

CHAPTER 1

Introduction

The importance of chronic noncommunicable diseases (NCDs) for global health has gained increased recognition since the early 1990s and has been accompanied by calls for a stronger policy response (Feachem and others 1992; Ghaffar, Reddy, and Singhi 2004; Leeder and others 2004; WHO 2005a; World Bank 1993, 2004; Yach and others 2004; Yach and Stuckler 2006). Aging populations, rising incomes, and increased exposure to risk factors are contributing to patterns of illness, disability, and premature death due to NCDs that merit greater policy attention than they have received in the past. This report contains an agenda for action in response to the growing economic, social, and health problems posed by NCDs.

Objective

The objective of this report is to enable the World Bank and its clients to examine and, where appropriate, strategically shift their thinking about the role of public policy in the control of NCDs. The report addresses both NCD outcomes and systemic issues related to the control of NCDs. Its approach is consistent with the *World Bank Strategy for Health, Nutrition, and Population (HNP) Results*, which

provides a framework for the Bank's analytical work and operations (World Bank 2007).

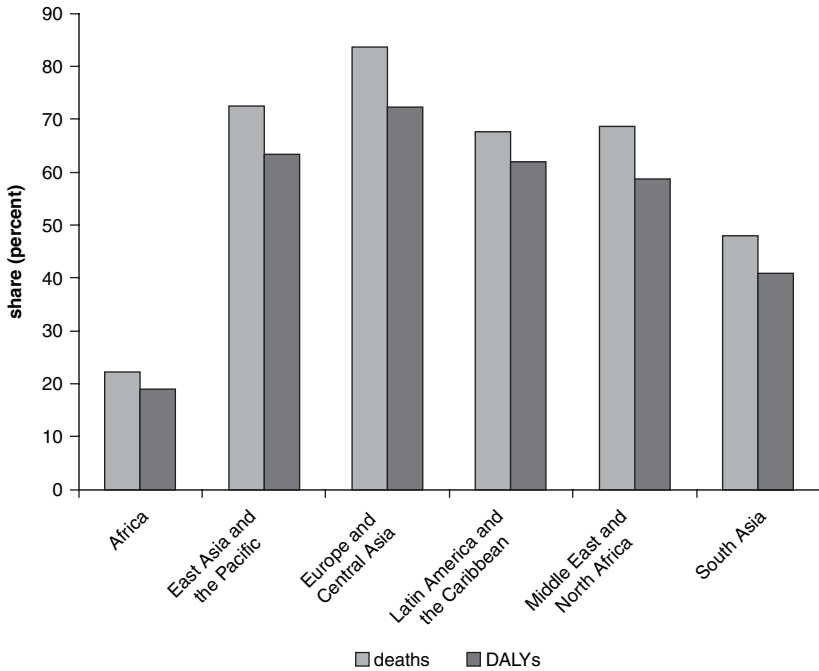
The report highlights two themes. First and foremost, public policies need to prevent NCDs to the greatest extent possible, and in doing so, promote healthy aging and avoid premature deaths. Second, at the same time, public policies need to recognize that the burden of NCDs will increase in line with demographic and epidemiological transitions, and thus they have a role to play in dealing with the pressures that this will impose on health services. Therefore, the objective will be addressed with a dual purview: how to avoid the burden of NCDs as much as possible and how to prepare for the consequences of the transitions.

The challenges policy makers face include how to address the links between NCDs and poverty, how to minimize the health and economic losses among the economically active population, and how to prepare for the pressures on health systems resulting from the growing numbers of people with NCDs associated with demographic change. Against this background, and based on the Bank's mission of poverty reduction, this report seeks to

- provide a framework for the World Bank's work with countries on NCDs, taking into account the emphasis on results in the *World Bank Strategy for HNP Results* (World Bank 2007).
- identify ways to integrate NCD prevention and control into the broader agenda of poverty reduction and economic development, with an emphasis on integration into each country's sectoral and multisectoral strategies and macroeconomic and budgetary context
- identify pathways through which to realize the control of NCDs in different operational settings
- define the short- to medium-term priorities for the World Bank's work on NCDs, bearing in mind its comparative advantages
- identify major gaps in knowledge and options for closing those gaps.

