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# Human resources for mental health: workforce shortages in low- and middle-income countries

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## Acknowledgements

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## Abbreviations and acronyms

| | |
|---|---|
| **AFR** | WHO African Region |
| **AMR** | WHO Region of the Americas |
| **AIC** | Akaike's Information Criterion |
| **CHOICE** | CHOosing Interventions that are Cost Effective |
| **EMR** | WHO Eastern Mediterranean Region |
| **EUR** | WHO European Region |
| **FTE** | Full-Time Equivalent (staff) |
| **ICD-10** | International Classification of Disease |
| **LIC** | Low-Income Countries |
| **LMIC** | Low- and Middle-Income Countries |
| **mhGAP** | mental health Gap Action Programme |
| **MIC** | Middle-Income Countries |
| **MNS** | Mental, Neurological and Substance use |
| **SEAR** | WHO South-East Asia Region |
| **WHO AIMS** | WHO Assessment Instrument for Mental Health Systems |
| **WPR** | WHO Western Pacific Region |

## Executive summary

Mental, neurological and substance use (MNS) disorders account for an estimated 14% of the global burden of disease, yet mental health routinely receives a low funding priority from governments. While evidence indicates there are insufficient numbers of mental health workers in low- and middle-income countries (LMIC) to meet the population needs, there are no rigorous estimates of the size of the mental health workforce shortage and the wage bill that would be required to remove the shortage.

This report aims to fill that gap by estimating the number of mental health workers required to treat MNS conditions. The workforce shortage is estimated based on comparing this needed number of mental health workers with the supply. The wage bill required to remove the shortage is based on mental health worker wages.

The principal datasets include the *2005 WHO Assessment Instrument for Mental Health Systems (WHO-AIMS)* and the *2004 WHO Global Burden of Disease Report*. The data were available for 58 LMIC and we extrapolate our results from these countries to all 144 LMIC. The results are for 2005, the latest year with reliable data, as well as for 2015, the target year of the United Nations Millennium Development Goals.

For each of the 58 LMIC, we estimated the number of mental health workers needed by applying service delivery models to the prevalence in each country of the following eight priority MNS conditions identified by the WHO *Mental Health Gap Action Programme (mhGAP)* report: depression; schizophrenia and other psychotic disorders; suicide; epilepsy; dementia; disorders due to the use of alcohol; disorders due to the use of illicit drugs; and mental disorders in children. Second, we subtracted the number of workers needed from the 2005 supply of mental health workers to estimate a shortage (or surplus). We repeated these steps for 2015. Third, we multiplied the shortages by annual wages to estimate the wage bill required to remove the shortages in 2005 and 2015.

In 2005, for the 144 LMIC, we found a shortage of 1.18 million workers, including 55,000 psychiatrists, 628,000 nurses in mental health settings and 493,000 psychosocial care providers. The annual wage bill to remove this shortage would be about US$ 4.4 billion (2009 dollars).[1]

In 2015, if the supply of mental health workers were to remain unchanged from 2005, and using population projections to update the number of workers that would be needed, the mental health worker shortage would increase from an estimated 1.18 million workers in 2005 to an estimated 1.71 million workers in 2015, representing a 45% increase. The annual wage bill to remove this shortage would be about US$ 6.4 billion (2009 dollars).

To meet the treatment needs for MNS disorders, our analysis provides benchmarks for human resources for mental health well into the future. The workforce represents one key component of the mental health system. However, to address the three main shortcomings of mental health care in most LMIC – scarcity, inequity and inefficiency – governments will need to take a comprehensive approach. Such a strategy will require, at the minimum, the allocation of health budgets towards MNS disorders. This is more likely if MNS disorders are destigmatized, there is a well-trained mental health workforce, and concerted efforts are made to increase the productivity of mental health workers.

[1] Dollars are stated in 2009 dollars and are based on the average inflation rate between the year of the data and 2009.

## Introduction

Mental, neurological and substance use (MNS) disorders account for an estimated 14% of the global burden of disease *(1)*. Up to 30% of the population has some form of MNS disorder each year *(2)*. These disorders result in direct economic costs of mental healthcare and indirect economic costs of lost productivity, impaired functioning and premature death *(3)*.

Several reports suggest cost-effective strategies to reduce the disability associated with MNS disorders *(4)*. Despite the availability of these strategies, the number of people with mental disorders who receive adequate treatment remains disturbingly low *(5)*. This gap between need and availability of treatment is especially wide in low-income countries (LIC) and middle-income countries (MIC), collectively referred to as LMIC (low- and middle-income countries). In these countries, treatment rates for mental disorders range from 35–50% *(5,6,7)*.

Mental health routinely receives a low funding priority from governments. Based on a 2001 survey conducted by WHO as part of Project Atlas, 32% of 191 countries did not have a specific mental health budget *(8)*. Of the 89 countries that reported budget information within the survey, 36% spent less than 1% of their health budget on mental health.

The evidence indicates a considerable gap between the global burden of MNS disorders and the financial and human resources being made available for their treatment and prevention. The magnitude of this public health problem poses a crucial question: do health systems meet the needs of those with MNS disorders? To strengthen the global mental health workforce – as part of mental health system development agenda – it is essential to know whether the current mental health workforce is able to meet the needs of those with MNS disorders. This report is designed to help us make that assessment.

Given the inadequacy of mental health resources, researchers, policy-makers and international agencies have asked governments to "scale up" their health services and systems devoted to mental health *(9,10,11,12)*. Psychiatrists, nurses in mental health settings and psychosocial health workers[2] provide the foundation for an effective mental health system. Without sufficient health workers, it will remain difficult for LMIC to adequately treat their populations. Mental health services depend primarily on trained human resources rather than sophisticated equipment or supplies; there can be no scale up in resources unless the workforce is bolstered.

Since approximately 2000, several reports have listed the labour force as a key component in developing mental health systems. *The World Health Report 2001 – Mental Health: New Understanding, New Hope* proposed staffing be segmented: primary care for initial care; and specialty care for a wider range of services *(9)*. Specialty care teams include health and allied health professionals, such as psychiatrists, psychologists, nurses, social workers, physical therapists, occupational therapists, law enforcement officers, clergy and traditional healers. In addition, the *World Health Report 2006 – Working Together for Health*, noted that the shift from institution- to community-based care requires innovative and multidisciplinary methods *(13)*. Moreover, the 2007 Lancet series on global mental health said that resources allocated for mental health systems remained insufficient, inequitably distributed and inefficiently used *(14)*. A survey of international mental health experts and leaders concluded that a shortage of trained mental health workers was one of five key barriers to improving mental health services in LMIC *(15)*. The WHO mental health Gap Action Programme *(mhGAP)*, endorsed by the 55th World Health Assembly in 2002, called for the distribution of health professionals to be more closely aligned with the global burden of MNS disorder *(16)*. The *mhGAP* report is an important step in assessing the global landscape of mental health resources.

Increasing the mental health workforce of LMIC has been recommended for more than 30 years *(17,9)*, but progress has been slow. The lack of progress may arise, in part, from the absence of clear, quantitative benchmarks to guide the prudent allocation of human resources in mental health.

This report aims to provide government officials, educators, health care planners and policy-makers with quantitative estimates of the human resources required to adequately treat populations in LMIC. Specifically, this report estimates the gap between the supply and the number of mental health workers needed for 58 LMIC as of 2005, the latest year with the most reliable data. Second, for each LMIC, we estimate what this gap might be in 2015, the target year for the achievement of the United Nations' Millennium Development Goals *(18)*. Third, we estimate the annual wage bill required to fill these resource gaps by country. Fourth, we extrapolate the results from these 58 LMIC to all 144 LMIC. For further information on this approach, refer to the study, *The Mental Health Workforce Gap in Low and Middle Income Countries: A Needs-Based Approach (19)*.

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[2] Nursing care providers include general nurses working in mental health settings and psychiatric nurses. Psychosocial care providers include psychologists, medical officers, social/rehabilitation workers, occupational therapists, community mental health workers, primary care workers and counsellors. We did not include neurologists in this classification. Although mental health disorders are sometimes diagnosed and treated in primary care settings, we did not include primary care workers because our focus was on mental health specialists.

**Structure of the report**

In the second section, (methodology), we use the prevalence of MNS disorders, along with demographic variables, to estimate the proportion of the population in low- and middle-income countries requiring mental health treatment. The third section (estimate of needed mental health workers based on treatment needs) applies service delivery estimates to the treated population to arrive at the number of mental health workers needed to provide the care. The fourth section (mental health workforce shortages and wage bill to remove them) compares the number of needed workers with the supply of workers to estimate the mental health workforce shortage (or surplus); this section includes estimates of the annual wage bill required to remove the shortage. This section also provides forecasts of the need, shortage and wage bill estimates for 2015. The fifth section (summary and results for all low- and middle income countries), integrates and discusses the quantitative findings, and presents them by WHO region. It extrapolates the results from the 58 LMIC to all 144 LMIC. The sixth section provides a policy discussion and conclusions.

## Methodology

In 2008, WHO published the *Mental Health Gap Action Programme (mhGAP) (16)*. This report was a planning guide for LMIC to scale up care for MNS disorders. The *mhGAP* specifies eight disorders that treatment planners should prioritize. To meet the priority definition, the condition must impose substantial disability, morbidity or mortality, lead to high economic costs or be associated with violations of human rights.[3] Based on these criteria, WHO identified the following eight priority conditions: depression; schizophrenia and other psychotic disorders; suicide; epilepsy; dementia; disorders due to the use of alcohol; disorders due to the use of illicit drugs; and mental disorders in children.[4]

Our report focuses on the eight priority conditions identified in *mhGAP*, which account for an estimated 75% of the total global burden of MNS disorders.[5] Many of these conditions have cost-effective interventions *(20,21)*. To calculate the overall burden of mental disorders in LMIC, we used information from the most reliable sources available (discussed below). In the following pages, we outline each step of this process.

We focused our analysis on those LMIC with sufficient data to permit estimates of the need and supply of mental health workforces. To meet this standard, the country required the following characteristics:

- World Bank designation as a low- or middle- income country
- Up-to-date population estimates from a census
- Prevalence estimates of eight mhGAP priority MNS conditions
- Participation in 2005–2008 WHO-AIMS assessment instrument, which contains several indicators on the existing mental health workforce

In 2005, 58 countries met these criteria. Table 1 (page 3) lists the participating countries. These countries cover all six designated WHO geographic regions and 11 of the 14 subregions.

[3] Disability represents the largest proportion of the burden of MNS disorders, although premature mortality is also substantial. The economic burden associated with MNS disorders includes, but is not limited to: loss of employment; loss of income; and the cost of medications and social services.

[4] For a description of the burden, costs, and human rights violations associated with these conditions, we refer the reader to Annex 1 (page 28) of (16)

[5] This estimate is based on DALY (disability-adjusted life year) estimates from the *2004 WHO Global Burden of Disease Report*, which found that in LMIC, the eight *mhGAP* priority conditions account for about 75% of the global burden of neuropsychiatric disorders.

Table 1. LMIC included in analysis (n=58), by geographic region

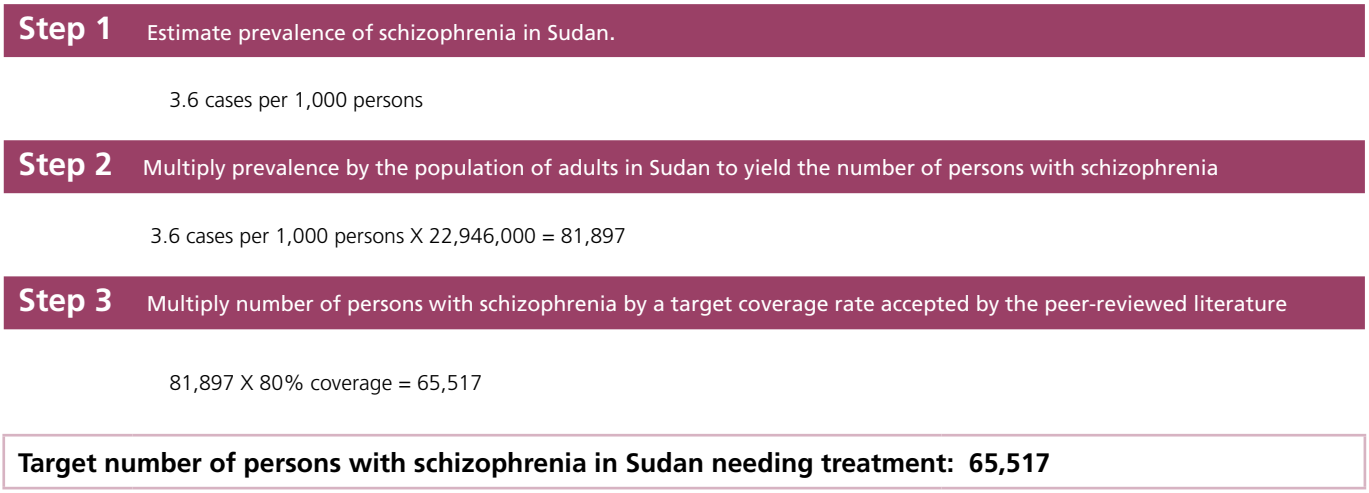
| Country | Income classification | Population (2005) |
|---|---|---|
| **African** | | |
| Benin | LIC | 7,869,000 |
| Burundi | LIC | 7,377,000 |
| Eritrea | LIC | 4,475,000 |
| Ethiopia | LIC | 75,662,000 |
| Nigeria | LIC | 140,881,000 |
| Uganda | LIC | 28,701,000 |
| Congo | MIC | 3,416,000 |
| South Africa | MIC | 48,073,000 |
| **Americas** | | |
| Argentina | MIC | 38,732,000 |
| Belize | MIC | 283,000 |
| Bolivia | MIC | 9,183,000 |
| Chile | MIC | 16,298,000 |
| Costa Rica | MIC | 4,330,000 |
| Dominican Republic | MIC | 9,536,000 |
| Ecuador | MIC | 13,065,000 |
| El Salvador | MIC | 6,060,000 |
| Guatemala | MIC | 12,710,000 |
| Guyana | MIC | 761,000 |
| Honduras | MIC | 6,891,000 |
| Jamaica | MIC | 2,666,000 |
| Nicaragua | MIC | 5,454,000 |
| Panama | MIC | 3,229,000 |
| Paraguay | MIC | 5,906,000 |
| Suriname | MIC | 497,000 |
| Uruguay | MIC | 3,327,000 |
| **Eastern Mediterranean** | | |
| Afghanistan | LIC | 24,507,000 |
| Pakistan | LIC | 165,816,000 |
| Somaliland | LIC | 8,353,000 |
| Djibouti | MIC | 804,000 |
| Egypt | MIC | 77,155,000 |
| Iran | MIC | 70,768,000 |
| Iraq | MIC | 28,240,000 |
| Jordan | MIC | 5,565,000 |
| Morocco | MIC | 30,493,000 |
| Sudan | MIC | 38,699,000 |
| Tunisia | MIC | 9,878,000 |

