

Chapter 2

Intersectoral Policy Priorities for Health

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INTRODUCTION

Many aspects of population health can be addressed solely by services delivered through the health sector. These services include health promotion and prevention efforts as well as treatment and rehabilitation for specific diseases or injuries. At the same time, policies initiated by or in collaboration with other sectors, such as agriculture, energy, and transportation, can also reduce the incidence of disease and injury, often to great effect. These policies can make use of several types of instruments, including fiscal measures (taxes, subsidies, and transfer payments); laws and regulations; changes in the built environment (roads, parks, and buildings); and information, education, and communication campaigns (see chapter 1 of this volume, Jamison and others 2018). In addition, a range of non-health sector social services can mitigate the consequences of ill health and provide financial protection. These intersectoral policies that promote or protect health, when implemented as part of a coherent plan, can constitute a whole-of-government approach to health (UN 2012).

Ideally, a whole-of-government approach to health would involve the systematic integration of health considerations into the policy processes of all ministries. This collaborative approach is often termed *Health in All Policies* (Khayat-zadeh-Mahani and others 2016). Some governments have achieved such collaboration by employing ministerial commissions or other

mechanisms comprising top-level policy makers to enable health-related decisions to be made across government sectors (Buss and others 2016). The goal is to create benefits across sectors by taking actions to support population health and beyond that, to ensure that even “nonhealth” policy decisions and implementation have beneficial, or at least neutral, effects on determinants of health. Intersectoral involvement increases the arsenal of available tools to improve health, helps ensure that government policies are not at cross-purposes to each other, and can generate sizable revenue (as in the case of tobacco and alcohol taxes).

Many countries do not practice a Health in All Policies approach, and doing so is especially challenging when there are extreme resource constraints, low capacity, and weak governance and communication structures (Khayat-zadeh-Mahani and others 2016), as in many low- and middle-income countries (LMICs). As an alternative in these settings, a ministry of health could engage other sectors opportunistically and strategically on specific issues that are likely to produce quick successes and have substantial health effects (WHO 2011a). Thus, a concrete menu of policy options that are highly effective, feasible, and relevant in low-resource environments is needed. This need is particularly relevant in light of the ambitious targets specified in the United Nations Sustainable Development Goals (SDGs) for 2030 (UN 2015).

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The *Disease Control Priorities* series has consistently stressed the importance of intersectoral action for health and the feasibility of intersectoral action in LMICs. *Disease Control Priorities in Developing Countries*, second edition (*DCP2*) (Jamison and others 2006), included chapters that emphasized intersectoral policies for specific diseases, injuries, and risk factors, and it also included a chapter devoted to fiscal policy (Nugent and Knaul 2006). *Disease Control Priorities*, third edition (*DCP3*), has reinforced many of these messages—usually with newer and stronger evidence—and has also explored some emerging topics and new paradigms, particularly for control of noncommunicable disease risk factors. Volume 7 of *DCP3* is especially noteworthy in this respect: it provides a list of 111 policy recommendations for prevention of injuries and reduction of environmental and occupational hazards, 109 of which are almost entirely outside the purview of health ministers to implement (Mock and others 2017).

Despite the political barriers to developing an intersectoral agenda for health, this chapter contends that not only is intersectoral action a good idea for health—it is a must. Much of the reduction in health loss globally over the past few decades can be attributed to reductions in risk factors such as tobacco consumption and unsafe water that have been implemented almost exclusively by actors outside the health sector (Hutton and Chase 2017; Jha and others 2015). An environment that increases health risks at early stages of industrial and urban growth often, although not always, gives way to a cleaner natural environment at higher levels of per capita income. Yet these risks can be associated with dramatic health losses along the way (Mock and others 2017). Furthermore, the health risks produced by advanced industrialization—such as unhealthy diet and physical inactivity—require policy interventions across multiple sectors if they are not to worsen substantially with economic development.

This chapter is based on a close look at the intersectoral policies recommended across the *DCP3* volumes, and it proposes 29 concrete early steps that countries with highly constrained resources can take to address the major risks that can be modified. The chapter also touches on broader social policies that address the consequences of ill health and stresses that the need for such policies will increasingly place demands on public finance. This chapter can be viewed as a complement to chapter 3 of this volume (Watkins and others 2018) concerning health sector interventions in the context of universal health coverage. It also provides illustrative examples of successful health risk reduction through intersectoral policy and discusses various aspects of policy implementation. By synthesizing non-health sector policies separately and in greater depth

in this chapter, *DCP3* seeks to reinforce the importance of these policy instruments and provide a template for action for ministers of health when engaging other sectors and heads of state.

HEALTH CONDITIONS AND RISK FACTORS AMENABLE TO INTERSECTORAL ACTION

Most of this chapter discusses policies that influence the distribution of selected risk factors for diseases and injuries across the population (Jamison and others 2018). Risk factors fall into three broad categories:

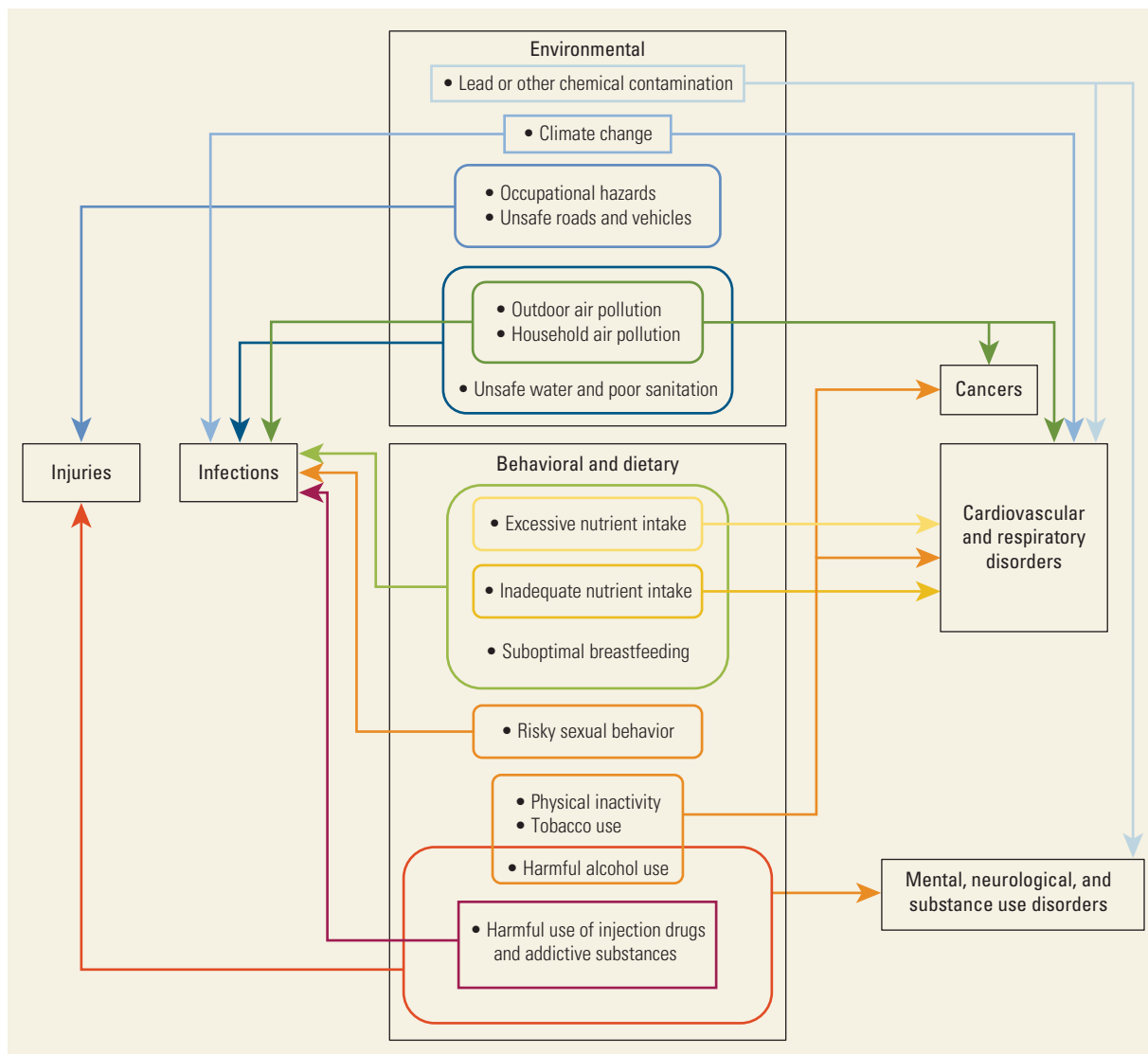
1. *Individual personal characteristics*. Important characteristics include an individual's genetics (including epigenetic factors arising very early), age, height, body mass index, blood lipid profile, blood pressure, and many others. Although age and genetics cannot be modified, they may provide information to guide medical treatment and behavior.
2. *Diseases*. Some diseases increase the risk of other diseases or increase their severity. Important examples include diabetes, hepatitis, severe mood disorders, and malaria. In some cases, the burden from diseases as risk factors well exceeds their intrinsic burden. Diabetes is one of the most prominent examples in this regard (Alegre-Díaz and others 2016).
3. *Behavior and environment*. Important examples of behavioral risk factors include diets that contribute to adiposity and vascular risk; diets that contribute to undernutrition; lack of exercise; unsafe sex; and abuse of addictive substances such as tobacco, alcohol, and narcotics. Important environmental risk factors include air and water pollution and unsafe occupational and transport conditions.

This chapter's main focus is on instruments of policy intended to change the third category of risk factors: behavior and environment. Changes in behavior and environment can influence disease incidence or severity either directly or by modifying other risk factors. Interventions that address both individual personal characteristics and diseases as risk factors are covered in chapter 3 of this volume (Watkins and others 2018).

Conceptual Model for Interactions among Health Risks

Behavioral and environmental risk factors can be disaggregated into multiple specific risks, illustrating sources and pathways of risk exposure. The more disaggregated set of risk factors outlined in figure 2.1 has two

Figure 2.1 Conceptual Model of Interactions among Key Risk Factors and Diseases That Can Be Modified



striking features. First, multiple risk factors can overlap and interact to influence the incidence of specific diseases or injuries; for example, smoking, dietary risks, and physical inactivity can all contribute to the development of ischemic heart disease (Ajay, Watkins, and Prabhakaran 2017). Second, single risk factors can be responsible for a substantial fraction of cases of multiple diseases or injuries; for example, air pollution from outdoor sources can lead to chronic obstructive pulmonary disease and asthma, among other conditions (Smith and Pillarisetti 2017). One implication of these interactions is that aggressive targeting of a few major risk factors, such as tobacco smoke and air pollution, can greatly improve population health.

Magnitude of Health Loss from Specific Risk Factors

There are theoretical and practical challenges to quantifying the effect of specific risk factors on fatal and non-fatal outcomes. Comparative risk assessment is the most commonly used approach for this purpose, and its limitations have been reviewed elsewhere (Hoorn and others 2004). Whereas expanded direct measurement of deaths by cause has led to greater precision in mortality estimates in recent years, especially in LMICs (Jha 2014), methods and data sources that can be used to quantify risk factor-attributable mortality are much less developed and subject to greater uncertainty. Nonetheless, for priority setting, information on mortality patterns by broad cause group and the relative proportion of cases

that can be attributed to modifiable risk factors, the latter of which is taken from comparative risk assessment studies, is useful. The data shown in table 2.1 suggest that perhaps one-fourth or more of the 57 million deaths globally in 2015 can be attributed to one or more behavioral or environmental risk factors.

In addition, several environmental and behavioral risk factors have been studied for their effects on life expectancy. Air pollution studies have estimated life expectancy losses of 3.3 years in India (Sudarshan and others 2015) and 5.5 years in northern China (Chen and others 2013). (It is important to note that the methodological challenges to estimating the relative risks from air pollution appear to be considerable in settings where there is widespread exposure [Lipfert and Wyzga 1995]). The losses from unsafe water and sanitation appear to be somewhat smaller—ranging from one month in more-developed areas of Mexico to one year or more in the least-developed areas (Stevens, Dias, and Ezzati 2008). In the behavioral risk factor cluster, tobacco studies have estimated that smokers in India, Japan, the United Kingdom, and the United States have about 10 years' lower life expectancy than their nonsmoking peers (Jha and Peto 2014). A U.S. study estimated that physical inactivity, defined as sitting for more than three hours a day, decreases life expectancy by three years (Katzmarzyk and Lee 2012).

Yet another way of appreciating the importance of various risk factors is simply to compare estimates of the proportion of the population exposed to specific risks. The World Health Organization (WHO) Global Health Observatory database contains estimates of the prevalence of a number of important risk factors (WHO 2016b). In the environmental cluster, 95–99 percent of cities across low- and lower-middle-income countries

exceed WHO-recommended limits on ambient particulate matter. Further, 91 percent and 56 percent of households in these two income groups, respectively, still used solid fuels for cooking in homes in 2013. Water, sanitation, and hygiene indicators appear to be more favorable: 34 percent and 11 percent, respectively, lack access to improved water sources; and 71 percent and 48 percent, respectively, lack access to improved sanitation. These proportions have declined significantly over the past decade (Hutton and Chase 2017).

As for the behavioral cluster of risk factors, insufficient physical inactivity appears to be the most prevalent risk, particularly among adolescents, with estimates ranging from 78 to 85 percent across World Bank income groups in 2010. The prevalence of risky sexual behavior among reproductive-age individuals in low-income and lower-middle-income countries was an estimated 74 percent and 30 percent, respectively, over 2007–13. The prevalence of tobacco smoking—likely the most hazardous behavior of all—was about 17–18 percent among adults in low- and lower-middle-income countries in 2012 (WHO 2016b).