The report provides a framework, not a blueprint, for action in each country or region. Blueprints are more appropriately developed on the basis of analyses and consultations at the country and regional levels. Figure 1.1 shows the share of the disease burden attributable to NCDs in each World Bank region. Even though the report is global in outlook, the section at the end of this volume entitled "Selected Noncommunicable Disease Indicators" includes selected country-specific indicators.

Figure 1.1. Share of the Disease Burden Attributable to NCDs by World Bank Region, 2002



Source: WHO 2004, annex table 4.

Note: DALYs = disability-adjusted life years.

Scope and Audience

The term NCDs, as used in this report, refers to one of the three major categories of the disease burden as defined by the World Health Organization (WHO) (2004). The others are (a) communicable, maternal, perinatal, and nutritional conditions and (b) injuries. The WHO classification is an exhaustive classification system to which all causes of death and disability-adjusted life years (DALYs) in a population may be attributed. Note that neither NCDs nor chronic diseases are ideal terms, in that some NCDs have an infectious origin, for example, cervical cancer, whereas some infectious diseases are chronic in nature, for instance, HIV/AIDS. Moreover, as a result of comorbidities, some people may suffer from both NCDs and communicable diseases at the same time. Readers should bear these caveats in mind as the term NCDs is used throughout this report.

The two most important NCDs in terms of mortality are cardiovascular disease (CVD) (heart disease and stroke) and malignant neoplasms (cancers). Others include respiratory and digestive diseases and diabetes. However, the report does not follow a disease-specific approach. Instead, it examines the policy and organizational responses that are appropriate in light of some of the key characteristics of NCDs. For example, many NCDs are preventable and some share the same risk factors. Many of the conditions are of relatively long gestation and include extended periods during which the patient may be asymptomatic. Once developed, they are chronic in nature, but some may have acute episodes. They tend to require multiple contacts with health systems over long periods of time, but exhibit fewer health externalities than communicable diseases. In short, these shared features of NCDs provide inputs for analysis. The report draws on examples that emphasize, but are not limited to, CVD, cancer, and diabetes. Beyond these examples, appendix 2 summarizes cost-effectiveness estimates for interventions against NCDs. A more comprehensive catalog of conditions and interventions is beyond the scope of this work, but is available elsewhere (see, for example, Jamison and others 2006b).

This report has three audiences. The first is internal, consisting of World Bank country directors, macroeconomists, sector directors, managers, and health specialists. They will find it useful in the course of policy dialogue within country teams and with country officials. The second is external, including country policy makers in ministries of finance, economic development, trade, agriculture, and health. This audience will find the report helpful in placing the prevention and control of NCDs within a broad public policy context. The third is also external, consisting of decision makers and technical specialists in partner agencies and foundations, for whom the report may be useful in discussions with the World Bank and with country officials.

The report is organized into three chapters, three technical appendixes, a glossary, and a data appendix. While the main section provides an integrated narrative, each appendix is prepared as a separate section for readers who wish to explore an aspect of the underlying subject matter in more detail.

