GLOBAL PRIORITIES FOR ADDRESSING THE BURDEN OF MENTAL, NEUROLOGICAL AND SUBSTANCE USE DISORDERS: KEY MESSAGES FROM *DISEASE CONTROL PRIORITIES*, 3RD EDITION

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SUMMARY

The burden of mental, neurological and substance use (MNS) disorders increased by 41% between 1990 and 2010, and now accounts for one in every ten years of lost health globally. This sobering statistic does not take into consideration either the substantial excess mortality associated with these disorders or the social and economic consequences of MNS disorders on affected persons, their care-givers and society. A wide variety of effective interventions, including medicines, psychological treatments and social interventions, can prevent and treat MNS disorders. At the population-level platform of service delivery, best practices include legislative measures aimed at restricting access to means of self-harm/suicide and reducing the availability of and demand for alcohol. In relation to the community platform, best practices include parenting programs in infancy and life skills training in schools to build social and emotional competencies. For the health care platform, we identify three delivery channels. Two are especially relevant from a public health perspective, viz., self-management, for example web-based psychological therapy for depression and anxiety disorders; and primary care and community outreach channels, for example non-specialist health worker delivered psychological and pharmacological management of selected conditions. Third, hospital channels, both those providing specialist services for MNS disorders as well as those providing other types of services (such as HIV or paediatric care), play an important role for a smaller proportion of cases with severe, refractory or emergency presentations and for the integration of mental health care in other health care channels respectively. The costs of providing a significantly scaled-up package of specified cost-effective interventions for prioritized MNS disorders is estimated at US\$ 1-2 per capita per year in low- and lower-middle income countries, and US\$ 3-5 per capita in upper-middle income countries. Since a significant proportion of MNS disorders run a chronic and disabling course and adversely affect household welfare, it is important that intervention costs are largely met by government through increased resource allocation and financial protection measures (rather than leaving households to pay out-of-pocket). Moreover, a policy of moving towards universal public finance can also be expected to lead to a far more equitable allocation of public health resources across income groups. Despite this evidence, less than 1% of development assistance for health and government spending on health in low- and middle-income countries is allocated to these disorders. Realizing the health gains associated with prioritised interventions will require not just financial resources, but committed and sustained efforts to address a range of other barriers (such as paucity of human resources, weak governance and stigma), with the ultimate goal of 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.

INTRODUCTION

The primary goal of *Disease Control Priorities in Developing Countries*, first published by the World Bank in 1993, is to synthesize evidence on the burden and, more importantly, the relative effectiveness and cost-effectiveness of interventions for specific health conditions, to assist decision makers in allocating often tightly constrained budgets so that health system objectives are maximally achieved. The third edition of this initiative (DCP-3) aims to provide an up to date synthesis of this evidence and includes several novel features building on the previous editions, for example by addressing how interventions can be packaged together across a range of delivery platforms and channels (Web-panel 1)¹. This paper describes the key findings of the evidence related to mental, neurological and substance use disorders (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, they have been grouped together here because they share a number of important characteristics, notably: they all owe their symptoms and impairments to some degree of brain dysfunction; social determinants play an important role in the aetiology and symptom expression (Web-panel 2); they frequently co-occur in the same individual; their impact on families and wider 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, but particularly in low- and middle-income countries (LMYs); and this grouping is consistent with the DCP-3 goals of synthesizing evidence and making recommendations across diverse health conditions and with the World Health Organization's Mental Health Gap Action Programme (mhGAP)².

In DCP-3, we have considered interventions for five groups of conditions (adult mental disorders, child mental and developmental disorders, neurological disorders, alcohol use disorder and illicit drug use disorders such as opioid dependence) and also for suicide and self-harm, a health outcome strongly associated with MNS disorders. Within each group of disorders, we have prioritized conditions which are associated with high burden and for which there is evidence in support of interventions which are cost-effective and scalable. 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), but our recommendations, in particular regarding the delivery of packages for care, could be extended to a number of other conditions which have not been expressly addressed. Additionally, some important MNS disorders or concerns are covered in other sections of DCP-3, notably, nicotine dependence, early child development, neurological infections and stroke.

In this paper, we address five themes. 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. Second, we address the 'what' question by reviewing the evidence on the effectiveness of specific interventions for the prevention and treatment of the selected 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. Finally, we consider the barriers and strategies on how these will need to be addressed for successful scaling up.

A) WHY MNS DISORDERS MATTER FOR GLOBAL HEALTH

The Global Burden of Disease Study 2010 (GBD 2010) identified MNS disorders as significant causes of the world's disease burden³. We make use of GBD 2010 data to investigate trends in the burden due to MNS disorders. There was a 41% rise in absolute DALYs due to MNS disorders between 1990 and 2010, from 182 to 258 million DALYs (the proportion of global disease burden increased from 7.3% to 10.4%). With the exception of substance use disorders, which increased due to changes in

prevalence over time, this increase was largely due to population growth and aging. As a group, MNS disorders were the leading cause of Years Lived with Disability (YLDs) in the world (Figure 1). MNS disorder DALYs were highest during early to mid-adulthood, explaining 18.6% of total DALYs in individuals aged 15 to 49 years (as opposed to 10.4% at all ages combined). For neurological disorders, DALYs were highest in the elderly. There are important gender differences in the burden of these disorders: males accounted for more DALYs for mental disorders occurring in childhood, schizophrenia, substance use disorders, Parkinson's disease and epilepsy while more DALYs accrue to females for all other disorders in this group. The relative proportion of MNS disorder DALYs to overall disease burden was estimated to be 1.3 times higher in developed regions (15.5% of total DALYs) than in developing regions (9.4% of total DALYs), largely due to the relatively higher burden of other health conditions such as infectious and perinatal diseases in developing regions. Due to their larger population, however, absolute MNS disorder DALYs are higher in low- and middle-income countries compared to high-income countries.