Distal Determinants of Health

Inadequate individual or household income constrains access to clean water, adequate sanitation, safe shelter, medical services, and other goods and services potentially important for health. Inadequate education results in less likelihood that individuals will acquire information relevant to their health-related behaviors or use that information well. For these reasons, income, education, and other social (or socioeconomic) determinants of health have received much attention for many years.

Table 2.1 Magnitude of Effect of Top Environmental and Behavioral Risk Factors on Major Causes of Death, 2015

Risk category	Number of deaths globally in 2015 (millions)	Share of deaths attributable to one or more behavioral or environmental risks (%)	Top risk factors
Communicable, maternal, perinatal, and nutritional conditions ^a	12	30	Unsafe water, sanitation, and handwashing; maternal and child nutritional risks; unsafe sex; air pollution; tobacco smoke
Noncommunicable diseases	40	24	Dietary risks; tobacco smoke; air pollution; alcohol and drug use; low physical activity; occupational hazards
Injuries ^b	5	20	Alcohol and drug use

Sources: GBD Risk Factors Collaborators (Forouzanfar and others 2016).

Note: Mortality data are taken from World Health Organization (WHO) Global Health Estimates database (Mathers and others 2018, chapter 4 of this volume). Risk factor proportions are taken from the Global Burden of Disease (GBD) 2015 Study (Forouzanfar and others 2016) because similar data were not available from Mathers and others (2018). The table includes risk factors that were estimated to be responsible for 1 percent or more of total deaths globally.

a. For alternative estimates of the attributable burden of maternal and child nutritional risks, see the 2013 *Lancet* series on “Maternal and Child Nutrition” (*Lancet* 2013).

b. Unsafe roads are not included as a risk factor in the GBD 2015 project (Forouzanfar and others 2016); however, the WHO estimates that about 1.3 million road injury deaths occurred in 2015, comprising about 2 percent of all deaths in 2015 (Mathers and others 2018).

Two recent studies extend cross-country time-series studies dealing with income and education (Jamison, Murphy, and Sandbu 2016; Pradhan and others 2017). Three broad conclusions emerge from this literature:

1. *Countries' income levels* are highly statistically significant but quantitatively small factors in terms of influencing reductions in both adult and child mortality.
2. *Level and quality of education* are both statistically significant and quantitatively important. Pradhan and others (2017) concluded that about 14 percent of the decline in under-five mortality between 1970 and 2010 resulted from improvements in education levels. Likewise, about 30 percent of the decline in adult mortality resulted from improvement in education.
3. *Female education* is far more important than male education for reducing both adult and child mortality.

Aside from income and education, social norms and attitudes can greatly affect health. For example, discrimination and stigma have been shown to increase the risks of acquiring sexually transmitted infections, suffering from mental disorders, and incurring injuries from interpersonal violence (Drew and others 2011; Piot and others 2015). In some countries, legalized discrimination persists against vulnerable groups such as men who have sex with men and transgender people. Even in countries without harsh legal arrangements, pervasive discrimination—for example, against indigenous groups—can greatly limit access to needed health and other social services (Davy and others 2016).

Emerging evidence suggests that providing legal and human rights protections to vulnerable and stigmatized groups can reduce health risks or improve health outcomes. Conversely, the lack of such protections can increase health risks and worsen outcomes. For example, criminalization of sex work and same-sex relations is associated with increased risk of human immunodeficiency virus (HIV) among commercial sex workers and men who have sex with men, through mechanisms such as increased risk of sexual violence and decreased provision and uptake of HIV prevention services (Beyrer and others 2012; Shannon and others 2015). At the same time, decriminalization can “avert incident infections through combined effects on violence, police harassment, safer work environments, and HIV transmission pathways” (Piot and others 2015). In general, criminalization of same-sex relations and certain health conditions—such as drug addiction and abortion—often leads to worse health outcomes and cannot be supported on health grounds (Godlee and Hurley 2016; Sedgh and others 2016).

A review of the full range of potential social determinants or the health outcomes they affect is beyond the scope of this chapter. However, these findings are highlighted to note two implications for intersectoral action on health. First, the level of female education appears to be a quantitatively important social determinant of mortality reduction, so discussions of intersectoral policies for health need to stress the importance of female education. Second, discrimination and violation of human rights lead to worse health outcomes and need to be considered in conversations with ministers of justice and law enforcement.

INTERSECTORAL POLICY PACKAGES

Essential Intersectoral Policies

Chapter 1 of this volume (Jamison and others 2018) describes the 21 packages of disease interventions presented throughout the nine *DCP3* volumes that contain 327 interventions in total. Of these, 218 are health sector specific and are covered in chapter 3 of this volume (Watkins and others 2018). The remaining 119 intersectoral interventions are discussed in this chapter.

Annex 2A presents the contents of the intersectoral component of *DCP3*'s essential packages of interventions. These policy interventions varied across packages in terms of their level of specificity, and in a number of cases (such as tobacco taxation) they were duplicated across packages. The authors of this chapter critically reviewed this list of policies and consolidated and harmonized them. This process led to a list of 71 harmonized intersectoral interventions that were grouped by risk factor and type of policy instrument (annex 2B).

Annex 2C provides a few important additional characteristics of the interventions contained in the harmonized list. These include

- The risk factor(s) or cause(s) of death or disability addressed
- The ministry primarily responsible for implementation of the policy
- Whether there are health sector interventions that are equally or more effective (that is, to serve as so-called substitutes—in which cases a health sector approach may be more feasible than an intersectoral approach in limited resource settings)
- Where relevant, notable costs and benefits of the intervention to other sectors
- SDG target(s) addressed.

The vast majority of interventions in annexes 2A and 2B were featured in volume 7 of *DCP3*. Major areas of

focus in this volume were air pollution, road injuries, and a number of individually small but collectively important environmental toxins such as lead, mercury, arsenic, and asbestos. This volume also included a number of interventions focused on occupational health, primarily by reducing occupational injury. Volumes 3, 4, and 5 of *DCP3* contained a number of interventions focused on noncommunicable disease risk, particular from addictive substances and excessive nutrient intake. The most common types of policy instruments recommended were legal and regulatory instruments (38 of 71), followed by fiscal instruments (15 of 71).

An Early Intersectoral Package

The 71 interventions listed in annex 2B constitute a demanding menu for policy makers, especially in low-resource settings. Even in well-resourced settings, an incremental approach to implementation of the essential intersectoral package may be politically or

economically more tractable than a comprehensive approach. Further, epidemiological and economic conditions will dictate that some intersectoral interventions can await a more urgent need for their implementation. Nonetheless, initiating a subset of intersectoral interventions as soon as possible to achieve significant progress during the 2015–30 SDG period is important. The focus could be on those policies that are likely to provide the best value for money and to be feasible in a wide range of settings.