Trends in NCD Outcomes and Possibilities for Improvement

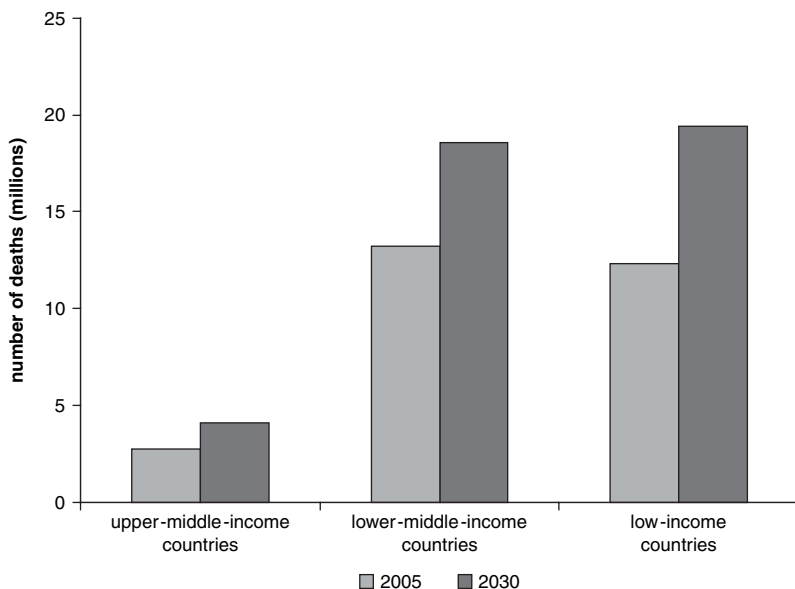
NCD outcomes are typically measured in terms of mortality and morbidity, and the goal of policy should be to improve both. More specifically, the main objective in addressing the NCD burden is both to postpone

mortality, and for a given mortality profile, to postpone morbidity. The latter is referred to as healthy aging or the compression of morbidity, whereby disability rates decline faster than mortality rates. This socially compelling ideal combines longer life spans with fewer years of disability at the end of life. The objective recognizes that while death is inevitable, it should ideally be neither premature nor preceded by years of poor health (Fries 1980). This section begins with a discussion of current mortality trends and prospects for improvement, and then shifts its focus to morbidity issues and the potential for achieving healthy aging.

What Are the Current Trends in NCD Mortality and What Explains Them?

NCDs are currently responsible for 56 percent of all deaths and 46 percent of the disease burden measured in DALYs in low- and middle-income countries (Lopez and others 2006). The burden of disease due to NCDs is projected to increase rapidly in the years ahead. Figure 1.2 shows projected deaths due to NCDs in low- and middle-income countries in 2005 and 2030. Currently, NCDs are by far the major cause of death in lower-middle, upper-middle, and high-income countries. By 2015, they

Figure 1.2. Projected Deaths due to NCDs by Country Income Level, 2005 and 2030



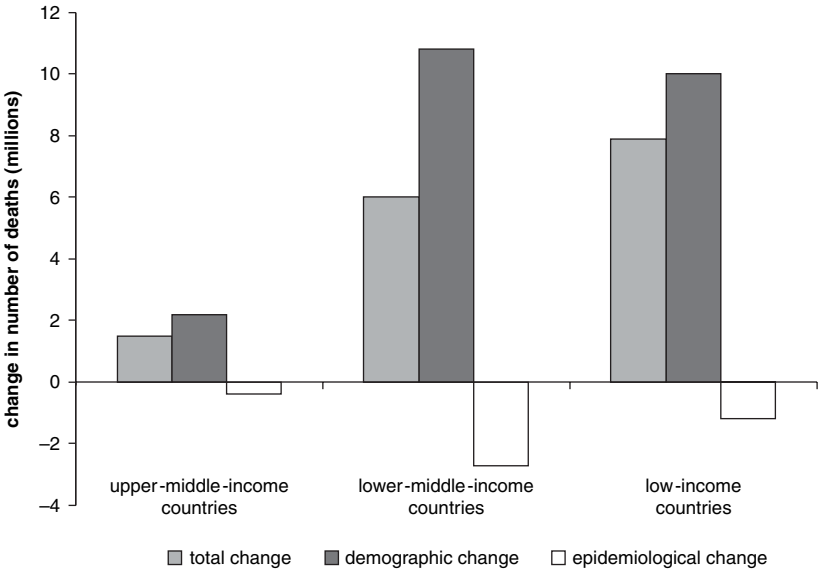
Source: Lopez and others 2006.

will also be the leading cause of death in low-income countries. The same is true for mortality among those of working age.

