help countries channel resources where they will have the largest impact, but it is not currently used much by countries. However, there are major challenges in tapping this base.

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 independent not-for-profit organizations, such as the Cochrane Collaboration, probably the best known of these.

Second, research studies use different approaches and methods, leaving the advantages of one treatment relative to another unclear. In an attempt to tackle this challenge, comparative effectiveness assessments of interventions and treatments examine efficiency (the outcome yielded from the inputs) by examining two or more treatment options and deciding which has (a) the greatest efficacy (the outcome in a carefully controlled study setting), (b) the greatest effectiveness (the outcome in a typical clinic or community setting), and (c) the greatest cost-effectiveness (the cost per outcome achieved). Countries may use different assessment methods and acceptability thresholds that are not necessarily standard and might not 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 costs, especially the fixed costs, of establishing an institution to rate comparative effectiveness can be high. The number of drugs, devices, and procedures that need evaluation is huge. All this suggests that there is an advantage to 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, a not-for-profit nongovernmental entity, collates and presents a structured assessment of comparative clinical effectiveness of different medical interventions for use in 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 reviews the guidelines and proposes adaptations suited to the Brazilian context; Brazilian economists conduct cost analyses based on the costs in Brazil; and the final presentation is then made to the decision maker, the Ministry of Health. 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 a regional collaboration to establish a comparative effectiveness institution is that such a body is unsustainable by means of the resources or expertise of a single country, yet its output will provide critical guidance on policy development for prevention and treatment at the country level.

**Use Regional Education and Training Capacity to Complement 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 of health
professionals across regional countries 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 human resources for health within and outside the region would provide insight into where efforts might be strategically directed to address shortages and needed skills.

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

The initial years of training could be carried out in one country followed by formal clinical rotations in other countries. In the United States, for example, a human resources for health training program conducts all the initial training for physicians and nurses from rural western states in Washington State, which has a large urban center; the clinical rotations take place in 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 and nursing schools in Washington State and, in return, are allowed to enroll their students there for basic training.

This is a model that could benefit the smaller countries in the region and that has multiple advantages. It enables more training of health professionals from smaller countries; it does not require larger countries to fill gaps in smaller countries’ needs for health professionals; and it would result in more people in smaller countries being treated by people from their own country.

The rationale for adopting a regional approach for the human resources for health 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 the World Health Organization (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 (WHO 2008a) 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 of allowing 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 that provide a strong justification for a regional strategy and build on what has been done.

A critical element in getting a regional policy or activity off the ground, as noted in *Guiding Principles for Regional Collaboration* above, 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.
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 build on the existing base of advertising bans and tax policy. In other areas, less progress has been made, and leadership, commitment, and resources from countries and development partners will be needed.

Table 7.2  **Regional Institutions Important for Policy Development, Implementation, and Technical Assistance**

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

*Source: Authors.*
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 human resources for health 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 the public and private sectors and health professionals from many disciplines.

Notes


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

References


A focus of this book was assessing country capacity and accomplishments for noncommunicable diseases (NCDs). Capacity assessments (box A.1) can be more challenging in some cases than disease burden assessments and may be conducted less frequently. However, they can be very useful for predicting which strategies can be accomplished and for highlighting ongoing efforts that can be scaled up and built on. Because policy options are the output of this book, understanding country capacity is critical.

In 2000 and in 2005, World Health Organization (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 evaluation 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 time frames. They tracked progress in several areas including infrastructure (for example, whether a country had an NCD unit), financial allocations to NCD, policies and programs, target setting, legislation and
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 a human resources for health 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 accomplishments 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 from 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 the global surveys in 2000 and 2005 and a new surveillance assessment tool under development and 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**
- Adopt an overarching national NCD policy
- Dedicated unit with staff and resources to develop and implement policy and to lead and coordinate efforts and convene stakeholders
- Review 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

**Reference**

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 and outcomes are unlikely to be attained. This view hinges, however, on three critical assumptions: (a) that decision making is based on accurate—or “perfect”—information about the consequences of the decision; (b) all the costs and benefits associated with the decision are borne by the person making the choice; and (c) people act “rationally”—that is, they will always (consciously or unconsciously) weigh the costs and benefits of each decision they make 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 do not hold; the result may be market failure. If markets have failed, people could in principle be made better off if government takes suitable measures. Government might either step in and produce or deliver the relevant good or service, or—in a less interventionist manner—it might give other actors an incentive to do so. Which of the measures governments should choose within that range depends on the market failure as well as the institutional capacity of the government (Jack 1999).
Standard Efficiency-Based Rationales

There are at least three potential sources of market failure, related to the three critical assumptions, 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. Nonstandard economic rationales are also discussed below in more detail.

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 unhealthful goods. The former potentially applies to all unhealthful 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. 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 expect that in South Asia (as in comparable low- and middle-income countries) 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.

On the whole, government intervention in the form of the provision (and production) of NCD-related health information (for example, 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. Government can take the role of engaging in research about the health consequences of unhealthful behavior. The provision of information in itself, however, is unlikely to be a very effective driver of behavior change.

**Externalities**

The total or “social” costs associated with a disease or risk factor are made up of combined internal and external costs. By far most of the costs associated with behavior choices that lead to ill health are paid by the consumer—internal costs. Situations arise, however, when a consumer does not bear all these costs. Some of the costs may be 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 because they tend to be larger than the external costs borne by society.

In brief, there are obvious and substantial external costs resulting from second-hand smoke and from alcohol-induced traffic fatalities, but these costs are less clear in the case of obesity. External costs are likely to be even higher (at least in the case of smoking) when intrahousehold effects are also considered 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 (that is, 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 and, hence, nonrationally. 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. These privately borne costs 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.

**Nonstandard Economic Rationales: Behavioral Economics**

A new paradigm of behavioral economics is slowly emerging, with the 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.⁴

One important feature of behavioral economics is the time-inconsistent preference, which result in individuals choosing 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 (for example, a tax) to induce people to do what they may want to do but are unable to do alone. The size of the internal cost 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 $0.40 per pack of cigarettes or less—much less than the $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. 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.

Taxes can serve as a commitment device. They increase the immediate cost of unhealthful 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 characterizing some of the substantial internal costs incurred through poor health habits as relevant to public policy, significantly reinforcing the case for government intervention.

Conclusion

In summary, the presence of market failure is in fact only one part of the full economic rationale for public policy intervention. If market failure exists, an effective intervention is needed to remedy the failure, and this situation justifies government-led interventions.

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.

Notes

1. Viscusi (1993, 1998) found that smokers in the United States overestimated 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 is taken into account.

2. See, for example, Burton et al. (2006) for evidence from the United States.

3. 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).

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

5. 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 $1.31 between 1997 and 2002, while the tax rose only $0.21 (Gruber 2002).

