Chapter 1

Global Priorities for Addressing the Burden of Mental, Neurological, and Substance Use Disorders

Vikram Patel, Dan Chisholm, Rachana Parikh, Fiona J. Charlson, Louisa Degenhardt, Tarun Dua, Alize J. Ferrari, Steven Hyman, Ramanan Laxminarayan, Carol Levin, Crick Lund, María Elena Medina-Mora, Inge Petersen, James G. Scott, Rahul Shidhaye, Lakshmi Vijayakumar, Graham Thornicroft, and Harvey A. Whiteford, on behalf of the DCP MNS authors group

INTRODUCTION

This volume of the third edition of the Disease Control Priorities (DCP) project addresses mental, neurological, and substance use (MNS) disorders. MNS disorders are a heterogeneous range of disorders that owe their origin to a complex array of genetic, biological, psychological, and social factors. Although many health systems deliver care for these disorders through separate channels, with an emphasis on specialist services in hospitals, the disorders have been grouped together in this volume to guide policy makers, particularly in low-resource settings, as they prioritize essential health care packages and delivery platforms (box 1.1).

MNS disorders are grouped together because they share several important characteristics, notably:

- They all owe their symptoms and impairments to some degree of brain dysfunction.
- Social determinants play an important role in the etiology and symptom expression for many of these disorders (box 1.2).
- The disorders frequently co-occur in the same individual.
- Their impact on families and society is profound.
- They are strongly associated with stigma and discrimination.
- They often observe a chronic or relapsing course.
- They all share a pitifully inadequate response from health care systems in all countries, particularly in low- and middle-income countries (LMICs).

Our grouping of MNS disorders is also consistent with programs intended to address their health burden, exemplified by the Mental Health Gap Action Programme (mhGAP) (WHO 2008), and with the goals of the third edition of *Disease Control Priorities (DCP3)* of synthesizing evidence and making recommendations across diverse health conditions. As we emphasize in this volume, these shared characteristics shape the response of countries in addressing the burden of MNS disorders. For example, a strong case is made for an integrated public health response to these conditions in all countries, but particularly in LMICs because of the paucity

Corresponding author: Vikram Patel, Public Health Foundation of India, the London School of Hygiene & Tropical Medicine, and Sangath, Goa, India, vikram.patel@lshtm.ac.uk.

Box 1.1

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Budgets constrain choices. Policy analysis helps decision makers achieve the greatest value from limited available resources. In 1993, the World Bank published *Disease Control Priorities in Developing Countries* (*DCP1*), an attempt to assess the cost-effectiveness (value for money) of interventions in a systematic way that would address the major sources of disease burden in low- and middle-income countries (Jamison and others 1993). The World Bank's 1993 *World Development Report* on health drew heavily on the findings in *DCP1* to conclude that specific interventions against noncommunicable diseases were cost-effective, even in environments in which substantial burdens of infection and undernutrition persisted.

DCP2, published in 2006, updated and extended *DCP1* in several respects, including explicit consideration of the implications for health systems of expanded intervention coverage (Jamison and others 2006). One way that health systems expand intervention coverage is through selected platforms that deliver interventions that require similar logistics but address heterogeneous health problems. Platforms often provide a more natural unit for investment than do individual interventions, but conventional health economics has offered little understanding of how to make choices across platforms. Analysis of the costs of packages and platforms—and the health improvements they can generate in given epidemiological environments—can help guide health system investments and development.

DCP3 differs substantively from *DCP1* and *DCP2* by extending and consolidating the concepts of platforms and packages, and by offering explicit consideration of the financial risk protection objective of health systems. In populations lacking access to health insurance or prepaid care, medical expenses that are high relative to income can be impoverishing. Where incomes are low, seemingly inexpensive medical procedures can have catastrophic financial effects. *DCP3* offers an approach that explicitly includes financial protection as well as the distribution across income groups of financial and health resulting from policies (for example, public finance) to increase intervention uptake (Verguet, Laxminarayan, and Jamison 2015).

The task in all *DCP* volumes has been to combine the available science about interventions implemented in very specific locales and under very specific conditions with informed judgment to reach reasonable conclusions about the impact of intervention mixes in diverse environments. The broad aim of *DCP3* is to delineate essential intervention packages—such as the package for mental, neurological, and substance use disorders, in this volume—and their related delivery platforms. This information will assist decision makers in allocating often tightly constrained budgets so that health system objectives are maximally achieved.

DCP3's nine volumes are being published in 2015 and 2016 in an environment in which serious discussion continues about quantifying the sustainable development goal (SDG) for health (UN 2015). DCP3's analyses are well-placed to assist in choosing the means to attain the health SDG and assessing the related costs for scaled-up action.

of specialist services in these settings. Such services have been the hallmark of the health system response to these conditions in high-income countries (HICs).

DCP1 had only addressed a few MNS disorders: psychosis and bipolar disorder. *DCP2* had focused on the cost-effectiveness of specific interventions for burdensome disorders, organized separately for mental disorders, neurological disorders, alcohol use disorders, illicit drug use disorders, and learning and developmental disabilities. In this third edition, we have considered interventions for five groups of disorders—adult mental disorders, child mental and developmental disorders, neurological disorders, alcohol use disorder, and illicit drug use such as opioid dependence—and suicide and self-harm-health outcomes strongly associated with MNS disorders. Within each group, we have prioritized conditions associated with high burden for which there is evidence in support of interventions that are cost-effective and scalable.

Box 1.2

Social Determinants of Mental, Neurological, and Substance Use Disorders

A range of social determinants influences the risk and outcome of MNS disorders. In particular, the following factors have been shown to be associated with several MNS disorders (Patel and others 2009):

1. Demographic factors, such as age, gender, and ethnicity
2. Socioeconomic status: low income, unemployment, income inequality, low education, and low social support
3. Neighborhood factors: inadequate housing, overcrowding, neighborhood violence
4. Environmental events: natural disasters, war, conflict, climate change, and migration.
5. Social change associated with changes in income, urbanization, and environmental degradation

The causal mechanisms of the social determinants of MNS disorders indicate a cyclical pattern. On the one hand, socioeconomic adversities increase the risk for MNS disorders (the *social causation* pathway); on the other hand, people living with MNS disorders drift into poverty during the course of their life through increased health care expenditures, reduced economic productivity associated with the disability of their condition, and stigma and discrimination associated with these conditions (the *social drift* pathway).

Understanding the vicious cycle of social determinants and MNS disorders provides opportunities for interventions that target social causation and social drift. In relation to social causation, the evidence for the mental health benefits of poverty alleviation interventions is mixed but growing. In relation to social drift, the evidence for the individual and household economic benefits of the prevention and treatment of MNS disorders is compelling, and supports the economic argument for scaling up these interventions (Lund and others 2011).

Inevitably, such an approach does not address a significant number of conditions, for example, multiple sclerosis as a neurological disorder and anorexia nervosa as an adult mental disorder. However, the recommendations in this volume, particularly regarding the delivery of packages for care, could be extended to other conditions not expressly addressed. In addition, some important MNS disorders or concerns are covered in companion volumes of *DCP3*, notably, nicotine dependence, early childhood development, neurological infections, and stroke.

This volume addresses four overall questions and themes (box 1.3):

- First, we address the question of *why* MNS disorders deserve prioritization by pointing to and reviewing the health and economic burden of disease attributable to MNS disorders. We build on the 2010 estimates of the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD 2010) in two important ways: by examining trends in the burden over time, and by estimating the additional mortality attributable to these disorders.
- Second, we address the question of *what* by reviewing the evidence on the effectiveness of specific interventions for the prevention and treatment of a selection of MNS disorders.
- Third, we consider *how* and *where* these interventions can be appropriately implemented across a range of service delivery platforms.
- Fourth, we address the question of *how much* by examining the cost of scaling up cost-effective interventions and the case for enhanced service coverage and financial protection for MNS disorders.

This chapter also considers how some countries have attempted to incorporate this body of evidence into scaled-up programs for MNS disorders. The chapter discusses lessons on barriers and strategies for how these will need to be addressed for successful scaling-up.

The primary focus of the volume—and *DCP3* as a whole—is on LMICs. We include HICs in the section on global disease burden, and we draw liberally on the concentration of available evidence on intervention effectiveness from these countries.

Box 1.3

Key Messages

This volume of the third edition of *Disease Control Priorities* addresses mental, neurological, and substance use (MNS) disorders. These heterogeneous conditions share several characteristics, not least that they are among the most neglected of diseases globally. This volume focuses on those conditions associated with the greatest burden for which there are effective and scalable interventions. The key findings and messages of the volume are presented in this overview chapter, as well as an assessment of critical health system barriers to scaling up evidence-based interventions and how to overcome them.