Several factors help explain the upward trend of NCDs in global burden of disease projections (Mathers and Loncar 2005; Murray and Lopez 1997). These include aging; the decline in communicable diseases and in conditions related to childbirth and nutrition; and changing lifestyles as they relate to smoking, drinking, diet, and exercise. As indicated by the first two reasons, in part the rise of NCDs reflects progress with respect to other international health priorities, such as infectious disease prevention and lower fertility. Observers often emphasize the role of demographics in NCD trends. The WHO Burden of Disease Project notes that “ageing of the population will result in significantly increasing total deaths due to [NCDs] over the next thirty years” (Mathers and Loncar 2005, p. 65). Marks and McQueen (2002, p. 119) note that “aging of the population in the first quarter of the twenty-first century will be the major force in the further tremendous increase in the burden of chronic diseases.”

Figure 1.3 represents one way to depict the underlying factors behind the projected rise in NCDs. The forecasted increase in NCD deaths

Figure 1.3. Decomposing NCD Mortality Trends by Country Income Level, 2002–30



Source: Mathers and Loncar 2005.

between 2002 and 2030 is decomposed into two parts: demographic and epidemiological (Mathers and Loncar 2005). For each income group, the first bar indicates the total projected increase in NCD deaths between 2002 and 2030, the second bar shows the contribution of demographic change to this process, whereas the third bar reflects a measure of epidemiological change.¹ As the figure indicates, NCD deaths are expected to rise over the next 25 years essentially because projected epidemiological trends, that is, declining age-specific death rates, will not be rapid enough to offset the effects of an older population structure.

Two important policy messages emerge from this decomposition of trends. Specifically, the appropriate policy response to NCDs will entail avoiding the looming NCD burden of disease to the extent possible, for example, through public health interventions and improved medical care, and simultaneously preparing to deal with the health system and cost pressures associated with an aging population. Policy makers should be made aware of both issues. An exclusive focus on prevention may lead to unrealistic expectations of a disease-free future, and thus a lack of readiness for emerging challenges. An overemphasis on aging, however, could result in a mistaken belief that policy cannot make a difference. This report addresses issues underlying both messages.

By How Much Can These Mortality Trends Be Improved Upon?

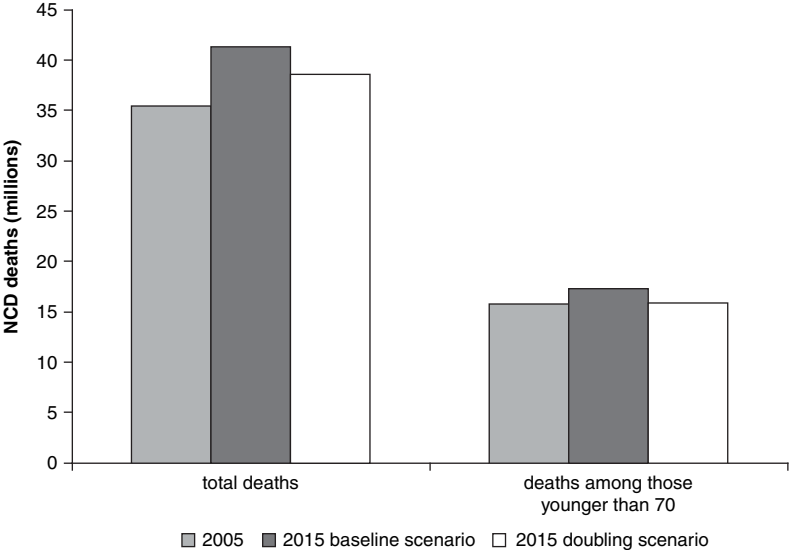
While the demographic forecasts underlying the previous figures are fairly reliable, the epidemiological projections are subject to much greater uncertainty (Mathers and Loncar 2005), as they are based on historical trends that may or may not persist in the future. If a wide range of NCD interventions is successfully adopted in the years ahead, more rapid progress in reducing age-specific death rates may be achieved. This would provide a stronger counterweight to the upward pressure exerted on NCD morbidity and mortality by population aging.