References


APPENDIX C

Disease Control Priorities in Developing Countries: Population-Based and Individualized Interventions for NCD Prevention and Control

The following tables summarize low-cost interventions for consideration in South Asia.
### Table C.1 Neglected Low-Cost Opportunities

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


*Note:* DALY = disability-adjusted life year; ACE = angiotensin-converting enzyme.

^a Range of cost effectiveness depends on the context.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Intervention</th>
<th>Intervention description</th>
<th>Target population</th>
<th>Cost-effectiveness ($)/DALY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol abuse</td>
<td>Excise tax</td>
<td>25%–50% increase in the current excise tax rate on alcoholic beverages</td>
<td>Adolescents and adults</td>
<td>1,377</td>
</tr>
<tr>
<td></td>
<td>Advertising ban and reduced access to beverages, retail</td>
<td>Reduced access to alcoholic beverages at retail outlets by reducing the hours of sale or advertising bans on television, radio, and billboards</td>
<td>Adolescents and adults</td>
<td>404</td>
</tr>
<tr>
<td></td>
<td>Excise tax, advertising ban, with brief advice</td>
<td>50% increase in the current excise tax rate on alcoholic beverages, combined with advice, education sessions, and psychosocial counseling; possible inclusion of random driver breath testing and advertising bans</td>
<td>Adolescents and adults</td>
<td>631</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>Legislation substituting 2% of trans fat with polyunsaturated fat at $0.50 per adult</td>
<td>Legislation replacing 2% of dietary trans fat from partial hydrogenation in manufactured foods with polyunsaturated fat, at a cost of $0.50 per adult, and assuming a 7% reduction in coronary artery disease</td>
<td>Adults</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Legislation substituting 2% of trans fat with polyunsaturated fat at $6 per adult</td>
<td>Legislation replacing 2% of dietary trans fat from partial hydrogenation in manufactured foods with polyunsaturated fat, at a cost of $6 per adult, and assuming a 7%–40% reduction in coronary artery disease</td>
<td>Adults</td>
<td>838</td>
</tr>
</tbody>
</table>

(continued next page)
<table>
<thead>
<tr>
<th>Condition</th>
<th>Intervention</th>
<th>Intervention description</th>
<th>Target population</th>
<th>Cost-effectiveness ($/DALY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes, ischemic heart disease, and stroke</td>
<td>Legislation with public education to reduce salt content</td>
<td>Legislated reduction in salt content of manufactured foods and an accompanying public education campaign</td>
<td>All ages</td>
<td>1,937</td>
</tr>
<tr>
<td></td>
<td>Media campaign to reduce saturated fat</td>
<td>Media campaign to reduce saturated fat content in manufactured foods and replace part of the saturated fat with polyunsaturated fat</td>
<td>All ages</td>
<td>2,617</td>
</tr>
<tr>
<td>Tobacco addiction</td>
<td>Taxation causing 33% price increase</td>
<td>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</td>
<td>Adolescents and adults</td>
<td>22</td>
</tr>
<tr>
<td>Nonprice interventions</td>
<td>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</td>
<td>Adolescents and adults</td>
<td>353</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>----------------------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td>Traffic accidents</td>
<td>Increased speeding penalties, law enforcement, media campaigns, and speed bumps</td>
<td>Adults</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimize exposure to high-risk scenarios by installation of speed bumps at hazardous junctions, increase penalties for speeding and other effective road-safety regulations combined with media coverage and better law enforcement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enforcement of seat belt laws, promotion of child restraints, and random driver breath testing</td>
<td>Mandatory seat belt and child-restraint laws, enforcement of drunk-driving laws, and random breath testing of drivers</td>
<td>Adults</td>
<td>2,449</td>
<td></td>
</tr>
</tbody>
</table>

Source: Laxminarayan et al. 2006; Jamison et al. 2006.

Note: DALY = disability-adjusted life year.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Interventions</th>
<th>Intervention description</th>
<th>Setting</th>
<th>Objective</th>
<th>Target population</th>
<th>Cost-effectiveness ($) (DALY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol abuse</td>
<td>Brief advice to heavy drinkers by primary health care providers</td>
<td>During primary health care visits, provision of advice by physicians through education sessions and psychosocial counseling</td>
<td>Clinic</td>
<td>Primary prevention</td>
<td>Adolescents and adults</td>
<td>642</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>ACE inhibitor and beta-blocker, with diuretics</td>
<td>Use of ACE inhibitor and an optional beta-blocker (metoprolol), incremental to diuretics</td>
<td>District hospital</td>
<td>Secondary prevention</td>
<td>Adults</td>
<td>150</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>Aspirin, beta-blocker, and optional ACE inhibitor</td>
<td>Aspirin plus beta-blocker (ateno(lo)l) with optional ACE inhibitor (enalapril), with or without hospital availability</td>
<td>District or referral hospital</td>
<td>Secondary prevention</td>
<td>Adults</td>
<td>688</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>Aspirin and beta-blocker</td>
<td>Aspirin with or without beta-blocker (ateno(lo)l) Incremental use of streptokinase in addition to aspirin and beta-blocker (ateno(lo)l)</td>
<td>District or referral hospital</td>
<td>Acute management</td>
<td>Adults</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Streptokinase with aspirin and beta-blocker</td>
<td>Incremental use of tissue plasminogen activator in addition to aspirin and beta-blocker (ateno(lo)l)</td>
<td>District hospital</td>
<td>Acute management</td>
<td>Adults</td>
<td>671</td>
</tr>
<tr>
<td></td>
<td>Tissue plasminogen activator with aspirin and beta-blocker</td>
<td>Incremental use of tissue plasminogen activator in addition to aspirin and beta-blocker (ateno(lo)l)</td>
<td>District hospital</td>
<td>Acute management</td>
<td>Adults</td>
<td>15,869</td>
</tr>
<tr>
<td>Category</td>
<td>Treatment</td>
<td>Setting</td>
<td>Prevention Type</td>
<td>Age Group</td>
<td>Quantity</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>-----------------------</td>
<td>--------------------</td>
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<td></td>
</tr>
<tr>
<td>Myocardial infarction and stroke</td>
<td>Polypill Combination treatment with aspirin, beta-blocker, thiazide diuretic, ACE inhibitor and statin, based on 10-year risk of CVD</td>
<td>District hospital</td>
<td>Secondary prevention</td>
<td>Adults</td>
<td>409</td>
<td></td>
</tr>
<tr>
<td>Stroke (ischemic)</td>
<td>Aspirin</td>
<td>Clinic or district hospital</td>
<td>Acute management</td>
<td>Adults over 15</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>Stroke (recurrent)</td>
<td>Aspirin and dipyridamole</td>
<td>Clinic or district hospital</td>
<td>Secondary prevention</td>
<td>Adults over 15</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Stroke and ischemic and hypertensive heart disease</td>
<td>Polypill by absolute risk approach Combination treatment with aspirin, beta-blocker, thiazide diuretic, ACE inhibitor, and statin based on 10-year risk of CVD</td>
<td>District or referral hospital</td>
<td>Primary prevention</td>
<td>Adults</td>
<td>2,128</td>
<td></td>
</tr>
<tr>
<td>Tobacco addiction</td>
<td>Nicotine replacement therapy Smoking cessation treatment in the form of nicotine replacement therapy</td>
<td>Clinic</td>
<td>Primary prevention</td>
<td>Adults</td>
<td>396</td>
<td></td>
</tr>
</tbody>
</table>

Source: Laxminarayan et al. 2006; Jamison et al. 2006.