[Figure 1 here]

Burden due to premature mortality from GBD 2010 may incorrectly lead to the interpretation that premature death in people with MNS disorders is inconsequential. This 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 risk of mortality increasing with disorder severity.⁴⁻⁶ Consequently, we also explore differences between 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% of MNS disorder DALYs, equivalent to 840,000 deaths, natural history models generated by DisMod-MR estimate substantially more deaths could be associated with these disorders⁷. Excess deaths for major depression alone were estimated at more than 2.2 million in 2010. This figure is significantly higher than other attempts to quantify the same⁶ and indicates a potentially much higher degree of mortality associated with MNS disorders than that captured by GBD 2010 YLLs. That said, as these estimates of excess deaths included deaths from both causal and non-causal origins, they must be interpreted with caution. In relation to excess deaths presented in Table 1, 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.⁸ For example, it has been estimated that around 60% 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.⁹

[Table 1 here]

It is important to note that these 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 that of maternal mental disorders on the well-being of their children contributing to the inter-generational transmission of ill-health and poverty; of substance use disorders on criminal behavior and incarceration; and of a range of severe conditions on the economic productivity of affected persons and of family members engaged in care-giving. A recent study estimated that total economic output lost to MNS disorders globally was US\$ 8.5 thousand million in 2010, a sum expected to nearly double by 2030 if a concerted response is not mounted¹⁰. Concerning economic costs attributable to alcohol use and alcohol use disorders alone, a separate study estimated these to amount to the equivalent of 1.3-3.3% of gross domestic product (GDP) in a range of high- and middle-income countries, with over two-thirds of the loss represented by productivity losses¹¹. The global cost of dementia in 2010 has been estimated to be US\$ 604 billion, equivalent to 1% of global GDP¹². Additionally, there is a rising tide of social adversities which are recognized to be associated with MNS disorders, with large and growing proportions of the global population affected by conflict or displacement due to environmental degradation and climate change, which bodes for a grim forecast on the future burden of these conditions. Finally, 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 ranging

from limited opportunities for education and employment and extending to torture and denial of freedom, sometimes within health care institutions¹³.

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

The evidence on interventions builds on the recommendations of the Second Edition of *Disease Control Priorities for Developing Countries*¹⁴⁻¹⁶ and is derived from a number of sources: the mhGAP guidelines developed by the WHO using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology of the literature published up to 2009¹⁷; other recent reviews where appropriate (for example Strang et al for illicit drugs);¹⁸ interventions which required a specialist for delivery, but which had not been addressed by mhGAP or DCP2, assessed using GRADE; and a review of all reviews including systematic reviews, and any type of evaluation evidence from a low and middle income country published since mhGAP, assessed using GRADE. Our findings are summarized in [Table 2](#).

[Table 2 here]

A wide variety of effective interventions comprising medicines, psychological and social interventions are available that can prevent and treat the range of the priority MNS disorders. As shown in Table 2, it is possible to identify for this group of conditions a set of 'essential medicines' (such as anti-psychotic, anti-depressant and anti-epileptic medications) and 'essential psychosocial interventions' (such as cognitive behavioural therapy and parent skills training). Although there are very few 'curative' interventions for any of these disorders, the severity and course of most disorders can be greatly attenuated by psychosocial treatment or generic formulations of essential psychotropic medicines, including in combinations tailored to the needs of the individual. 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 electro-convulsive therapy (ECT) for severe depression or surgery for epilepsy. It is important to acknowledge that certain preventive interventions which are primarily intended to target disorders covered in other sections of DCP-3, for example interventions to prevent cardio-vascular diseases or neurocysticercosis, will also have benefits on MNS disorders such as dementia and epilepsy respectively. Conversely, some interventions targeting MNS disorders are also associated with benefits to health outcomes for other disorders, for example: injury prevention as a result of reduced alcohol or drug use or effective treatment of ADHD and improved cardiovascular health as a result of recovery from depression. Even for those conditions where we do not currently possess highly effective treatments for the primary disorder, such as autism and dementia, psychosocial interventions have been shown to effectively address their adverse social consequences and support family caregivers.

Despite this evidence, a large proportion of persons affected by MNS disorders do not have access to these interventions. The lack of adoption of effective interventions is often influenced by concerns about financial resources needed, an issue which is now being addressed by a mounting evidence base demonstrating the effectiveness of the delivery of these interventions by non-specialist health workers¹⁹ as well as their cost and cost-effectiveness²⁰. 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 symptoms associated with depression or anxiety disorders are commonly interpreted as being normative consequences of social adversity and proven biomedical causal models are rare, leading to low demand for care and invisibility of the condition from the view of health policy makers and providers²¹. 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 the low levels of political commitment and the paucity of demand for care for MNS disorders in many populations²².

C) 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 centre) 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). We identified three broad platforms for the delivery of MNS disorder interventions: population; community; and health care. While there is a fair amount of good evidence from high-income countries (HICs) for interventions across these platforms and along the continuum of primary, secondary and tertiary prevention, the evidence base for LMJs is far less robust. Recommendations for “best practice” and “good practice” interventions for these platforms are set out in [Table 3](#). Best-practice interventions were identified on the basis of there being evidence for their effectiveness and contextual acceptability and scalability in LMJ, plus evidence of their cost-effectiveness at least in HIC; good practice interventions were identified on the basis of sufficient evidence of their effectiveness in HIC and/or promising evidence of their effectiveness in LMJs. It is important to stress that for most interventions lacking evidence of cost-effectiveness in LMJs, this reflects the absence of evidence rather than the lack of cost-effectiveness.

[Table 3 here]

Population platform interventions typically apply to the entire population and mainly revolve around the promotion of population mental health, prevention of MNS disorders, and addressing demand side barriers. Best practice packages include legislative and regulatory measures aimed at restricting access to means of self-harm/suicide (notably pesticides) and reducing the availability of and demand for alcohol (for example through increased taxes and enforcement of blood alcohol concentration limits for drivers of motorised vehicles). Good practice packages include interventions aimed at raising mental health literacy and reducing stigma and discrimination. Other preventive and promotion interventions do not require such a population-wide approach but are best delivered by targeting a group of people in the community that share a certain characteristic or are part of a particular setting; this platform is referred to as the “community”. Best practice packages at the community-level include parenting programs during infancy and life skills training to build social and emotional competencies in children and adolescents. The criminal justice system offers an important channel for delivery of interventions for a range of MNS disorders, notably those associated with alcohol and illicit drug use, behaviour disorders in adolescents and the psychoses. A number of other good practice packages are reported in [Table 3](#).