What would be a feasible target for NCD mortality reduction? Historical experience, used as the basis for WHO's 2002–30 burden of disease projections, indicates that NCD mortality reduction in recent decades has typically been achieved at a rate slightly below 1 percent annually for the key age groups between 30 and 69 (Lopez and others 2006). A few countries, however, such as Australia, Canada, the United Kingdom, and the United States, have achieved CVD mortality reductions at a rate of close to 3 percent per year over the last three decades (WHO 2005a). A plausible scenario may therefore be constructed that improves significantly upon historical rates, but acknowledges that the experiences

of high-income countries with excellent medical care are likely to be beyond the reach of most low- and middle-income countries in the immediate future. Specifically, figure 1.4 shows the implications of doubling historical rates of NCD mortality reduction worldwide during 2005–15.

Given the difficulties of offsetting aging trends noted earlier, the total number of NCD deaths would still increase, but by about 3 million, instead of about 6 million as in the baseline (which is based on historical trends). Among the population under 70, the doubling scenario would mean that the aging process could be almost fully offset to keep deaths constant between 2005 and 2015, instead of rising by 1.5 million as in the baseline scenario. In all, roughly 13 million deaths could be averted for all age groups cumulatively over 10 years. This would translate into a gain of nearly 30 million years of life in 2015, thereby holding years of life lost in that year to virtually the same level as in 2005. Additional details on these estimates are described in appendix 1. The methods are similar to those found in Strong and others (2005), and as in that study, the estimates here use deaths and years of life lost instead of DALYs as the unit of measurement. The focus on mortality is not intended to diminish the potential gains in morbidity reduction that can be achieved through improved NCD outcomes.

Figure 1.4. NCD Mortality Reduction Scenarios, 2005–15



Source: Authors' calculations.

In sum, the results suggest that extraordinary success with NCD interventions will slow down, but not reverse, the overall upward trend in NCD mortality due to population aging. The same message can be conveyed based on the results of a cross-country study of CVD risk factors. The Asia Pacific Cohort Studies Collaboration (2006) found (a) that the risk of dying from coronary heart disease increases substantially with age; (b) that systolic blood pressure is the most important risk factor explaining the age-related excess risk of coronary heart disease; but (c) that in comparison with the effects of age itself, the effects of blood pressure and other cardiovascular risk factors are small. Thus, although highly desirable, the scope for risk factor reduction to fully offset the implications of an aging population is limited.

Can the Compression of Morbidity Be Achieved?

The focus thus far has been on mortality, but an equally important measure of NCD outcomes is the trend in morbidity. Policy makers are often justifiably more interested in the illnesses that precede death, because of the implications for treatment and costs. The two are closely related, of course, and WHO burden of disease projections also forecast large increases in NCD-related DALYs (Lopez and others 2006). In addition, because health expenditures are often concentrated at the end of life, a discussion of mortality trends offers a useful first approximation of potential health system pressures. However, as noted at the outset, our objective in addressing NCDs is not only to achieve reductions in both death and disability, but also to reduce morbidity for a given mortality profile, or healthy aging.

Achieving healthy aging and its implications for public policy depend crucially on two relationships: between life expectancy and health status and between health status and health care. First, what is the relationship between longevity and health status? Different scenarios are possible. One is that longer lives reflect the improved survival of sick people to such an extent that overall disability rates decline more slowly than mortality rates, resulting in an expansion of morbidity. Alternatively, the opposite could happen: improved behaviors and health care could mean that the health status of older cohorts improves more rapidly than longevity gains, leading to a compression of morbidity. This is healthy aging.

Cross-country empirical evidence on these trends is inconclusive. Some evidence suggests that compression of morbidity may be occurring over time in some low-mortality countries as death rates at older ages continue to decline (Crimmins, Saito, and Reynolds 1997; Manton, Stallard, and

Corder 1995). However, country context appears to matter a good deal, for example, Taiwan (China) appears to match the first scenario (overall disability rates are declining more slowly than mortality rates), whereas France, Switzerland, and the United States correspond more closely with the second (the health status of older cohorts is improving more rapidly than longevity gains). In the United Kingdom, there appears to be an equilibrium between falling mortality and increasing disability (Michel and Robine 2004). Across industrial countries, the evolution of disability rates varies considerably (Cutler and Sheiner 1998).