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


Policy options in some key areas will vary among countries depending on country capacity and burden. 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 were developed (box D.1). Using this capacity index score and mapping it with the percentage of the total country burden caused by 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 and capacity to higher burden and capacity.

To support these findings, several other standard indicators were used: (a) health system infrastructure (physicians per 10,000 population, hospital beds per 10,000 population, out-of-pocket expenditures for health as a proportion of total health expenditures; (b) service delivery (prenatal care and vaccine coverage); and (c) outcome indicators (such as life expectancy). Using various combinations of these indicators to create a capacity index revealed trends (data not shown) similar to those found with established financing and governance indicators.
Box D.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 text. Generating a simple, comparable, and internally consistent index of capacity is more difficult than generating 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 et al. 1999; Kaufmann et al. 2008). For South Asian countries, between 5 and 13 sources from four types of respondents (businesses, 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 the policies, strategies, and actions can be carried out by the government will be commensurate with the level of public resources available or potentially available for the health sector (that is, its “fiscal space”).

Thus, in principle, within South Asia the more a country spends on health the better equipped it is to take additional action related to NCD prevention and control. However, governments may have a high share of total health spending that is poorly spent because of factors such as weak institutional capacity and corruption. Because we could not find an internationally recognized measure that reflects these weaknesses 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 D.1).

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 means of adapting a range of strategies to the needs and capacity levels of countries at different levels of development. Exceptions may occur. Afghanistan (lower burden and lower capacity),
<table>
<thead>
<tr>
<th>Capacity indicator</th>
<th>Afghanistan</th>
<th>Bangladesh</th>
<th>Bhutan</th>
<th>India</th>
<th>Maldives</th>
<th>Nepal</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Rationale</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government public sector effectiveness (percentile)</td>
<td>8.5</td>
<td>22.7</td>
<td>59.2</td>
<td>53.6</td>
<td>44.1</td>
<td>24.2</td>
<td>25.6</td>
<td>46.9</td>
<td>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</td>
<td>Country global percentile rank (0=worst, 100=best)</td>
</tr>
<tr>
<td>Regulatory quality (percentile)</td>
<td>3.9</td>
<td>20.8</td>
<td>19.3</td>
<td>46.9</td>
<td>37.2</td>
<td>26.6</td>
<td>34.8</td>
<td>44.4</td>
<td>Many critical NCD functions will involve regulation of policy implementation</td>
<td>(continued next page)</td>
</tr>
</tbody>
</table>
Table D.1  
(continued)

<table>
<thead>
<tr>
<th>Capacity indicator</th>
<th>Afghanistan</th>
<th>Bangladesh</th>
<th>Bhutan</th>
<th>India</th>
<th>Maldives</th>
<th>Nepal</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Rationale</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public expenditures for health as percentage of THE</td>
<td>21.2</td>
<td>35.7</td>
<td>80.3</td>
<td>28.0</td>
<td>69.6</td>
<td>39.0</td>
<td>29.7</td>
<td>42.9</td>
<td>Higher public expenditures for health reflect the level of resources available to the public sector, which may enable it to provide a range of services, both population-based and individualized</td>
<td>Country-specific rating with share of public funding of THE (public and private)</td>
</tr>
<tr>
<td>DALYs forgone to NCDs (% of total)</td>
<td>46</td>
<td>61</td>
<td>62</td>
<td>62</td>
<td>77</td>
<td>60</td>
<td>60</td>
<td>87</td>
<td>Captures morbidity, disability, and premature mortality. It is a standardized measure used globally. Because NCDs can lead to many years of disability and premature mortality, DALYs reflect the burden better than mortality</td>
<td>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)</td>
</tr>
</tbody>
</table>


Note: Capacity is the sum of government effectiveness and regulatory quality percentiles and public expenditures as a percentage of total expenditures on health (100 maximum) and of the government effectiveness and regulatory quality (global) percentiles rating (100 maximum for each; the maximum index score is 300). THE = total health expenditures.
<table>
<thead>
<tr>
<th>Program management stage</th>
<th>Action areas</th>
<th>NCD/capacity index</th>
<th>Population-based interventions</th>
<th>Individualized interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess</td>
<td>Burden of NCDs and their risk factors</td>
<td>Lower – Middle – Higher</td>
<td>Identify risk factors in non-health sectors – Economic burden</td>
<td>Identify risk factors of NCDs – Assess mortality from NCDs – Assess morbidity from NCDs – Assess burden of disease of NCDs – Identify high-risk population</td>
</tr>
<tr>
<td></td>
<td>System capacity</td>
<td>Lower – Middle – Higher</td>
<td>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)</td>
<td>Assess health service delivery capacity (facilities, human resources, drugs, and so on) – Assess health service delivery utilization for ambulatory and inpatient care</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Program management stage</th>
<th>Action areas</th>
<th>NCD/capacity index</th>
<th>Population-based interventions</th>
<th>Individualized interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>National plan and strategy</td>
<td>Lower</td>
<td>Develop a national policy and multisectoral strategy plan for the prevention and treatment of NCDs</td>
<td>- Develop and implement basic primary care programs for control and treatment of NCDs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle</td>
<td>- Convene stakeholders for consultation</td>
<td>- Develop and implement clinical protocols for reducing complications from NCDs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher</td>
<td>- Develop the financing strategy</td>
<td>- Develop and monitor a set of clinical indicators to assure quality care services are delivered in public and private sectors</td>
</tr>
<tr>
<td>Develop/Implement</td>
<td>Policy and regulatory framework</td>
<td>Lower</td>
<td>- Develop policies related to nonhealth sectors (tobacco taxes, smoking ban in public areas, food processing [fat, salt], agriculture policy, air quality, built environment, injury prevention [community and worksite])</td>
<td>- Develop and implement basic primary care programs for reducing risk factors and prevention of NCDs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle</td>
<td>- Regulate compliance with policies in nonhealth sectors</td>
<td>- Develop and implement regulations and certifications for individuals and institutions in both public and private sectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>- Develop policies for the health sector for tobacco control and risk reduction, health promotion, and mental health in schools</td>
<td>- Regulate compliance with policies within the health sector</td>
</tr>
</tbody>
</table>