| Country | Income classification | Population (2005) |
|---|---|---|
| **European** | | |
| Tajikistan | LIC | 6,538,000 |
| Uzbekistan | LIC | 26,320,000 |
| Albania | MIC | 3,112,000 |
| Armenia | MIC | 3,065,000 |
| Azerbaijan | MIC | 8,444,000 |
| Georgia | MIC | 4,464,000 |
| Kyrgyzstan | MIC | 5,224,000 |
| Latvia | MIC | 2,292,000 |
| Republic of Moldova | MIC | 3,756,000 |
| Ukraine | MIC | 46,935,000 |
| **South-East Asia** | | |
| Bangladesh | LIC | 153,121,000 |
| Nepal | LIC | 27,221,000 |
| Bhutan | MIC | 649,000 |
| India-Uttarakhand | MIC | 9,073,000 |
| Maldives | MIC | 293,000 |
| Sri Lanka | MIC | 19,532,000 |
| Thailand | MIC | 65,945,000 |
| Timor-Leste | MIC | 991,000 |
| **Western Pacific** | | |
| Viet Nam | LIC | 84,074,000 |
| China-Hunan | MIC | 6,325,999 |
| Mongolia | MIC | 2,549,000 |
| Philippines | MIC | 85,495,000 |
| **Total** | | **1,481,078,999** |

LIC – low-income country.
MIC – middle-income country.
LMIC – low- and middle-income countries.

Figure 1 describes the analytic process to estimate the number of individuals, by MNS disorder and country, who need treatment. We used schizophrenia in Sudan as an example. The first step to quantify workforce needs was to identify in each LMIC the population with MNS disorders. Ideally, this process would use population-based surveys for each LMIC to estimate the prevalence of MNS disorders. Prevalence for each disorder would then be multiplied by the population at risk of the disorder to yield the estimated number of cases. This step would be repeated for the eight *mhGAP* priority conditions.

Figure 1. Step-by-step process to estimate persons with a mental disorder requiring treatment: schizophrenia in Sudan as an example




Sources
Step 1: WHO Global Burden of Disease, 2004.
Step 2: United Nations Population Reference Bureau, 2008 Revision.
Step 3: Chisholm et al., Br J Psych 2007;191: 528-35.

In many LMIC, however, population-level prevalence data are not available. In the absence of such, we estimated prevalence from two reliable sources. First, the 2004 WHO Global Burden of Disease Project has developed prevalence estimates for each WHO subregion, based on comprehensive reviews and syntheses of the available epidemiological evidence.[6, 7] We applied those subregional estimates to the 58 countries. As a second source, for MNS disorders not included in the 2004 Global Burden of Disease Project (i.e., illicit substance-use disorders (25), childhood mental disorders[8]), we based our estimates on the best available prevalence data from the peer-reviewed epidemiologic literature.[9]

Table 2 (page 17) displays the prevalence estimates of the eight *mhGAP* priority conditions for each LMIC.[10] As reflected in the table, we further classified illicit substance-use disorders and childhood mental disorders by subcategory, as each subcategory requires distinct treatments and human resource levels. The prevalence estimates indicate the number of cases per population per year that meet the International Classification of Disease (ICD-10) case definition for that disorder.[11]

[6] We used the 2004 GBD estimates for six disorders: schizophrenia, bipolar disorder, depression, alcohol use disorder, dementia, epilepsy, and suicide. The 2004 GBD estimates are a reasonable substitute for the 2005 estimates, because the prevalences are stable over this short time period. Regarding suicide estimates, we incorporated suicidal ideation by multiplying suicide death rates by a factor of 20 (the estimated number of ideations per suicide), consistent with the literature (22,23,24).

[7] We refer the reader to the WHO technical appendix for a detailed description of the prevalence estimation for each cause: Available under "Cause-Specific Documentation" at: http://www.who.int/healthinfo/global_burden_disease/data_sources_methods/en/index.html.

[8] The prevalence of childhood mental disorders reflects WHO expert panel opinion, based on an extensive review of the literature.

[9] As a sensitivity analysis to estimate the needed number of mental health workers, we increased and decreased the prevalence of each of the eight mhGAP priority conditions by 20% (see Table 8 Confidence interval, page 28).

[10] Disease and injury regional estimates for 2004. prev 6_2004.XLS table downloaded at: http://www.who.int/healthinfo/global_burden_disease/estimates_regional/en/index.html

[11] Please refer to Table 2 Footnotes (page 17) for a list of the case definitions used.

**Population and target coverage rates**

The next step to identify the population needing mental health treatment was to apply each country's population size to the prevalence of MNS disorders. With the exception of China (Hunan province) and India (Uttarakhand state),[12] 2005 population census estimates for LMIC were taken from the population database of the United Nations Population Division (see Table 1, page 3).[13] We then multiplied the prevalence by population size, taking into account the age groups affected by each disorder. For example, with child MNS disorders, we multiplied only the child population size (age, less than 15 years) by the prevalence of child disorders to yield the total number of child cases.

In LMIC with limited health resources, it is unreasonable to expect that all MNS disorders in the population will receive treatment. Some individuals may not seek treatment, while screening the entire population to identify disorder is not feasible. Given these circumstances, the target rates of coverage for each disorder were determined from the literature and by consultation with international mental health experts.[14] Table 3 (page 5) reports target coverage rates for the *mhGAP* priority conditions and their sources. These normative rates reflect both disability severity and the ability of public health systems to identify and treat cases. Target coverage ranges from 80% (severely disabling conditions such as schizophrenia and bipolar disorder) to 20% of cases (e.g., childhood intellectual disability).[15]

**Target population needing treatment**

Table 4 (page 20) shows the target population in each LMIC that requires treatment for mental disorders. An estimated 38 million people in the 58 countries require treatment for at least one of the eight *mhGAP* priority conditions. Table 5 (page 23) shows the share of the total cases requiring treatment for each of the eight *mhGAP* priority conditions. This table allows countries to compare their burden of mental disorders with other LMIC. Childhood disorders account for the largest proportion of cases in LIC (32%) and the second largest in MIC (22%, second to depression). In MIC, dementia accounts for 3.6% of all cases, whereas in LIC it accounts for only 1.9% of cases. The reason for this almost two-fold difference in the proportionate burden of dementia is that dementia is more prevalent in older people and MIC have more older people.[16] Notably, the European Region has the largest proportion of MNS cases requiring treatment for alcohol-use disorders (23%).

Table 3. Target coverage rates for mhGAP conditions, LMIC

| Conditions | % |
|---|---|
| Schizophrenia [1] | 80 |
| Depression[1] | 33 |
| Suicide | 80 |
| Epilepsy[2] | 80 |
| Dementia[3] | 80 |
| Alcohol use[1] | 25 |
| Drug use | 50 |
| Opioid use | 50 |
| Other drug use | 50 |
| Childhood disabilities[4] | 20 |

[1] Chisholm D et al, 2007 (21).
[2] Ding D et al, 2008 (51).
[3] Ferri C et al, 2004 (52).
[4] Taken from level attainable in developed countries. See Kataoka SH et al, 2002 (26); Belfer ML, 2008 (53).

[12] China-Hunan population estimates were derived from age proportions in the government-sponsored, province-specific 2005 China 1% Population Survey, extrapolated to the total province population. India-Uttarakhand population estimates were derived from projected population (based on the India 2001 Census) and age proportions in the WHO country *report Health Sector Reforms in India: Initiatives from Nine States* (2004).

[13] United Nations, Department of Economic and Social Affairs (DESA) Population Division, Population Estimates and Projections Section. World Population Prospects: The 2008 Revision Population Database. Data available at: http://esa.un.org/unpp/. Accessed on July 15, 2009.

[14] As a sensitivity analysis to estimate the needed number of mental health workers, the target coverage rates were increased and decreased by 20% (see Table 8 Confidence interval, page 28).

[15] The 20% target coverage for childhood disorders reflects the highest coverage rate that is currently attained in developed countries (26). Moreover, the 20% target is low because coverage is focused on children with severe cases.

[16] 6.2% of the population in MIC report >65 years of age, compared with only 3.7% in LIC.

## Estimate of needed mental health workers based on treatment needs

The health care service delivery models for the *mhGAP* conditions outline the level of human resources required to deliver mental health interventions in LMIC. Each service intervention consists of essential care and treatment for the target populations identified in section 2. The intervention packages vary by condition. Each of the eight *mhGAP* priority conditions calls for a specific mix of health care workers, rate of use and facility type. For instance, the treatment model for most people with alcohol-use disorder includes eight sessions of outpatient psychosocial care per year. In contrast, a subset of those with schizophrenia should receive long-term inpatient residential care, with stays lasting for more than 90 days. These diverse service models by MNS disorder emphasize the different human resource requirements *(20,21)*.

Figure 2. Step-by-step process to estimate baseline workforce need for mental health: schizophrenia in Sudan as an example

**Step 1** Begin with total number of persons with schizophrenia in Sudan needing treatment (from Figure 1).

65,517 persons

**Step 2** Assign treatment models to persons with schizophrenia, taking into account the health care setting (inpatient or outpatient) and the quantity of use per year (bed days or visits).

65,517
- 50% use hospital outpatient services @ 12 visits per year
- 30% use primary health center outpatient services @ 5 visits per year
- 15% use community residential inpatient services @ 28 bed-days per year
- several other inpatient and outpatient treatment settings

= 1,159,658 outpatient visits per year and 687,933 bed-days per year

**Step 3** Calculate number of Full-Time-Equivalent (FTE) Staff needed per treatment setting.

$$\frac{\text{1,159,658 outpatient visits per year}}{\text{(11 consultations per day x 225 working days per year)}} = \text{468.55 FTEs}$$

$$\frac{\text{687,933 bed-days per year}}{\text{(365 days in year x 1.15 rotation factor, given 85\% bed capacity)}} = \text{1,638.91 beds}$$

**Step 4** Assign staffing ratios based on unique treatment setting needs.

| | Outpatient need | Inpatient need |
|---|---|---|
| Psychiatrists | 9.6 | 93.1 |
| Nurses | 201.2 | 872.7 |
| Psychosocial care providers | 257.7 | 357.9 |

**Step 5** By specialty, sum FTE across treatment setting, for schizophrenia in Sudan.

| | |
|---|---|
| Psychiatrists | 103 |
| Nurses | 1074 |
| Psychosocial care providers | 616 |

Sources
Steps 1 & 2: Chisholm D (unpublished). Target norms for service coverage and resource utilisation - Six disorders.
Step 3: Rispel L, Price M and Cabral J, 1996. Confronting need and affordability: Guidelines for primary health care services in South Africa. Johannesburg: Centre for Health Policy.
Step 4: Chisholm D, Lund C, Saxena S. Br J Psychiatry. 2007 Dec;191:528-35.