The following are the key messages:

1. *The burden of MNS disorders is large, growing, and underestimated.*
   The public health burden of MNS disorders, as estimated by disability-adjusted life years, is on a sharp upward trajectory; it increased by 41 percent between 1990 and 2010 and now accounts for one in every 10 years of lost health globally. Even this sobering statistic is an underestimate, because it does not explicitly take into consideration either the substantial excess mortality associated with these disorders, estimated in this volume for the first time, or the enormous social and economic consequences of MNS disorders on affected persons, their caregivers, and societies.
2. *Many MNS disorders can be prevented and treated effectively.*
   A wide variety of effective interventions can prevent and treat MNS disorders. Although some of these interventions are also supported by evidence of cost-effectiveness, significant gaps remain in the availability of evidence to support the scaling-up of many interventions. Some of these interventions can have significant impacts on other global health and development priorities. For example, the effective management of maternal depression can affect child health outcomes, and the effective management of conduct disorders in children can affect adult antisocial and criminal behavior.
3. *Best practice interventions for MNS disorders can be appropriately implemented across a range of population, community, and health care platforms.*
   - At the population-level platform of service delivery, best practices include legislative and regulatory measures to restrict access to means of self-harm/suicide and reduce the availability of and demand for alcohol.
   - At the community-level platform, best practices include life skills training in schools to build social and emotional competencies in children and adolescents.
   - At the health care platform, which covers self-care, primary health care, and hospital care delivery channels, best practices include self-management of migraine; diagnosis and management of epilepsy, headache, depression, anxiety, alcohol and illicit drug use disorders; and continuing care of schizophrenia and bipolar disorder in primary care.
4. *Public financing of scaling-up is affordable and increases financial protection.*
   The costs of providing a significantly scaled-up package of specified cost-effective interventions for prioritized MNS disorders is estimated at US$3–US$4 per capita of total population per year in low- and lower-middle-income countries, and at least double that in upper-middle-income countries. This package includes interventions at the population, community, and health care levels. Since a significant proportion of MNS disorders may run a chronic and disabling course and adversely affect household welfare, it is important that intervention costs are largely met by governments through increased resource allocation and financial protection measures. Investment of public resources in the prevention and treatment of MNS disorders addresses a large and neglected public health concern; if targeted wisely, this investment will produce substantial economic as well as health benefits in populations at an affordable cost. A policy of moving toward universal public finance can lead to a far more

box continues next page

Box 1.3 (continued)

equitable allocation of public health resources across income groups.

As many countries and the global community move toward a consensus on the need for universal health coverage, this volume provides clear recommendations about which interventions should be prioritized, how they can be delivered, and the expected cost of scaling up these interventions. We provide evidence from four countries to demonstrate how a combination of political will and increased financial commitment to support the delivery of cost-effective preventive and treatment interventions through public systems can lead to significant improvements in service coverage and health outcomes. In most countries, a range of health system barriers will need to be addressed to achieve these goals, not least the lack of strong and technically sound leadership to guide the scaling-up effort, the relatively low levels of demand for care for some of the most common conditions, the high levels of stigma attached to many conditions, and the continuing reliance on specialized hospital-based care as the primary delivery platform.

Realizing the health gains associated with the interventions recommended in this volume will require more than financial resources. Committed and sustained efforts will be needed to address these barriers. The ultimate goal is massively increasing opportunities for persons with MNS disorders to access services without the prospect of discrimination or impoverishment, and with the hope of attaining optimal health and social outcomes.

WHY MNS DISORDERS MATTER FOR GLOBAL HEALTH

The GBD 2010 identified MNS disorders as significant causes of the world's disease burden (Whiteford and others 2013). The DCP3 series as a whole uses the Global Health Estimates of disease burden. This volume also includes data from the 2010 GBD study, which are used in the burden calculations presented in chapter 3 (Charlson and others 2015). The broad patterns conveyed are the same across the 2010 GBD study (Whiteford and others 2013), the more recent 2013 GBD data (Global Burden of Disease Study 2013 Collaborators 2015), and WHO's Global Health Estimates (WHO 2014).

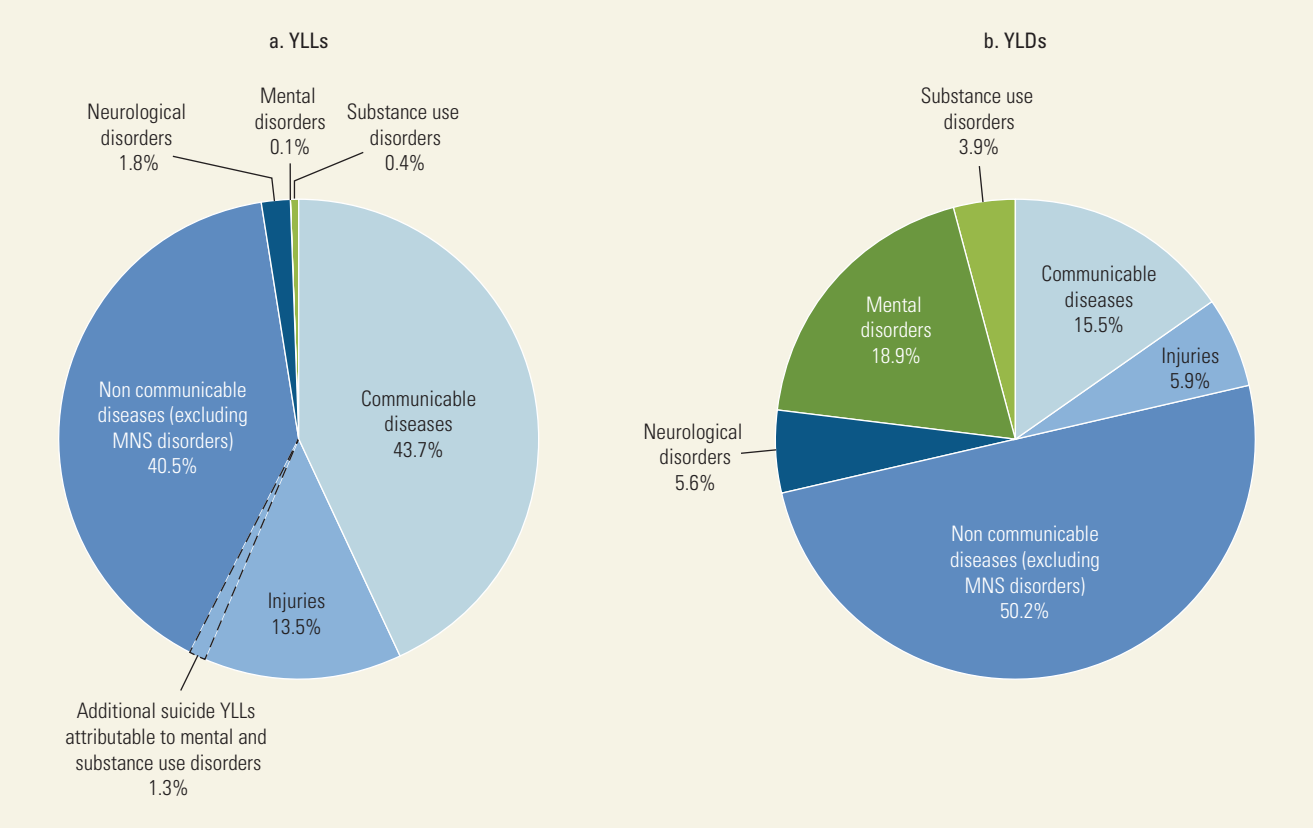
In chapter 2 in this volume (Whiteford and others 2015), we investigate trends in the burden caused by MNS disorders. There was a 41 percent increase in absolute disability-adjusted life years (DALYs) caused by MNS disorders between 1990 and 2010, from 182 million to 258 million DALYs (the proportion of global disease burden increased from 7.3 to 10.4 percent). With the exception of substance use disorders, which increased because of changes in prevalence over time, this increase was largely caused by population growth and aging.

DALYs are constituted of two components: years of life lost (YLLs) and years lived with disability (YLDs). Figure 1.1 summarizes the proportion of all-cause YLLs and YLDs explained by MNS disorders in 2010. As a group, MNS disorders were the leading cause of YLDs in the world. In 2010, DALYs for MNS disorders were highest during early to mid-adulthood, explaining 18.6 percent of total DALYs for individuals aged 15 to 49 years, compared with 10.4 percent for all ages combined. Within the 15 to 49 years age group, mental and substance use disorders were the leading contributor to the total burden caused by MNS disorders. For neurological disorders, DALYs were highest in the elderly.

There are important gender differences in the burden of these disorders. Overall, males accounted for 48.1 percent and females for 51.9 percent of DALYs for MNS disorders. Males accounted for more DALYs for mental disorders occurring in childhood, schizophrenia, substance use disorders, Parkinson's disease, and epilepsy; whereas, more DALYs accrued to females for all other disorders in this group. The relative proportion of DALYs for MNS disorders to overall disease burden was estimated to be 1.6 times higher in HICs (15.5 percent of total DALYs) than in LMICs (9.4 percent of total DALYs), largely because of the relatively higher burden of other health conditions, such as infectious and perinatal diseases, in LMICs. However, because of the larger population of LMICs, absolute DALYs for MNS disorders are higher in LMICs compared with HICs.

Data from GBD 2010 on burden caused by premature mortality may incorrectly lead to the interpretation that premature death in people with MNS disorders is inconsequential. This interpretation is due to how causes of deaths are assigned in the International Classification of Diseases (ICD) death coding system used by GBD 2010. Yet, evidence shows that people with MNS disorders experience a significant reduction in life expectancy, with the risk of mortality increasing with

Figure 1.1 Proportion of Global YLDs and YLLs Attributable to Mental, Neurological, and Substance Use Disorders, 2010



Source: Whiteford and others 2015; http://vizhub.healthdata.org/gbd-compare.
Note: In GBD 2010, injuries included deaths and YLLs due to suicide. Mental and substance use disorders explained 22.5 million suicide YLLs, equivalent to 62.1 percent of suicide YLLs or 1.3 percent of total all-cause YLLs (Ferrari and others 2014).

the severity of the disorder (Chang and others 2011; Lawrence, Hancock, and Kisely 2013; Walker, McGee, and Druss 2015).

Therefore, chapter 3 in this volume (Charlson and others 2015) explores differences between the GBD 2010 estimates of cause-specific and excess mortality of these disorders, and potential contributors to life expectancy gaps. Although reported YLLs accounted for only 15.3 percent of MNS disorder DALYs, equivalent to 840,000 deaths, natural history models generated by DisMod-MR (a disease modeling tool) estimate that substantially more deaths are associated with these disorders. Excess deaths associated with major depression alone were estimated at more than 2.2 million in 2010. This figure is significantly higher than other attempts to quantify these deaths (Walker, McGee, and Druss 2015), and indicates a potentially higher degree of mortality associated with MNS disorders than that captured by GBD 2010 YLLs.