**Table D.2 (continued)**

<table>
<thead>
<tr>
<th>Action areas</th>
<th>NCD/capacity index</th>
<th>Population-based interventions</th>
<th>Individualized interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td></td>
<td>Develop a national policy and multisectoral strategy plan for the prevention and treatment of NCDs</td>
<td>- Develop and implement basic primary care programs for control and treatment of NCDs</td>
</tr>
<tr>
<td>Middle</td>
<td></td>
<td>- Convene stakeholders for consultation</td>
<td>- Develop and implement clinical protocols for reducing complications from NCDs</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>- Develop the financing strategy</td>
<td>- Develop and monitor a set of clinical indicators to assure quality care services are delivered in public and private sectors</td>
</tr>
<tr>
<td>Health service delivery capacity (facilities, drugs, human resources)</td>
<td>Lower</td>
<td>Middle</td>
<td>High</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
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</tr>
<tr>
<td>No activity</td>
<td>- Develop a central node to: (a) lead and coordinate prevention, treatment, and surveillance interventions; and (b) manage resources</td>
<td>- Strengthen health service delivery to provide quality promotion, behavior change, risk reduction, and prevention services</td>
<td>- Retool public facilities to deliver effective NCD services</td>
</tr>
<tr>
<td>- Develop capacity to implement health promotion and risk reduction programs</td>
<td>- Train new and current cadre of HRH in NCD prevention and treatment and establish specialty training tracks in prevention</td>
<td>- Framework to establish comparative effectiveness of treatments and technology in context</td>
<td>- Assure delivery of quality services</td>
</tr>
<tr>
<td>- Develop capacity for behavior change and advocacy</td>
<td>- Train new and current cadre of HRH in NCD management programs including promotion and prevention</td>
<td>- Assure adequate financing for public facilities</td>
<td>- Train new and current cadre of HRH in NCD prevention and treatment and establish specialty training tracks in prevention</td>
</tr>
<tr>
<td>- Mobilize public and private resources and use risk pooling to finance private goods and services for treatment that address context, access, and equity</td>
<td>(continued next page)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Financing framework</th>
<th>Lower</th>
<th>Middle</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private financing schemes</td>
<td>- Determine level of public financing for public goods, information, and to reduce externalities</td>
<td>- Mobilize public and private resources and use risk pooling to finance private goods and services for treatment that address context, access, and equity</td>
<td>(continued next page)</td>
</tr>
</tbody>
</table>
### Table D.2 (continued)

<table>
<thead>
<tr>
<th>Program management stage</th>
<th>Action areas</th>
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<th>Individualized interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate</td>
<td>Monitoring and system intelligence</td>
<td>Lower</td>
<td>No activity</td>
<td>Track development and implementation of prevention policies and risk factor trends</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle</td>
<td></td>
<td>Management information systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact evaluation</td>
<td></td>
<td>Lower</td>
<td>No activity</td>
<td>Clinical policy and program impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle</td>
<td></td>
<td>Comprehensive health impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Authors' conclusions.

**Note:** This table is a guide to focus policy discussion and actions in key areas. The context of the setting will dictate final options and decisions. HRH = human resources for health. Lower burden and lower capacity (heavy shade); middle burden and middle to higher capacity (heavy and light shade); higher burden and higher capacity (heavy, light, and no shade).
for example, has had success with its tobacco policy and has signed 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 highlight the subset of strategic options for population-based and individualized interventions (table 4.3 in 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, policies 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- to higher–capacity context, broader efforts become strategic. In addition to capacity assessment, planning, and human resource development, prevention now includes identifying high-risk groups for targeted 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

Figure D.1 Country Standing Based on Standardized Public Expenditures as a Percentage of Total Health Expenditures and Effectiveness and Regulatory Quality Index Compared with Country NCD Burden

Sources: (WHO 2008); Kaufmann et al. 2008; World Bank 2010.
Note: The capacity index is the composite sum of public expenditures as percentage of total expenditures on health (100 maximum) and of the 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 are at the same point in the figure.
accommodate provision of NCD care. Finally, the importance of evaluation emerges with the focus on efforts for prevention.

In the higher burden and higher capacity context, the framework expands again. For both population-based and individualized 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 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 variations in NCD burden and capacity within their borders and should consider tailoring policies for subnational regions.

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

The policy options framework can be applied to all NCDs taken together or to individual NCDs, such as cardiovascular disease and diabetes, because the options are essentially the same. In addition, the method of burden, capacity, and country assessment, followed by application of the framework, can be used in other regions to inform policy discussions.

References


Capacity, Key Accomplishments, and Situational Analysis for NCDs

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 primary source of outpatient services, especially in urban areas, and includes both not-for-profit nongovernmental organizations 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 were developed and introduced in 2003. Mental health services, currently a component of the Basic Health Package Services, 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 psychosocial support to women traumatized by violence, through case supervision, monitoring, and referrals; and Medica Mondiale (Afghanistan), which supports women and girls through psychosocial support, legal assistance, advocacy, trauma training, and development of psychotherapeutic treatment standards.

Treatment of hypertension and respiratory conditions is included at the district hospital level. However, symptomatic care of ischemic heart disease and diabetes is provided only 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 enacted, although it is the lowest in the region (8 percent). Cigarette smuggling is an issue but its extent is unclear. In addition, the country faces tremendous challenges 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 noncommunicable disease (NCD) policy or strategy. The agenda for new health projects is guided by the Millennium Development Goals, which also orient donor funding, on which the Ministry of Public Health relies to a large extent. Maternal and child health, family planning, and communicable diseases have been higher priority areas. Except for the European Commission, none of the donor partners has prioritized NCD-related preventive or curative services in their programs. The World Bank has completed a review of mental health and is exploring options to implement mental health interventions.

Although supplies of essential drugs are included in the Basic Health Package Services, the essential drug list lacks medications for prevention and treatment of several NCDs. For example, the list has no hypoglycemic agent for diabetes or statins for high cholesterol, and the range of cardiovascular drugs is limited. Such drugs are not necessarily stocked at basic health units and can be dispensed only 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 financed mainly by private out-of-pocket expenditure and development partners. The estimated total expenditure on health was $48 per capita in 2008, of which 79 percent was from private sources (out-of-pocket, development assistance, and nongovernmental organizations). Public spending per capita was about $10. Heavy reliance on external funding will pose a significant threat to the sustainability of the country’s health system.

Nongovernmental organizations collect health information, and most participate in the quality assessment evaluations to gain contract extensions and renewals for delivering services. However, none of the evaluation 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, cardiovascular disease, 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 illness. Efforts to include NCD prevention and treatment have been a lower priority in light of the current focus on the Millennium Development Goals.

The Strategic Plan for Surveillance and Prevention of Noncommunicable Diseases in Bangladesh, 2007–10, a comprehensive national NCD plan, has been adopted. Implementation has been stalled,
however, 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 a 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 comes mostly at the tertiary level, where there is a long tradition of specialty hospitals and foundations in both the public and private (including nongovernmental organizations) sectors that provide individualized 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 consists of a 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 the Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders 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 cardiovascular disease. 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 data network has been created and includes government and private clinical institutions. The recently formed Alliance for Community Based Surveillance promotes periodic population-based surveys of NCDs and their risk factors. A national risk factor survey was completed in 2010 and is being analyzed. The 2006 Bangladesh Urban Health Survey included NCD-related items in slum and nonslum areas of the country’s six largest city corporations. The 2003 Bangladesh Health and Injury Survey was the largest injury survey conducted in a developing country.