The health care platform comprises three specific delivery channels: self-management, primary health care, and specialist channels. Examples of best or good practice packages for self-care include the self-management of conditions such as migraine 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 conditions including depression (including maternal depression), anxiety disorders, migraine and alcohol and illicit drug use disorders, can be effectively performed, as can continuing care for severe disorders such as epilepsy or psychosis. The recommended delivery model is that of collaborative stepped care, in which patient care is coordinated by a primary care based non-specialist case manager who carries out a range of tasks including screening, provision of psychosocial interventions and pro-active monitoring, working in close liaison with and acting as a link between the patient, the primary care physician and specialist services^{19 23}. At the hospital level, first-level hospitals, typically district hospitals, can 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 in those domains where MNS disorders frequently co-occur such as maternal health, other non-communicable diseases and HIV²⁴⁻²⁶.). In specialist hospitals, which may either be offered

within first-level hospitals or in separate specialist hospitals (such as psychiatric hospitals or alcohol and illicit drug treatment centres), interventions focus on the diagnosis and management of complex, refractory and severe cases (for example for psychosis, bipolar disorder or refractory epilepsy, childhood behavioural disorders, dementia, severe alcohol or illicit drug use disorders and withdrawal and severe depression). . It is important to note that a small minority of individuals with MNS disorders require ongoing care in community-based residential facilities due to their disability and lack of alternative sources of care and support. The role of community outreach teams which can provide variable levels of intensity of care appropriate for the individual's needs is also crucial as they provide support to these individuals to enable them to continue to function in an independent and supported way, in the community, alongside close liaison with general primary care services and other social and criminal justice services.

In humanitarian contexts and emergency affected populations, such as those arising from conflict or natural disaster; a further channel for delivering much-needed mental health care is the humanitarian aid and emergency response platform. These populations are at an increased risk of MNS disorders which 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, both for those with disorders induced by the emergency and for those with preexisting disorders. In a number of countries, such emergencies have actually provided opportunities for systemic change or service reform in public mental health.²⁷ Alongside efforts to bridge the treatment gap for MNS disorders by improving levels of contact coverage, it is imperative to also enhance the quality of service delivery. 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 get utilized appropriately and good quality services build people's confidence in care, thereby fuelling the demand and increased utilization of preventive and treatment interventions.

D) HOW MUCH WILL IT COST? UNIVERSAL HEALTH COVERAGE FOR MNS DISORDER

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 their costs and cost-effectiveness. Even when this 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. The methods used for our economic analyses included a review of existing cost-effectiveness evidence and exploratory analyses of the distributional and financial protection effects of interventions (Web-panel 2).

[Web-Panel 2 here]

There is a small but growing economic evidence base to inform decision-making in LMIC settings, mainly focused on the treatment of specific disorders such as epilepsy, alcohol use disorders, depression and schizophrenia. Analysis undertaken at the global level by WHO, updated to 2012 values for DCP3, reveals a marked variation in the cost per disability-adjusted life year (DALY) averted, not only between different regions of the world but also between different disorders and interventions; Figure 2 shows the range for the most cost-effective intervention identified for each of the four conditions mentioned above; see WebAppendix for details)^{20, 28}. Brief interventions for harmful alcohol use and treatment of epilepsy with first-line anti-epileptic medicines fall towards the lower (more favourable) end, while community-based treatment of schizophrenia with first-generation medication and psychosocial care falls towards the upper end. Comparable national studies from Brazil, Nigeria and Thailand, again adjusted here to 2012 values, provide estimates that fall in the range of US\$ 100-2,000 per DALY averted²⁹⁻³¹. With the exception of an analysis of alcohol demand reduction measures – which estimated that one DALY could be averted for a cost of as little as US\$200-400 through increases in excise taxes on alcoholic beverages, and for US\$200-1,200 through comprehensive advertising bans or reduced

availability of retail outlets³² – there is hardly any published evidence on the cost-effectiveness of population-based or community-level strategies in or for LMY settings.

The combined cost of implementing these alcohol control measures in LMY settings has been estimated to range between US\$ 0.10-0.30 per head of population³². A new cost analysis carried out for DCP-3 estimates that a school-based life skills programme would also cost between US\$ 0.05-0.25 per capita (see Web Appendix for details). The annual cost of delivering a defined package of cost-effective interventions for schizophrenia, depression, epilepsy and alcohol use disorders in two WHO sub-regions (one in Sub-Saharan Africa, the other in South Asia) has been estimated to be US\$ 3-4 per capita²⁰. In more affluent regions or in upper-middle income countries, the cost of such a package is expected to be at least double this amount (see WebAppendix).

[Figure 2 here]

Beyond health improvement itself, there are other important goals or attributes of health systems to be considered, including equity and financial protection. Since many MNS disorders run a chronic and disabling course, often go undetected and are regularly omitted from essential packages of care or insurance schemes, they pose a direct threat to households' well-being and economic viability, as a result of private out-of-pocket expenditures on health services and goods, as well as diminished production or income opportunities³³. It is therefore incumbent upon governments to ensure that intervention costs are largely met through financial protection measures such as health insurance schemes. In the many LMY settings where rates of service availability and uptake remain very low, however, enhanced financial protection measures alone will not move the population of persons with MNS disorders substantially towards a goal of universal health coverage. For that goal to be progressively realized, financial coverage of persons with MNS disorders needs to be accompanied by substantially scaled-up service coverage³⁴.