Since these estimates of excess deaths include deaths from causal and non-causal origins, however, they must be interpreted carefully. Table 1.1 summarizes cause-specific and excess deaths attributable to each MNS disorder. Comparative risk analyses have also highlighted mental and substance use disorders as significant risk factors of premature death from a range of other health outcomes (Lim and others 2012). For example, an estimated 60 percent of suicide deaths can be re-attributed to mental and substance use disorders, elevating them from the fifth to third leading cause of burden of disease (Ferrari and others 2014). These findings strongly suggest the importance of continued assessment of the role MNS disorders play in premature death and as risk factors for other health outcomes.

The estimates of disease burden do not fully take into account the significant social and economic consequences of MNS disorders, not only for affected individuals and households, but also for communities and economies. Notable examples of such impacts include the effects of maternal mental disorders on the well-being of children, contributing to the intergenerational transmission of ill-health and poverty; the effects of

Table 1.1 Cause-Specific and Excess Deaths Associated with Mental, Neurological, and Substance Use Disorders, Global Burden of Disease Study, 2010

Disorder	Cause-specific deaths (uncertainty range)	Excess deaths (uncertainty range)	Contributors to excess deaths
Alzheimer's disease and other dementias	486,000 (308,000–590,000)	2,114,000 (1,304,000–2,882,000)	Lifestyle factors including smoking, hypercholesterolemia, high blood pressure, low forced vital capacity; comorbid physical conditions including cardiovascular disease; infectious disease including pneumonia.
Epilepsy	178,000 (20,000–222,000)	296,000 (261,000–331,000)	Underlying conditions including neoplasms, cerebrovascular diseases, and cardiac disease; accident or injury resultant from status epilepticus including drowning and burns.
Migraine	0	0	N/A
Alcohol use disorders	111,000 (64,000–186,000)	1,954,000 (1,910,000–1,997,000)	Comorbid disease including cancer; mental, neurological, and substance use disorders; cardiovascular disease; liver and pancreas diseases; epilepsy, injuries; and infectious disease.
Opioid dependence	43,000 (27,000–68,000)	404,000 (304,000–499,000)	Acute toxic effects and overdose; accidental injuries, violence, and suicide; comorbid disease including cardiovascular disease, liver disease, mental disorders, and blood-borne bacterial and viral infections.
Cocaine dependence	500 (200–500)[c]	96,000 (60,000–130,000)	
Amphetamine dependence	500 (100–300)[c]	202,000 (155,000–250,000)	
Cannabis dependence	0	0	
Schizophrenia	20,000 (17,000–25,000)	699,000 (504,000–886,000)	Suicide and comorbid disease including cardiovascular disease and diabetes.
Major depressive disorder	0	2,224,000 (1,900,000–2,586,000)	Suicide and comorbid disease such as cardiovascular disease and infectious disease.
Anxiety disorders	0	0[a]	Comorbid disease such as cardiovascular disease and neoplasms; intentional and unintentional injuries.
Bipolar disorder	0	1,320,000 (1,147,000–1,495,000)	Comorbid disease such as cardiovascular disease; causes including intentional injuries/suicide.
Disruptive behavioral disorders	0	0[b]	Unintentional injuries including traffic accidents; lifestyle factors such as smoking, binge drinking, and obesity.
Autistic spectrum disorders	0	109,000 (96,000–122,000)	Accidents, respiratory diseases, and seizures; comorbid conditions, particularly epilepsy and intellectual disability.

Source: Whiteford and others 2015.

a. In GBD 2010, the anxiety disorders category represents "any" anxiety disorder. Although mortality data are available for individual anxiety disorders, estimates of mortality associated with "any" anxiety disorder required for GBD purposes are unavailable.

b. There are currently insufficient data to derive estimates of excess mortality for disruptive behavioral disorders.

c. In the GBD 2010 cause of death modeling, the mean value for cocaine and amphetamine use disorders falls outside of the 95% uncertainty interval. This was because the full distribution of 1,000 draws is asymmetric with a long tail, and a small number of high values in the uncertainty distribution pushes the mean above the 97·5 percentile of distribution.

substance use disorders on criminal behavior and incarceration; and the effects of a range of severe conditions on the economic productivity of affected persons and family members engaged in caregiving.

A recent study estimated that total economic output lost to MNS disorders globally was US$8.5 trillion in 2010, a sum expected to nearly double by 2030 if a concerted response is not mounted (Bloom and others 2011). A separate study estimated the economic costs attributable to alcohol use and alcohol use disorders to amount to the equivalent of between 1.3 and 3.3 percent of gross domestic product (GDP) in a range of high- and middle-income countries, with over two-thirds of the loss represented by productivity losses (Rehm and others 2009).

The global cost of dementia in 2010 was estimated to be US$604 billion, equivalent to 1 percent of global GDP (WHO 2012). In addition, a rising tide of social adversities is associated with MNS disorders (box 1.2). Moreover, large and growing proportions of the global population have been affected by conflict or displacement because of environmental degradation and climate change, which bodes for a grim forecast on the future burden of these conditions.

Finally, the disease burden estimates do not account for the significant hazards faced by persons with MNS disorders in relation to the systematic denial of basic human rights. These costs range from limited opportunities for education and employment, to torture and denial of freedom, sometimes within health care institutions (Patel, Kleinman, and Saraceno 2012).

WHAT WORKS? EFFECTIVE INTERVENTIONS FOR THE PREVENTION AND TREATMENT OF MNS DISORDERS

This section addresses the evidence on effective interventions for a subset of MNS disorders selected because of their contribution to the burden of disease and the availability of cost-effective and scalable interventions. The disorders are organized under five broad groups: adult mental disorders (chapter 4), neurological disorders (chapter 5), illicit drug use disorders (chapter 6), alcohol use disorders (chapter 7), and child mental and developmental disorders (chapter 8). Self-harm and suicide (chapter 9), which are commonly associated with MNS disorders, are also addressed.

The selected disorders have their onset across the life course: epilepsy, anxiety disorders, autism, and intellectual disability in childhood; migraine, depression, psychotic disorders (schizophrenia and bipolar disorders), illicit drug use, and alcohol use disorders in adolescence and young adulthood; and dementia late in life. The epidemiologies of these disorders share some important characteristics: with the exception of dementia, the vast majority of cases have their onset before age 30 years and most tend to run a chronic or relapsing course. In addition, several of the disorders are associated with other health concerns. For example, injecting drug use is associated with HIV/AIDS, alcohol use disorders are associated with road traffic injuries and liver cirrhosis, depression is associated with cardiovascular disease, and maternal depression is associated with child undernutrition and delayed cognitive development (Prince and others 2007).

The evidence on interventions presented in this section builds on the work published in *DCP2* and its findings (Chandra and others 2006; Hyman and others 2006; Rehm and others 2006). The evidence is derived from various sources: the mhGAP guidelines developed by the World Health Organization (WHO) for use in non-specialized health settings, which used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology to review the literature published up to 2009 (Dua and others 2011); other recent reviews, where appropriate, such as Strang and others (2012) for illicit drugs; interventions that require a specialist for delivery but that were not addressed by mhGAP or DCP2, assessed with GRADE; and a review of all reviews. The review of all reviews includes systematic reviews and any type of evaluation evidence from LMICs published since mhGAP and assessed with GRADE. The findings are summarized in table 1.2.

Effective Essential Interventions

A wide variety of effective medicines and psychological and social interventions is available to prevent and treat the range of MNS disorders covered in this volume. As shown in table 1.2, it is possible to identify for this group of conditions a set of *essential medicines* (such as antipsychotic, antidepressant, and anti-epileptic medications) and *essential psychosocial interventions* (such as cognitive behavioral therapy and parent skills training). Although there are very few curative interventions for these disorders, the severity and course of most of them can be greatly attenuated by psychosocial treatment or generic formulations of essential psychotropic medicines, including in combinations tailored to the needs of individuals. A small minority of patients with more severe, refractory, or emergency clinical presentations will require specialist interventions, such as inpatient care with expert nursing for acute psychosis, modified electroconvulsive therapy for severe depression, or surgery for epilepsy.

Table 1.2 Effective Interventions for the Prevention, Treatment, and Care of Mental, Neurological, and Substance Use Disorders

Type of disorder		Preventive interventions	Drug and physical interventions	Psychosocial interventions
MENTAL DISORDERS IN ADULTHOOD				
Schizophrenia *(5.3% of total MNS DALYs)*	*Chronic or relapsing condition characterized by delusions, hallucinations, and disturbed behavior*		Antipsychotic medication***	• Family therapy/support** • Community-based rehabilitation* • Self-help and support groups*
Mood and anxiety disorders *(41.9% of total MNS DALYs)*	*Group of conditions characterized by somatic, emotional, cognitive, and behavioral symptoms; bipolar disorder associated with episodes of elated and depressed mood*	CBT for persons with subthreshold symptoms**	Antidepressant, anxiolytic, mood stabilizer, and antipsychotic medication;*** ECT for severe refractory depression**	• CBT*** • Interpersonal therapy**
MENTAL AND DEVELOPMENTAL DISORDERS IN CHILDHOOD AND ADOLESCENCE				
Conduct disorder *(2.2% of total MNS DALYs)*	*Pattern of antisocial behaviors that violate the basic rights of others or major age-appropriate societal norms*	Life skills education to build social and emotional well-being and competencies;** parenting skills training;** maternal mental health interventions*		• Parenting skills training*** • CBT*
Anxiety disorders *(2.3% of total MNS DALYs)*	*Excessive or inappropriate fear, with associated behavioral disturbances that impair functioning*	Parenting skills training;** maternal mental health interventions**		• CBT***
Autism *(1.6% of total MNS DALYs)*	*Severe impairment in reciprocal social interactions and communication skills, as well as the presence of restricted and stereotypical behaviors*			• Parental education and skills training* • Educational support*
ADHD *(0.2% of total MNS DALYs)*	*Neurodevelopmental disorder characterized by inattention and disorganization, with or without hyperactivity-impulsivity, causing impairment of functioning*	Psychosocial stimulation of infants and young children*	Methylphenidate**	• Parenting skills training** • Cognitive behavioral therapy**