The new Centre for Control of Chronic Diseases in Bangladesh 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 and no cancer registry.

In 2008, total expenditures on health amounted to 3.5 percent of gross domestic product (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 Ministries of Education, Road and Transport, Agriculture and Information and Communication, among others. Although 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 (2005–09) for diabetes 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 interventions. The protocols cover cardiovascular disease, diabetes, cancer, and chronic obstructive pulmonary disease and were scheduled 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 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 new 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 in 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 seat belts and motorcycle helmets and establishes blood alcohol tests for vehicle 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 (obtained in India and Thailand). Currently, there is neither an in-country training facility for NCDs nor an institutionalized exchange program 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. A system is yet to be put in place, however, 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 STEPSwise Approach to Surveillance 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 input 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 (Nagarajan 2011). 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 provide technical leadership for 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 Ministry of Health including all NCD control programs. The National Cancer Control Program was initiated in fiscal 1975/76 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 prehospital 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, a tax framework that includes all major tobacco products (including bidis) could have a large impact.

In terms of tracking the disease burden, surveillance is conducted by the states. The NCD arm of the Integrated Disease Surveillance Project used WHO methodology and planned three phases of population-based NCD risk factor surveys for all states. Phase 1 covered seven states; the fieldwork 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 Integrated Disease Surveillance Project, the NCD arm was dropped and phase 2 and phase 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 that 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 the 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 on health infrastructure and services from the private sector. People with NCDs in India incurred significantly
higher treatment costs (about double) in terms of out-of-pocket expenses than those with other conditions and illnesses. Approximately 40 percent of household spending for NCDs had a distressed pattern (leading to financial hardship), and the odds of catastrophic spending and impoverishment were much higher among those hospitalized for NCDs than for those hospitalized for communicable diseases. The chronic nature of NCDs and the high cost of some medications often result in financial vulnerability, and this accounts for some of the distress financing of care.

The 11th Five-Year Plan includes development of a comprehensive health information system to integrate 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 patients with NCDs, those people with common risk factors such as cardiovascular disease, diabetes, renal diseases, chronic obstructive pulmonary disease, 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. Thalassemia 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. Efforts are under way to create tobacco-free zones. In 2001, four islands declared themselves tobacco free and, in 2007, the finance minister proposed a doubling of the duty on tobacco products including cigarettes (this proposition is still under consideration). 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 use in the past. However, progress has been limited due to lack of legislation. Maldives ratified the FCTC in 2004. The enabling national legislation (the Tobacco Control Act) was passed and ratified in August 2010. Pursuant to the act a national advisory body (the Tobacco Control Board) has been formed and is currently formulating tobacco control regulations. In parallel, the Centre 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 this recent progress, Maldives has the highest prevalence of tobacco use in South Asia. Tobacco products are widely available and comparatively low-priced. Progress towards effective policies such as taxation and supply control has been hindered by the strong lobbying from the tobacco industry.

In 2009, the Ministry of Health created the Centre for Community Health and Disease Control (formerly the Department of Public Health) with six divisions, four of which are Mental Health (which includes the Tobacco Prevention Program), Non-Communicable Diseases Control (leads individual education and counseling, advocacy, and workshop efforts in atolls with technical cooperation from WHO), Environmental and 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, the Mental Health division is working with Trade to combat tobacco use through increasing tariffs and improving labeling. In terms of human resources, the NCD division is still understaffed (four staff positions are currently filled out of a possible 14 positions) 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 away from government services and toward public-private partnerships. All curative facilities were consolidated under the Health Services Division (previously the Department of Medical Services). The Centre for Community Health and Disease Control 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 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 and are undergoing dissemination and
implementation. In the private sector, there are 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, and there is no cancer registry. A subnational NCD Risk Factor Survey was conducted in 2004, and another subnational Survey is planned for mid-2011. Global Youth Tobacco Surveys were conducted in 2003 and 2007. A Global School Health survey was conducted in 2010. The 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 stock medications only for hospital and institutional use. Drugs for people with NCDs are purchased by patients from private pharmacies. Supply and access are issues, especially in remote areas and among the poor. A pilot program 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 the expansion of the existing health system and the opening of the Indira Gandhi Medical Hospital. There is a high dependence on short-term (most, one year) expatriate providers (approximately 73 percent), reducing the continuity of care that is important for NCDs.

Under the recently introduced universal social insurance scheme, MADHANNA, services can be sought from private institutions, hospitals, clinics, and pharmacies linked to the scheme. Challenges facing MADHANNA 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 surgery, and cardiac catheterization. However this scheme is still in its early stages and is likely to face challenges to its long-term financial sustainability. Pharmacies are not present on most small islands, leaving some unable to benefit from MADHANNA’s services.

Nepal

Capacity, Key Accomplishments, and Situational Analysis
The Ministry of Health has developed a decentralized system of health subposts, health posts, and primary health care centers. Curative health
service delivery is poorly developed (two 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 uses government and external development partners to implement the national health strategy. Its purpose is 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 free of cost to the public at several facilities since 2008. Services related to NCDs are not categorically included, 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 has 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 antitobacco programs. The Ministry of Education includes elements in the curriculum 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 being prepared 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 fiscal 2009/10 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 the WHO STEPwise Approach to Surveillance 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 emphasized noncommunicable diseases. In 2003, the country was the first of 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. Neither the policy nor the plan could be implemented due to the change in government. In 2009, the Ministry of Health 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 came 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
prohibit smoking in public places and a ban on cigarette advertisements. However, implementation has been slow. In 2004, Pakistan adopted the FCTC. The Ministry of Health has taken several actions to implement control measures, although efforts to implement legislation for tobacco control remain weak. In 2009, the Ministry of Health 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 outlets must 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 too low to change driver behavior. 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 Ministry of Health 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, maternal and child health, immunization, tuberculosis, HIV/AIDS, malaria, hepatitis, nutrition, and blindness. The primary care level is not well programmed to deliver 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 are no formal integration, referral, or contractual arrangements between the two sectors. Both provide mainly curative NCD care. Population-based prevention is not addressed, apart from tobacco. Promising pilot programs for community-based hypertension control have recently been conducted. Because 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 an NCD prevention program. Currently, there is no primary care service delivery model for NCDs suitable for the context.

Although the number of physicians may be sufficient for population coverage ratios for public service delivery, there is maldistribution with 85 percent of physicians practicing in urban areas and understaffing in
rural areas. General practitioners tend to be poor performers in managing common medical conditions, such as hypertension, diabetes, and lowering of lipid levels. 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 antihypertensive, lipid-lowering, and antidiabetic drugs, as well as bronchodilators and antidepressants. However, stocking and availability of supplies are problematic; 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-of-pocket, and most of that goes to purchase medications. The private health services are poorly regulated, letting the market dictate prices to semiliterate consumers.