Table 2.2 outlines the authors’ distillation of the contents of annex 2B into an *early* intersectoral package. This package draws on policy interventions that the authors have reviewed and determined to have the strongest evidence and the highest likely magnitude of health effect. (The specific interventions are shown in boldface in annex 2B.) In some cases, the policies have quickly and directly resulted in a measurable decline in mortality, with notable examples being in the area of household air pollution (box 2.1) and suicide prevention (box 2.2).

Table 2.2 Components of an Early Intersectoral Package of Policy Instruments

Key health risk	Policy	Instrument
Air pollution	1. Indoor air pollution: subsidize other clean household energy sources, including liquid propane gas (LPG), for the poor and other key populations.	Fiscal
	2. Indoor air pollution: halt the use of unprocessed coal and kerosene as a household fuel.	Regulatory
	3. Indoor air pollution: promote the use of low-emission household devices.	Information and education
	4. Emissions: tax emissions and/or auction off transferable emission permits.	Fiscal
	5. Emissions: regulate transport, industrial, and power generation emissions.	Regulatory
	6. Fossil fuel subsidies: dismantle subsidies for and increase taxation of fossil fuels (except LPG).	Fiscal
	7. Public transportation: build and strengthen affordable public transportation systems in urban areas.	Built environment
Addictive substance use	8. Substance use: impose large excise taxes on tobacco, alcohol, and other addictive substances.	Fiscal
	9. Substance use: impose strict regulation of advertising, promotion, packaging, and availability of tobacco, alcohol, and other addictive substances, with enforcement.	Regulatory
	10. Smoking in public places: ban smoking in public places.	Regulatory
Inadequate nutrient intake	11. School feeding: finance school feeding for all schools and students in selected geographical areas.	Fiscal
	12. Food quality: ensure that subsidized foods and school feeding programs have adequate nutritional quality.	Regulatory
	13. Iron and folic acid: fortify food.	Regulatory
	14. Iodine: fortify salt.	Regulatory

table continues next page

Table 2.2 Components of an Early Intersectoral Package of Policy Instruments (continued)

Key health risk	Policy	Instrument
Excessive nutrient intake	15. Trans fats: ban and replace with polyunsaturated fats.	Regulatory
	16. Salt: impose regulations to reduce salt in manufactured food products.	Regulatory
	17. Sugar sweetened beverages: tax to discourage use.	Fiscal
	18. Salt and sugar: provide consumer education against excess use, including product labeling.	Information and education
Road traffic injuries	19. Vehicle safety: enact legislation and enforcement of personal transport safety measures, including seatbelts in vehicles and helmets for motorcycle users.	Regulatory
	20. Traffic safety: set and enforce speed limits on roads.	Regulatory
	21. Traffic safety: include traffic calming mechanisms into road construction.	Built environment
Other risks	22. Pesticides: enact strict control and move to selective bans on highly hazardous pesticides.	Regulatory
	23. Water and sanitation: enact national standards for safe drinking water, sanitation, and hygienic behavior within and outside households and institutions.	Regulatory
	24. Hazardous waste: enact legislation and enforcement of standards for hazardous waste disposal.	Regulatory
	25. Lead exposure: take actions to reduce human exposure to lead, including bans on leaded fuels and on lead in paint, cookware, water pipes, cosmetics, drugs, and food supplements.	Regulatory
	26. Agricultural antibiotic use: reduce and eventually phase out subtherapeutic antibiotic use in agriculture.	Regulatory
	27. Emergency response: create and exercise multisectoral responses and supply stockpiles to respond to pandemics and other emergencies.	Regulatory
	28. Safe sex: remove duties and taxes on condoms, then introduce subsidies in brothels and for key at-risk populations.	Fiscal
	29. Exercise: take initial steps to develop infrastructure enabling safe walking and cycling.	Built environment

Box 2.1**Bans on Household Coal Use**

Coal has been used for household cooking and heating for around 1,000 years, especially in places such as China and the United Kingdom where coal is easy to mine. The famous 1952 “London smog” (smoke and fog) episode, which killed 12,000 people, was mostly the result of indoor burning of coal for heating (Bell, Davis, and Fletcher 2004).

Household coal use has diminished in high-income countries. Today, it is mostly confined to LMICs, especially China and other countries in the Western Pacific region, where it constitutes around 20 percent of all household fuel use (Duan and others 2010). Indoor burning of coal and other solid fuels is a

risk factor for cancer and cardiac and respiratory diseases in adults and children.

Bans on coal use, and successful enforcement of these bans have been followed by a reduction in premature deaths from these conditions. For example, during the six years after the Irish government banned the sale of coal in 1990, the age-standardized cardiovascular death rate fell by 10.3 percent and the age-standardized respiratory death rate by 15.5 percent (Clancy and others 2002). These reductions suggest that Dublin experienced about 243 fewer cardiovascular deaths and 116 fewer respiratory deaths per year after the coal ban.

Box 2.2

Preventing Suicide in Sri Lanka by Regulating Pesticides

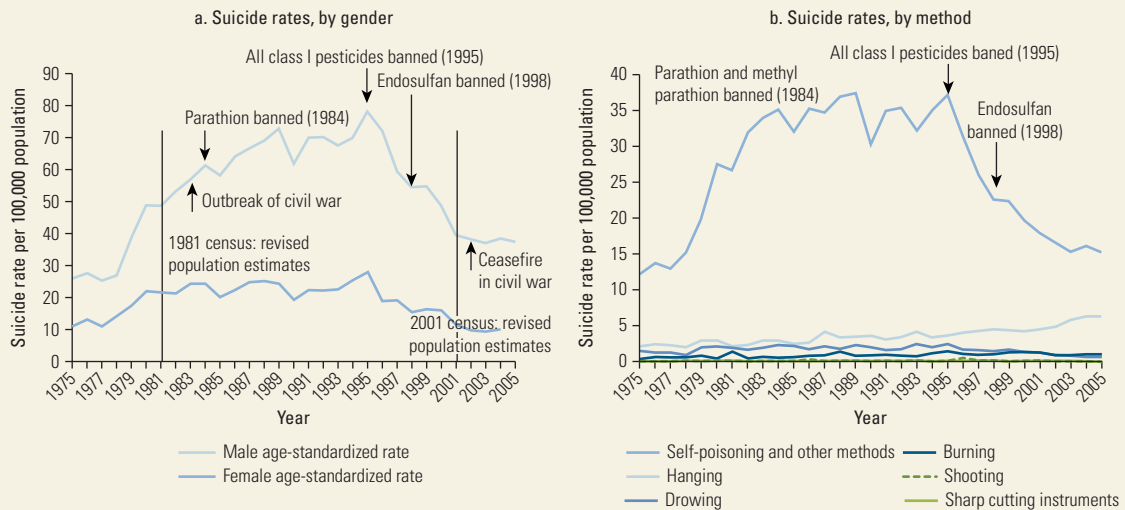
From 1950 to 1995, suicide rates in Sri Lanka increased eightfold to a peak of 47 per 100,000 in 1995, the highest rate in the world (Gunnell and others 2007). Around two-thirds of the suicide deaths during this period were due to self-poisoning with pesticides (Abeyasinghe 2002). Consensus is lacking on the chief contributors to the changing rates of suicide in Sri Lanka, but these are likely to include periods of civil war and economic recession, changes in the rates of mental illness and its treatment, and the easy availability of hazardous agrochemicals (Abeyasinghe 2002; Gunnell and others 2007).