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Table 1.2 Effective Interventions for the Prevention, Treatment, and Care of Mental, Neurological, and Substance Use Disorders (continued)

	Type of disorder	Preventive interventions	Drug and physical interventions	Psychosocial interventions
Intellectual disability (idiopathic) *(0.4% of total MNS DALYs)*	*Significantly impaired cognitive functioning and deficits in two or more adaptive behaviors*	Psychosocial stimulation of infants and young children;* perinatal interventions, for example screening for congenital hypothyroidism;** population-based interventions targeting intellectual disability risk factors (such as reducing maternal alcohol use)*		• Parental education and skills training* • Educational support*
NEUROLOGICAL DISORDERS				
Migraine *(8.7% of total MNS DALYs)*	*Episodic attacks where headache and nausea are the most characteristic attack features; headache lasting for hours to 2–3 days, typically moderate or severe and likely to be unilateral, pulsating, and aggravated by routine physical activity*	Prophylactic drug treatment with propranolol or amitriptyline***	Drug treatments, aspirin or one of several other nonsteroidal anti-inflammatory drugs***	• Behavioral and cognitive interventions*
Epilepsy *(6.8% of total MNS DALYs)*	*A brain disorder traditionally defined as the occurrence of two unprovoked seizures occurring more than 24 hours apart with an enduring predisposition to generate further seizures*	Population-based interventions targeting epilepsy risk factors (preventing head injuries, neurocysticercosis prevention)*	Standard anti-epileptic medications (phenobarbital, phenytoin, carbamazepine, valproic acid);*** epilepsy surgery**	
Dementia *(4.4% of total MNS DALYs)*	*A neuropsychiatric syndrome characterized by a combination of progressive cognitive impairment, BPSD, and functional difficulties*	Cardiovascular risk factors management (healthy diet, physical activity, tobacco use cessation)*	Cholinesterase inhibitors and memantine for cognitive functions; medications for management of BPSD*	• Caregiver education and support*** • Behavioral training and environmental modifications ** • Interventions to support caregivers of people with dementia**

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Table 1.2 Effective Interventions for the Prevention, Treatment, and Care of Mental, Neurological, and Substance Use Disorders (continued)

	Type of disorder	Preventive interventions	Drug and physical interventions	Psychosocial interventions
SUBSTANCE USE DISORDERS				
Alcohol use disorders *(6.9% of total MNS DALYs)*	*Harmful use is a pattern of alcohol use that causes damage to physical or mental health* *Alcohol dependence is a cluster of physiological, behavioral, and cognitive phenomena in which the use of a substance takes on a much higher priority for a given individual than other behaviors that once had greater value*	Excise taxes*** Restriction on sales** Minimum legal age** Drunk driving countermeasures** Advertising bans* Restrictions on density* Opening and closing hours and days of sale** Family interventions*	Naltrexone, acamprosate*	• Family support* • Motivational enhancement, brief advice, CBT** • Screening and brief interventions*** • Self-help groups*
Illicit drug use disorders *(7.8% of total MNS DALYs)*	*A pattern of regular use of illicit drugs characterized by significantly impaired control over use and physiological adaptation to regular consumption as indicated by tolerance and withdrawal*	Psychosocial interventions with primary school children, such as the Good Behavior Game or Strengthening Families Program*	Opioid substitution therapy (methadone, buprenorphine)***	• Self-help groups, psychological interventions, CBT*
SUICIDE AND SELF-HARM				
Suicide and self-harm *(1.47% of GBD; 22.5 million YLLs or 62.1% of suicide YLLs are attributed to mental and substance use disorders in 2010)*	*The act of deliberately killing oneself; suicide attempt refers to any nonfatal suicidal behavior and intentional self-inflicted poisoning, injury, or self-harm that may or may not have a fatal intent or outcome*	Policies and legislation to reduce access to the means of suicide (such as pesticides)*** Decriminalization of suicide* Responsible media reporting of suicide*	Effective drug interventions for underlying MNS disorders** Emergency management of poisoning**	• Social support and psychological therapies for underlying MNS disorders, Planned follow-up and monitoring of suicide attempters*

Notes: ADHD = Attention Deficit Hyperactivity Disorder; BPSD = behavioral and psychological symptoms; CBT = cognitive behavioral therapy; DALY = disability-adjusted life year; ECT = electroconvulsive therapy; GBD = Global Burden of Diseases; MNS = mental, neurological, and substance use; YLLs = years of life lost.
*** = evidence of cost-effectiveness; ** = strong evidence of effectiveness but not cost-effectiveness;
* = modest evidence of effectiveness and either no cost-effectiveness or no evidence of cost-effectiveness.

Certain preventive interventions that are primarily intended to target disorders covered in other DCP3 volumes, for example, to prevent cardiovascular diseases or neurocysticercosis, will also have benefits for disorders covered in this volume, such as dementia and epilepsy, respectively. Conversely, some interventions targeting MNS disorders are also associated with benefits to health outcomes for other disorders. Examples include injury prevention as a result of reduced alcohol or drug use or effective treatment of Attention Deficit Hyperactivity Disorder, reduced antisocial behaviors and associated social consequences as a result of treatment of conduct disorders in childhood, improved cardiovascular health as a result of recovery from depression, and enhanced early child development as a result of psychosocial stimulation in infancy. Even for those conditions for which there are currently no highly effective treatments for the primary disorder, such as autism and dementia, psychosocial interventions have been shown to be effective in addressing their adverse social consequences and supporting family caregivers.

Limited Access to Essential Interventions

Despite this evidence, many persons affected by MNS disorders do not have access to the interventions. In general, severe MNS disorders tend to have higher rates of contact coverage, while treatment gaps for less visible conditions, such as harmful drinking and depression and anxiety disorders, approach or exceed 90 percent in many populations. Similarly, the coverage rates tend to be much higher for medicines than for psychosocial interventions. Across all disorders, the rates of effective coverage are low. Supply-side and demand-side barriers play a role in explaining these low coverage rates. The lack of adoption of effective interventions is often influenced by concerns about financial resources. This issue is being addressed by a mounting evidence base demonstrating the effectiveness of the delivery of these interventions by nonspecialist health workers (van Ginneken and others 2013), as well as their costs and cost-effectiveness (chapter 12 in this volume, Levin and Chisholm 2015).

A related resource constraint concerns the low availability of appropriately trained mental health workers. Cultural attitudes and beliefs may also pose specific barriers. For example, the moral model of addiction sees it as largely a voluntary behavior in which people freely engage in substance use. By contrast, the medical model of addiction recognizes that a minority of users will lose control over their use and develop a mental or physical disorder—an addiction—that requires specific treatment if sufferers are to become abstinent. As another example, the symptoms associated with depression or anxiety disorders are commonly interpreted as being normative consequences of social adversity, and proven biomedical or psychological causal models are rare, leading to low demand for care and low visibility of the condition from the view of health policy makers and providers (Aggarwal and others 2014). It is clear that these competing views will affect the societal preference for and acceptability of investment in the wider adoption of effective interventions for MNS disorders. More generally, stigma, lack of awareness, and discrimination are major factors behind low levels of political commitment and the paucity of demand for care for persons with MNS disorders in many populations (Saraceno and others 2007).

HOW TO DELIVER EFFECTIVE INTERVENTIONS?

The implementation of evidence-based interventions for MNS disorders seldom occurs through the delivery of single, vertical interventions. More frequently, these interventions are delivered via platforms—the level of the health or welfare system at which interventions or packages can be most appropriately, effectively, and efficiently delivered. A specific delivery channel, such as a school or a primary health care center, can be viewed as the vehicle for delivery of a particular intervention on a specified platform. Identifying the set of interventions that fall within the realm of a particular delivery channel or platform is of interest and relevance to decision makers because it enables potential opportunities, synergies, and efficiencies to be identified. It also reflects how resources are often allocated in practice, for example, to schools or primary health care services, rather than to specific interventions or disorders. This section identifies three broad platforms: population, community, and health care.

There is a fair amount of good evidence from HICs for interventions across these platforms and along the continuum of primary, secondary, and tertiary prevention. However, the evidence base for LMICs is far less robust. Recommendations for best practice and good practice interventions for the platforms are shown in table 1.3. Best practice interventions were identified on the basis of evidence for their effectiveness and contextual acceptability and scalability in LMICs, plus evidence of their cost-effectiveness at least in HICs. Good practice interventions were identified on the basis of sufficient evidence of their effectiveness in HICs and/or promising evidence of their effectiveness in LMICs. The lack of evidence of cost-effectiveness in LMICs reflects the absence

Table 1.3 Intervention Priorities for Mental, Neurological, and Substance Use Disorders by Delivery Platform

	Platforms for intervention delivery					
			Health care platforms			
Target area	**Population platform**	**Community platform**	**Self-care**	**Primary health care**	**First-level hospital care**	**Specialized care**
All MNS disorders	Awareness campaigns to increase mental health literacy and address stigma and discrimination Legislation on protection of human rights of persons affected by MNS disorders	Training of gatekeepers (community workers, police, teachers) in early identification of priority disorders, provision of low-intensity psychosocial support, and referral pathways Self-help and support groups (for example, for alcohol use disorders, epilepsy, parents of children with developmental disorders, and survivors of suicide)				
Adult mental disorders	Child protection laws	Workplace stress reduction programs and awareness of alcohol and drug abuse	Physical activity Relaxation training Education about early symptoms and their management Web- and smartphone-based psychological therapy for depression and anxiety disorders	Screening and proactive case finding of psychosis, depression, and anxiety disorders **Diagnosis and management of depression (including maternal) and anxiety disorders*** **Continuing care of schizophrenia and bipolar disorder** Management of depression and anxiety disorders in people with HIV, with other NCDs*	Diagnosis and management of acute psychoses Management of severe maternal depression* Management of depression and anxiety disorders in people with HIV, and people with other NCDs*	ECT for severe or refractory depression Management of refractory psychosis with clozapine
Child mental and developmental disorders	Child protection laws	Parenting programs in infancy to promote early child development **Life skills training in schools to build social and emotional competencies** Parenting programs in early and middle childhood (ages 2-14 years) Early child enrichment/preschool education programs Identification of children with MNS disorders in schools	Web- and smartphone-based psychological therapy for depression and anxiety disorders in adolescents	Screening for developmental disorders in children Maternal mental health interventions Parent skills training for developmental disorders **Psychological treatment for mood, anxiety, ADHD, and disruptive behavior disorders*** Improve the quality of antenatal and perinatal care to reduce risk factors associated with intellectual disability	Diagnosis of childhood mental disorders such as autism and ADHD Stimulant medication for severe cases of ADHD Newborn screening for modifiable risk factors for intellectual disability	