E) HOW TO SCALE UP? HEALTH SYSTEM BARRIERS AND OPPORTUNITIES

Despite the evidence summarized in the preceding sections, there is relatively little action on addressing MNS disorders in most LMYs. 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 evident from the fact that less than 1% of the health budget is allocated to mental health in most LMYs³⁵. Similarly, despite the evidence based calls to action for scaling up services for almost a decade³⁶, less than 1% of development assistance for health is devoted to mental health.³⁷ Key contributors to the lack of political will and consequently low levels of resource allocation include the low demand for mental health care interventions (in part due to low levels of mental health literacy and high levels of stigma attached to MNS disorders); the lack of technically sound leadership in designing and implementing evidence based programs; the lack of adequate absorptive capacity in the existing health care system's competing policy priorities and vested interests (for e.g. in relation to the alcohol beverage and pharmaceutical industry and the medical profession); the lack of effective agency and advocacy by affected people; and the persisting belief in the importance of hospital based specialized models of care which continue to absorb disproportionate amounts of the already meagre budgetary allocations for this sector²². To add to this list is the reality that the evidence synthesized in this paper has limitations, in particular significant gaps in the evidence in support of some interventions in low and middle income countries and limited effectiveness of the best available interventions for some disorders. In order to address this formidable list of 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, as has been demonstrated by a number of countries (Panel 2).

Key health system strengthening strategies that are needed include: 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 multi-component initiatives to address stigma, enhance mental health literacy and demand for care, and mobilizing 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, criminal justice, education and indigenous medical sectors; provision of in-patient care in the form of units in general or district hospitals rather than stand-alone psychiatric hospitals; the creation of non-specialist human resource cadres who can perform the roles of case managers for delivery of collaborative care in primary care and other health care platforms; ensuring the supply of essential medicines at relevant platforms; and investing in research across the translational continuum to improve knowledge on more effective interventions and more effective delivery systems. Innovative financing options could include 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 irrational use of benzodiazepines and vitamins in primary care). The participation of a range of sectors, beyond the traditional public health care delivery sector, is essential: sectors such as education, criminal justice, NGOs and the private sector may all play complementary roles. 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 evaluated³⁸. The WHO Comprehensive Mental Health Action Plan³⁹ offers a clear road-map for countries at any stage of the journey to scale-up, and some regions (such as the Eastern Mediterranean Regional Office) have adapted this new policy instrument to initiate consultations with international experts and regional policy makers to develop frameworks for action (Panel 1) across all four domains of the Plan, along with priority interventions and indicators for evaluation of progress⁴⁰.

Panel 1 here

TIME TO ACT, NOW

MNS disorders account for a substantial proportion of the global disease burden. This burden has increased dramatically in the two decades since 1990, and is likely to continue to rise with the epidemiological transition from infectious disease to NCDs and demographic transition in LMICs and the increase in the prevalence of a number of social determinants associated with these conditions. New analyses presented in this paper suggest that the mortality-associated disease burden is very large and previously under-estimated. This paper has also summarized evidence to document a number of 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. While a number of critical health system barriers need to be addressed to scale up the recommendations in this paper, country case studies (Panel 2) show that the most important drivers of change is the political will and commitment in countries and development agencies to allocate the necessary resources and provide technical leadership.

The analyses presented in this DCP3 volume will be synthesized over the coming months along with the findings and recommendations of the other eight volumes with a view to informing ongoing deliberations around the implementation of the Sustainable Development Goals and other policy agendas. The evidence from this Volume alone makes a compelling case to scale up interventions to address the avoidable toll of suffering caused by MNS disorders, not least among the poorest people and least resourced countries in the world. Although our analyses have presented the 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 routinely denied⁴¹. The time to act on this evidence is therefore now.

[Panel 2 here]

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Panel 1: Proposed Regional framework to Scale up Action on Mental Health in the WHO Eastern Mediterranean Region⁴⁰

Domain	Strategic interventions	Proposed indicators
Leadership and governance	<ul style="list-style-type: none"> Establish/update a multi-sectoral national policy/strategic action plan for mental health in line with international/regional human rights instruments Establish a structure; as appropriate to the national context; to facilitate and monitor implementation of the multi-sectoral national policy/strategic action plan 	<ul style="list-style-type: none"> Country has an operational multisectoral national mental health policy/plan in line with international/regional human rights instruments
	<ul style="list-style-type: none"> Review legislation related to mental health in line with international human rights covenants/instruments. 	<ul style="list-style-type: none"> Country has an updated mental health legislation in line with international/regional human rights instruments
	<ul style="list-style-type: none"> Include defined priority mental conditions in the basic health delivery package of the government and social/private insurance reimbursement schemes Increase and prioritize budgetary allocations for addressing the agreed upon service targets and priorities, including providing Transitional/Bridge funding. 	<ul style="list-style-type: none"> Inclusion of specified priority mental health conditions in basic packages of health care, of public and private insurance / reimbursement schemes
Reorientation and Scaling Up of Mental Health Services	<ul style="list-style-type: none"> Establish mental health services in general hospitals for outpatient and short-stay inpatient care. Integrate delivery of evidence-based interventions for priority mental conditions in primary health care and other priority health programmes. Enable people with mental health conditions and their families through self-help and community based interventions. Downsize the existing long-stay mental hospitals 	<ul style="list-style-type: none"> Proportion of general hospitals which 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 non-pharmacological interventions. Proportion of mental health facilities monitored annually to ensure protection of human rights of persons with mental conditions using Quality and Right Standards.

	<ul style="list-style-type: none"> • 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 conditions during emergencies. • Implement evidence informed interventions for psychosocial assistance to vulnerable groups. 	<ul style="list-style-type: none"> • 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 conditions during emergencies
Promotion and Prevention	<ul style="list-style-type: none"> • Integrate recognition and management of maternal depression and parenting skills training in maternal and child health programmes. • Integrate life skills education (LSE), using a whole school approach, • Reduce access to means of suicide. • Employ evidence-based methods to improve mental health literacy and reduce stigma. 	<ul style="list-style-type: none"> • Proportion of community workers trained in early recognition and management of maternal depression and to provide 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • Routine data and reports at national level available on core set of mental health indicators. • Annual reporting of national data on numbers of deaths by suicide.