In the 1980s and 1990s, a series of legislative activities led to the stepwise banning of the most toxic of the pesticides being used for self-poisoning. This legislation included (a) the 1984 ban on methyl parathion and parathion, (b) the 1995 ban on the

remaining WHO Class I (“extremely” or “highly” toxic) organophosphate pesticides, and (c) the 1998 ban on endosulfan, a Class II (“moderately hazardous”) pesticide that farmers had been using in place of Class I pesticides (figure B2.1.1, panel a).

An ecological analysis of time trends in suicide and suicide risk factors in Sri Lanka from 1975 to 2005 found that these bans coincided with marked declines in the suicide rates of both men and women (figure B2.1.1, panel a). Time trends in the data on suicide method showed that the large reduction in suicide was mostly due to a reduction in self-poisoning (figure B2.1.1, panel b). Further support for this interpretation came from in-hospital mortality data, which showed a halving in death rates from pesticide self-poisoning—from 12.0 per 100,000 population in 1998 to 6.5 per 100,000 population in 2005.

Figure B2.1.1 Suicide Rates in Relation to Selected Events in Sri Lanka, by Gender and Method, 1975–2005



Source: Gunnell and others 2007.

A few general themes emerge from table 2.2:

- *Nearly all of the policies address risks that produce large negative externalities* such as polluted air (including from tobacco), unsafe driving, and environmental toxins, to name a few. The presence of such externalities justifies the use of aggressive fiscal and regulatory measures to correct the economic inefficiencies that result from the failure of households or firms to take negative externalities into account in their decision making.
- *Many of the policies attempt to regulate or alter markets for unhealthy and often addictive substances* such as tobacco, alcohol, and processed foods. These might be seen as important first steps toward a more comprehensive approach to reduce disease risks that would eventually include greater incentives for healthy eating and physical activity. Greater incentives for healthy eating and physical activity are likely to be much more disruptive and potentially expensive to fully incorporate into a whole-of-government policy but could lead to greater and more sustained gains in healthy life years as incomes grow.
- *These policies require cross-cutting engagement with a few key ministries*, including finance, justice, environment, agriculture, and trade. Ministers of health could seek to develop productive relationships across these key sectors early in the process.

POLICIES TO ADDRESS THE CONSEQUENCES OF ILLNESS OR INJURY

Globally, estimates of overall life expectancy have exceeded estimates of healthy life expectancy by several years on average over the past few decades, suggesting that nonfatal health losses are a significant—and in many countries, growing—concern for global health (WHO 2016b). One group has estimated that at the same time that global mortality has declined in absolute terms, absolute levels of disability have increased over time, particularly in regions that have experienced significant social and economic development (Kassebaum and others 2016). Thus, the general conclusion is that although rapid declines in child and adult mortality have facilitated population growth and aging, these changes have not been matched by improvements in overall rates of disability. In part, this phenomenon can be attributed to unchanged or increased levels of non-communicable disease and injury risk factors that could potentially be addressed using intersectoral measures, as described previously. At the same time, an equally important question is the role of health and nonhealth

sectors in mitigating the consequences of illness and injury for the fraction of cases that are not effectively preventable by addressing the major risk factors.

Projection studies from high-income and selected middle-income countries raise concerns that, even in countries with high-performing health systems, spending on long-term care for individuals with chronic physical or mental disability is significant and likely to continue increasing (de la Maisonnette and Oliveira Martins 2013). A recent study from the Netherlands found that health expenditure increases dramatically with age and nearness to death, with about 10 percent of aggregate expenditure devoted to individuals in their last year of life (Bakx, O'Donnell, and van Doorslaer 2016). Studies from other settings such as the United States validate these findings (Bekelman and others 2016). Yet another concerning result of the Dutch study is that about one-third of total health expenditure in recent years was on long-term care, and the distribution of this share of expenditure was skewed toward a relatively small number of individuals with severe disability (Bakx, O'Donnell, and van Doorslaer 2016). These expenditures were also persistent over time, highlighting the chronic, often lifelong, nature of ill health.

Several sources of long-term disabilities have been observed to accompany economic growth and population aging, including vision and hearing loss, dementias, disability from cerebrovascular disease, and injuries related to advanced age. These conditions are no longer limited to high-income countries; most LMICs are now experiencing substantial health burden related to population aging (WHO 2011b). In many cases, these trends are superimposed on continued high levels of disability at younger ages—for example, disabilities resulting from severe injuries (which can result from interpersonal violence, falls, or transport injury), severe psychiatric disorders, and intellectual disability (Kassebaum and others 2016). The growing population, elderly and nonelderly, needing long-term care in LMICs will inevitably require a greater response from government in the form of broad-based social support measures.

Support for those individuals with long-term disability will need to include health sector-based interventions such as home health services, institutional care (for example, in skilled nursing facilities), and palliative care, but it will need more than the health sector can provide to care adequately for the whole person. Intersectoral policies can be developed to provide these individuals with assistance in obtaining affordable food, housing, and transportation, all of which are instrumental to preventing further health loss. These policies usually fall under the category of transfer payments and may be delivered directly as grants (nonwage income) or through

more targeted efforts such as subsidized housing or nutrition programs.

These transfer payments provide an important opportunity for ministries of health to work with ministries of social development and others to care for the whole individual. In some settings, intersectoral collaboration has led to large-scale anti-poverty, social welfare, and cash-transfer programs that integrate key social support measures and enable effective uptake of health interventions (Watkins and others 2018). There are examples of successful social support programs that effectively integrate health interventions, including support for older adults. One of these is Mexico's Prospera program, which has been in operation since the late 1990s and covers the majority of the population living in poverty (Knaul and others 2017).

As a result, *DCP3* recommends that, as resources permit, countries consider income and in-kind social support for individuals living with long-term disability or severe, life-limiting illness (Krakauer and others 2018). Unfortunately, there is a limited evidence base on which to design and implement social support measures in LMICs. Further, the feasibility and sustainability of broad-based social support programs in low-income and lower-middle-income countries, in particular, are unknown. For example, Krakauer and others (2018) produce preliminary estimates of social support costs for individuals in need of palliative care. These costs could vary widely

by country and would depend on the proportion of the population in extreme poverty and the sorts of benefits (such as income, food, and transportation) included in the social support package. In low-income countries, such a comprehensive program would probably be unaffordable at current levels of government spending.