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Table 1.3 Intervention Priorities for Mental, Neurological, and Substance Use Disorders by Delivery Platform (continued)

	Platforms for intervention delivery					
			Health care platforms			
Target area	**Population platform**	**Community platform**	**Self-care**	**Primary health care**	**First-level hospital care**	**Specialized care**
Neurological disorders	Policy interventions to address the risk factors for cardio-vascular diseases, for example, tobacco control Improved control of neurocysticercosis		**Self-managed treatment of migraine** Self-identification/ management of seizure triggers Self-management of risk factors for vascular disease (healthy diet, physical activity, tobacco use)	**Diagnosis and management of epilepsy and headaches** Screening for detection of dementia **Interventions to support caregivers of patients with dementia** Management of prolonged seizures or status epilepticus	Diagnosis of dementia and secondary causes of headache	Surgery for refractory epilepsy
Alcohol and illicit drug use disorders	**Regulate the availability and demand for alcohol (for example, increases in excise taxes on alcohol products, advertising bans)** Penalize risky behaviors associated with alcohol (enforcement of BAC limits)	Awareness campaigns to reduce maternal alcohol use during pregnancy	Self-monitoring of substance use	**Screening and brief interventions for alcohol use disorders** **Opioid substitution therapy (methadone and buprenorphine) for opioid dependence**	Management of severe dependence and withdrawal	Psychological treatments (CBT) for refractory cases*
Suicide and self-harm	**Control the sale and distribution of means of suicide (such as pesticides)** Decriminalize suicide	Safer storage of pesticides in the community and farming households	Web- and smartphone-based treatment for depression and self – harm	Primary health care packages for underlying MNS disorders (as described above)* Planned follow-up and monitoring of suicide attempters* Emergency management of poisoning	Treatment of comorbid mood and substance use disorder*	Specialist health care packages for underlying MNS disorders (as described above)

Note: Red type denotes urgent care; blue type denotes continuing care; black type denotes routine care. Recommendations in **bold** = best practice; recommendations in normal font = good practice.
ADHD = Attention Deficit Hyperactivity Disorder; BAC = blood alcohol concentration; CBT = cognitive behavioral therapy; ECT = electroconvulsive therapy; HIV = human immunodeficiency virus; MNS = mental, neurological, and substance use; NCDs = noncommunicable diseases.
*There is no fixed time period for the management of these complex conditions; for example, in the management of depression, some individuals need relatively short periods of engagement (for example, 6-12 months for a single episode) at the one end, while others may need maintenance care for several years (for example, when there is a relapsing course).

of evidence rather than the lack of cost-effectiveness for most interventions.

In addition to bridging the treatment gap for MNS disorders by improving access to evidence-based interventions, it is imperative to enhance the quality of service delivery, which together with need and utilization make up the concept of *effective coverage*. The quality of care should not be subservient to the quantity of available and accessible services, not least since robust quality improvement mechanisms ensure that limited resources are utilized appropriately. Good quality services also build people's confidence in care, thereby fueling the demand for and increased utilization of preventive and treatment interventions.

Population and Community Platforms

Chapter 10 in this volume (Petersen and others 2015) outlines the intervention packages for delivery through the population and community platforms. *Population* platform interventions typically apply to the entire population and mainly revolve around promoting mental health, preventing MNS disorders, and addressing demand-side barriers. Best practice packages include legislative and regulatory measures to restrict access to means of self-harm/suicide (notably pesticides) and reduce the availability of and demand for alcohol, including increased taxes and advertising bans. Good practice packages include interventions aimed at raising mental health literacy and reducing stigma and discrimination. The criminal justice system offers an important channel for the delivery of interventions for a range of MNS disorders, notably those associated with alcohol and illicit drug use, behavior disorders in adolescents, and psychoses.

Other preventive and promotion interventions do not require such a populationwide approach. These interventions are best delivered by targeting a group of people in the community that share a certain characteristic or are part of a particular setting, such as children in school. This platform is referred to as the *community*. Best practice packages at the community level include life skills training to build social and emotional competencies in children and adolescents (school-based programs and programs that target vulnerable children). Good practice packages at the community level are reported in table 1.3.

Health Care Platform

Chapter 11 in this volume (Shidhaye, Lund, and Chisholm 2015) outlines the packages pertaining to the *health care* platform through three specific delivery channels: self-management and care, primary health care (which includes outreach services in the community), and hospital care (which include MNS specialist services and other specialist services, such as HIV or maternal health care).

Examples of best or good practice packages for self-care include the self-management of conditions, such as migraines, and web-based psychological therapy for depression and anxiety disorders, increasingly enabled by internet- and smartphone-based delivery.

At the primary health care level, a range of case-finding, detection, and diagnostic measures, as well as the psychological and pharmacological management of such conditions, can be effectively performed. The conditions include depression (including maternal depression), anxiety disorders, migraines, and alcohol and illicit drug use disorders, as well as continuing care for severe disorders such as epilepsy or psychosis.

The recommended delivery model is collaborative stepped care, in which patient care is coordinated by a primary care–based nonspecialist case manager who carries out a range of tasks including screening, provision of psychosocial interventions, and proactive monitoring, while working in close liaison with, and acting as a link between the patient, primary care physician, and specialist services. A robust evidence base supports the delivery of psychosocial interventions by appropriately trained and supervised nonspecialist health workers (van Ginneken and others 2013) and the collaborative stepped care model of delivery (Patel and others 2013).

At the hospital level, first-level hospitals, typically district hospitals, offer a range of medical care services focused on providing integrated care for MNS disorders, by implementing the same packages as recommended for the primary care channel. In particular, first-level hospitals offer those services where MNS disorders frequently co-occur, such as maternal health, other noncommunicable diseases, and HIV/AIDS (Kaaya and others 2013; Ngo and others 2013; Rahman and others 2013). Specialist health care may be offered in first-level hospitals or separate specialist hospitals, such as psychiatric hospitals or de-addiction centers. Specialist health care delivery channels focus on the diagnosis and management of complex, refractory, and severe cases (for example for psychosis, bipolar disorder, or refractory epilepsy); childhood behavioral disorders; dementia; severe alcohol or illicit drug dependence and withdrawal; and severe depression.

A small minority of individuals with MNS disorders will require ongoing care in community-based residential facilities because of their disability and lack of alternative sources of care and support. The role of

community outreach teams that can provide variable levels of intensity of care appropriate for individuals' needs is also crucial as they provide support to enable these individuals to function in an independent way, in the community, alongside close liaison with general primary care services and other social and criminal justice services.

Humanitarian Aid and Emergency Response

In humanitarian contexts and emergency affected populations, such as those arising from conflicts or natural disasters, the humanitarian aid and emergency response channel is yet another channel for delivering much needed mental health care. These populations are at an increased risk of MNS disorders that can overwhelm the local capacity to respond, particularly if the existing infrastructure or health system was already weak or may have been rendered dysfunctional as a result of the emergency situation. There is a heightened need to identify and allocate resources for providing mental health care and psychosocial support in these settings, for those with disorders induced by the emergency and for those with preexisting disorders. International humanitarian aid and emergency response at the national level can be a channel for rapidly enabling or supporting the availability of and access to basic or specialist care. In several countries, such emergencies have actually provided opportunities for systemic change or service reform in public mental health (WHO 2013b; see also box 1.4).

Box 1.4

Country Case Studies on Scaling Up Interventions for Mental, Neurological, and Substance Use Disorders

The 686 Project: China (Hong 2012)

The Central Government Support for the Local Management and Treatment of Severe Mental Illnesses Project was initiated in China in 2004 with the first financial allotment of ¥ 6.86 million (US$829,000 in 2004 dollars). Subsequently it was referred to as the 686 Project. Modeled on the World Health Organization's (WHO's) recommended method for integrating hospital-based and community-based mental health services, this program provides care for a range of severe mental disorders through the delivery of a community-based package by multidisciplinary teams.

The interventions are functionality oriented and provide free outpatient treatment through insurance coverage (New Rural Cooperative Medical Care system) along with subsidized inpatient treatment for poor patients. The program covered 30 percent of the population of China by the end of 2011. Evaluation of the program showed improved outcomes for the more than 280,000 registered patients, as the proportion of patients with severe mental illnesses who did not suffer a relapse for five years or longer increased from a baseline of 67 percent to 90 percent, along with large reductions in the rates of "creating disturbances" and "causing serious accidents."

Government investment in the program amounted to ¥ 280 million in 2011. The program's key innovations were the increase in the availability of human resources, including the involvement of non-mental-health professionals and their intensive capacity building, which increased the number of psychiatrists in the country by one-third.