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

In 2003, a pilot program designed to develop a model for population-based surveillance of NCDs was implemented in one district with a population of one million (Nishtar et al. 2005). A joint study in 2004 by the World Bank, Centres for Disease Control, and World Health Organization recommended that the pilot program be replicated and taken on nationwide scale (World Bank 2005). 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**

*Capacity, Key Accomplishments, and Situational Analysis*

An extensive network of hospitals and preventive health offices for tertiary, secondary, and primary level care has been developed. Although a
substantial proportion of both inpatient and outpatient curative care could be delivered within primary care facilities, the bulk of these services is provided by tertiary and secondary level facilities. The general trend for several decades has been for public sector patients to increasingly choose higher-level facilities because lower-level facilities are not equipped for basic diagnostics or 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 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 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, which take a lead role in implementing the provisions aimed at reducing tobacco use.

Three key directorates within the central Ministry of Health 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 the 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 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, more than 70 percent of health services costs were financed out-of-pocket.

**Note**

1. Data for Sri Lanka were drawn from World Bank (2010).

**References**


Index

Boxes, figures, notes, and tables are indicated by $b$, $f$, $n$, and $t$, respectively.

A

Action Plan for the Global Strategy for the Prevention and Control of NCDs, 65–66

Afghanistan
   age structure in, 42f
   Assess stage, 97
   Basic Health Package Services, 159–61
   country-level NCD burdens, 29
   demographic transition, 42
   Develop and Implement stage, 98
   life expectancies, 21
   NCD trends in, 42–43
   Plan stage, 97
   policy options framework, 97–98
   tobacco taxation, 114

Aga Kahn University Mental Health Project, Afghanistan, 159–60
   age-standardized undiscounted DALYs, 25b
   age structure
      in Afghanistan, 42f
      in Bangladesh, 43f
      in Bhutan, 45f
      in India, 46f
      in Maldives, 48f
      in Nepal, 49f
      in Pakistan, 50f
      in South Asia, 16f
      in Sri Lanka, 52f
   alcohol taxation, 75, 77n7
   allocative efficiency, 120

Assess stage
   Afghanistan, 97
   Bangladesh, 98
   Bhutan, 99
   definition of, 84, 85f, 89
   health system indicators, 131
   India, 100
   Maldives, 101–2
   Nepal, 103
   Pakistan, 103–4
   policy options framework, 86t
   Sri Lanka, 105

B

Bangladesh
   age structure in, 43f
   Assess stage, 98
   consumption patterns, 34
   cost-effectiveness of pharmacological interventions, 76
   demographic transition, 43
Bangladesh (continued)
Develop and Implement stage, 98–99
drug manufacturing program, 118
Evaluate stage, 99
NCD trends in, 43–44
out-of-pocket expenditures, 33
policy options framework, 98–99
prevention and treatment services, 161–63
risk factors for CVD, 27
tobacco taxation, 114
Basic Health Package Services, Afghanistan, 159–61
behavior risk factors, 83, 135–36
behavioral economics, 136–37
behaviors, nonrational, 61
Bhutan
age structure in, 45f
Assess stage, 99
demographic transition, 44
Develop and Implement stage, 99
Evaluate stage, 100
Los Angeles Society of Pathologists, 164
NCD trends in, 45
Plan stage, 99
policy options framework, 99–100
prevention and treatment services, 163–65
tobacco use, 29–30
bidis, 114
Brazil, comparative effectiveness institutions, 121
breastfeeding practices and NCD outcomes, 30–31
burden, country-level health, 29, 149–50, 157, 157f
C
Cancer Control Directorate, Sri Lanka, 174
capacity assessments, 129–31
index of NCD burden as percentage of total forgone DALYs, 157f
index score, 149–50, 150b, 157f
profile of selected indicators, NCD, 96f
cardiovascular disease. See CVD
catastrophic hospitalization expenditures, 34, 36–37n4
CEA (cost-effectiveness analysis), 71, 72, 77n2
Centre for Community Health and Disease Control, Maldives, 168
Centre for Control of Chronic Diseases in Bangladesh, 163
challenges for tackling NCDs, 90–93
China, intervention, diabetes, 75
CHOICE project, 71
chronic NCDs
costs of, 33
on Global Risk Matrix, 61
major, 83
Cigarette and Other Tobacco Products Act, India, 166
commitment devices, 137
cost-benefit analysis, 76–77n1
cost-effectiveness of pharmacological interventions, 75–76
of prevention, control, and treatment, 71–72
studies, availability of, 77n2
cost-effectiveness analysis (CEA), 71, 72, 77n2
costs for bulk purchasing transaction of medications, 125n2
of NCDs, 31
CVD (cardiovascular disease)
mortality attributed to population-level risk reduction and treatment, reduction of, 70–71, 70r
mortality rates, macroeconomic costs, 32
multidrug regimen for prevention, 75–76
risk factors for, 27–29
D
DALYs (disability-adjusted life years)
age-standardized undiscounted, 25b
attributable to diseases, conditions, and injuries in adults, 26t
attributable to leading risk factors, 28f
definition of, 36n1
forgone DALYs in Bhutan, 45
deaths due to NCDs, 29f
death burdens, 24f
index of burden as percentage of, 157f
pattern of, 25, 27
by sex, age, and cause, 27–28, 27t
deaths attributable to diseases, conditions, and injuries, 26t certification, Sri Lanka, 174 forgone DALYs and, 29f rates from heart disease, 70f demographic dividend, 16 demographic profiles for low- and middle-income regions, 19–20t for South Asian countries, 22–23t demographic transitions Afghanistan, 42 Bangladesh, 43 Bhutan, 44 definition of, 15, 17b epidemiologic and, 17b India, 46 Maldives, 47 Nepal, 49 Pakistan, 50 Sri Lanka, 51–52 Department of Health and Family Welfare, India, 165 Department of Public Health, Maldives, 168 dependency ratios, 18f, 36n2 Develop and Implement stage Afghanistan, 98 Bangladesh, 98–99 Bhutan, 99 definition of, 84, 85f, 89 health system indicators, 131 India, 100–101 Maldives, 102 Nepal, 103 Pakistan, 104 policy options framework, 87t Sri Lanka, 105–6 development and economic perspectives for action against NCDs, 60–62 disability-adjusted life years. See DALYs disease burdens country level risk factors and, 29–31 double, 3, 53 measurement of, 36n1 as a proportion of total forgone DALYs, 24f regional, 24–25, 27–29 in Sri Lanka, 174 toward NCDs, 52–53 diseases, deaths and DALYs attributable to leading, 26t drinking, definitions of, 55n3 drug manufacturing programs, 118 E economic and development perspectives for action against NCDs, 60–62 economic burden of NCDs, 31f economic challenges for tackling NCDs, 91 economic impact of NCDs in Russian Federation, 54b economic profiles for low- and middle-income regions, 19–20t for South Asian countries, 22–23t efficiency, economic rationale on, 133–34 epidemiologic transition, 15, 17b Essential Drugs Program, Bhutan, 164 European Commission, tobacco antismuggling efforts, 116 Evaluate stage Bangladesh, 99 Bhutan, 100 definition of, 84, 85f, 89 health system indicators, 131 India, 101 Maldives, 102 Nepal, 103 Pakistan, 104–5 policy options framework, 88t Sri Lanka, 106 expenditures Bangladesh out-of-pocket, 33, 163 health, 21 India, 33–34, 166–67 Nepal, out-of-pocket, 33 Pakistan, out-of-pocket, 173 public, compared with country burden, 157f Sri Lanka private and public, 33, 174–75 externalities definition of, 61 in market failures, 135 F FCTC. See Framework Convention on Tobacco Control fetal origins hypothesis of adult diseases, 30 financing of care by individuals, 33–34 Finland, diabetes intervention in, 75
food labeling policies, collaboration on, 117
forgone DALYs. *See under DALYs*
Framework Convention on Tobacco
Control (FCTC). *See also smoking; tobacco*
Afghanistan, 160
Bangladesh, 162
Bhutan, 164
enhancing country capacity, 157–58
India, 166
Maldives, 167–68
Nepal, 170
Pakistan, 172
population-based interventions, 72, 73
Sri Lanka, 174
strategic focuses, 66b