We applied treatment models for each of the eight *mhGAP* priority conditions. Figure 2 (page 6) continues to describe the step-by-step process that began in Figure 1, using schizophrenia in Sudan as an example, by which we estimated the human resources needs for mental health. These treatment models are based on rigorous cost-effectiveness studies and input from WHO experts who developed the service delivery packages.[17] The key components of the treatment packages include the percentage of cases needing care in each setting, the average number of visits per person per year and whether the visit requires a bed (i.e., inpatient or outpatient). In addition, for the *mhGAP* conditions that comprise several distinct disorders with unique service delivery models, we calculated health service need separately for each disorder and then added these values to yield an aggregate estimate.[18] Table 6 (page 26) summarizes the total annual outpatient visits and inpatient bed days expected for the target population needing mental health treatment. Table 6 (page 26) indicates that, relative to MIC, outpatient visits in LIC account for a greater percentage of overall visits. Also, the rate of per capita inpatient bed days in MIC is greater than that in LIC.

Previous analyses of LMIC have identified the number of staff required per patient for each inpatient bed and outpatient visit (28,29,21). We applied results from these staffing patterns, shown in Table 7 (page 7), to the case population in need. This calculation assumes 225 working days per year and 11 consultations per day for the staff schedule (30). Consistent with earlier methodology, we classified mental health workers into one of three categories: psychiatrists; nurses in mental health settings; and psychosocial care providers.[19]

Table 7. Staffing proportions by health-care setting and country income classification*

| Occupation | Outpatient | | Inpatient | |
|---|---|---|---|---|
| | Day care | Acute and primary care | Acute care | Long stay/ residential care |
| **Low-income countries** | | | | |
| Psychiatrists/specialists | 0.00% | 1.67% | 6.25% | 7.69% |
| Nursing care provider | 66.67% | 20.83% | 62.50% | 61.54% |
| Psychosocial care provider | 33.33% | 77.50% | 31.25% | 30.77% |
| **TOTAL** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| **Middle-income countries** | | | | |
| Psychiatrists/specialists | 0.00% | 3.57% | 10.00% | 6.67% |
| Nursing care provider | 62.50% | 28.57% | 60.00% | 66.67% |
| Psychosocial care provider | 37.50% | 67.86% | 30.00% | 26.67% |
| **TOTAL** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |

* Staffing proportions derived from Table 2 (page 17) in: Chisholm D, Lund C, Saxena S. Cost of scaling up mental healthcare in low- and middle-income countries. Br J Psychiatry. 2007 191:528-35.

Table 8 (page 28) displays the country-level estimates of mental health care providers needed to treat persons with one or more of the eight mhGAP priority conditions. The confidence intervals for each worker category reflect the range of expected need based on varying the case load and the intensity of treatment services. The estimated total number of workers needed across the LMIC is 362,000, which represents 22.3 workers per 100,000 population in low-income countries and 26.7 workers per 100,000 population in middle-income countries. Nurses in mental health settings account for the majority (54%) of all workers needed, whereas psychiatrists represent only 6% of total need. The remaining 41% represents psychosocial care providers.[20]

[17] Depression, bipolar disorder, schizophrenia and alcohol-use disorder (19); and epilepsy (20). Suicide: Used the same model for depression, excluding any pharmacological treatment provisions. Illicit drug use disorders: Separate models were developed for opioid use and other drug-use disorders. Childhood mental disorders – Intellectual disabilities: three models were developed based on severity (mild, moderate and severe), service type (initial assessment and follow-up care) and outpatient setting (hospital outpatient setting and primary health care setting). A weighted average of resource use per case was derived from the three intellectual disabilities models. Conduct disorders: The Lund et al (27) report was based on the South African children and adolescent mental health service sector. The resource use per case is a weighted average of three disorders from the Lund data: ADHD, Conduct Disorder and ODD. Emotional disorders: Used the same service models developed for adults for children also. Thus, given adequate prevalence data, the disorders accounted for in this sub-category are depression, bipolar disorder, schizophrenia and epilepsy. As a sensitivity analysis to estimate the number of mental health workers needed, we increased and decreased the inpatient and outpatient treatment services by 20% (see Table 8 confidence interval, page 28).

[18] Based on the epidemiology and cost-effectiveness literature, we calculated separate intervention service models based on the distinct conditions that fall into the following categories: disorders due to use of illicit drugs (opioid use, other drug use disorders); mental disorders in children (intellectual disabilities, conduct disorders, emotional disorders).

[19] We classified psychologists, social workers and occupational therapists under one worker category, psychosocial care providers, because in LMIC, these workers often perform the same tasks (e.g., delivering psychosocial interventions). We note that high-income countries have a more distinct division of tasks across these professions.

[20] The percentages do not total 100% because of rounding.

With this table, LMIC can compare the number of needed mental health workers relative to countries within the same region and income classification. For example, we find that Sri Lanka and Thailand, two MIC in the WHO South-East Asia Region, share almost identical needs for psychiatrists (1.46 and 1.47 per 100,000 population respectively).

## Mental health workforce shortages and the wage bill to remove them

In this section, we estimate the 2005 and 2015 shortages (or surpluses) of mental health workers in the 58 LMIC, based on the needed number of workers estimated in the previous section. We also estimate the annual wage bill for the required additional mental health workers.

The shortage (or surplus) of mental health workers is calculated for each LMIC in 2005 as the difference between the number of needed mental health workers reported in Table 8 (page 28) (prevalence-based need estimates) and the supply of mental health workers. Workforce supply data were retrieved from 58 countries that completed a WHO-AIMS assessment. WHO-AIMS records information on mental health professionals by specialty from 2005 or the most recent year available. Consistent with previous sections, we consider three specialties of mental health workers: psychiatrists; nurses that work in mental health settings; and psychosocial care providers.[21]

Table 9 (page 31) shows the needs-based shortage of mental health workers, by specialty for each of the 58 LMIC, to treat the eight *mhGAP* priority conditions. Except for Latvia,[22] all of the LMIC experience a shortage of mental health workers in at least one of the three types of workers analysed, including 39 countries for psychiatrists, 55 for nurses in mental health settings and 46 for psychosocial care providers. The shortage amounts to about 239,000 workers, including 11,000 psychiatrists, 128,000 nurses in mental health settings and 100,000 psychosocial care providers. All LIC, except for Uzbekistan, have a shortage of psychiatrists, ranging from just 0.26 psychiatrists per 100,000 population in Tajikistan to 1.70 per 100,000 population in Viet Nam. In 44 MIC, 26 have a psychiatrist shortage, ranging from 0.09 psychiatrists per 100,000 population in Iran to 1.33 in Mongolia.

Nurse shortages in mental health settings in LMIC are more critical. Except in three countries (Pakistan, Latvia and Timor-Leste), all LMIC have a shortage. In Ukraine there are just 0.82 nurses per 100,000 population, and in Uruguay, 22.2 per 100,000 population. Similarly, for psychosocial care providers, all LIC have shortages, ranging from 4.12 per 100,000 population in Tajikistan to 11.52 per 100,000 population in Viet Nam. About 73% of MIC (32 countries) do not have an adequate level of psychosocial care providers.

WHO-AIMS reports the number of medical doctors who do not specialize in psychiatry but work in mental health settings (hereafter, referred to as "other medical doctors"). We did not include other medical doctors in the mental health workforce estimates because we focused on mental health professionals. Including these doctors in our calculations could potentially inflate the supply counts, thereby underestimating the true shortage of psychiatrists and other mental health professionals. Nevertheless, we note that in several countries, these doctors represent a large proportion of the physicians (i.e., psychiatrists and other medical doctors) working in mental health settings. Table A1 (page 43) in the appendix shows, by country, the number of other medical doctors per 100,000 population in mental health settings, the number of psychiatrists per 100,000 population and the estimated shortage of psychiatrists per 100,000 population. Countries with higher shortages of psychiatrists per 100,000 population have a higher proportion of other medical doctors, suggesting these doctors are practising in roles normally filled by psychiatrists. In Viet Nam, for example, there are 0.90 other medical doctors per 100,000 population in mental health settings, while there are only 0.35 psychiatrists per 100,000 population. In Mongolia, the contrast is greater: 4.74 other medical doctors per 100,000 population in mental health settings, and only 0.51 psychiatrists per 100,000 population.

For our shortages estimates, we assumed worker surpluses in one country do not offset worker shortages in other countries, and assumed worker surpluses within a specialty within a country do not offset shortages within other specialties for that country. Table 10 (page 9) relaxes this assumption and calculates shortages using two alternative methods. The method above is presented first (labelled the No-Offset Method). Alternative Method I allows for surpluses in one specialty to offset shortages in another specialty within a country, using a one-for-one substitution, but does not allow for surpluses in one country to offset shortages in another country. The resulting shortage is about 215,000 workers across 51 countries.[23]

[21] We were able to estimate the number of nurses that work in mental health settings because WHO-AIMS Version 2.2 includes estimates of the number of nurses that work in or for mental health facilities or private practice (31).

[22] Latvia does not have an estimated shortage in any of the three worker categories, primarily because of its supply of mental health workers is higher than average.

[23] This method is similar to the method used by WHO in its report World Health Report 2006 - Working Together for Health (13). Health professional workforce surpluses in one country did not offset shortages in other countries. However, that report did not include a separate estimate for each workforce cadre – doctors, nurses and midwives – so each cadre implicitly could be substituted for the others.

Alternative Method II allows for surpluses in one specialty to offset shortages in another specialty within a country or across countries, using a one-for-one substitution. The resulting shortage is about 172,000 workers. We chose the No-Offset Method; that is, to assume worker surpluses do not offset worker shortages, because of the different training requirements among worker specialties and because cross-country migration will not likely occur at the level required, and evidence of this movement is lacking.

Table 10. Shortage calculations by surplus offset method for 58 LMIC, 2005

| Surplus offset method | Psychiatrists | Nurses in mental health settings | Psychosocial care providers | Total |
|---|---|---|---|---|
| **No-offset method: Surpluses do not offset shortages** | | | | |
| Need | 19,996 | 194,502 | 147,436 | 361,935 |
| Supply | 8,775 | 66,928 | 47,180 | 122,883 |
| Shortage | 11,222 | 127,575 | 100,256 | 239,052 |
| Countries with shortages | 39 | 55 | 46 | 57 |
| **Alternative method I: Allow surpluses to offset shortages within a country (a)** | | | | |
| Need | 19,996 | 194,502 | 147,436 | 361,935 |
| Supply | 14,270 | 80,003 | 52,756 | 147,028 |
| Shortage | 5,726 | 114,500 | 94,680 | 214,906 |
| Countries with shortages | | | | 51 |
| **Alternative method II: Allow surpluses to offset shortages within and across countries (b)** | | | | |
| Need | 19,996 | 194,502 | 147,436 | 361,935 |
| Supply | 17,443 | 80,237 | 92,615 | 190,296 |
| Shortage | 2,553 | 114,265 | 54,821 | 171,639 |

(a) Compared with the No-offset method, the supply of mental health workers increased, because surpluses in one specialty were allowed to offset shortages in another specialty within a country using a one-for-one substitution. This decreased the number of countries with shortages from 57 to 51.

(b) Compared with Alternative method I, the supply of mental health workers increased, because surpluses in one specialty were allowed to offset shortages in another specialty within a country or across countries using a one-for-one substitution. The number of countries with remaining shortages would depend on which countries the workers migrated to.

Table 11 (page 34) provides the annual estimated wage costs of scaling-up mental health workers to eliminate shortages in treatment for the eight *mhGAP* priority conditions in 2005. The wage costs were estimated for each country by multiplying the shortage of workers by specialty and the annual wage by specialty. The wage data are from WHO's CHOICE project (CHOosing Interventions that are Cost Effective), an initiative designed to provide evidence of the health interventions that are most cost-effective.[24] As part of the initiative, health-care wage datasets were collected in 2000-2001 across 14 epidemiological subregions of the world. Using these data, wages for five education levels were estimated within each country using a multivariate regression model.[25] The education levels ranged from lower secondary education (level 1), to post-secondary, non-tertiary education or, alternatively, the first stage of tertiary education (level 3), to the second stage of tertiary education with specialized training (level 5). The final model specification was based on Akaike's Information Criterion (AIC) or a pseudo R-squared. The independent variables included: a country's gross domestic product per worker; government health spending as a percentage of total spending; region of the world; whether the country was English-speaking; and interaction terms. We assigned the following education levels for each provider type within our study: psychiatrists (level 5); nurses in mental health settings (level 3); and psychosocial care providers (level 3). Level 3 was chosen for the category of psychosocial care providers (which includes psychologists, social workers and occupational therapists) as most psychosocial care and support is commonly expected in LMIC to be provided by health workers without an advanced degree. All wages were converted to 2005 United States dollars using buying power parity conversion rates.

[24] The WHO CHOICE Project can be found at http://www.who.int/choice/en/.

[25] WHO unpublished report, Determinants of Variation in Health Sector Wages Across Countries. For a copy of the report, contact Dan Chisholm at chisholmd@who.int.

Table 11 (page 34) shows that the annual wage costs to remove the mental health workforce shortages in the 58 LMIC would have been in 2005 about US$ 814 million (US$ 894 million in 2009 dollars). This US$ 814 million includes US$ 80 million for psychiatrists, US$ 420 million for nurses in mental health settings and US$ 314 million for psychosocial care providers. These costs vary considerably by country and specialty. For example, annual wages required to remove the shortages range from US$ 30,000 for Timor-Leste to US$ 118 million for Nigeria.