Indeed, investigators have suggested that patterns may evolve over time within the same country. Under this scenario the aging of the population follows a cyclical movement where, first, sicker people survive into old age and disability rises; then the number of years lived with disability decreases as new cohorts of healthier people enter old age; but, finally, the number of years lived with disability rises again when the average age at death rises so much that many people spend their last years at an advanced age burdened by multiple chronic illnesses and frailty (Michel and Robine 2004). If this is the case, then today's low- and middle-income countries face a future with periods of both expanding and compressing morbidity. Trends may also vary across income groups within the same country. In short, achieving healthy aging is possible, but by no means assured.

For public policy purposes, an equally important relationship is the one between health status and health care. If disability rates fall as morbidity is compressed (healthy aging), the need for medical care should, in theory, decline, but causation may also run in the opposite direction: disability rates may decline precisely because of greater use of improved medical care systems. Various studies in high-income countries suggest that the latter is indeed important. The evidence indicates that disability rates have declined to a significant extent because of medical interventions as well as more healthful behaviors (Cutler 2001; Cutler, Landrum, and Stewart 2006; Vita and others 1998). This relationship may help explain why studies on the link between health status and subsequent health care costs have yielded mixed results with regard to whether expenditures on the relatively healthy are lower, higher, or similar to spending on those who are relatively sick (Daviglius and others 1998, 2005; Lubitz and others 2003; Russell 1998). Over the long term, historical experience and projections for the future suggest that the upward pressure on costs resulting from the introduction of previously unavailable technologies far outweighs the downward effect of improvements in health status (Mortensen 2005).

The relationship between health status and medical care over long time horizons is especially relevant in low- and middle-income countries, where many existing NCD interventions are underprovided. Thus, a large number of people do not receive the drugs or procedures from which they could greatly benefit. As a result, improving health status is unlikely to be cost saving relative to a status quo in which only a few dollars per person are spent annually on NCD care. In this setting, the immediately relevant question is not about potential cost savings within a high-income context, but rather how to improve outcomes by introducing the many services that are currently not available and how to accomplish this transition on a more affordable cost trajectory. In this sense, the compression of morbidity should not automatically be associated with a decreased use of medical interventions and the alleviation of health system pressures.

What can we conclude? First, note that a common theme in the literature is that much remains unknown about the two relationships, their underlying causes, and how they may evolve in the future. Second, the compression of morbidity is an important objective, and even though cross-country evidence is mixed, the experience of certain countries at certain points in time suggests that it is achievable. Lastly, improving health status in low- and middle-income countries is, on balance, more likely to be the result of more medical care rather than the cause of less medical care, and thus the imperative for public policy to both avoid and prepare for NCDs is a key message.

How Can Current Outcome Trends Be Improved?

An improvement over past trends might be achieved through three broad channels. The first channel is achieving higher incomes through economic growth.² This matters, because higher incomes can help households escape the vicious circle of poor health and poverty by reducing their vulnerabilities to falling ill and expanding their choices when they do become ill. The second channel is addressing NCD risk factors, for example, tobacco use, obesity, high cholesterol, and high blood pressure, outside the clinical setting. This may take the form of legislation, such as cigarette taxes or mandatory nutrition labeling, or it may entail the provision of information and behavior change interventions to address such factors as smoking, drinking, diet, and exercise in a range of settings, for instance, at the population, community, workplace, or school levels. The third channel is providing direct medical care for individuals in a clinical setting to screen for NCDs, control risk factors clinically, or provide treatment.

The broad stylized facts related to these three channels are instructive. As countries develop, incomes rise and medical care improves. At the same time, risk factors tend to worsen on average. Overall, NCD outcomes as measured by age-specific mortality and morbidity improve as development unfolds. Thus, on aggregate, the positive impact of higher incomes and better medical care is stronger than the negative influence of certain deteriorating risk factors over long time horizons. Better outcomes will require reinforcing the former while minimizing the latter. Despite variation around these trends and some exceptions, the patterns generally hold true.