The following three general points can be emphasized for all countries, even those that are not currently able to implement fiscal policies that address long-term care:

1. The need for long-term care is increasing in nearly all countries because of population aging and high rates of nonfatal health loss.
2. Long-term care accounts for a significant fraction of government expenditure in high-income settings, and LMICs need to start preparing for this transition.
3. To address the needs of disabled persons adequately, non-health sectors will need to be engaged and willing to assume a large part of the fiscal responsibility.

This last point suggests that countries could begin to develop a more inclusive notion of national health accounts. Mexico's experience in developing inclusive national health accounts can be instructive for other LMICs (box 2.3). In light of the critical gaps in current evidence and the rapid shifts in disease burden in

Box 2.3

Inclusive National Health Accounts: The Case of Mexico

National health accounts (NHAs) show that Mexico spent 5.7 percent of its gross domestic product (GDP) on health in 2015. This share is low compared with an average of 9.3 percent among Organisation for Economic Co-operation and Development countries and an average of 8.2 percent for the Latin American region. However, the real figure is probably much larger because a significant part of health-related economic activities, in particular those related to long-term illness and injuries, goes unreported or unaccounted for by official NHA figures.

The National Institute of Statistics and Geography (INEGI) acknowledged this concern by producing

satellite accounts to estimate the value at market prices of informal health activities generated by economic agents. These satellite accounts are sizable: the value of unpaid work related to health care performed by households alone can add an extra 18.6 percent to the traditional GDP estimates for the health sector. An even more inclusive figure of the costs of ill health would add income transfers of voluntary and legally mandated sick leave and disability insurance. Figures from the main social security institutions would add another 9.2 percent, bringing total health spending estimates closer to 7.3 percent of GDP.

box continues next page

Box 2.3 (continued)

Conservative estimates from the satellite accounts of the combined value of (a) unpaid household members' activities aimed at preventing ill health and caring for and maintaining health both within and outside the household and (b) the volunteer work for nonprofit organizations averages 1 percent of GDP over the past 10 years (INEGI 2017). According to INEGI, the value of 69 percent of total hours and 82 percent of unpaid work comes from household members undertaking mostly specialty care of chronic ailments. Moreover, 70 percent of unremunerated caregivers are women (INEGI 2017).

A more inclusive approach toward NHA also helps estimate the economic consequences of ill health that are increasingly being borne outside of institutional settings. In 2015, approximately half of the burden of disease in Mexico was related to years lived with disability, out of which mental and substance abuse and musculoskeletal disorders accounted for 40 percent (Kassebaum and others 2016), and an estimated 16 percent of the adult population had diabetes (OECD 2016). This burden has not only increased pressure in an already overwhelmed and underfunded public health care system but also created significant pressure on social security institutions. Not surprisingly, about half of total health spending is from private sources, most of it paid out of pocket. Moreover, figures on the value of cash benefits for temporary disability (resulting from illness or accident, whether work or nonwork related, and maternity leave) paid through the main social security schemes—the Mexican Social Security Institute and the Institute of Social Security and Services for State Workers—amount to at least 9.2 percent of total health spending. Adding pensions for permanent disability would include this value. None of these figures are currently being accounted for as health-related spending neither in the NHA nor in the satellite accounts.

Naturally, families also face increased pressure as they seek ways to care for these patients, whether by reorganizing household members' roles and timetables, investing to adapt their homes to better suit their needs, hiring nonfamily caregivers, or sometimes even quitting their own jobs or

reducing work hours. Because long-term care for the elderly or the chronically ill is not reimbursed by social or public health insurance schemes, families must step in and find ways to provide care, sometimes for long periods of time. The institutional response from the health system has been slow regarding long-term care. Elderly or chronically ill patients receive hospital care for acute events, but the supply of publicly funded long-term care or nursing homes to care for them over longer periods is very limited, and services provided by existing private nursing homes need to be paid for out of pocket.

Although social security institutions and other social assistance programs run day centers, which can include meals, families are by far the main provider of long-term care for the elderly (OECD 2007). Mexico's omission in reporting expenditure on long-term care only reflects this institutional void. Part of the value of the informal long-term care provided by families is included in the satellite health accounts, but a significant amount of nursing home services paid for out of pocket by families possibly still goes unregistered.

As health needs become more complex and require care that goes beyond the traditional clinical and acute care settings, a broader perspective is needed to tease apart the economic and organizational implications. Mexico's satellite accounts illustrate one step in this direction, highlighting the need to broaden the range of types of care and providers considered when estimating the production value of the health sector's share of GDP is necessary. Informal care undertaken by families and by nursing homes and other types of long-term care facilities needs to be accounted for, even if this means considering a mix of medical and other services (such as psychological and nutrition services). Yet the indirect costs of illness are also important, as confirmed by the large value of income transfers for temporary disability. These should also be considered for a more inclusive NHA. More comprehensive estimates of the production value of the health sector would increase awareness and inform policy formulation to better prepare for the long-term care transition.

LMICs, the issue of long-term care could be regarded as one of the most important priorities for policy research over the coming years.

IMPLEMENTATION OF AN INTERSECTORAL AGENDA FOR HEALTH

Translation of the Intersectoral Package into Action

The *DCP3* intersectoral package, including the early-priority actions outlined in table 2.2, is intended to provide a list of policy actions outside the health sector that could substantially improve population health through a whole-of-government approach. Of course, the application of this intersectoral package will vary according to epidemiological and demographic considerations. For instance, low- and lower-middle-income countries might place a higher priority on controlling indoor sources of air pollution, improving maternal and child nutrition through food fortification, and scaling up water and sanitation measures. Upper-middle-income and high-income countries would probably devote more efforts toward reductions in dietary risks. Most LMICs could consider implementing stronger road safety and tobacco control measures. All countries could work collectively to address climate change, antimicrobial resistance, and other global threats.

The WHO (2011b) has produced a practical guide to intersectoral engagement that includes a 10-step process for building and sustaining cross-sectoral collaboration. The guide—“Intersectoral Action on Health: A Path for Policy-Makers to Implement Effective and Sustainable Action on Health”—highlights three cross-cutting themes relevant to implementation:

- Careful consideration of the social, cultural, economic, and political context
- Emphasis on generating political will and commitment from all relevant sectors at the national and subnational levels
- Design and reinforcement of accountability mechanisms, which also integrate into the monitoring and evaluation process.

In addition, it stresses that historically major policy change has tended to occur at times of political or economic transition or crisis and that ministries of health should take advantage of these times to put their priorities on the agenda (WHO 2011b).