The National Depression Detection and Treatment Program: Chile (MHIN)

The National Depression Detection and Treatment Program in Chile is a national mental health program that integrates detection and treatment of depression in primary care. The program is based on scaling up an evidence-based collaborative stepped care intervention in which most patients diagnosed with depression are provided medications and psychotherapy at primary care clinics, while only severe cases are referred to specialists. Launched in 2001, the program operates through a network of 500 primary care centers, and presently covers 50 percent of Chile's population.

box continues next page

Box 1.4 (continued)

The program has added many psychologists in primary care, amounting to an increase of 344 percent between 2003 and 2008. Enrollment of patients in the program has grown steadily, with around 100,000 to 125,000 patients starting treatment each year from 2004 to 2006 and close to 170,000 patients starting treatment in 2007. Nationwide implementation of the program has led to greater utilization of health services by women and the less educated, contributing to reduced health inequalities. The program's success can be attributed to the use of an evidence-based design that was made available to policy makers, teamwork, proactive leadership, strategic alliances across sectors, sustained investment and ring-fencing new and essential financial resources, program institutionalization, and sustained development of human resources that can implement the program.

Building Back Better: Burundi (WHO 2013a)

Civil war in the last decade of the 20th century and first decade of this century resulted in widespread massacres and forced migrations and internal displacement of around one million individuals in Burundi. To address this humanitarian crisis, Healthnet Transcultural Psychosocial Organization (TPO) started providing mental health services in Burundi during 2000 when the then Ministry of Public Health had no mental health policy, plan, or unit, and virtually all the psychiatric services were provided by one psychiatric hospital. Healthnet TPO first conducted a needs assessment and then built a network of psychosocial and mental health services in communities in the national capital, Bujumbura, and in seven of the country's 17 provinces. A new health worker cadre, the psychosocial worker, played a pivotal role in delivery of these services.

Considerable progress has been made in the past decade. The government now supplies essential psychiatric medications through its national drug distribution center, and outpatient mental health clinics are established in several provincial hospitals. From 2000 to 2008, more than 27,000 people were helped by newly established mental health and psychosocial services. Between 2006 and 2008, the mental health clinics in the provincial hospitals registered almost 10,000 people, who received more than 60,000 consultations. The majority (65 percent) were people with epilepsy.

In 2011, funding from the Dutch government enabled HealthNet TPO and the Burundian government to initiate a five-year project aimed at strengthening health systems. One of the project's components is the integration of mental health care into primary care using WHO Mental Health Gap Action Programme guidelines. The government has established a national commission for mental health and appropriate steps are being taken to support the provision of mental health care in general hospitals and follow-up within the community.

Suicide Prevention through Pesticide Regulation: Sri Lanka (Gunnell and others 2007)

In Sri Lanka, as well as in other Asian countries, pesticide self-poisoning is one of the most commonly used methods of suicide. Suicide rates in Sri Lanka increased eight-fold from 1950 to 1995, and the country had the highest rate of suicide worldwide (approximately 47 per 100,000 population) during this period. A series of policy and legislative actions around this time reduced the suicide rate by half by 2005.

Gunnell and others (2007) carried out an ecological analysis of trends in suicide and risk factors for suicide in Sri Lanka during 1975–2005. The analysis suggests that the marked decline in Sri Lanka's suicide rate in the mid-1990s coincided with the culmination of a series of legislative activities that systematically banned the most highly toxic pesticides that had been responsible for the majority of pesticide deaths in the preceding two decades. The Registrar of Pesticides banned methyl parathion and parathion in 1984 and over the following years gradually phased out all the remaining Class I (the most toxic) organophosphate pesticides, culminating in July 1995 with bans on the remaining Class I pesticides monocrotophos and methamidophos. By December 1998, endosulfan (a Class II pesticide) was also banned as farmers had substituted Class I pesticides with endosulfan.

By 2005, suicide rates halved to around 25 per 100,000 population. This case study underlines the fact that in countries where pesticides are commonly used in acts of self-poisoning, regulatory controls on the sale of the most toxic pesticides may help to reduce the number of suicides.

HOW MUCH WILL IT COST? MOVING TOWARD UNIVERSAL HEALTH COVERAGE FOR MNS DISORDERS

For successful and sustainable scale-up of effective interventions and innovative service delivery strategies, such as task-sharing and collaborative care, decision makers require not only evidence of an intervention's health impact, but also the costs and cost-effectiveness. Even when cost-effectiveness evidence is available, there remains the question of whether or how an intervention might confer wider economic and social benefits on households or society, such as restored productivity, reduced medical impoverishment, or greater equality. This volume reviews existing cost-effectiveness evidence and new analyses of the distributional and financial protection effects of interventions (box 1.5).

Intervention Costs and Cost-Effectiveness

There is a small but growing economic evidence base to inform decision making in LMICs, mainly on the treatment of specific disorders. Analysis undertaken at the global level by WHO, updated to 2012 values for DCP3, reveals a marked variation in the cost per DALY averted, not only between different regions of the world, but also between different disorders and interventions (Chisholm and Saxena 2012; Hyman and others 2006).

Box 1.5

Economic Evaluation of the Treatment and Prevention of Mental, Neurological, and Substance Use Disorders

Economic evaluations aim to inform decision making by quantifying the trade-offs between the resource inputs needed for alternative investments and the resulting outcomes. Four approaches to economic evaluation in health are particularly prominent:

1. Assessment of how much of a specific health outcome (for example, depressive episodes or epileptic seizures averted) can be attained for a particular level of resource input.
2. Assessment of how much of an aggregate measure of health (for example, averted deaths, disability, or quality-adjusted life years) can be attained from a particular level of resource inputs applied to alternative interventions. This approach of cost-effectiveness analysis enables comparison of the attractiveness of interventions addressing many different health outcomes (such as tuberculosis or HIV treatment versus prevention of harmful alcohol use or treatment of psychosis).
3. Assessment of how much health and financial risk protection can be attained for a particular level of public sector finance of a particular intervention. This approach (extended cost-effectiveness analysis) enables assessment not only of efficiency in improving the health of a population, but also of efficiency in achieving the other major goal of a health system (that is, protection of the population from financial risk).
4. Assessment of the economic benefits, measured in monetary terms, from investment in a health intervention and weighing that benefit against its cost (benefit-cost analysis). This analysis enables comparison of the attractiveness of health investments compared with those in other sectors.

Cost-effectiveness analyses predominate among economic evaluations in the care and prevention of mental, neurological, and substance use (MNS) disorders. These types of analysis are reviewed in the disorder-specific chapters of the volume and, in a more synthesized format, in chapter 12 (Levin and Chisholm 2015). This review shows that the economic evidence base for mental health policy and planning continues to strengthen. Thus, the overgeneralized claim that treatment of MNS disorders is not a cost-effective use of scarce health care resources can be increasingly debunked.

Extended cost-effectiveness analyses remain a fairly new evaluation approach developed for *Disease Control Priorities*, 3rd edition (*DCP3*). In this volume, Chisholm and others (chapter 13) apply extended cost-effectiveness analysis to a range of MNS disorder interventions in Ethiopia and India. The chapter shows that moving toward universal coverage via scaled-up provision of publicly financed services leads to significant financial protection effects as well as health gains in the population.

Brief interventions for harmful alcohol use and treatment of epilepsy with first-line anti-epileptic medicines fall toward the lower (more favorable) end, while community-based treatment of schizophrenia and bipolar disorder with first-generation medications and psychosocial care fall toward the upper end. Figure 1.2 shows the range for the most cost-effective intervention identified for each of these four conditions (for details, see chapter 12 in this volume, Levin and Chisholm 2015).

Anderson, Chisholm, and Fuhr (2009) analyze the cost-effectiveness of alcohol demand reduction measures. They estimate that one DALY could be averted for as little as US$200–US$400 through increases in excise taxes on alcoholic beverages, and for US$200–US$1,200 through comprehensive advertising bans or reduced availability of retail outlets. Other than that study, there is hardly any published evidence on the cost-effectiveness of population-based or community-level strategies in or for LMICs. For example, there remains a startling paucity of robust economic studies with which to inform planners and policy makers in LMICs about scaled-up efforts to prevent self-harm and suicide, or to enhance the mental and social development of children through parent skills training.

The combined cost of implementing alcohol control measures is estimated to range between US$0.10 and US$0.30 per capita (Anderson, Chisholm, and Fuhr 2009; WHO 2011). A new cost analysis carried out for this volume estimates that a school-based, life skills program would cost between US$0.05 and US$0.25 per capita (Levin and Chisholm 2015). The annual cost of delivering a defined package of cost-effective interventions for schizophrenia, depression, epilepsy, and alcohol use disorders in two WHO subregions (one in Sub-Saharan Africa, the other in South Asia) has been estimated to be US$3–US$4 per capita (Chisholm and Saxena 2012); in HICs and upper-middle-income countries, the cost of such a package is expected to be at least double this amount (chapter 12 in this volume, Levin and Chisholm 2015).

Financial Risk Protection: Extended Cost-Effectiveness Analysis

By considering important goals or attributes of health systems other than health improvement itself, such as equity and financial risk protection, this volume has taken some initial steps toward addressing and analyzing the concept of universal health coverage for MNS disorders (Chisholm and others 2015). These disorders are chronic and disabling, often go undetected, and are regularly omitted from essential packages of care or insurance schemes. Therefore, these health conditions pose a direct threat to households' well-being and economic viability, as a result of private out-of-pocket (OOP) expenditures on health services and goods, as well as diminished production or income opportunities.