Thus, with respect to addressing NCD risk factors in many low- and middle-income countries, the challenge will generally be to stay ahead of (or at least keep level with), as opposed to catch up with, similar indicators in high-income countries. Thailand, for example, scores better than France in terms of blood pressure, smoking, cholesterol, and obesity, and yet it has a higher NCD mortality rate. Appendix 1 shows the broadly consistent international evidence, which reflects both time lags and different lifestyles, for example, as related to smoking, urbanization, and dietary habits. This evidence justifies strong efforts to prevent an increase in exposure to the main risk factors for NCDs.

With respect to medical care, the challenge will be to catch up with high-income countries. Many NCD clinical interventions are not yet widely available in low- and middle-income settings. Because risk factors are often better in these countries whereas outcomes are worse, the importance of improved medical care (and economic growth) for reducing the outcome gap is clear. Moreover, research into high-income countries' success in improving CVD outcomes in recent decades has accorded a significant role to clinical interventions (Critchley and Capewell 2002; Cutler 2001; Cutler, Landrum, and Stewart 2006; Laatikainen and others 2005; Tunstall-Pedoe and others 2000). Finland and Poland are noteworthy examples of countries that have rapidly improved NCD outcomes based on a large role for nonclinical interventions; however, their initial conditions were characterized by high levels of risk factors. This, along with variations in both capacity and social contexts (including literacy rates), suggests a need for caution against generalizing the Finnish and Polish experiences to other countries.

In sum, success in reducing the NCD burden will require action across many fronts. A holistic approach that addresses the full continuum of population-based and clinical services is ideal, although given limited resource envelopes, prioritization is inevitable. A key message is that economic growth, nonclinical interventions to control risk factors, and

direct medical care will all play important roles in improving future NCD outcomes and achieving the objective of healthy aging. None of the three in isolation is likely to be adequate to significantly improve upon current trends. The next chapter explores the challenge of improving outcomes in greater detail.

Key Messages

The key messages of this chapter are as follows:

- NCDs represent a large and growing share of the disease burden, and therefore cause for concern, in countries around the world. Their relevance to the World Bank arises from the known and potential linkages with poverty; the health and economic losses they impose on populations, including those of working age; and the demands they will place on resources because of the growing NCD burden associated with aging populations.
- The objective of addressing NCDs is both to reduce premature mortality and, for a given mortality profile, to reduce morbidity. The latter is referred to as the compression of morbidity or healthy aging.
- NCD deaths are expected to rise over the next 25 years essentially because projected epidemiological trends, namely, declining age-specific death rates, will not be rapid enough to offset the effects of an older population structure. Thus, NCDs pose a dual challenge for public policy: to avoid the burden of disease imposed by NCDs to the greatest extent possible, but also to prepare for the aging-related pressures that NCDs will impose on health systems.
- The compression of morbidity is an important objective, and even though cross-country evidence is mixed, the experiences of certain countries at certain points in time suggest that it is achievable. On balance, however, healthy aging is more likely to be the result of more medical care (given the large underprovision of many NCD interventions in low- and middle-income countries at present) rather than the cause of less medical care due to better health. This does not diminish its desirability, but rather underlines the need for policy preparedness.
- Economic growth, nonclinical interventions to control risk factors, and direct medical care will all play important roles in improving future NCD outcomes in low- and middle-income countries. None of the three in isolation is likely to be adequate to bring these countries' mortality rates down to the levels currently prevailing in high-income countries.

Notes

1. More specifically, the contribution of demographic change is approximated by calculating the difference between 2002 mortality and mortality in the hypothetical scenario in which 2002 age-specific death rates are applied to the projected 2030 population (that is, the demographics change, but the epidemiological structure does not). Similarly, the contribution of epidemiological change is approximated by calculating the difference between 2002 mortality and mortality in the hypothetical scenario in which projected 2030 age-specific death rates are applied to the 2002 population (that is, the epidemiological structure changes, but the demographic profile does not). See Mathers and Loncar (2005) for more details.
2. How to achieve higher growth is outside the scope of this report, so the focus here will be on the other two channels. It is also clear that income is not an all-determining factor in health outcomes, given the observed cross-country differences in those outcomes when controlling for gross domestic product per capita or health spending (see World Bank 2004).