**G**

GDP (gross domestic product) of South Asia, 18, 21
generalized CEA, 71, 77n2
German Institute for Quality and Efficiency in Healthcare, 121
Germany, comparative effectiveness institutions, 121
global collaboration, 110–12
global public goods, 111
Global Risk Matrix, chronic NCDs on, 61
governance indicators used to develop government capacity and burden of disease indicators, 151–52

government role in NCD prevention, 66–68
gross domestic product (GDP) of South Asia, 18, 21

**H**

HALE (healthy life expectancy), 36n3
harmful or hazardous drinking, definition of, 55n3
health burdens, country-level, 149–50, 150b, 157, 157f
Health Care Development Project, Bangladesh, 162
health expenditures, Maldives, 21
Health Master Plan 2006–2015, Maldives, 167
Health Nutrition and Population Sector Program, Bangladesh, 161
health professionals, cross-national training for, 121–22
health profiles
for low- and middle-income regions, 19–20t
for South Asian countries, 22–23t
health sector perspective on action against NCDs, 62–63
Health Sector Program Implementation Plan 2004–2010, Nepal, 170
health situation, methods to describe, 25b
health systems
capacity, 130b
improving infrastructure, 67
indicators, 131
Maldives, 168–69
Nepal, 169–71
Pakistan, 172

*Health Systems Assessment Approach: A How-To Manual*, 131
healthy life expectancy (HALE), 36n3
heart disease death rates, 70f

**I**

illness, duration of hospitalized surviving persons and outpatients, 35f
impoverishing effect of hospitalization, 34, 37n5
income loss among households with a member having an NCD, 36f
India
age structure in, 46f
Assess stage, 100
consumption patterns, 34–35
cost-effectiveness of pharmacological interventions, 76
demographic transition, 46
Develop and Implement stage, 100–101
drug manufacturing program, 118
Evaluate stage, 101
financing of care by individuals, 33–34
Indian Polycap Study, 76
intervention, health, 75
NCD trends in, 46–47
Plan stage, 100
policy options framework, 100–101
prevention and treatment services, 165–67
risk factors for CVD, 27
social welfare costs, 32
tobacco taxation, 114
Indian Polycap Study, 76
individualized interventions, 72, 75–76, 84, 146–47
information, insufficient and asymmetric, 134–35, 137–38n1
Institute for Health Sciences Academy, Bangladesh, 163
institutional challenges, 91–92
institutions, policy development, implementation and technical assistance, 123, 124t
Integrated Disease Surveillance Project, India, 166
international collaboration, 110–12
international reference price for medications, 118
International Task Force on Global Public Goods, 110–11

L
Lady Health Workers, Pakistan, 173
life expectancies, 21
Los Angeles Society of Pathologists, Bhutan, 164
lost income, 35
low-cost interventions, 142t

M
macroeconomic costs and effects of NCDs, 31, 32, 62f
MADHANA, Maldives, 169
Maldives
age structure in, 48f
Assess stage, 101–2
demographic transition, 47
Develop and Implement stage, 102
Evaluate stage, 102
health expenditures, 21
MADHANA, 169
NCD trends in, 48
policy options framework, 101–2
prevention and treatment services, 167–69
tobacco use, 29–30
market failures, 60–61, 133–37
maternal and child health (MCH), 15–16
Mauritius, population-based interventions, 74
MDG (Millennium Development Goals), 18, 21, 68
Medica Mondiale, Afghanistan, 160
medical systems. See entries at health medications
  collaborative bulk purchasing of, 117–19
distribution in Maldives, 169
  multidrug regimen for CVD prevention, 75–76
  pooled procurement of, 119
transaction costs for bulk purchasing of, 125n2
Mental Health Directorate, Sri Lanka, 174
microeconomic costs, 31, 32–35
Millennium Development Goals (MDG), 18, 21, 68
  multidrug regimen for CVD prevention, 75–76
myopic behavior, 138n3

N
National Authority on Tobacco and Alcohol Bill, Sri Lanka, 174
National Cancer Control Program, India, 165
National Drug Policy, Bhutan, 164
National Essential Drugs List, Pakistan, 173
National Institute of Cardiovascular Disease, Bangladesh, 163
National Institute of Diseases of Chest & Hospital, Bangladesh, 163
National Program on Diabetes, Cardiovascular Diseases and Stroke (NPDCS), India, 165
National Rural Health Mission (NRHM), India, 165
National Trauma Control Program, India, 165
NCDs (noncommunicable-diseases) definition of, 11n1
Directorate, Sri Lanka, 174
trends in Afghanistan, 42–43
trends in Bangladesh, 43–44
trends in Bhutan, 45
trends in India, 46–47
trends in Maldives, 48
trends in Nepal, 49–50
trends in Pakistan, 50–51
trends in Sri Lanka, 52–53
types of, 65
neglected low-cost opportunities, 73–74
Nepal
age structure in, 49f
Assess stage, 103
Nepal (continued)
  demographic transition, 49
  Develop and Implement stage, 103
  Evaluate stage, 103
  medication program, 118
  NCD trends in, 49–50
  out-of-pocket expenditures, 33
  Plan stage, 103
  policy options framework, 103
  prevention and treatment services, 169–71
  and risk factors for CVD, 27
  tobacco use, 29–30
Network for NCD Surveillance and Prevention, Bangladesh, 163
noncommunicable-diseases. See NCDs
NPDCS (National Program on Diabetes, Cardiovascular Diseases and Stroke), India, 165
NRHM (National Rural Health Mission), India, 165
nutrition issues as risk factor, 15–16