Panel 2: Country case studies on scaling up interventions for MNS disorders

The “686 Project”: China⁴²

The ‘Central Government Support for the Local Management and Treatment of Severe Mental Illnesses Project’ was initiated in 2004 with the first financial allotment of 6.86 million Renminbi (\$829,000 in 2004 dollars) as a result of which, subsequently it was referred to as the ‘686 Project’. Modelled on the WHO’s recommended method for integrating hospital-based and community-based mental health services, this programme provides care for a range of severe mental disorders through the delivery of a community-based packages by multi-disciplinary teams. The interventions are functionality oriented, and are for free out-patient treatment through insurance coverage (New Rural Cooperative Medical Care system) along with subsidised in-patient treatment for poor patients. The programme has covered 30% of the population of China by end of 2011. Programme evaluation 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% to 90% along with large reductions in the rates of ‘creating disturbances’ and ‘causing serious accidents’. The program investment by the government amounted to 280 million Renminbi in 2011, and its key innovations were the increase in the availability of human resources including both the involvement of non-mental health professionals and intensive capacity building which have added a 1/3 of all psychiatrists in the country.

The National Depression Detection and Treatment Program (Programa Nacional de Diagnóstico y Tratamiento de la Depresión): Chile⁴³

‘The National Depression Detection and Treatment Program’ or ‘Programa Nacional de Diagnóstico y Tratamiento de la Depresión’ is a national mental health program of Chile that integrates detection and treatment of depression in primary care. The program is based on the scaling up of an evidence based collaborative stepped care intervention in which most patients diagnosed with depression are provided medications and psychotherapy at the primary care clinics, while only severe cases are referred to specialists. Launched in 2001, the program operates through a network of 500 primary care centres, and presently covers 50% of Chile’s population. The program has added a large number of psychologists in the primary care with a 344% increase between 2003 and 2008. Enrollment of the patients in the program is growing steadily, with around 100,000 to 125,000 patients starting treatment each year from 2004 to 2006 and close to 170,000 patients started treatment in 2007. Universal implementation of the program has led to a greater utilisation 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 and proactive leadership, strategic alliances across sectors, sustained investment and ring-fencing new and essential financial resources, programme institutionalisation, and sustained development of human resources that can implement the programme.

Building Back Better: Burundi⁴⁴

Civil war in the last decade of 20th century and first decade of this century resulted in widespread massacres and forceful migrations and internal displacement of around a million individuals in Burundi. In order to address this humanitarian crisis, Healthnet TPO (Transcultural Psychosocial Organization) started providing mental health services in Burundi during the year 2000 when the then Ministry of Public Health had no mental health policy, plan, mental health unit and virtually all the psychiatric services were provided by one psychiatric hospital. Healthnet TPO conducted needs assessment first 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 last decade with the government now supplying essential psychiatric medications through its national drug distribution centre, 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 service. In the three year duration from 2006 to 2008, the mental health clinics in the provincial hospitals registered almost 10 000 people, who received more than 60 000 consultations. The majority (65%) were people with epilepsy. In 2011, funding from the Dutch government enabled HealthNet TPO and the Burundian government to initiate a 5-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 mhGAP guidelines. The government has now established a National Commission for mental health and appropriate steps are being taken to support provision of mental health care in general hospitals and follow-up within the community.

Suicide Prevention through Pesticide Regulation: Sri Lanka⁴⁵

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 8-fold from 1950 to 1995, and the country had the highest rate of suicide worldwide (approximately 47 per 100,000) during this period. A series of policy and legislative actions around this time, reduced the suicide rates to half by 2005. An ecological analysis⁴⁵ of trends in suicide and risk factors for suicide in Sri Lanka from 1975–2005, suggests that the marked decline in Sri Lanka's suicide rates 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. 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 have a favourable impact on suicide.

Web-Panel 1: The history of the Disease Control Priorities Initiative

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 systematically assess the cost-effectiveness (value for money) of interventions that would address the major sources of disease burden in low- and middle-income countries.⁴⁶ The World Bank's 1993 World Development Report on health drew heavily on DCP1's findings to conclude that specific interventions against non-communicable diseases were cost-effective, even in environments in which substantial burdens of infection and under-nutrition persisted.

DCP2, published in 2006, updated and extended DCP1 in several respects, including explicit consideration of the implications for health systems of expanded intervention coverage⁴⁷. 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, and conventional health economics has offered little understanding of how to make choices across platforms. Analysis of the costs of packages and platforms—and of the health improvements they can generate in given epidemiological environments—can help guide health system investments and development.

The third edition of DCP is being completed. 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 outcomes resulting from policies (for example, public finance) to increase intervention uptake.⁴⁸ The task in all the 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. DCP3's broad aim 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 (United Nations 2015). DCP3's analyses are well-placed to assist in choosing the means to attain the health SDG and assessing the related costs of scaled-up action.

Web-Panel 2: The social determinants of MNS disorders

Social determinants include an array of social, economic, neighborhood and demographic factors that interact with environmental events, to adversely influence the risk and outcome of MNS disorders. Within these domains, the following factors have been shown to be associated with several MNS disorders⁴⁹:

1. Socio-economic status: low income, financial stress, unemployment, income inequality, low education, low social support.
2. Neighborhood: inadequate housing structure, over-crowding, perceived neighborhood violence and composite neighborhood deprivation indices.
3. Environmental events: natural disasters, war, conflict, climate change and migration.

In relation to demographic factors, age, gender and ethnicity influence MNS disorders in complex ways. For example women show increased risk for depression and anxiety disorders, whereas men show increased risk for substance use disorders; and socially marginalized groups (the homeless, refugees, minorities etc) have increased risk for MNS disorders in some settings. Low socio-economic status in childhood has been shown to increase risk for emotional and behavioral disorders in childhood as well as depressive disorders in later adulthood, even when adjusting for childhood socio-demographic factors, family history of mental illness and adult socio-economic position. Social change, associated with changes in income, urbanization, environmental degradation and growth of the private sector, all influence the risk for MNS disorders.

The causal mechanisms of the social determinants of MNS disorders indicate a cyclical pattern: on the one hand, socio-economic adversities increases 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 healthcare expenditure, 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 both 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 MNS disorder prevention and treatment is compelling, and supports the economic argument for scaling up these interventions⁵⁰.