**Forecasts of shortages and scaling-up costs of mental health workers in 2015**

We forecast future shortages of mental health workers, by specialty, in LMIC in 2015, the target year of the United Nations Millennium Development Goals. We also estimate the annual wage costs to remove the shortages in that year. We calculate shortages by subtracting the 2005 supply level of mental health workers from the prevalence-based need estimates for the eight mhGAP priority conditions in 2015. Table 12 (page 36) updates the need estimates, based on how each country's age distribution is expected to change between 2005 and 2015. The table shows the total need across the 58 LMIC increases from 362,000 workers to 440,000 workers, a 21% increase. Most of this increase is because of projected population growth from 1.5 billion to 1.7 billion. The number of needed workers per 100,000 population increases by 3%, from 24.4 workers per 100,000 population in 2005, to 25.3 workers per 100,000 population in 2015.

To estimate shortages (or surpluses) in 2015, we assumed the supply of workers in 2015 would be the same as the supply in 2005. This assumption provides a starting point that shows what the ramifications would be in 2015 if a country's mental health workforce supply were to remain unchanged. We used the same methodology to estimate shortages for 2005; that is, we assumed that worker surpluses in one country do not offset worker shortages in other countries, and that worker surpluses within a specialty within a country do not offset shortages within other specialties in that country. Based on this method, we project that from 2005 to 2015, shortages will increase from 239,000 workers to 347,000 workers, a 45% increase (see Table 13, page 38). Based on 2005 levels, all countries, except Latvia, are estimated to experience a shortage in one or more mental health specialties. All LIC, except Uzbekistan, and about a half of MIC are projected to have continued shortages of per-capita psychiatrists in 2015. LMIC, except Pakistan, Latvia and Timor-Leste, are expected to have nurse shortages in mental health settings ranging from 1.8 to 23.6 per 100,000 population. All LIC and most MIC are expected to have shortages in psychosocial care providers.

The annual wage bill to remove the projected mental health workforce shortages for the eight *mhGAP* priority conditions in 2015 in the 57 LMIC with shortages is estimated in 2005 dollars to be US$ 1.2 billion, equivalent to US$ 1.3 billion in 2009 dollars (see Table 14, page 41). The US$ 1.2 billion is 45% higher than the annual wage bill required in 2005 to remove the shortages for the eight *mhGAP* priority conditions in the 57 LMIC. By specialty, the annual wage bill to remove shortages is US$ 113 million for psychiatrists, US$ 583 million for nurses in mental health settings and US$ 489 million for psychosocial care providers (all stated in 2005 dollars). As with 2005 estimates, the cost of increasing worker levels varies considerably by country and specialty. For example, annual wages required to remove the projected shortages range from US$ 89,000 in Timor-Leste to US$ 186 million in Nigeria.

## Summary and results for all low– and middle–income countries

Analysis of human resources for mental health in 58 low- and middle-income countries reveals substantial shortages in the mental health workforce and that the situation will worsen by 2015 if the additional workers are not trained and hired. Based on other studies, a similar situation exists for health professionals in general, including doctors, nurses and midwives *(13,32,33,34)*. About 93% of LIC and 59% of MIC experience a needs-based shortage of psychiatrists. All but three of the 58 countries have insufficient numbers of nurses in mental health settings devoted to mental health care. In addition, 79% of LMIC show a workforce gap in psychosocial care providers. Although the shortage varies substantially by country, the widest gaps occur in LIC.

This section presents the 2005 results in two summary tables by WHO region and also includes adjustments to account for all MNS disorders across all 144 LMIC. For the 58 LMIC we analysed for the eight *mhGAP* priority conditions, we estimate a shortage of 11,000 psychiatrists, 128,000 nurses in mental health settings and 100,000 psychosocial care providers, totaling 239,000 mental health workers in 2005 (Table 15, page 12). By specialty, the supply met 44% of the psychiatrist need, 34 % of the nurse need in mental health settings and 32 % of the psychosocial care -provider need. Overall, the supply met 34 % of the mental health worker need. On a per capita basis, the shortage is highest in the WHO Western Pacific Region, with a 26.6 mental health worker shortage per 100,000 population, followed by the South-East Asia Region, with a shortage of 21.1 mental health workers per 100,000 population. The results show that the 2005 levels of mental health workers do not meet the treatment needs of persons with priority MNS disorders. Failure to adequately treat these disorders implies: a large number of overall disability-adjusted life years lost; reductions in employment and productivity; and an increased strain on related social services.

The eight *mhGAP* priority conditions we studied comprise about 75% of all MNS disorders in LMIC,[26] while the LMIC we examined represent 27% of the total population living in all 144 LMIC.[27] If we view the mental health burden in our study of the eight *mhGAP* priority conditions in the 58 LMIC as representative of all MNS disorders in all 144 LMIC[28], we estimate a workforce gap of 1.18 million mental health professionals in 2005 (see Table 15, page 12).[29] This shortage comprises 55,000 psychiatrists, 628,000 nurses in mental health settings and 493,000 psychosocial care providers. The parallel estimate for all MNS disorders in all 144 LMIC in 2015 is a shortage of 1.71 million workers, including 78,000 psychiatrists, 866,000 nurses in mental health settings and 764,000 psychosocial care providers.

Table 16 (page 12) shows the annual wage bill required to remove the mental health workforce shortages by WHO region. The annual cost to remove the shortage based on the eight *mhGAP* priority conditions in the 58 LMIC is US$ 814 million (in 2005 dollars), and is highest in the Eastern

Mediterranean Region (US$ 227 million) and African Region (US$ 207 million). Applying the same methodology to include all MNS disorders in all 144 LMIC, the annual cost would be US$ 4 billion in 2005 dollars or US$ 4.4 billion in 2009 dollars. The parallel estimate for all MNS disorders in all 144 LMIC in 2015 is an annual cost of US$ 5.8 billion (in 2005 dollars) or $6.4 billion (in 2009 dollars). These costs represent only a fraction of the total costs required to scale up the mental health workforce. They do not include the cost of training, support staff and new workers' facilities, equipment, supplies and medication. Nor do they include the costs to scale up cadres, who work in primary-care settings where mental health disorders are sometimes diagnosed and treated, or where patients are assessed and referred to specialists in mental health settings.

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[26] This estimate is based on DALY estimates from the *2004 WHO Global Burden of Disease Report*, which found that in LMIC, the eight *mhGAP* priority conditions account for about 75% of the global burden of neuropsychiatric disorders. To account for this percentage, we increased the worker shortage estimates by 1.33 (or 1/0.75). This was a conservative approach, because we could have increased the worker-need estimates by 1.33, which would have resulted in the worker shortage estimates increasing by more than a factor of 1.33, if the worker supply were unchanged. However, because the nature of the remaining neuropsychiatric disorders is not well specified, there may be additional supply of mental health workers available to treat these disorders.

[27] Note that we only used a province of China (Hunan) and a state of India (Uttarakhand) in our need and supply estimates; therefore, most of these countries' populations were excluded from the analysis.

[28] In this projection, we assume that all characteristics of the 58 LMIC (overall prevalence of disorder, service delivery model, target coverage rate, etc) are representative of the 144 LMIC.

[29] United Nations, Department of Economic and Social Affairs (DESA) Population Division, Population Estimates and Projections Section. World Population Prospects: The 2008 Revision Population Database. Data available at: http://esa.un.org/unpp/ Accessed on 1 May, 2010. 144 LIC, Lower MIC, and Upper MIC included.

Table 15. FTE shortage of mental health workers by WHO Region, 2005

| WHO Region | Psychiatrists | | Nurses in mental health settings | | Psychosocial care providers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | per 100,000 population | N | per 100,000 population | N | per 100,000 population | N | per 100,000 population | N |
| AFR | 0.8 | 2,668 | 6.4 | 20,279 | 7.2 | 22,900 | 14.5 | 45,848 |
| AMR | 0.1 | 203 | 11.7 | 16,229 | 2.9 | 4,096 | 14.8 | 20,528 |
| EMR | 0.6 | 2,885 | 5.7 | 26,440 | 6.5 | 29,710 | 12.8 | 59,035 |
| EUR | 0.0 | 17 | 5.4 | 5,912 | 1.9 | 2,039 | 7.2 | 7,968 |
| SEAR | 1.1 | 3,010 | 11.3 | 31,270 | 8.7 | 24,011 | 21.1 | 58,291 |
| WPR | 1.4 | 2,439 | 15.4 | 27,445 | 9.8 | 17,500 | 26.6 | 47,383 |
| **Total for 58 LMIC, 8 MNS Disorders** | **0.8** | **11,222** | **8.6** | **127,575** | **6.8** | **100,256** | **16.1** | **239,052** |
| **Total for 58 LMIC, All MNS Disorders** | | **14,962** | | **170,100** | | **133,674** | | **318,736** |
| **Total for 144 LMIC, All MNS Disorders** | | **55,223** | | **627,822** | | **493,380** | | **1,176,425** |

Table 16. Annual wage bill to remove shortage of mental health workers by WHO Region, 2005 (millions $US 2005)

| WHO Region | Psychiatrists | Nurses in mental health settings | Psychosocial care providers | Total |
|---|---|---|---|---|
| AFR | 29 | 74 | 104 | 207 |
| AMR | 2 | 102 | 20 | 125 |
| EMR | 21 | 107 | 99 | 227 |
| EUR | 0 | 9 | 2 | 11 |
| SEAR | 16 | 69 | 51 | 136 |
| WPR | 12 | 59 | 37 | 109 |
| **Total for 58 LAMIC, 8 MNS disorders** | **80** | **420** | **314** | **814** |
| **Total for 58 LAMIC, All MNS disorders** | **107** | **559** | **419** | **1,085** |
| **Total for 144 LAMIC, All MNS disorders** | **396** | **2,065** | **1,545** | **4,005** |

Notes:
Totals may not add due to rounding.
LIC – low-income country
MIC – middle-income country
LMIC – low- and middle-income countries.

## Policy discussion and conclusions

According to Saxena et al *(14)*, resources for mental health in LMIC remain grossly inadequate. In this report, we provide benchmarks for LMIC to redress this problem by increasing their mental health workforce. The rapid scaling up of a well-trained workforce requires a sizeable investment immediately. Population forecasts show that doing nothing will worsen the mental health treatment gap for decades to come. This treatment gap will not only increase disability, but hinder economic productivity and drain resources from other government programmes.

Government budgets and private spending in most LMIC, particularly LIC, are insufficient to scale up the mental health workforce to required levels. Mental health care providers and policy-makers should consider how task shifting and worker incentives might improve productivity *(35)*. Task shifting involves delegating tasks to existing or new cadres with either less training or narrowly focused training to increase access to lower-cost services. Task shifting can include delegating tasks to professionals with less training and even to non-professionals, or a combination of these *(36)*. In a mental health setting, task shifting might include transferring tasks from a psychiatrist to a non-specialist medical doctor, which seems to be occurring in some countries where there are psychiatrist shortages (see appendix). Task shifting might also include developing a new cadre. For example, female community health workers who were trained in cognitive behaviour techniques in the Lady Health Worker Programme in Pakistan demonstrated their ability to significantly lower depression prevalence among new mothers *(37)*. Successful task shifting requires good management and supervision. Higher-skilled mental health workers and/or professionals outside of mental health will need to acquire these management and supervision skills. Governments will also need to do more to help develop informal resources, such as family and consumer associations, which play a key role in the care and rehabilitation of people with mental disorders. Increasing worker incentives can also improve productivity. The primary financial incentive is the payment system in the form of fees for services, capitation or salary *(38)*. Health-care payment systems are increasingly being augmented with pay-for-performance programmes, which use financial and non-financial incentives to better align provider and payer objectives, where the payer could be the government, a private insurer or a patient *(39,40,41)*. For example, Rwanda's pay-for-performance programme included a fee-for-service payment for specific maternal and child-health services, and the payment was adjusted based on quality-of-care indicators *(42)* . Facilities with the programme had a higher probability of institutional deliveries and of children aged 0–23 months receiving a preventative care visit, and better prenatal care quality when compared with health care facilities without the programme. Pay-for-performance programmes are less common in mental health, but the United Kingdom's Quality and Outcomes Framework pay-for-performance programme, for example, includes mental health quality-of-care measures, including whether a practice can produce a registry of people with schizophrenia, bipolar disorder and other psychoses, and whether these patients have had a review in the preceding 15 months *(43)*.

The workforce represents one key component of the mental health system. However, to address the three main shortcomings of mental health care in most LMIC – scarcity, inequity and inefficiency – governments will need to take a comprehensive approach. Such a strategy will require, at the minimum, the allocation of health budgets towards MNS disorders. This is more likely if MNS disorders are destigmatized, there is a well-trained mental health workforce, and concerted efforts are made to increase the productivity of mental health workers.

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## Appendix 1. Country-level supplemental tables

The following supplemental tables include the country-level statistics that were used to create the tables in the main report.