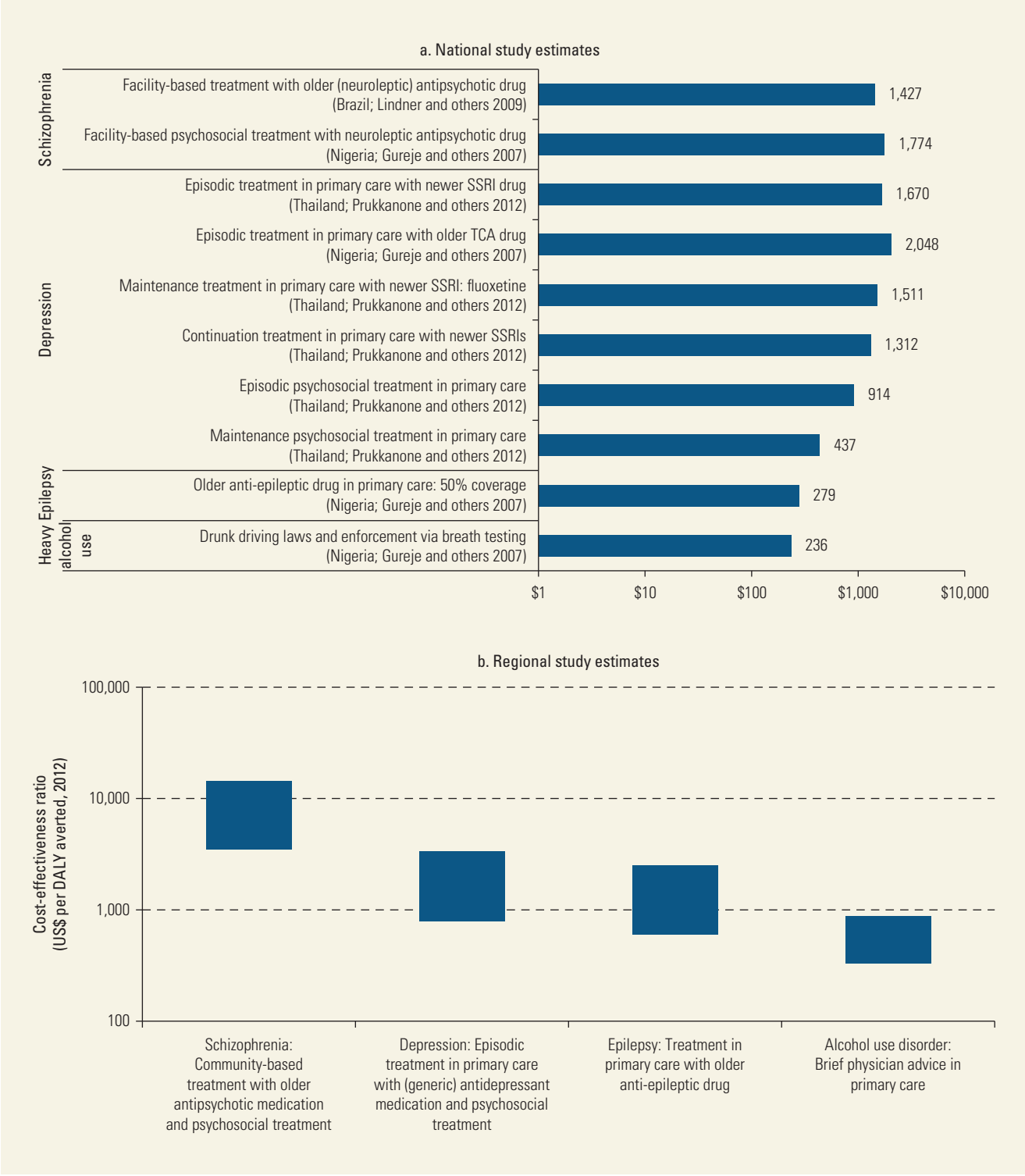
Through the application of a newly developed approach to economic evaluation called extended cost-effectiveness analysis (Verguet, Laxminarayan, and Jamison 2015; see also box 1.5), an effort has been made to identify how scaled-up, community-based public services might contribute to greater equality of access and less OOP spending in two distinct settings, India and Ethiopia. Both countries have recently articulated ambitious plans to enhance mental health service quality and coverage, as well as extend financial protection or health insurance for their citizens. Across these two geographical settings, it is evident that publicly financing the scale-up of mental health service leads to a more equitable allocation of public health resources across income groups, with the lowest-income groups benefiting most in financial protection.

For example, an extended cost-effectiveness analysis was done for schizophrenia treatment in India. The analysis shows that public financing of the 70 percent of total treatment costs incurred by households would remove US$140,000 of OOP spending per one million population at current treatment coverage rates. Public financing of a concerted effort to provide an enhanced level of service coverage (80 percent) for all segments of the Indian population would result in a more equitable allocation of resources (as shown in figure 1.3, panel a). This effort would have a clear pro-poor effect (figure 1.3, panel b): 30 percent of the total estimated value of insurance (estimated at US$24,582 for a population of one million persons) is bestowed on the poorest quintile of the population, compared with 10 percent for the richest quintile.

In Ethiopia, where current treatment coverage for psychosis and other mental disorders is very low (10 percent or less), the averted OOP spending arising from a switch to public finance of treatment costs would also be low. Only when a substantial increase in service coverage is modeled does the true scale of the private expenditures that would pertain in the absence of publicly financed care become apparent.

It is therefore vital for increased financial protection of persons with MNS disorders to go hand in hand with scaled-up coverage of an essential package of care. Improved service access without financial protection for persons with MNS disorders will lead to inequitable rates of service uptake and outcomes, while improved financial protection without appropriate service scale-up will bring little public health gain at all. In short, a concerted, multidimensional effort is needed if the move toward universal health coverage for MNS disorders is to occur.

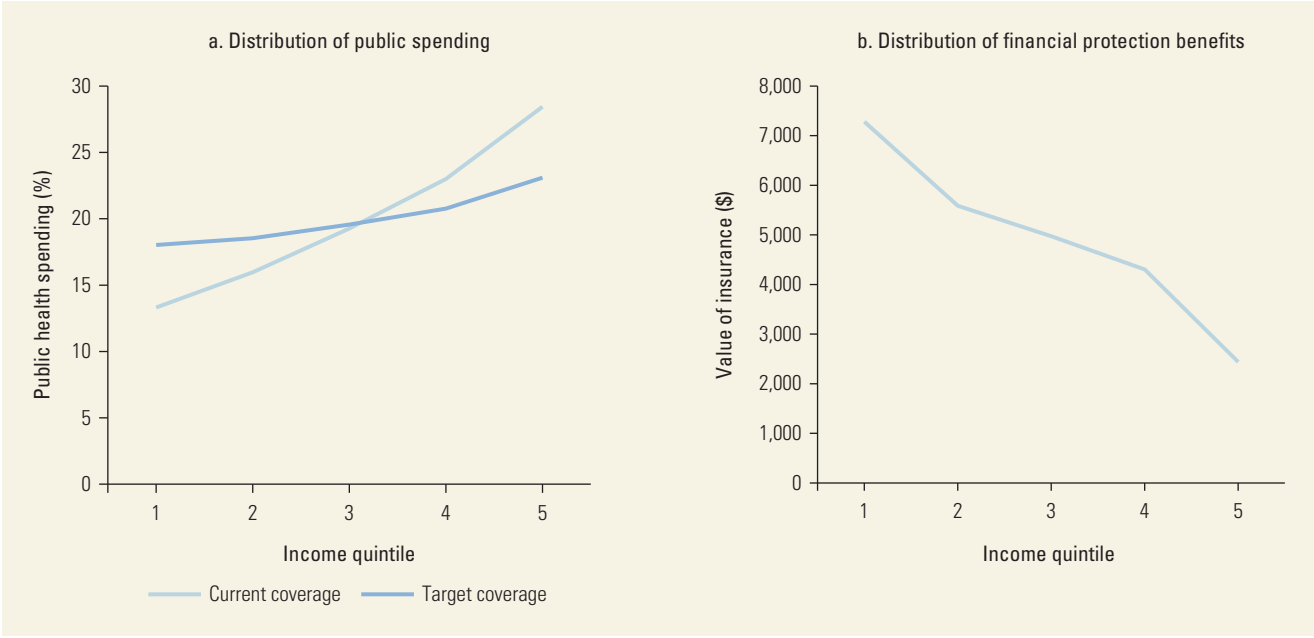
Figure 1.2 Cost-Effectiveness of Selected Interventions for Addressing Mental, Neurological and Substance Use Disorders in Low-income and Middle-income Countries (2012 US$ per DALY averted)



Source: Hyman and others 2006; Chisholm and Saxena 2012; Levin and Chisholm 2015.

Note: In panel a, all reported cost-effectiveness estimates have been converted to 2012 US$. In panel b, previously published findings have been converted to 2012 US$ values, based on International Monetary Fund inflation estimates for World Bank reporting regions. Bars show the range in cost-effectiveness for six low- and middle-income world regions: Sub-Saharan Africa, Latin America and the Caribbean, Middle East and North Africa, Europe and Central Asia, South Asia, and East Asia and Pacific. DALY = disability-adjusted life year; SSRI = selective serotonin reuptake inhibitor; TCA = tricyclic antidepressants.

Figure 1.3 Distribution of Public Spending and Insurance Value of Enhanced Public Finance for Schizophrenia Treatment in India, by Income Quintile



Source: Chisholm and others 2015 (chapter 13 in this volume).
Note: Results are based on a population of one million people, divided into equal income quintiles of 200,000 persons (quintile 1 has the lowest income and quintile 5 the highest). Monetary values are expressed in 2012 US$. Target coverage for schizophrenia treatment for all income groups is set at 80 percent. Current coverage ranges from 30 percent in the poorest income group to 50 percent in the richest. Panel A shows the distribution of public health spending across income groups before and after the introduction of universal public finance. Panel B shows the distribution of financial protection benefits across income groups resulting from a policy of universal public finance; the value of insurance is per income quintile (each with 200,000 persons).

HOW TO SCALE UP? HEALTH SYSTEM BARRIERS AND OPPORTUNITIES

Despite the need for renewed attention and scaled-up investment, there is relatively little action on addressing MNS disorders in most LMICs. There are several reasons for this lack of action, perhaps the most important one being the overall lack of policy commitment to MNS disorders, as is evident from the fact that less than 1 percent of the health budget is allocated to mental health in most LMICs (Saxena and others 2007). Similarly, despite the evidence-based calls to action for scaling up services for almost a decade (Lancet Global Mental Health Group 2007), less than 1 percent of development assistance for health is devoted to mental health (Gilbert and others 2015).