Web-Panel 3: Economic evaluation of the treatment and prevention of MNS disorders

Economic evaluations aim to inform decision making by quantifying the tradeoffs between 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 (e.g., 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 (e.g., 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 (e.g., tuberculosis or HIV treatment vs 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 (i.e., 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 MNS disorders, and these are reviewed both in the disorder-specific chapters of the Volume and, in a more synthesised format, in a chapter of its own (Chapter 12). This review shows that the economic evidence base for mental health policy and planning continues to strengthen, as a result of which the over-generalized 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 is a new evaluation approach (developed for Disease Control Priorities, 3rd edition). ECEA goes beyond conventional cost-effectiveness analysis (CEA) by not only considering the distribution of costs and outcomes across different socioeconomic groups in the population, but also by explicitly examining the extent to which interventions or policies protect households against the financial risk of medical impoverishment. In the MNS disorders Volume of DCP-3, Chisholm and colleagues (Chapter 13) apply extended cost-effectiveness analysis to a range of MNS disorder interventions in Ethiopia and India, showing that moving towards universal coverage via scaled up provision of publicly financed services leads to significant financial protection effects as well as health gains in the population.

Figure 1. Proportion of Global YLDs and YLLs attributable to mental, neurological, and Substance Use Disorders, 2010

Source: <http://vizhub.healthdata.org/gbd-compare/>; Note: YLLs = years lost to premature mortality; YLDs = Years lived with disability

Source: Whiteford et al, 2015⁵¹

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% of suicide YLLs or 1.3% of total all cause YLLs⁹.

Figure 2. Cost-effectiveness of selected interventions for MNS disorders in low- and middle-income countries (US\$ 2012)

Source: Hyman et al, 2006; Chisholm and Saxena, 2012

Note: Previously published estimates have been updated to 2012 US\$ values. Bars show the range in cost-effectiveness between six low- and middle-income world regions: Sub-Saharan Africa, Latin America & Caribbean, Middle East & North Africa, Europe and Central Asia, South Asia, East Asia & Pacific. (see WebAppendix for details)

Table 1 Cause-specific and excess deaths associated with mental, neurological and substance use disorders (GBD 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)	96,000 (60,000-130,000)	
Amphetamine dependence	500 (100-300)	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*	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 behavioural disorders	0	0**	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.

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

** There is currently insufficient data to derive estimates of excess mortality for disruptive behavioural disorders.

Table 2: Effective interventions for the prevention, treatment and care of MNS disorders

Type of disorder	Preventive interventions	Drug and physical interventions	Psychosocial interventions
MENTAL DISORDERS IN ADULTHOOD			
Schizophrenia <i>(5.3% of total MNS DAL Ys)</i>	<i>Chronic or relapsing condition characterized by delusions, hallucinations and disturbed behavior</i>	Anti-psychotic medication***	Family therapy/support** Community based rehabilitation* Self-help and support groups*
Mood and anxiety disorders <i>(41.9% of total MNS DAL Ys)</i>	<i>Group of conditions characterized by somatic, emotional, cognitive and behavioural symptoms; bipolar disorder is associated with episodes of elated and depressed mood</i>	Cognitive-behavioural therapy for persons with sub-threshold symptoms** Anti-depressant, anxiolytic, mood stabilizer and antipsychotic medication*** Electro-convulsive therapy (ECT) for severe refractory depression**	Cognitive behavioural therapy*** Inter-personal therapy**
MENTAL AND DEVELOPMENTAL DISORDERS IN CHILDHOOD AND ADOLESCENCE			
Conduct disorder <i>(2.2% of total MNS DAL Ys)</i>	<i>Pattern of antisocial behaviors that violate the basic rights of others or major age-appropriate societal norms</i>	Life skills education to build social and emotional wellbeing and competencies*** Parenting skills training** Maternal mental health interventions**	Parenting Skills training** Cognitive behavioural therapy*
	<i>Excessive or inappropriate fear,</i>	Parenting skills training**	Cognitive behavioural

Anxiety disorders (2.3% of <i>total MNS DAL Ys</i>)	<i>with associated behavioral disturbances that impair functioning</i>	Maternal mental health interventions**	therapy**
Autism (1.6% of <i>total MNS DAL Ys</i>)	<i>Severe impairment in reciprocal social interactions and communication skills, as well as the presence of restricted and stereotypical behaviors.</i>		Parental education and skills training* Educational support*
ADHD (0.2% of <i>total MNS DAL Ys</i>)	<i>Neurodevelopmental disorder characterized by inattention and disorganization, with or without hyperactivity-impulsivity, causing impairment of functioning</i>	Psychosocial stimulation of infants and young children* Methylphenidate**	Parenting skills training** Cognitive behavioural therapy**
Intellectual disability (idiopathic) (0.4% of <i>total MNS DAL Ys</i>)	<i>Significantly impaired cognitive functioning and deficits in two or more adaptive behaviors</i>	Psychosocial stimulation of infants and young children** Perinatal interventions, for example screening for congenital hypothyroidism** Population-based interventions targeting intellectual disability risk factors (e.g. reducing maternal alcohol use)*	Parental education and skills training* Educational support*
NEUROLOGICAL DISORDERS			
Migraine	<i>Episodic attacks where headache and nausea are the most</i>	Prophylactic drug treatment with propranolol or	Drug treatments - aspirin or one of several Behavioural and cognitive interventions*

(8.7% of total MNS DAL Ys)	<i>characteristic attack features. Headache itself, lasting for hours to 2–3 days, is typically moderate or severe and likely to be unilateral, pulsating and aggravated by routine physical activity</i>	amitriptyline***	other non-steroidal anti-inflammatory drugs [NSAIDs]***	
Epilepsy (6.8% of total MNS DAL Ys)	<i>Epilepsy is 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</i>	Population-based interventions targeting epilepsy risk factors (e.g. preventing head injuries; neurocysticercosis prevention)*	Standard antiepileptic medications (phenobarbital, phenytoin, carbamazepine, valproic acid)*** Epilepsy surgery**	
Dementia (4.4% of total MNS DAL Ys)	<i>A neuropsychiatric syndrome characterized by a combination of progressive cognitive impairment, behavioral and psychological symptoms (BPSD) and functional difficulties</i>	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 and behavioral training, and environmental modifications ** Interventions to support carers of people with dementia**
SUBSTANCE USE DISORDERS				
Alcohol use disorders (6.9% of total MNS DAL Ys)	Harmful use: “a pattern of alcohol use that causes damage to physical or mental health” Alcohol dependence: a cluster of physiological, behavioural, and cognitive phenomena in which the	Excise taxes*** Restriction on sales** Minimum legal age** Drink driving countermeasures** Advertising bans*	Naltrexone, Acamprosate*	Family support* Motivational enhancement, brief advice, cognitive behavioral** Screening and brief interventions***