Table 2. Prevalence (%) of mental, neurological and substance use disorders identified in mhGAP report, LMIC (n=58)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression[1] | Suicidal ideation[1] | Epilepsy[1] | Dementia[1] | Alcohol use[1] | Illicit substance use | | Prevalence of Childhood Disorders (per 100,000 child population) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia[1] | Bipolar[1] | | | | | | Opioid use[2] | Other drug use[2] | Intellectual disabilities[3] | Conduct/ behavioral[3] | Emotional[3] |
| **Low income countries** | | | | | | | | | | | | | |
| Benin | AFR | 0.28 | 0.37 | 2.18 | 0.08 | 1.04 | 0.09 | 0.52 | 0.09 | 0.46 | 1.50 | 4.25 | 4.25 |
| Burundi | AFR | 0.28 | 0.37 | 2.18 | 0.18 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| Eritrea | AFR | 0.28 | 0.37 | 2.18 | 0.10 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| Ethiopia | AFR | 0.28 | 0.37 | 2.18 | 0.12 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| Nigeria | AFR | 0.28 | 0.37 | 2.18 | 0.10 | 1.04 | 0.09 | 0.52 | 0.09 | 0.46 | 1.50 | 4.25 | 4.25 |
| Uganda | AFR | 0.28 | 0.37 | 2.18 | 0.14 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| Afghanistan | EMR | 0.36 | 0.41 | 2.79 | 0.13 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Pakistan | EMR | 0.36 | 0.41 | 2.79 | 0.21 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Somaliland | EMR | 0.36 | 0.41 | 2.79 | 0.50 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Tajikistan | EUR | 0.50 | 0.49 | 2.83 | 0.04 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Uzbekistan | EUR | 0.50 | 0.49 | 2.83 | 0.12 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Bangladesh | SEAR | 0.37 | 0.43 | 2.88 | 0.25 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| Nepal | SEAR | 0.37 | 0.43 | 2.88 | 0.20 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| Viet Nam | WPR | 0.44 | 0.51 | 2.84 | 0.20 | 0.39 | 0.33 | 2.77 | 0.02 | 0.34 | 1.50 | 4.25 | 4.25 |
| **Middle income countries (lower middle and upper middle)** | | | | | | | | | | | | | |
| Congo | AFR | 0.28 | 0.37 | 2.18 | 0.12 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| South Africa | AFR | 0.28 | 0.37 | 2.18 | 0.28 | 1.04 | 0.09 | 0.52 | 0.01 | 0.14 | 1.50 | 4.25 | 4.25 |
| Argentina | AMR | 0.42 | 0.45 | 2.80 | 0.19 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Belize | AMR | 0.42 | 0.45 | 2.80 | 0.17 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Bolivia | AMR | 0.42 | 0.45 | 2.80 | 0.04 | 1.26 | 0.34 | 2.68 | 0.07 | 0.43 | 1.50 | 4.25 | 4.25 |
| Chile | AMR | 0.42 | 0.45 | 2.80 | 0.22 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Costa Rica | AMR | 0.42 | 0.45 | 2.80 | 0.17 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Dominican Republic | AMR | 0.42 | 0.45 | 2.80 | 0.11 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Ecuador | AMR | 0.42 | 0.45 | 2.80 | 0.16 | 1.26 | 0.34 | 2.68 | 0.07 | 0.43 | 1.50 | 4.25 | 4.25 |
| El Salvador | AMR | 0.42 | 0.45 | 2.80 | 0.15 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Guatemala | AMR | 0.42 | 0.45 | 2.80 | 0.06 | 1.26 | 0.34 | 2.68 | 0.07 | 0.43 | 1.50 | 4.25 | 4.25 |
| Guyana | AMR | 0.42 | 0.45 | 2.80 | 0.67 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |

Table 2 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression[1] | Suicidal ideation[1] | Epilepsy[1] | Dementia[1] | Alcohol use[1] | Illicit substance use | | Prevalence of Childhood Disorders (per 100,000 child population) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia[1] | Bipolar[1] | | | | | | Opioid use[2] | Other drug use[2] | Intellectual disabilities[3] | Conduct/ behavioral[3] | Emotional[3] |
| **Middle income countries (lower middle and upper middle)** | | | | | | | | | | | | | |
| Honduras | AMR | 0.42 | 0.45 | 2.80 | 0.13 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Jamaica | AMR | 0.42 | 0.45 | 2.80 | 0.08 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Nicaragua | AMR | 0.42 | 0.45 | 2.80 | 0.22 | 1.26 | 0.34 | 2.68 | 0.07 | 0.35 | 1.50 | 4.25 | 4.25 |
| Panama | AMR | 0.42 | 0.45 | 2.80 | 0.13 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Paraguay | AMR | 0.42 | 0.51 | 2.80 | 0.10 | 1.26 | 0.34 | 2.68 | 0.03 | 0.34 | 1.50 | 4.25 | 4.25 |
| Suriname | AMR | 0.42 | 0.45 | 2.80 | 0.39 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Uruguay | AMR | 0.42 | 0.45 | 2.80 | 0.33 | 1.26 | 0.34 | 2.68 | 0.03 | 0.35 | 1.50 | 4.25 | 4.25 |
| Djibouti | EMR | 0.36 | 0.41 | 2.79 | 0.09 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Egypt | EMR | 0.36 | 0.41 | 2.79 | 0.03 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Iran | EMR | 0.36 | 0.41 | 2.79 | 0.12 | 0.55 | 0.12 | 0.21 | 0.55 | 0.02 | 1.50 | 4.25 | 4.25 |
| Iraq | EMR | 0.36 | 0.41 | 2.79 | 0.31 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Jordan | EMR | 0.36 | 0.41 | 2.79 | 0.00 | 0.55 | 0.12 | 0.21 | 0.55 | 0.02 | 1.50 | 4.25 | 4.25 |
| Morocco | EMR | 0.36 | 0.45 | 2.79 | 0.04 | 0.55 | 0.12 | 0.21 | 0.41 | 0.43 | 1.50 | 4.25 | 4.25 |
| Sudan | EMR | 0.36 | 0.41 | 2.79 | 0.15 | 0.55 | 0.12 | 0.21 | 0.41 | 0.14 | 1.50 | 4.25 | 4.25 |
| Tunisia | EMR | 0.36 | 0.41 | 2.79 | 0.06 | 0.55 | 0.12 | 0.21 | 0.55 | 0.02 | 1.50 | 4.25 | 4.25 |
| Albania | EUR | 0.50 | 0.49 | 2.83 | 0.15 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Armenia | EUR | 0.50 | 0.49 | 2.83 | 0.08 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Azerbaijan | EUR | 0.50 | 0.49 | 2.83 | 0.03 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Georgia | EUR | 0.50 | 0.49 | 2.83 | 0.04 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Kyrgyzstan | EUR | 0.50 | 0.49 | 2.83 | 0.23 | 0.42 | 0.51 | 4.01 | 0.09 | 0.09 | 1.50 | 4.25 | 4.25 |
| Latvia | EUR | 0.50 | 0.49 | 2.83 | 0.52 | 0.42 | 0.51 | 4.01 | 0.19 | 0.04 | 1.50 | 4.25 | 4.25 |
| Republic of Moldova | EUR | 0.50 | 0.51 | 2.83 | 0.35 | 0.42 | 0.51 | 4.01 | 0.19 | 0.34 | 1.50 | 4.25 | 4.25 |
| Ukraine | EUR | 0.50 | 0.49 | 2.83 | 0.54 | 0.42 | 0.51 | 4.01 | 0.19 | 0.04 | 1.50 | 4.25 | 4.25 |
| Bhutan | SEAR | 0.37 | 0.43 | 2.88 | 0.27 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| India-Uttarakhand | SEAR | 0.37 | 0.43 | 2.88 | 0.34 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| Maldives | SEAR | 0.37 | 0.43 | 2.88 | 0.27 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| Sri Lanka | SEAR | 0.37 | 0.43 | 2.88 | 0.56 | 0.58 | 0.17 | 1.28 | 0.04 | 0.10 | 1.50 | 4.25 | 4.25 |

Table 2 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression[1] | Suicidal ideation[1] | Epilepsy[1] | Dementia[1] | Alcohol use[1] | Illicit substance use | | Prevalence of Childhood Disorders (per 100,000 child population) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia[1] | Bipolar[1] | | | | | | Opioid use[2] | Other drug use[2] | Intellectual disabilities[3] | Conduct/ behavioral[3] | Emotional[3] |
| **Middle income countries (lower middle and upper middle)** | | | | | | | | | | | | | |
| Thailand | SEAR | 0.37 | 0.43 | 2.88 | 0.20 | 0.58 | 0.17 | 1.28 | 0.04 | 0.10 | 1.50 | 4.25 | 4.25 |
| Timor-Leste | SEAR | 0.37 | 0.43 | 2.88 | 0.14 | 0.58 | 0.17 | 1.28 | 0.15 | 0.10 | 1.50 | 4.25 | 4.25 |
| China-Hunan | WPR | 0.44 | 0.51 | 2.84 | 0.34 | 0.39 | 0.33 | 2.77 | 0.02 | 0.34 | 1.50 | 4.25 | 4.25 |
| Mongolia | WPR | 0.44 | 0.41 | 2.84 | 0.23 | 0.39 | 0.33 | 2.77 | 0.02 | 0.14 | 1.50 | 4.25 | 4.25 |
| Philippines | WPR | 0.44 | 0.49 | 2.84 | 0.03 | 0.39 | 0.33 | 2.77 | 0.02 | 0.04 | 1.50 | 4.25 | 4.25 |

[1] WHO Global Burden of Disease Estimates for 2004.
[2] Comparative Risk Assessment http://www.who.int/publications/cra/chapters/volume1/1109-1176.pdf.
[3] WHO Expert Panel on Child Disorders.

**Case definitions used**:
**Schizophrenia**: cases that meet ICD-10 criteria for schizophrenia only.
**Bipolar**: cases that meet ICD-10 criteria for bipolar only.
**Depression** (unipolar depressive disorders and bipolar affective disorder): Major depressive episode or bipolar disorder meeting ICD-10 criteria.
**Suicide** (suicide attempt): Global Burden of Disease self-inflicted injury death rate multiplied by a factor of 20 (22,23,24).
**Epilepsy**: cases meeting International League Against Epilepsy definition (excluding epilepsy secondary to other diseases or injury).
**Dementia**: Global Burden of Disease Estimate of Alzheimer disease and dementia multiplied by a correction factor of 0.5 to remove Alzheimer disease and mild dementia cases (45). Given the strong age-dependence of dementia, we then apply a correction factor that weights prevalence by the age structure of the population (older populations receive a greater weight).
**Alcohol-use disorder**: cases meeting ICD-10 criteria for alcohol dependence and harmful use (F10.1 and F 10.2), excluding cases with comorbid depressive episode.
**Opioid-use disorder**: cases meeting ICD-10 criteria for opioid dependence and harmful use (F 11.1 F 11. 2), excluding cases with comorbid depressive episode.
**Other drug-use disorders**: cases meeting ICD-10 criteria for cocaine dependence and harmful use (F 14.1 and F 14.2) or amphetamine use.
**Childhood intellectual disabilities**: moderate and severe forms of mental retardation, based on international estimates of prevalence (46,47,48).
**Conduct/behavioral disorders**: prevalence of severe aggression, disobedience and irritability based on WHO expert panel estimates.
**Childhood emotional disorders**: WHO-based estimate of children that meet criteria for major depression or anxiety-related disorders (49,50).