Political Will

Key contributors to the lack of political will and consequently low levels of resource allocation include the low demand for mental health care interventions, which is in part caused by low levels of mental health literacy and high levels of stigma attached to MNS disorders. In addition, the following are lacking: technically sound leadership in designing and implementing evidence-based programs; adequate absorptive capacity in the existing health care system; competing policy priorities and vested interests; and effective agency and advocacy by affected people. And there is a persisting belief in the importance of hospital-based specialized models of care, which continue to absorb disproportionate amounts of the already meager budgetary allocations for this sector (Saraceno and others 2007).

Knowledge Gaps

There is a lack of evidence from LMICs, especially on the cost-effectiveness of many interventions and the integration of care for MNS disorders in routine health and social care platforms. This lack continues to represent a constraint to investment for many stakeholders, and is partly a result of low levels of political commitment to this dimension of health through disproportionately less funding for research. The critical knowledge gaps are related to implementation science, that is, research to bridge the gap between what we know works and how to implement it at scale (Collins and others 2011).

Research that seeks to address the significant knowledge gaps on the causes of MNS disorders and the discovery of novel interventions is also urgently needed. An empirical approach to analysis of the impact of macroeconomic and structural factors on the burden of MNS disorders, such as global conventions on the regulation of illicit drugs and climate change, is warranted to guide evidence-based policy making in the wider context. However, these knowledge gaps cannot explain why even known cost-effective interventions have not been adopted.

A complicating factor is the limitations of the evidence synthesized in this chapter. In particular, there are significant gaps in the evidence in support of some interventions in LMICs and limited effectiveness of the best available interventions for some disorders. To address these barriers, the scaling-up of interventions for MNS disorders requires an approach that embraces public health principles, systems thinking, and a whole-of-government perspective. Reassuringly, several countries are now demonstrating how a combination of these ingredients can lead to significant increases in the coverage of evidence-based interventions (box 1.4).

Strategies for Strengthening the Health System

Key strategies for strengthening the health system include the following:

- Mainstreaming a rights-based perspective throughout the health system and ensuring health policies, plans, and laws are updated to be consistent with international human rights standards and conventions
- Implementing multicomponent initiatives to address stigma, enhance mental health literacy and demand for care, and mobilize people with the conditions to support one another and be effective advocates
- Engaging other key sectors concerned with MNS disorders to improve services, notably the social care, non-governmental organizations, private sector, criminal justice, education, and indigenous medical sectors, as they all have complementary roles.
- Providing inpatient care through units in general or district hospitals rather than standalone psychiatric hospitals
- Implementing large-scale or national rollouts of training and supervision programs for nonspecialist human resource cadres that can perform the roles of case managers for delivery of collaborative care in primary care and other health care platforms to improve treatment coverage
- Ensuring the supply of essential medicines at relevant platforms
- Investing in research across the translational continuum to improve knowledge on more effective interventions and more effective delivery systems, including innovative financing options such as raising and diverting income from taxes on unhealthy products (such as alcohol and tobacco)
- Emphasizing the use of low-cost generic medicines throughout the health care systems, and reallocating expenditure on ineffective or low-value interventions, such as overprescription of benzodiazepines and vitamins in primary care.
- Finally, it will be important to embed health indicators for MNS disorders within national health information and surveillance systems so that progress and achievements can be monitored and evaluated (WHO 2015).

The WHO Comprehensive Mental Health Action Plan (Saxena, Funk, and Chisholm 2013) offers a clear road map for countries at any stage of the journey to scale up. Some regions (such as the Eastern Mediterranean) have adapted this new policy instrument to initiate consultations with international experts and regional policy makers and develop frameworks for action (box 1.6) across all four domains of the plan, along with priority interventions and indicators for evaluation of progress (Gater, Saeed, and Rahman 2015).

TIME TO ACT NOW

MNS disorders account for a substantial proportion of the global disease burden. This burden has increased dramatically since 1990 and is likely to continue to rise with the epidemiological transition from infectious diseases to noncommunicable diseases, the demographic transition in LMICs, and the increase in the prevalence of several social determinants associated with these conditions.

Despite the challenges in quantifying causal mortality in these disorders, new analyses presented in this volume suggest that the mortality-associated disease burden is very large and was previously underestimated. This volume also summarizes evidence to document effective treatment and prevention interventions that are feasible to implement across diverse socioeconomic and cultural settings for a range of priority MNS disorders. A critically relevant aspect of these disorders is their propensity to strike early in life, which is a key factor behind their large contribution to the global burden of disease.

Populationwide platforms are primarily suited for policy-level interventions for promoting mental health, preventing MNS disorders, improving mental health literacy, and protecting the human rights of persons affected by these disorders. The community platform provides opportunities for leveraging non-health

Box 1.6

Proposed Regional Framework to Scale Up Action on Mental Health in the WHO Eastern Mediterranean Region

Domain	Strategic interventions	Proposed indicators
Leadership and governance	• Establish/update a multisector national policy/strategic action plan for mental health in line with international and regional human rights instruments. • Establish a structure, as appropriate for the national context, to facilitate and monitor implementation of the multisector national policy/strategic action plan. • Review legislation related to mental health in line with international human rights covenants and instruments. • Include defined priority mental health conditions in the basic health delivery package of the government and social and private insurance reimbursement schemes. • Increase and prioritize budgetary allocations to address the agreed upon service targets and priorities, including providing transitional or bridge funding.	• Country has an operational multisectoral national mental health policy or plan in line with international and regional human rights instruments. • Country has an updated mental health law in line with international and regional human rights instruments. • Inclusion of specified priority mental health conditions in the basic health care packages for public and private insurance and reimbursement schemes.
Reorientation and scaling-up of mental health services	• Establish mental health services in general hospitals for outpatient and short-stay inpatient care. • Integrate delivery of evidence-based interventions for priority mental health conditions in primary health care and other priority health programs. • Enable people with mental health conditions and their families through self-help and community-based interventions. • Downsize the existing long-stay mental hospitals (in parallel with investment increases in integrated inpatient and general hospitals and supported residential care in the community).[a] • Embed mental health and psychosocial support in national emergency preparedness and recovery plans. • Strengthen the capacity of health professionals for recognition and management of priority mental health conditions during emergencies. • Implement evidence-informed interventions for psychosocial assistance to vulnerable groups.	• Proportion of general hospitals that have mental health units including inpatient and outpatient units. • Proportion of persons with mental health conditions utilizing health services (disaggregated by age, sex, diagnosis, and setting). • Proportion of PHC facilities having regular availability of essential psychotropic medicines. • Proportion of PHC facilities with at least one staff trained to deliver nonpharmacological interventions. • Proportion of mental health facilities monitored annually to ensure use of quality and rights standards for the protection of human rights of persons with mental health conditions. • Mental health and psychosocial support provision is integrated in the national emergency preparedness plans. • Proportion of health care workers trained in recognition and management of priority mental health conditions during emergencies.

box continues next page

Box 1.6 (continued)

Domain	Strategic interventions	Proposed indicators
Promotion and prevention	• Integrate recognition and management of maternal depression and parenting skills training in maternal and child health programs. • Integrate life skills education with a whole-school approach. • Reduce access to means of suicide. • Employ evidence-based methods to improve mental health literacy and reduce stigma.	• Proportion of community workers trained in early recognition and management of maternal depression and providing early childhood care and development and parenting skills to mothers and families. • Proportion of schools implementing the whole-school approach to promote life skills.
Information, evidence, and research	• Integrate the core indicators within the national health information systems. • Enhance the national capacity to undertake prioritized research. • Engage stakeholders in research planning, implementation, and dissemination.	• Routine data and reports at the national level available on core set of mental health indicators. • Annual reporting of national data on numbers of deaths by suicide.

Source: Gater, Saeed, and Rahman 2015.
Note: PHC = primary health care; WHO = World Health Organization.
a. Modified by authors.

resources for prevention and promotion interventions targeting particular groups of people or particular settings. The health care interventions primarily comprise generic medicines, brief psychological treatments, and social interventions. Interventions for diverse disorders can be packaged together to deploy low-cost and widely available human resources in primary health care and non-health care platforms, with appropriate support and supervision provided by mental health care professionals. In settings with a higher level of resources, as is the case in many middle-income countries, specialist platforms offer incremental value in addressing the needs of the relatively small proportion of persons with complex, severe, or refractory clinical presentations.

Apart from being effective and feasible and providing benefits that improve the lifelong trajectories of individuals, many of these interventions are also inexpensive to implement and represent a cost-effective use of resources for health. Furthermore, a policy of moving toward universal public finance for MNS disorders can be expected to lead to a far more equitable allocation of public health resources across income groups. With universal public finance, the lowest-income groups would benefit most from the value of insurance (used here as a measure of financial protection).

Country case studies show that the most important drivers of change are the political will and commitment of countries and development agencies to allocate the necessary resources and provide technical leadership. As also emphasized in the WHO Mental Health Action Plan, this will and commitment are essential to address the avoidable toll of suffering caused by MNS disorders, not least among the poorest people and least resourced countries in the world.

This volume presents strong clinical and economic evidence to back this investment. Ultimately there must also be a moral case for scaling up care for the hundreds of millions of people whose health care needs have been systematically neglected and whose basic human rights have been routinely denied (Patel, Saraceno, and Kleinman 2006). The time to act on this evidence is therefore now.

NOTE

Disclaimer: Dan Chisholm and Tarun Dua are staff members of the World Health Organization. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions, policy, or views of the World Health Organization.

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$1,045 to US$4,125
  b) Upper-middle-income (UMICs) = US$4,126 to US$12,735
- High-income countries (HICs) = US$12,736 or more.

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