	<i>use of a substance takes on a much higher priority for a given individual than other behaviours that once had greater value</i>	Restrictions on density* Opening, closing hours and days of sale** Family interventions*		Self-help groups*
Illicit drug use disorders (7.8% total MNS DALYs)	<i>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.</i>	Psychosocial interventions with primary school children e.g. good behavior game or strengthening families program*	Opioid substitution therapy (e.g. methadone, buprenorphine)***	Self-help groups, psychological interventions e.g. CBT*
SUICIDE AND SELF-HARM				
Suicide and self-harm <i>(1.47% of GBD; 22.5 million YLLs or 62.1% of suicide YLLs are attributed to mental and substance use disorders in 2010)</i>	<i>Suicide is the act of deliberately killing oneself.</i> <i>Suicide attempt refers to any non - fatal suicidal behaviour and refers to intentional self -inflicted poisoning, injury or self-harm which may or may not have a fatal intent or outcome</i>	Policies and legislations to reduce access to the means of suicide (e.g. 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*

Notes: Strength of evidence: 3 asterisks for evidence of Cost-effectiveness (CE),, 2 asterisks for strong evidence of Effectiveness (E) but not of CE, and 1 asterisk for modest evidence of E and either not CE or no evidence of CE.

Table 3. Intervention priorities for MNS disorders by delivery platform

Platform for intervention delivery						
Problem area	Population platform	Community platform	Health Care Platforms			
			Self-care and management	Primary Health Care	First-level hospital	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 (e.g. 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 e.g. for alcohol use disorders, epilepsy or parent support groups for children with developmental disorders, and survivors of suicide)				
Adult Mental Disorders	Child protection laws		Physical activity Relaxation training Education about early symptoms and their management Web- and smartphone-based psychological therapy for depression and anxiety disorders	Screening and pro-active case finding of psychosis, depression and anxiety disorders Diagnosis and management of depression and anxiety disorders* Continuing care of schizophrenia and bipolar disorder	Diagnosis and management of acute psychoses Management of severe maternal depression* Management of depression and anxiety disorders in mothers, people with HIV and people with other NCDs*	Electroconvulsive therapy for severe or refractory depression Management of refractory psychosis with clozapine
Child mental and developmental disorders	Child protection laws	Parenting programmes in infancy to promote early child development Life skills training in schools to build social and emotional competencies Parenting programmes in early and middle childhood	Web- and smartphone-based psychological therapy for depression and anxiety disorders	Screening for developmental disorders in children and maternal mental health interventions Parent skills training for developmental disorders Psychological treatment for mood, anxiety, ADHD and disruptive behaviour	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	

		(2-14 years)		disorders*		
		Improve the quality of antenatal and perinatal care to reduce risk factors associated with intellectual disability				
Neurological disorders	Policy interventions to address the risk factors for cardio-vascular diseases, e.g. tobacco control		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 Community based 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 e.g. increases in excise taxes on alcohol products, advertising bans) Penalize risky behaviours associated with alcohol (for e.g. 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 (e.g. methadone and buprenorphine) for opioid dependence	Management of severe dependence and withdrawal	Psychological treatments (e.g. CBT) for refractory cases*
Suicide and self-harm	Control the sale and distribution of means of suicide (for e.g. pesticides) Decriminalize suicide	Safer storage of pesticides in the community and farming households.	Web and smart-phone 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: BAC = blood alcohol concentration; MNS = mental, neurological, and substance; ADHD, Attention deficit hyperactivity disorder; CBT, Cognitive behavioural therapy.

a. **Red** type denotes urgent care; **blue** type denotes continuing care; black type denotes routine care.

b. Recommendations in **bold** = best practice; recommendations in normal font = good practice.

*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 e.g. 6-12 months for a single episode) at the one end, while others may need maintenance care for several years (for e.g. when there is a relapsing course).

WebAppendix

Costs and cost-effectiveness of interventions for MNS disorders in low- and middle-income countries

Table 2 shows the comparative cost-effectiveness of a range of interventions for addressing MNS disorders in different regions of the world, relative to a situation of no intervention. Because each intervention is being compared to a situation of no treatment, the resulting metric is called an average (as opposed to incremental) cost-effectiveness ratio. Previously published and updated findings (Hyman and others, 2006; Chisholm and Saxena, 2012) have been converted to 2012 US dollar values to enable comparison with other cost and cost-effectiveness information presented in this and other DCP-3 Volumes, based on IMF inflation estimates for different World Bank reporting regions. The exception to this price conversion process relates to newer psychotropic medications (such as fluoxetine for depression or risperidone for psychotic disorders), which are now produced in a number of countries under non-branded, generic licenses and can be purchased for approximately ten times less than a decade ago.

Table 2 Regional Cost-Effectiveness of Interventions for MNS Disorders

(Cost Per Healthy Life-Year Gained, US\$ 2012)

Cost per DALY averted (compared to no intervention), US\$ 2012	Sub-Saharan Africa	Latin America & Caribbean	Middle East & North Africa	Europe & Central Asia	South Asia	East Asia & Pacific
<u>SCHIZOPHRENIA</u>						
SCZ-1: Community-based treatment with older (neuroleptic) anti-psychotic drug	8,390	20,465	21,263	13,799	4,915	5,688
SCZ-2: Community-based treatment with newer (atypical) anti-psychotic drug	7,978	18,961	19,755	12,891	4,718	5,414
SCZ-3: Community-based treatment with older anti-psychotic drug + psychosocial treatment	6,005	13,858	14,413	11,396	3,490	3,865
SCZ-4: Community-based treatment with newer anti-psychotic drug + psychosocial treatment	6,014	13,649	14,192	11,233	3,523	3,890
<u>DEPRESSION</u>						
DEP-1: Episodic treatment in primary care with older antidepressant drug (TCAs)	1,410	3,491	3,171	2,668	786	899