Table 4. Target population in 58 LMIC that requires treatment for MNS disorders*

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol use | Illicit substance Use | | Childhood Disorders | | | Total Target Cases | Total cases per 100,000 total popula-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizo-phrenia | Bipolar | | | | | | Opioid use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional | | |
| **Low-income countries** | | | | | | | | | | | | | | | |
| Benin | AFR | 9,964 | 12,960 | 31,872 | 2,724 | 36,768 | 1,946 | 5,746 | 1,993 | 10,096 | 10,323 | 29,249 | 29,249 | 182,889 | 2,324 |
| Burundi | AFR | 9,721 | 12,644 | 31,094 | 6,380 | 35,871 | 1,691 | 5,606 | 216 | 2,938 | 9,171 | 25,985 | 25,985 | 167,301 | 2,268 |
| Eritrea | AFR | 5,855 | 7,616 | 18,728 | 2,059 | 21,606 | 860 | 3,377 | 130 | 1,769 | 5,619 | 15,921 | 15,921 | 99,460 | 2,223 |
| Ethiopia | AFR | 94,966 | 123,519 | 303,758 | 39,906 | 350,426 | 17,821 | 54,766 | 2,110 | 28,697 | 100,380 | 284,410 | 284,410 | 1,685,171 | 2,227 |
| Nigeria | AFR | 180,432 | 234,681 | 577,128 | 64,595 | 665,795 | 34,139 | 104,053 | 36,082 | 182,815 | 182,097 | 515,942 | 515,942 | 3,293,699 | 2,338 |
| Uganda | AFR | 32,726 | 42,565 | 104,676 | 15,962 | 120,758 | 5,300 | 18,873 | 727 | 9,889 | 42,474 | 120,343 | 120,343 | 634,637 | 2,211 |
| Afghanistan | EMR | 37,224 | 42,274 | 119,978 | 13,047 | 57,403 | 4,309 | 6,987 | 26,726 | 9,126 | 34,410 | 97,495 | 97,495 | 546,474 | 2,230 |
| Pakistan | EMR | 290,937 | 330,399 | 937,716 | 167,840 | 448,651 | 57,714 | 54,609 | 208,883 | 71,326 | 191,766 | 543,337 | 543,337 | 3,846,514 | 2,320 |
| Somaliland | EMR | 13,206 | 14,997 | 42,563 | 18,511 | 20,364 | 1,884 | 2,479 | 9,481 | 3,238 | 11,184 | 31,688 | 31,688 | 201,283 | 2,410 |
| Tajikistan | EUR | 15,754 | 15,668 | 37,003 | 1,362 | 13,376 | 3,567 | 39,665 | 1,782 | 1,742 | 7,734 | 21,913 | 21,913 | 181,481 | 2,776 |
| Uzbekistan | EUR | 70,357 | 69,973 | 165,253 | 16,836 | 59,737 | 19,534 | 177,141 | 7,958 | 7,781 | 25,905 | 73,398 | 73,398 | 767,271 | 2,915 |
| Bangladesh | SEAR | 298,937 | 350,258 | 962,542 | 204,239 | 473,157 | 65,475 | 325,246 | 75,982 | 50,655 | 155,436 | 440,402 | 440,402 | 3,842,729 | 2,510 |
| Nepal | SEAR | 49,006 | 57,419 | 157,793 | 26,241 | 77,567 | 11,126 | 53,319 | 12,456 | 8,304 | 31,839 | 90,211 | 90,211 | 665,491 | 2,445 |
| Viet Nam | WPR | 211,230 | 245,201 | 557,334 | 95,016 | 185,984 | 118,769 | 412,696 | 5,953 | 101,208 | 73,620 | 208,590 | 208,590 | 2,424,192 | 2,883 |
| **Total for low-income countries** | | **1,320,314** | **1,560,175** | **4,047,440** | **674,718** | **2,567,464** | **344,135** | **1,264,561** | **390,479** | **489,584** | **881,958** | **2,498,881** | **2,498,881** | **18,538,590** | **2,436** |
| **Middle income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | |
| Congo | AFR | 4,519 | 5,877 | 14,453 | 1,934 | 16,674 | 1,066 | 2,606 | 100 | 1,365 | 4,224 | 11,968 | 11,968 | 76,754 | 2,247 |
| South Africa | AFR | 73,910 | 96,133 | 236,409 | 73,047 | 272,730 | 18,562 | 42,623 | 1,642 | 22,335 | 45,684 | 129,438 | 129,438 | 1,141,951 | 2,375 |
| Argentina | AMR | 96,598 | 102,679 | 264,221 | 42,730 | 288,417 | 70,771 | 191,610 | 4,287 | 50,297 | 30,462 | 86,309 | 86,309 | 1,314,690 | 3,394 |
| Belize | AMR | 595 | 632 | 1,627 | 240 | 1,776 | 164 | 1,180 | 26 | 310 | 321 | 910 | 910 | 8,691 | 3,071 |
| Bolivia | AMR | 19,216 | 20,426 | 52,561 | 1,642 | 57,375 | 6,155 | 38,117 | 1,990 | 12,280 | 10,494 | 29,733 | 29,733 | 279,720 | 3,046 |
| Chile | AMR | 41,390 | 43,996 | 113,212 | 21,228 | 123,580 | 23,775 | 82,100 | 1,837 | 21,551 | 12,159 | 34,451 | 34,451 | 553,730 | 3,398 |
| Costa Rica | AMR | 10,485 | 11,145 | 28,680 | 4,107 | 31,306 | 4,325 | 20,798 | 465 | 5,460 | 3,684 | 10,438 | 10,438 | 141,332 | 3,264 |
| Dominican Republic | AMR | 21,596 | 22,955 | 59,070 | 5,648 | 64,480 | 8,538 | 42,837 | 958 | 11,245 | 9,441 | 26,750 | 26,750 | 300,267 | 3,149 |
| Ecuador | AMR | 29,762 | 31,636 | 81,407 | 11,517 | 88,863 | 12,447 | 59,036 | 3,082 | 19,019 | 12,780 | 36,210 | 36,210 | 421,969 | 3,230 |

Table 4 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol use | Illicit substance Use | | Childhood Disorders | | | Total Target Cases | Total cases per 100,000 total popula-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizo-phrenia | Bipolar | | | | | | Opioid use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional | | |
| Middle income countries (lower-middle and upper-middle) | | | | | | | | | | | | | | | |
| El Salvador | AMR | 13,298 | 14,135 | 36,372 | 4,784 | 39,703 | 6,205 | 26,377 | 590 | 6,924 | 6,378 | 18,071 | 18,071 | 190,907 | 3,150 |
| Guatemala | AMR | 24,422 | 25,959 | 66,799 | 3,670 | 72,917 | 7,435 | 48,442 | 2,529 | 15,606 | 16,455 | 46,623 | 46,623 | 377,479 | 2,970 |
| Guyana | AMR | 1,775 | 1,886 | 4,854 | 2,834 | 5,298 | 711 | 3,520 | 79 | 924 | 708 | 2,006 | 2,006 | 26,600 | 3,495 |
| Honduras | AMR | 14,018 | 14,900 | 38,341 | 4,306 | 41,853 | 4,109 | 27,805 | 622 | 7,299 | 8,232 | 23,324 | 23,324 | 208,132 | 3,020 |
| Jamaica | AMR | 6,179 | 6,568 | 16,901 | 1,161 | 18,449 | 3,351 | 12,256 | 274 | 3,217 | 2,514 | 7,123 | 7,123 | 85,116 | 3,193 |
| Nicaragua | AMR | 9,688 | 12,191 | 31,225 | 1,105 | 14,940 | 1,189 | 1,818 | 6,956 | 7,329 | 6,183 | 17,519 | 17,519 | 127,661 | 2,341 |
| Panama | AMR | 7,602 | 8,081 | 20,793 | 3,911 | 22,698 | 3,203 | 15,079 | 787 | 3,958 | 2,940 | 8,330 | 8,330 | 105,713 | 3,274 |
| Paraguay | AMR | 12,818 | 13,624 | 35,059 | 3,953 | 38,270 | 4,353 | 25,425 | 569 | 6,674 | 6,342 | 17,969 | 17,969 | 183,024 | 3,099 |
| Suriname | AMR | 1,176 | 1,250 | 3,217 | 1,083 | 3,512 | 486 | 2,333 | 52 | 612 | 447 | 1,267 | 1,267 | 16,704 | 3,361 |
| Uruguay | AMR | 8,575 | 9,115 | 23,456 | 6,763 | 25,604 | 8,257 | 17,010 | 381 | 4,465 | 2,370 | 6,715 | 6,715 | 119,426 | 3,590 |
| Djibouti | EMR | 1,413 | 1,605 | 4,555 | 372 | 2,180 | 220 | 265 | 1,015 | 347 | 927 | 2,627 | 2,627 | 18,152 | 2,258 |
| Egypt | EMR | 146,847 | 166,766 | 473,303 | 13,043 | 226,452 | 34,225 | 27,563 | 105,432 | 36,001 | 77,175 | 218,663 | 218,663 | 1,744,132 | 2,261 |
| Iran | EMR | 148,709 | 168,880 | 479,303 | 50,832 | 229,323 | 38,892 | 27,913 | 143,226 | 5,208 | 56,058 | 158,831 | 158,831 | 1,666,005 | 2,354 |
| Iraq | EMR | 46,915 | 53,279 | 151,212 | 40,210 | 72,348 | 8,344 | 8,806 | 33,684 | 11,502 | 35,427 | 100,377 | 100,377 | 662,479 | 2,346 |
| Jordan | EMR | 9,979 | 11,333 | 32,164 | 106 | 15,389 | 1,801 | 1,873 | 9,611 | 350 | 6,210 | 17,595 | 17,595 | 124,006 | 2,228 |
| Morocco | EMR | 75,428 | 68,934 | 199,019 | 39,032 | 66,413 | 45,299 | 147,370 | 2,126 | 14,881 | 27,702 | 78,489 | 78,489 | 843,181 | 2,765 |
| Sudan | EMR | 65,517 | 74,404 | 211,169 | 28,398 | 101,034 | 11,728 | 12,298 | 47,039 | 16,062 | 47,259 | 133,901 | 133,901 | 882,709 | 2,281 |
| Tunisia | EMR | 20,969 | 23,814 | 67,586 | 3,696 | 32,336 | 7,270 | 3,936 | 20,196 | 734 | 7,602 | 21,539 | 21,539 | 231,217 | 2,341 |
| Albania | EUR | 9,106 | 9,057 | 21,389 | 2,783 | 7,732 | 4,674 | 22,928 | 1,030 | 1,007 | 2,469 | 6,996 | 6,996 | 96,166 | 3,090 |
| Armenia | EUR | 9,520 | 9,468 | 22,361 | 1,528 | 8,083 | 6,688 | 23,969 | 1,077 | 1,053 | 2,016 | 5,712 | 5,712 | 97,187 | 3,171 |
| Azerbaijan | EUR | 24,654 | 24,519 | 57,906 | 1,274 | 20,932 | 9,788 | 62,072 | 2,789 | 2,727 | 6,741 | 19,100 | 19,100 | 251,601 | 2,980 |
| Georgia | EUR | 14,485 | 14,406 | 34,022 | 1,127 | 12,299 | 12,245 | 36,470 | 1,638 | 1,602 | 2,469 | 6,996 | 6,996 | 144,755 | 3,243 |
| Kyrgyzstan | EUR | 14,286 | 14,208 | 33,555 | 6,694 | 12,130 | 4,896 | 35,969 | 1,616 | 1,580 | 4,899 | 13,881 | 13,881 | 157,594 | 3,017 |
| Latvia | EUR | 7,798 | 7,755 | 18,315 | 8,223 | 6,621 | 7,544 | 19,632 | 1,862 | 392 | 996 | 2,822 | 2,822 | 84,780 | 3,699 |
| Republic of Moldova | EUR | 10,797 | 12,040 | 28,487 | 820 | 9,506 | 5,144 | 21,094 | 304 | 609 | 2,139 | 6,061 | 6,061 | 103,062 | 2,744 |
| Ukraine | EUR | 159,336 | 158,468 | 374,247 | 172,315 | 135,286 | 149,819 | 401,168 | 38,048 | 8,010 | 20,652 | 58,514 | 58,514 | 1,734,378 | 3,695 |

Table 4 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol use | Illicit substance Use | | Childhood Disorders | | | Total Target Cases | Total cases per 100,000 total popula-tion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizo-phrenia | Bipolar | | | | | | Opioid use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional | | |
| Middle income countries (lower-middle and upper-middle) | | | | | | | | | | | | | | | |
| Bhutan | SEAR | 1,260 | 1,476 | 4,057 | 925 | 1,994 | 340 | 1,371 | 320 | 214 | 666 | 1,887 | 1,887 | 16,398 | 2,527 |
| India-Uttarakhand | SEAR | 17,134 | 20,076 | 55,170 | 15,683 | 27,120 | 5,181 | 18,642 | 4,355 | 2,903 | 9,799 | 27,763 | 27,763 | 231,589 | 2,553 |
| Maldives | SEAR | 581 | 681 | 1,872 | 430 | 920 | 120 | 632 | 148 | 99 | 288 | 816 | 816 | 7,403 | 2,526 |
| Sri Lanka | SEAR | 43,444 | 50,902 | 139,884 | 66,442 | 68,763 | 17,862 | 47,267 | 2,945 | 7,362 | 14,427 | 40,877 | 40,877 | 541,050 | 2,770 |
| Thailand | SEAR | 149,951 | 175,694 | 482,824 | 83,179 | 237,342 | 64,407 | 163,148 | 10,164 | 25,409 | 45,381 | 128,580 | 128,580 | 1,694,658 | 2,570 |
| Timor-Leste | SEAR | 1,573 | 1,843 | 5,064 | 603 | 2,489 | 259 | 1,711 | 400 | 267 | 1,374 | 3,893 | 3,893 | 23,369 | 2,358 |
| China- Hunan | WPR | 18,245 | 21,179 | 48,140 | 13,929 | 16,064 | 16,861 | 35,646 | 514 | 8,742 | 3,551 | 10,062 | 10,062 | 202,996 | 3,209 |
| Mongolia | WPR | 7,217 | 7,471 | 16,951 | 5,137 | 6,127 | 3,322 | 18,170 | 1,723 | 3,084 | 2,205 | 6,248 | 6,248 | 83,903 | 3,292 |
| Philippines | WPR | 186,196 | 226,877 | 509,294 | 46,227 | 555,933 | 70,651 | 369,334 | 8,263 | 93,645 | 91,230 | 258,485 | 258,485 | 2,674,620 | 3,128 |
| **Total for middle-income countries** | | **1,588,982** | **1,768,325** | **4,600,510** | **798,671** | **3,103,260** | **712,681** | **2,170,220** | **466,750** | **444,656** | **651,480** | **1,845,860** | **1,845,860** | **19,997,256** | **2,777** |
| **Total for low and middle-income countries** | | **2,909,297** | **3,328,501** | **8,647,950** | **1,473,389** | **5,670,724** | **1,056,815** | **3,434,781** | **857,229** | **934,240** | **1,533,438** | **4,344,741** | **4,344,741** | **38,535,846** | **2,602** |

* All calculations take into account the age structure of the country's population.