A number of countries have overcome barriers to implementation by mainstreaming intersectoral approaches to health. A common theme in these successes is that the government, including the health sector, recognized the legitimacy of intersectoral action for health, as the following examples show:

- *Iran* has established several national mechanisms for bringing sectors together to improve health, including the National Coordination Council for Healthy Cities and Healthy Villages (Sheikh and others 2012). The council oversees community-based health improvement initiatives based on strategies such as expanding access to financial credit, social services, and sanitation.
- *Vietnam* has established a national intersectoral coordination mechanism, the National Traffic Safety Committee, with representatives from 15 ministries and agencies, to advise the prime minister on improving road safety. The committee played a key role in the passage of Vietnam’s national mandatory helmet law (box 2.4).

Box 2.4

Reducing Road Traffic Deaths in Vietnam through Helmet Laws

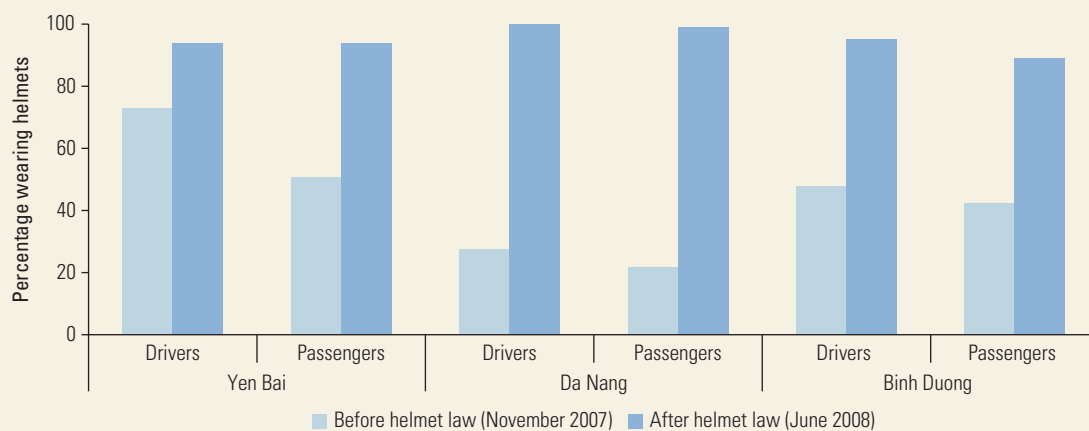
Nearly half of all road deaths worldwide are among groups of individuals who are the least protected—pedestrians, cyclists, and motorcyclists (WHO 2015). The risk to these different groups shows large regional variations. For example, in Sub-Saharan Africa pedestrians and cyclists are at highest risk, whereas in Southeast Asia motorcyclists are at greatest risk.

Head injuries from motorcycle crashes are a common cause of morbidity and mortality. A Cochrane systematic review of 61 observational studies concluded that motorcycle helmets reduce the risk of head injury by around 69 percent and death by around 42 percent (Liu and others 2008). Several countries in Southeast Asia have seen significant reductions in the rate of head injuries and deaths

box continues next page

Box 2.4 (continued)

Figure B2.4.1 Share of Motorcycle Drivers and Passengers Wearing Helmets in Vietnam, 2007 and 2008



Source: Passmore, Nguyen, and others 2010.

Note: Figure shows extent of motorcycle helmet wearing in three provinces of Vietnam before and after the introduction of mandatory helmet-wearing legislation.

among motorcyclists after the introduction of laws that made motorcycle helmet use mandatory (Hyder and others 2007). For example, after Vietnam's mandatory motorcycle helmet law went into effect in December 2007, an observational time-series study using data from a random selection of the road network in three provinces (Yen Bai, Da Nang, and Binh Duong) found significant increases in helmet wearing among both motorcycle riders and their passengers (Passmore, Nguyen, and others 2010), as shown in figure B2.4.1. Surveillance data from 20 rural and urban hospitals found that the risk of road traffic head injuries and deaths decreased by 16 percent

and 18 percent, respectively (Passmore, Tu, and others 2010).

An extended cost-effectiveness analysis of the 2007 helmet policy suggests that it prevented about 2,200 deaths and 29,000 head injuries in the year following its introduction (Olson and others 2016). The analysis found that the wealthy owned the greatest number of motorcycles, so they accrued a larger share of the absolute health and financial benefits from the law. However, the policy probably prevented a larger number of cases of poverty among the poor and middle class as well.

- *Thailand* has vigorously promoted nationwide intersectoral action on health, including the use of health impact assessments. Such assessments are important tools for the health sector to engage other sectors by identifying the possible positive and negative health consequences of other sectoral policies (Kang, Park, and Kim 2011). They have been conducted for a wide range of policies or plans, including biomass power plant projects, patents on medicines, coal mining, and industrial estate development (Phoolcharoen, Sukkumnoed, and Kessomboon 2003).

A Key Role for Ministries of Finance

As shown in table 2.2 and annexes 2A and 2B, many of the essential intersectoral policies in *DCP3* are fiscal in nature. Even the nonfiscal instruments proposed have implications for non-health sector budgets and thus involve ministries of finance to a degree. By tracking the anticipated effects of interventions on government and private revenues and expenditures outside the health sector, annex 2C provides ministries of health with some sense of where opportunity and opposition may arise on fiscal grounds.

Estimating the costs and consequences of intersectoral intervention can be challenging for a variety of reasons, and evaluation of all-of-society costs and benefits of health-related policies is outside the scope of *DCP3*. Health economic evaluations usually implement cost-effectiveness and cost-utility analyses from a health sector perspective on costs. In some cases, cost-effectiveness analysis has been used to evaluate intersectoral interventions. However, this perspective is quite limited because many of the important economic costs and benefits of these interventions lie outside the health sector. Fortunately, interest in benefit-cost analysis has grown within health economics of late, and this approach is ideal for evaluating intersectoral policies (see chapter 9 of this volume, Chang, Horton, and Jamison 2018).

In volume 7 of *DCP3*, Watkins and others (2017) summarize benefit-cost studies, including program costs, of interventions focusing on injury prevention and environmental hazards, which are among the health topics with a significant benefit-cost literature. Although the costs reviewed in volume 7 are neither totally representative nor exhaustive, they can provide a rough sense of the magnitude of intersectoral costs. These range from negative costs in the case of taxes to less than US\$1 per capita per year for regulation and legislation to more than US\$10 per capita per year for certain education interventions or built-environment modifications (Watkins and others 2017).

Taxation-Based Strategies

This chapter strongly recommends taxation-based strategies for addressing harmful substance use and selected environmental hazards because of their clear effect on behavioral change and the positive revenue implications for governments. Tobacco, alcohol, carbon emissions, and unhealthy food products may all be considered as candidates for taxation. Although tobacco and alcohol were originally taxed solely to generate revenue—perhaps as early as the 1300s (Crooks 1989)—the long history of these taxes can provide insights into how to implement a variety of taxes to improve health. The fundamental question to answer first is *what* to tax. For example, is it more effective to tax sugar as a nutrient per se, to tax specific products such as sugar-sweetened beverages, or to opt for a hybrid approach (for example, a tax based on the amount of added sugar in a particular class of products, such as sugar-sweetened beverages)? The pros and cons of any specific tax target need to be evaluated in terms of consumption habits, possible substitution effects (as discussed below), and the administrative costs and feasibility of tax implementation given a country's tax administration. Taxing the amount of

added sugar in a product group would also require information on the nutrient content in those foods.