DEP-2: Episodic treatment in primary care with newer antidepressant drug (SSRIs)	2,189	4,838	4,594	2,724	1,161	1,223
DEP-3: Episodic psychosocial treatment in primary care	2,083	4,427	4,232	2,722	1,128	1,178
DEP-4: Episodic psychosocial treatment plus older antidepressant	2,461	4,866	4,783	3,225	1,315	1,373
DEP-5: Episodic psychosocial treatment plus newer antidepressant	1,395	3,361	3,057	2,456	788	894
DEP-6: Maintenance psychosocial treatment plus older antidepressant	2,144	4,477	4,285	2,660	1,167	1,218
DEP-7: Maintenance psychosocial treatment plus newer antidepressant	2,532	4,927	4,847	3,137	1,367	1,425
<u>ALCOHOL USE DISORDERS</u>						
ALC-8: Brief physician advice in primary care	407	878	-	494	684	332
<u>EPILEPSY</u>						
EPI-1: Older anti-epileptic drug in primary care	694	1,511	1,450	2,516	600	1,057
EPI-2: Newer anti-epileptic drug in primary care	1,884	2,854	2,877	4,115	1,639	2,249

Cost per capita of intervention, US\$ 2012	<i>Sub-Saharan Africa</i>	<i>Latin America & Caribbean</i>	<i>Middle East & North Africa</i>	<i>Europe & Central Asia</i>	<i>South Asia</i>	<i>East Asia & Pacific</i>
<u>SCHIZOPHRENIA</u>						
SCZ-1: Community-based treatment with older (neuroleptic) anti-psychotic drug	1.25	4.48	4.55	3.51	0.87	1.31
SCZ-2: Community-based treatment with newer (atypical) anti-psychotic drug	1.28	4.46	4.54	3.52	0.90	1.34
SCZ-3: Community-based treatment with older anti-psychotic drug + psychosocial treatment	1.53	5.17	5.25	4.02	1.05	1.52
SCZ-4: Community-based treatment with newer anti-psychotic drug + psychosocial treatment	1.57	5.22	5.30	4.09	1.09	1.57

<u>DEPRESSION</u>						
DEP-1: Episodic treatment in primary care with older antidepressant drug (TCAs)	0.74	1.79	1.33	1.49	0.83	0.98
DEP-2: Episodic treatment in primary care with newer antidepressant drug (SSRIs)	0.84	3.47	2.92	2.33	0.78	0.80
DEP-3: Episodic psychosocial treatment in primary care	0.88	3.53	2.97	2.27	0.82	0.84
DEP-4: Episodic psychosocial treatment plus older antidepressant	1.37	5.01	4.40	2.55	1.19	1.13
DEP-5: Episodic psychosocial treatment plus newer antidepressant	1.55	5.48	4.84	2.99	1.39	1.30
DEP-6: Maintenance psychosocial treatment plus older antidepressant	1.60	5.54	4.90	2.93	1.43	1.35
DEP-7: Maintenance psychosocial treatment plus newer antidepressant	2.89	9.50	8.64	5.77	2.55	2.40
<u>ALCOHOL USE DISORDERS</u>						
ALC-8: Brief physician advice in primary care	0.22	0.63	-	0.66	0.05	0.12
<u>EPILEPSY</u>						
EPI-1: Older anti-epileptic drug in primary care	0.67	1.13	0.35	0.53	0.23	0.32
EPI-2: Newer anti-epileptic drug in primary care	1.81	2.13	0.69	0.87	0.62	0.68
Combined cost of implementing the most cost-effective intervention for each disorder	3.96	12.40	10.43	8.21	2.72	3.26

WebAppendix 2 Cost of school-based socio-emotional learning intervention in low- and middle-income countries

The cost of implementing school-based SEL interventions in the context of LMICs has not yet been estimated, so an analysis was undertaken for the specific purpose of this volume for a selection of countries—Ethiopia, India, Mexico, and Mauritius—using methods already developed for micro-costing of population-based alcohol control strategies (WHO 2011), ⁵²⁵²⁵¹⁵⁰⁵⁰⁴⁹⁴⁹⁴⁹⁴⁹⁵¹⁵⁰⁴⁹⁴⁹⁴⁸⁴⁸ as well as data from a psychosocial intervention to prevent depression in 12- to 16-year-old adolescents in Mauritius (Rivet-Duval and others 2011). The Resourceful Adolescent Programme-Adolescent version (RAP-A) showed that 11 hourly psychosocial sessions led to short-term benefits to depression, hopelessness, coping skills, and self-esteem; benefits to coping skills and self-esteem were sustained at follow-up after six months. For costing this intervention, we assessed the annual budgetary impact associated with the implementation of the program among all 12-year-olds in the local population, who make up 0.8-1.4 percent of the total population in the selected countries. The health educators, who are teachers, are assumed to work full-time on this program, visiting and delivering the intervention at different schools within municipalities or districts (six sessions per day). For every set of 20 health educators, we included one supervisor; central administration and program management costs were also included.

Based on 220 school days per year and 20 students per session, 1.7-2.8 full-time health educators would be needed to deliver the intervention at scale for a district of one million persons (Web Appendix 2, Table 1). Country-specific unit cost estimates taken from the WHO’s CHOICE database (<http://www.who.int/choice/costs>) were used to place a monetary value on these various resource inputs. The resulting cost of implementing this program at full scale (100 percent coverage) ranges from US\$0.03 per head of population in Ethiopia and India, to US\$0.11 in Mexico and US\$0.24 in Mauritius, reflecting higher salary and other input costs. These findings indicate that school-based SEL interventions represent a low-cost strategy for promoting adolescent mental health.

Web Appendix Table 1

	Ethiopia	India	Mexico	Mauritius
Total population age 12 years, percent	1.4	1.1	1.0	0.8
Health educators needed per 1 million population (at 100 percent coverage)	2.8	2.3	2.1	1.7
Cost per capita (at 100 percent coverage)	US\$0.03	US\$0.03	US\$0.11	US\$0.24

Note: LMICS = low- and middle-income countries.

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