Table 5. Percentage of target cases within 58 LMIC attributable to specific MNS disorders*

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol Use | Illicit Substance Use | | Childhood Disorders | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia | Bipolar | | | | | | Opioid Use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional |
| **Low-income countries** | | | | | | | | | | | | | |
| Benin | AFR | 5.4 | 7.1 | 17.4 | 1.5 | 20.1 | 1.1 | 3.1 | 1.1 | 5.5 | 5.6 | 16.0 | 16.0 |
| Burundi | AFR | 5.8 | 7.6 | 18.6 | 3.8 | 21.4 | 1.0 | 3.4 | 0.1 | 1.8 | 5.5 | 15.5 | 15.5 |
| Eritrea | AFR | 5.9 | 7.7 | 18.8 | 2.1 | 21.7 | 0.9 | 3.4 | 0.1 | 1.8 | 5.6 | 16.0 | 16.0 |
| Ethiopia | AFR | 5.6 | 7.3 | 18.0 | 2.4 | 20.8 | 1.1 | 3.2 | 0.1 | 1.7 | 6.0 | 16.9 | 16.9 |
| Nigeria | AFR | 5.5 | 7.1 | 17.5 | 2.0 | 20.2 | 1.0 | 3.2 | 1.1 | 5.6 | 5.5 | 15.7 | 15.7 |
| Uganda | AFR | 5.2 | 6.7 | 16.5 | 2.5 | 19.0 | 0.8 | 3.0 | 0.1 | 1.6 | 6.7 | 19.0 | 19.0 |
| Afghanistan | EMR | 6.8 | 7.7 | 22.0 | 2.4 | 10.5 | 0.8 | 1.3 | 4.9 | 1.7 | 6.3 | 17.8 | 17.8 |
| Pakistan | EMR | 7.6 | 8.6 | 24.4 | 4.4 | 11.7 | 1.5 | 1.4 | 5.4 | 1.9 | 5.0 | 14.1 | 14.1 |
| Somaliland | EMR | 6.6 | 7.5 | 21.1 | 9.2 | 10.1 | 0.9 | 1.2 | 4.7 | 1.6 | 5.6 | 15.7 | 15.7 |
| Tajikistan | EUR | 8.7 | 8.6 | 20.4 | 0.8 | 7.4 | 2.0 | 21.9 | 1.0 | 1.0 | 4.3 | 12.1 | 12.1 |
| Uzbekistan | EUR | 9.2 | 9.1 | 21.5 | 2.2 | 7.8 | 2.5 | 23.1 | 1.0 | 1.0 | 3.4 | 9.6 | 9.6 |
| Bangladesh | SEAR | 7.8 | 9.1 | 25.0 | 5.3 | 12.3 | 1.7 | 8.5 | 2.0 | 1.3 | 4.0 | 11.5 | 11.5 |
| Nepal | SEAR | 7.4 | 8.6 | 23.7 | 3.9 | 11.7 | 1.7 | 8.0 | 1.9 | 1.2 | 4.8 | 13.6 | 13.6 |
| Viet Nam | WPR | 8.7 | 10.1 | 23.0 | 3.9 | 7.7 | 4.9 | 17.0 | 0.2 | 4.2 | 3.0 | 8.6 | 8.6 |
| **Average for low-income countries** | | **7.1** | **8.4** | **21.8** | **3.6** | **13.8** | **1.9** | **6.8** | **2.1** | **2.6** | **4.8** | **13.5** | **13.5** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | |
| Congo | AFR | 5.9 | 7.7 | 18.8 | 2.5 | 21.7 | 1.4 | 3.4 | 0.1 | 1.8 | 5.5 | 15.6 | 15.6 |
| South Africa | AFR | 6.5 | 8.4 | 20.7 | 6.4 | 23.9 | 1.6 | 3.7 | 0.1 | 2.0 | 4.0 | 11.3 | 11.3 |
| Argentina | AMR | 7.3 | 7.8 | 20.1 | 3.3 | 21.9 | 5.4 | 14.6 | 0.3 | 3.8 | 2.3 | 6.6 | 6.6 |
| Belize | AMR | 6.8 | 7.3 | 18.7 | 2.8 | 20.4 | 1.9 | 13.6 | 0.3 | 3.6 | 3.7 | 10.5 | 10.5 |
| Bolivia | AMR | 6.9 | 7.3 | 18.8 | 0.6 | 20.5 | 2.2 | 13.6 | 0.7 | 4.4 | 3.8 | 10.6 | 10.6 |
| Chile | AMR | 7.5 | 7.9 | 20.4 | 3.8 | 22.3 | 4.3 | 14.8 | 0.3 | 3.9 | 2.2 | 6.2 | 6.2 |
| Costa Rica | AMR | 7.4 | 7.9 | 20.3 | 2.9 | 22.2 | 3.1 | 14.7 | 0.3 | 3.9 | 2.6 | 7.4 | 7.4 |
| Dominican Republic | AMR | 7.2 | 7.6 | 19.7 | 1.9 | 21.5 | 2.8 | 14.3 | 0.3 | 3.7 | 3.1 | 8.9 | 8.9 |
| Ecuador | AMR | 7.1 | 7.5 | 19.3 | 2.7 | 21.1 | 2.9 | 14.0 | 0.7 | 4.5 | 3.0 | 8.6 | 8.6 |
| El Salvador | AMR | 7.0 | 7.4 | 19.1 | 2.5 | 20.8 | 3.3 | 13.8 | 0.3 | 3.6 | 3.3 | 9.5 | 9.5 |

Table 5 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol Use | Illicit Substance Use | | Childhood Disorders | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia | Bipolar | | | | | | Opioid Use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | |
| Guatemala | AMR | 6.5 | 6.9 | 17.7 | 1.0 | 19.3 | 2.0 | 12.8 | 0.7 | 4.1 | 4.4 | 12.4 | 12.4 |
| Guyana | AMR | 6.7 | 7.1 | 18.2 | 10.7 | 19.9 | 2.7 | 13.2 | 0.3 | 3.5 | 2.7 | 7.5 | 7.5 |
| Honduras | AMR | 6.7 | 7.2 | 18.4 | 2.1 | 20.1 | 2.0 | 13.4 | 0.3 | 3.5 | 4.0 | 11.2 | 11.2 |
| Jamaica | AMR | 7.3 | 7.7 | 19.9 | 1.4 | 21.7 | 3.9 | 14.4 | 0.3 | 3.8 | 3.0 | 8.4 | 8.4 |
| Nicaragua | AMR | 7.6 | 9.5 | 24.5 | 0.9 | 11.7 | 0.9 | 1.4 | 5.4 | 5.7 | 4.8 | 13.7 | 13.7 |
| Panama | AMR | 7.2 | 7.6 | 19.7 | 3.7 | 21.5 | 3.0 | 14.3 | 0.7 | 3.7 | 2.8 | 7.9 | 7.9 |
| Paraguay | AMR | 7.0 | 7.4 | 19.2 | 2.2 | 20.9 | 2.4 | 13.9 | 0.3 | 3.6 | 3.5 | 9.8 | 9.8 |
| Suriname | AMR | 7.0 | 7.5 | 19.3 | 6.5 | 21.0 | 2.9 | 14.0 | 0.3 | 3.7 | 2.7 | 7.6 | 7.6 |
| Uruguay | AMR | 7.2 | 7.6 | 19.6 | 5.7 | 21.4 | 6.9 | 14.2 | 0.3 | 3.7 | 2.0 | 5.6 | 5.6 |
| Djibouti | EMR | 7.8 | 8.8 | 25.1 | 2.1 | 12.0 | 1.2 | 1.5 | 5.6 | 1.9 | 5.1 | 14.5 | 14.5 |
| Egypt | EMR | 8.4 | 9.6 | 27.1 | 0.7 | 13.0 | 2.0 | 1.6 | 6.0 | 2.1 | 4.4 | 12.5 | 12.5 |
| Iran | EMR | 8.9 | 10.1 | 28.8 | 3.1 | 13.8 | 2.3 | 1.7 | 8.6 | 0.3 | 3.4 | 9.5 | 9.5 |
| Iraq | EMR | 7.1 | 8.0 | 22.8 | 6.1 | 10.9 | 1.3 | 1.3 | 5.1 | 1.7 | 5.3 | 15.2 | 15.2 |
| Jordan | EMR | 8.0 | 9.1 | 25.9 | 0.1 | 12.4 | 1.5 | 1.5 | 7.8 | 0.3 | 5.0 | 14.2 | 14.2 |
| Morocco | EMR | 8.9 | 8.2 | 23.6 | 4.6 | 7.9 | 5.4 | 17.5 | 0.3 | 1.8 | 3.3 | 9.3 | 9.3 |
| Sudan | EMR | 7.4 | 8.4 | 23.9 | 3.2 | 11.4 | 1.3 | 1.4 | 5.3 | 1.8 | 5.4 | 15.2 | 15.2 |
| Tunisia | EMR | 9.1 | 10.3 | 29.2 | 1.6 | 14.0 | 3.1 | 1.7 | 8.7 | 0.3 | 3.3 | 9.3 | 9.3 |
| Albania | EUR | 9.5 | 9.4 | 22.2 | 2.9 | 8.0 | 4.9 | 23.8 | 1.1 | 1.0 | 2.6 | 7.3 | 7.3 |
| Armenia | EUR | 9.8 | 9.7 | 23.0 | 1.6 | 8.3 | 6.9 | 24.7 | 1.1 | 1.1 | 2.1 | 5.9 | 5.9 |
| Azerbaijan | EUR | 9.8 | 9.7 | 23.0 | 0.5 | 8.3 | 3.9 | 24.7 | 1.1 | 1.1 | 2.7 | 7.6 | 7.6 |
| Georgia | EUR | 10.0 | 10.0 | 23.5 | 0.8 | 8.5 | 8.5 | 25.2 | 1.1 | 1.1 | 1.7 | 4.8 | 4.8 |
| Kyrgyzstan | EUR | 9.1 | 9.0 | 21.3 | 4.2 | 7.7 | 3.1 | 22.8 | 1.0 | 1.0 | 3.1 | 8.8 | 8.8 |
| Latvia | EUR | 9.2 | 9.1 | 21.6 | 9.7 | 7.8 | 8.9 | 23.2 | 2.2 | 0.5 | 1.2 | 3.3 | 3.3 |
| Republic of Moldova | EUR | 10.5 | 11.7 | 27.6 | 0.8 | 9.2 | 5.0 | 20.5 | 0.3 | 0.6 | 2.1 | 5.9 | 5.9 |
| Ukraine | EUR | 9.2 | 9.1 | 21.6 | 9.9 | 7.8 | 8.6 | 23.1 | 2.2 | 0.5 | 1.2 | 3.4 | 3.4 |
| Bhutan | SEAR | 7.7 | 9.0 | 24.7 | 5.6 | 12.2 | 2.1 | 8.4 | 2.0 | 1.3 | 4.1 | 11.5 | 11.5 |
| India-Uttarakhand | SEAR | 7.4 | 8.7 | 23.8 | 6.8 | 11.7 | 2.2 | 8.0 | 1.9 | 1.3 | 4.2 | 12.0 | 12.0 |
| Maldives | SEAR | 7.9 | 9.2 | 25.3 | 5.8 | 12.4 | 1.6 | 8.5 | 2.0 | 1.3 | 3.9 | 11.0 | 11.0 |

Table 5 (continued)

| Country | WHO Region | Schizophrenia and other non-affective psychoses | | Depression | Suicidal ideation | Epilepsy | Dementia | Alcohol Use | Illicit Substance Use | | Childhood Disorders | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Schizophrenia | Bipolar | | | | | | Opioid Use | Other Drug Use | Intellectual Disabilities | Conduct/ Behavioral | Emotional |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | |
| Sri Lanka | SEAR | 8.0 | 9.4 | 25.9 | 12.3 | 12.7 | 3.3 | 8.7 | 0.5 | 1.4 | 2.7 | 7.6 | 7.6 |
| Thailand | SEAR | 8.8 | 10.4 | 28.5 | 4.9 | 14.0 | 3.8 | 9.6 | 0.6 | 1.5 | 2.7 | 7.6 | 7.6 |
| Timor-Leste | SEAR | 6.7 | 7.9 | 21.7 | 2.6 | 10.7 | 1.1 | 7.3 | 1.7 | 1.1 | 5.9 | 16.7 | 16.7 |
| China-Hunan | WPR | 9.0 | 10.4 | 23.7 | 6.9 | 7.9 | 8.3 | 17.6 | 0.3 | 4.3 | 1.7 | 5.0 | 5.0 |
| Mongolia | WPR | 8.6 | 8.9 | 20.2 | 6.1 | 7.3 | 4.0 | 21.7 | 2.1 | 3.7 | 2.6 | 7.4 | 7.4 |
| Philippines | WPR | 7.0 | 8.5 | 19.0 | 1.7 | 20.8 | 2.6 | 13.8 | 0.3 | 3.5 | 3.4 | 9.7 | 9.7 |
| **Average for middle-income countries** | | **7.9** | **8.8** | **23.0** | **4.0** | **15.5** | **3.6** | **10.9** | **2.3** | **2.2** | **3.3** | **9.2** | **9.2** |
| **Average for low- and middle-income countries** | | **7.5%** | **8.6%** | **22.4%** | **3.8%** | **14.7%** | **2.7%** | **8.9%** | **2.2%** | **2.4%** | **4.0%** | **11.3%** | **11.3%** |

* Derived from data in Table 3. The proportions are calculated within each LMIC (by row). Each row totals 100%.