O
out-of-pocket expenditures
  in Bangladesh, 33, 163
  in Nepal, 33
  in Pakistan, 173

P
Package of Essential NCD interventions, Bhutan, 163–64
Pakistan
  age structure in, 50f
  Assess stage, 103–4
  cost-effectiveness of pharmacological interventions, 76
  demographic transition, 50
  Develop and Implement stage, 104
  Evaluate stage, 104–5
  health expenditures, 21
  Lady Health Workers, 173
  medication program, 118
  NCD trends in, 50–51
  Plan stage, 104
  policy options framework, 103–4
  prevention and treatment services, 171–73
  and risk factors for CVD, 27
Pathologists Overseas, Bhutan, 164
pharmaceutical distribution in
  Maldives, 169
pharmacological interventions,
cost-effectiveness of, 75–76
Plan stage
  Afghanistan, 97
  Bhutan, 99
  definition of, 84, 85f, 89
  health system indicators, 131
  India, 100
  Nepal, 103
  Pakistan, 104
  policy options framework, 87t
Poland, population-based interventions, 74
policy options framework
  Afghanistan, 97–98
  Bangladesh, 98–99
  Bhutan, 99–100
  India, 100–101
  Maldives, 101–2
  Pakistan, 103–4
  for prevention and control of NCDs,
    83–85, 86–88r, 89–90, 153–56t
  Sri Lanka, 105–6
political and social perspectives for action against NCDs, 59–60
political challenges for tackling NCDs, 90–91
polypill, 76
pooled procurement of medications, 119
population aging, 53
population-based interventions, 72–75, 76,
  83–84, 143–45t
population-level risk reduction and treatment, CVD mortality attributed to, 70–71, 70t
poverty, social determinants, NCDs and relationship to, 59–60, 60f
prescription drugs. See medications
prevention
government role in, 66–68
  of NCDs, 68, 69b
  treatment of NCDs versus, 68–72
prevention and treatment services
  Bangladesh, 161–63
  Bhutan, 163–65
  Maldives, 167–69
  Pakistan, 171–73
  Sri Lanka, 173–75
Primary Mental Health Project,
  Afghanistan, 159
primary prevention of NCDs, 69b
private sector and NCDs, 92b
program management stages, policy options framework, 84–85
Prohibition of Smoking and protection of Non-Smokers Health Ordinance 2002, 171–72
Psycho-Social and Health Project, Afghanistan, 160
Public Health Standards for NCDs, India, 165
Public Policy and the Challenge of Chronic Noncommunicable Diseases, 66–67

R
reduction of CVD mortality attributed to population-level risk reduction and treatment, 70–71, 70r
reference pricing for medication, 118–19
regional collaboration, guiding principles for, 110–12
regional comparisons, challenges of, 41
risk factors for CVD, 27–29
disease burdens and, 27, 29–31
nutrition issues, 15–16
road safety legislation, Pakistan, 172
Road Traffic Injury Research & Prevention Center, Pakistan, 173
Russian Federation, social and economic impact of NCDs in, 54b

S
salt interventions, 73–74, 74t
SEAR-B, 77n3
SEAR-D, 77n3
secondary prevention of NCDs, 69b
service delivery for outpatients, Pakistan, 172
smoking. See also Framework Convention on Tobacco Control (FCTC); tobacco
age-adjusted prevalence of, 30f, 31f
Bangladesh Smoking and Tobacco Product Usage (Control) Act 2005, 162
Nepal Smoking (Prohibition and Control) Act, 170
social and political perspectives for action against NCDs, 59–60
social determinants, NCDs, and relationship to poverty, 59–60, 60f
social impact of NCDs in Russian Federation, 54b
social welfare costs, 31, 32
Spain, tobacco antismuggling efforts in, 116
Sri Lanka
age structure in, 52f
Assess stage, 105
country-level NCD burdens, 29
demographic transition, 51–52
Develop and Implement stage, 105–6
Evaluate stage, 106
life expectancies, 21
NCD trends, 52–53
out-of-pocket expenditures, 33
policy options framework, 105–6
prevention and treatment services, 173–75
price of medication, 118
and risk factors for CVD, 27
tobacco taxation, 114
Strategic Investment Plan, Bangladesh, 161
Strategic Plan for surveillance and prevention of NCDs, Bangladesh, 161–62
surveillance network
Bangladesh, 161–62, 163
country-level, 122–23
India, 166
Nepal, 171
Pakistan, 173

taxes as commitment device, 137, 138n5
technical challenges, 92–93
tertiary prevention of NCDs, 69b
time-inconsistent preferences, 61, 136–37
tobacco. See also Framework Convention on Tobacco Control; smoking antismuggling measures, 115–16
Cigarette and Other Tobacco Products Act, India, 166
tobacco control interventions, 73t, 109–10, 112, 114–15
tobacco control measures, Pakistan, 172
tobacco control measures, Sri Lanka, 174
tobacco prevention and control policies, 113t
tobacco product prices, 115f
tobacco (continued)
  taxation, 112, 114–16, 114f, 171
  use, age-adjusted prevalence of, 30f, 31f
  use, Maldives, 29–30
  training for health professionals, cross-
  national, 121–22
  treatment versus prevention of NCDs,
  68–72. See also prevention and
  treatment services

U
United States
  diabetes intervention, 75
  health training program, 122

W
WHO. See World Health Organization
World Bank
  cost-effectiveness of interventions, 72
  global collaboration principles, 111–12
  interventions for CVD burden, 76
  neglected low-cost opportunities, 73–74
World Diabetes Foundation,
  Bhutan, 163
World Health Organization (WHO)
  capacity assessments, 129–30
  prevention in Bhutan, 163–64
  STEPwise Approach to Surveillance,
    Nepal, 171
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Increases in life expectancy in South Asia are resulting in a demographic transition that could potentially yield dividends for developing countries in the region. As the working, nondependent share of the population increases, so too does per capita income. The key to securing these gains, however, is the prevention and control of noncommunicable diseases (NCDs).

*Capitalizing on the Demographic Transition* aims to encourage countries to develop, adopt, and implement effective and timely country and regional responses that reduce population-level risk factors and NCD burden. The authors focus primarily on cardiovascular disease and tobacco use, which constitute a disproportionate share of the NCD burden. The book provides

- an NCD burden and risk factor profile for each South Asian country as well as the region as a whole;
- a rationale for public policy and action;
- a framework to guide the formulation of public policies and strategies;
- a profile for each country, including capacity and ongoing NCD activities as well as policy options and actions that will help stimulate dialogue within and among countries; and
- a regional strategy for NCD prevention and control.

*Capitalizing on the Demographic Transition* will be of particular interest to policy makers in South Asia, both inside and outside the health sector; the book will also be useful to development practitioners.