Closely tied to what to tax is the issue of *substitution* effects—that is, how demand for another product might change when the price of the newly taxed product changes (Fletcher, Frisvold, and Tefft 2013). For example, if sugar-sweetened beverages are taxed, the decrease in sugar intake from reduced consumption of sugar-sweetened beverages might be offset by increased consumption of fruit juice or confectionary products. At the same time, not all substitution effects are negative: recently implemented soda taxes in Mexico were associated with increased consumption of bottled water (Colchero and others 2016, Colchero and others 2017). In some cases, substitution effects might mutually reinforce public health goals ultimately. For example, tobacco taxes appear to decrease binge drinking, presumably because tobacco and alcohol use disorders co-occur in many individuals (Young-Wolff and others 2014). Hence, when designing taxes, policy makers need to consider substitution effects and balance these against implementation feasibility. For example, a broader nutrient tax on sugar or on added sugar in processed foods would decrease the substitution effects relative to a tax on sugar-sweetened beverages alone, but it may not be easily implemented in many settings given the high tax administration requirements.

Several other tax design considerations are worth noting briefly:

- *The type of tax* is important to determine, and experience suggests that excise taxes can be more effective than sales taxes (IARC 2011). Tobacco taxes provide an important example in this regard. Tax rates can be simplified and based on the quantity of cigarettes, not their price (the latter of which is easier for the tobacco industry to manipulate). A related goal is to preempt downward substitution, when smokers switch to cheaper cigarette brands in response to a tax-rate hike on the brands they had previously smoked. Specific excises, as opposed to *ad valorem* (value-based) excises or other taxes, are more effective at doing so. The second strategy is to merge the multiple tobacco tax tiers that are used in most LMICs. This way, tax hikes raise prices by the same large amount on all brands at once, pushing smokers to quit completely rather than switch (Marquez and Moreno-Dodson 2017).
- *The amount of tax* needs to be large enough to change behavior. For example, the WHO recommends that the cigarette excise tax make up at least 70 percent of the final consumer price and that it be designed

to keep up with inflation and overall affordability (WHO 2011c).

- *Tax evasion and avoidance* are common problems that can be mitigated by having effective tax administration measures and harmonized tax rates within a country and with neighboring countries (WHO 2011c).
- *Tax effectiveness* may improve as part of a comprehensive approach that includes public education, regulations, and other types of policies that support behavior change (WHO 2016a).
- *Public and industry opposition to taxes* needs to be anticipated and countered. A traditional tactic of industry groups is to argue that taxes will hurt employment and have a regressive effect on the poor. Yet low-income groups are generally more responsive to these taxes and are likely receive more of the long-term health and economic benefits from the tax (Chaloupka and others 2012).

Subsidy-Related Strategies

Recognizing the role that subsidies can play in increasing or reducing health risks is also important. In many countries, fossil fuels are heavily subsidized, representing a major economic barrier to clean energy (Coady and others 2015). In some countries, broad food subsidies (such as on bread, milk, or other products) are entrenched, but these measures are ineffective in promoting a healthy diet and may actually incentivize overconsumption in environments, such as in the Arab Republic of Egypt, that are experiencing forms of malnutrition currently (IFPRI 2013). Similarly, agricultural subsidies in some countries greatly influence food consumption, both in the producing country and in its trading partners, sometimes to the detriment of health (Fields 2004; Russo and Smith 2013).

In light of anticipated revenue streams and country experiences, a potential expansion path can be conceived for the rollout of fiscal policies directed toward a given substance. A first step would be to remove subsidies—especially important in the case of fossil fuels and unhealthy foods—or, at the very least, to prevent subsidies from being added. The next step would be to add taxes on the substance. The final step would be to add subsidies for healthier substitutes. The first two steps would generate revenue and create fiscal space for subsidies, including those that preferentially affect vulnerable populations.

Intersectoral Action in the SDG Era

One method for increasing political will and accountability is to design policies explicitly linked to international agreements to which governments are already signatories. Annex 2C demonstrates wide-reaching

connections between the *DCP3* intersectoral package and the SDG targets—especially the nonhealth-related SDGs, which are of particular interest to other sectors. These connections and other international agreements that have intersectoral implications (for example, the WHO Framework Convention on Tobacco Control and the United Nations Convention on the Rights of the Child) can be leveraged both to engage other sectors on health issues and to put into place good accountability and reporting mechanisms for specific policies. This approach suggests a strong relationship with ministries of foreign affairs that are accountable for the implementation of these agreements (WHO 2011b).

The SDGs contain strong language on poverty alleviation (for example, SDG 1) and equity (for example, SDGs 5 and 10).¹ One new scientific contribution of *DCP3* has been the development of extended cost-effectiveness analysis (ECEA), which considers not only the health outcomes but also the financial risk protection and distributional (equity-enhancing) effects of policies (as further discussed in chapter 8 of this volume, Verguet and Jamison 2018). Although ECEA most naturally serves as a tool to prioritize various health services for public finance (covered in chapter 3 of this volume, Watkins and others 2018), several ECEAs have also been conducted on intersectoral policies, including tobacco taxation (Verguet and others 2015), regulation of salt in processed foods (Watkins and others 2016), and mandatory helmet laws (Olson and others 2016). These ECEAs show that intersectoral policies can—by reducing disease risk and hence reducing an individual’s need for health care—prevent medical impoverishment, and in some cases they can be pro-poor (meaning the poor benefit disproportionately to their population share from the combined health and financial benefits of such interventions). One area of future work would be to integrate the ECEA approach into health impact assessment or benefit-cost analysis to illustrate the disaggregated non-health benefits of intersectoral policies, particularly when those benefits speak to SDG targets or goals.

ANNEXES

The following annexes to this chapter are available at <http://www.dcp-3.org/DCP>.

- Annex 2A: Intersectoral Policies of *DCP3*’s 21 Essential Packages
- Annex 2B: Essential Intersectoral Policies Covered in This Chapter
- Annex 2C: Characteristics of Essential Intersectoral Policies Covered in This Chapter

NOTES

World Bank Income Classifications as of July 2014 are as follows, based on estimates of gross national income (GNI) per capita for 2013:

- Low-income countries (LICs) = US\$1,045 or less
 - Middle-income countries (MICs) are subdivided:
 - (a) lower-middle-income = US\$1,046 to US\$4,125.
 - (b) upper-middle-income (UMICs) = US\$4,126 to US\$12,745.
 - High-income countries (HICs) = US\$12,746 or more.
1. SDG 1: “End poverty in all its forms everywhere”; SDG 5: “Achieve gender equality and empower all women and girls”; and SDG 10: “Reduce inequality within and among countries.”

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