Table 6. Total expected annual outpatient visits and inpatient days for target cases with MNS disorders in 58 LMIC

| Country | WHO Region | Outpatient | | | | Inpatient | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day care visits | | Regular visits | | Acute days | | Community/res days | |
| | | Visits | Visits per 100,000 total population | Visits | Visits per 100,000 total population | Days | Days per 100,000 total population | Days | Days per 100,000 total population |
| **Low-income countries** | | | | | | | | | |
| Benin | AFR | 227,533 | 2,892 | 1,127,406 | 14,327 | 41,264 | 524 | 385,825 | 4,903 |
| Burundi | AFR | 210,684 | 2,856 | 1,021,948 | 13,853 | 40,257 | 546 | 321,345 | 4,356 |
| Eritrea | AFR | 125,776 | 2,811 | 609,921 | 13,630 | 24,248 | 542 | 187,373 | 4,187 |
| Ethiopia | AFR | 2,069,173 | 2,735 | 10,278,987 | 13,585 | 393,273 | 520 | 3,171,996 | 4,192 |
| Nigeria | AFR | 4,116,548 | 2,922 | 20,304,877 | 14,413 | 747,203 | 530 | 6,963,992 | 4,943 |
| Uganda | AFR | 725,895 | 2,529 | 3,837,450 | 13,370 | 135,524 | 472 | 1,090,488 | 3,799 |
| Afghanistan | EMR | 787,677 | 3,214 | 3,714,954 | 15,159 | 143,096 | 584 | 1,119,760 | 4,569 |
| Pakistan | EMR | 6,113,756 | 3,687 | 26,626,798 | 16,058 | 1,118,405 | 674 | 9,307,137 | 5,613 |
| Somaliland | EMR | 285,469 | 3,418 | 1,347,291 | 16,129 | 50,765 | 608 | 420,960 | 5,040 |
| Tajikistan | EUR | 282,297 | 4,318 | 977,914 | 14,957 | 56,561 | 865 | 438,550 | 6,708 |
| Uzbekistan | EUR | 1,259,933 | 4,787 | 4,117,843 | 15,645 | 252,594 | 960 | 2,049,365 | 7,786 |
| Bangladesh | SEAR | 6,071,443 | 3,965 | 23,536,423 | 15,371 | 1,168,551 | 763 | 9,362,100 | 6,114 |
| Nepal | SEAR | 1,003,846 | 3,688 | 4,058,976 | 14,911 | 191,565 | 704 | 1,550,946 | 5,698 |
| Viet Nam | WPR | 4,306,633 | 5,122 | 13,197,901 | 15,698 | 821,576 | 977 | 8,668,348 | 10,310 |
| **Average for LIC** | | **1,970,476** | | **8,197,049** | | **370,349** | | **3,217,013** | |
| **Population-weighted average for LIC** | | | **3,625** | | **15,082** | | **681** | | **5,919** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | |
| Congo | AFR | 98,045 | 2,870 | 470,008 | 13,759 | 18,712 | 548 | 155,621 | 4,556 |
| South Africa | AFR | 1,586,135 | 3,299 | 7,030,452 | 14,625 | 306,077 | 637 | 2,572,867 | 5,352 |
| Argentina | AMR | 1,945,711 | 5,024 | 7,410,565 | 19,133 | 358,699 | 926 | 4,407,424 | 11,379 |
| Belize | AMR | 11,526 | 4,073 | 49,190 | 17,382 | 2,209 | 781 | 20,069 | 7,092 |
| Bolivia | AMR | 376,157 | 4,096 | 1,600,571 | 17,430 | 71,356 | 777 | 682,768 | 7,435 |
| Chile | AMR | 817,211 | 5,014 | 3,126,794 | 19,185 | 153,694 | 943 | 1,713,131 | 10,511 |
| Costa Rica | AMR | 203,202 | 4,693 | 800,601 | 18,490 | 38,935 | 899 | 387,972 | 8,960 |
| Dominican Republic | AMR | 419,451 | 4,399 | 1,701,944 | 17,848 | 80,192 | 841 | 789,923 | 8,284 |
| Ecuador | AMR | 588,271 | 4,503 | 2,407,091 | 18,424 | 110,517 | 846 | 1,139,062 | 8,718 |
| El Salvador | AMR | 262,289 | 4,328 | 1,079,048 | 17,806 | 49,378 | 815 | 514,767 | 8,495 |
| Guatemala | AMR | 483,357 | 3,803 | 2,154,043 | 16,948 | 90,685 | 713 | 866,079 | 6,814 |
| Guyana | AMR | 35,556 | 4,672 | 148,548 | 19,520 | 6,590 | 866 | 67,799 | 8,909 |
| Honduras | AMR | 272,691 | 3,957 | 1,178,312 | 17,099 | 52,051 | 755 | 479,451 | 6,958 |
| Jamaica | AMR | 121,725 | 4,566 | 482,046 | 18,081 | 22,944 | 861 | 249,568 | 9,361 |
| Nicaragua | AMR | 214,014 | 3,924 | 885,710 | 16,240 | 39,382 | 722 | 329,413 | 6,040 |
| Panama | AMR | 149,154 | 4,619 | 604,217 | 18,712 | 28,229 | 874 | 285,722 | 8,849 |
| Paraguay | AMR | 248,763 | 4,212 | 1,036,790 | 17,555 | 47,596 | 806 | 451,880 | 7,651 |
| Suriname | AMR | 23,170 | 4,662 | 93,982 | 18,910 | 4,368 | 879 | 44,368 | 8,927 |
| Uruguay | AMR | 178,562 | 5,367 | 668,468 | 20,092 | 31,843 | 957 | 447,327 | 13,445 |
| Djibouti | EMR | 29,319 | 3,647 | 126,828 | 15,775 | 5,433 | 676 | 43,040 | 5,353 |

Table 6 (continued)

| Country | WHO Region | Outpatient | | | | Inpatient | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day care visits | | Regular visits | | Acute days | | Community/res days | |
| | | Visits | Visits per 100,000 total population | Visits | Visits per 100,000 total population | Days | Days per 100,000 total population | Days | Days per 100,000 total population |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | |
| Egypt | EMR | 3,028,297 | 3,925 | 12,407,303 | 16,081 | 564,504 | 732 | 4,707,084 | 6,101 |
| Iran | EMR | 3,078,101 | 4,350 | 12,580,598 | 17,777 | 571,660 | 808 | 4,730,526 | 6,685 |
| Iraq | EMR | 997,955 | 3,534 | 4,516,096 | 15,992 | 180,349 | 639 | 1,500,348 | 5,313 |
| Jordan | EMR | 207,185 | 3,723 | 914,711 | 16,437 | 38,362 | 689 | 297,153 | 5,340 |
| Morocco | EMR | 1,384,912 | 4,542 | 4,531,227 | 14,860 | 259,852 | 852 | 2,871,661 | 9,417 |
| Sudan | EMR | 1,376,072 | 3,556 | 6,095,534 | 15,751 | 251,859 | 651 | 2,059,621 | 5,322 |
| Tunisia | EMR | 436,235 | 4,416 | 1,754,604 | 17,763 | 80,609 | 816 | 710,495 | 7,193 |
| Albania | EUR | 167,189 | 5,372 | 513,105 | 16,488 | 32,694 | 1,051 | 321,932 | 10,345 |
| Armenia | EUR | 177,604 | 5,795 | 517,331 | 16,879 | 34,179 | 1,115 | 382,309 | 12,473 |
| Azerbaijan | EUR | 442,434 | 5,240 | 1,348,880 | 15,974 | 88,512 | 1,048 | 786,935 | 9,319 |
| Georgia | EUR | 273,753 | 6,132 | 768,905 | 17,225 | 52,004 | 1,165 | 634,835 | 14,221 |
| Kyrgyzstan | EUR | 259,161 | 4,961 | 842,494 | 16,127 | 51,290 | 982 | 444,291 | 8,505 |
| Latvia | EUR | 153,971 | 6,718 | 460,104 | 20,074 | 27,995 | 1,221 | 374,359 | 16,333 |
| Republic of Moldova | EUR | 203,764 | 5,425 | 569,698 | 15,168 | 41,106 | 1,094 | 373,432 | 9,942 |
| Ukraine | EUR | 3,138,127 | 6,686 | 9,413,510 | 20,056 | 572,047 | 1,219 | 7,538,515 | 16,062 |
| Bhutan | SEAR | 25,803 | 3,976 | 100,192 | 15,438 | 4,925 | 759 | 41,301 | 6,364 |
| India-Uttarakhand | SEAR | 355,117 | 3,914 | 1,406,731 | 15,505 | 66,978 | 738 | 581,826 | 6,413 |
| Maldives | SEAR | 11,779 | 4,020 | 45,366 | 15,483 | 2,272 | 776 | 18,014 | 6,148 |
| Sri Lanka | SEAR | 894,301 | 4,579 | 3,165,927 | 16,209 | 169,823 | 869 | 1,594,982 | 8,166 |
| Thailand | SEAR | 3,012,829 | 4,569 | 10,091,324 | 15,303 | 586,161 | 889 | 5,397,358 | 8,185 |
| Timor-Leste | SEAR | 32,471 | 3,277 | 141,599 | 14,288 | 6,148 | 620 | 47,630 | 4,806 |
| China-Hunan | WPR | 386,420 | 6,108 | 1,093,757 | 17,290 | 70,963 | 1,122 | 927,511 | 14,662 |
| Mongolia | WPR | 139,841 | 5,486 | 458,015 | 17,968 | 26,438 | 1,037 | 269,208 | 10,561 |
| Philippines | WPR | 3,838,292 | 4,489 | 15,291,869 | 17,886 | 743,532 | 870 | 6,978,264 | 8,162 |
| **Average for MIC** | | **729,225** | | **2,774,638** | | **137,344** | | **1,346,315** | |
| **Population-weighted average for MIC** | | | **4,455** | | **16,952** | | **839** | | **8,226** |
| **Average for LMIC** | | **1,028,838** | | **4,083,496** | | **193,587** | | **1,797,863** | |
| **Population-weighted average for LMIC** | | | **4,029** | | **15,991** | | **758** | | **7,041** |

LIC – low-income country
MIC – middle-income country
LMIC – low- and middle-income countries

Table 8. Estimated full-time equivalent staff needed to treat mental disorders in 58 LMIC, 2005

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff Needed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff needed | Confidence interval* | per 100,000 population | per 100,000 treated cases | FTE staff needed | Confidence interval* | per 100,000 population | per 100,000 treated cases | FTE Staff Needed | Confidence Interval* | per 100,000 population | per 100,000 treated cases | Total FTE Staff Needed | Total per 100,000 population | Total per 100,000 treated cases |
| **Low-income countries** | | | | | | | | | | | | | | | | |
| Benin | AFR | 81 | (65-97) | 1.0 | 44.1 | 746 | (597-896) | 9.5 | 408.1 | 679 | (543-815) | 8.6 | 371.1 | 1,506 | 19 | 823 |
| Burundi | AFR | 68 | (55-82) | 0.9 | 40.7 | 638 | (511-766) | 8.7 | 381.6 | 596 | (477-715) | 8.1 | 356.4 | 1,303 | 18 | 779 |
| Eritrea | AFR | 40 | (32-48) | 0.9 | 40.1 | 375 | (300-450) | 8.4 | 376.8 | 353 | (282-423) | 7.9 | 354.6 | 767 | 17 | 772 |
| Ethiopia | AFR | 674 | (539-808) | 0.9 | 40.0 | 6,312 | (5,050-7,575) | 8.3 | 374.6 | 5,942 | (4,754-7,131) | 7.9 | 352.6 | 12,928 | 17 | 767 |
| Nigeria | AFR | 1,456 | (1,165-1,747) | 1.0 | 44.2 | 13,473 | (10,779-16,168) | 9.6 | 409.1 | 12,240 | (9,792-14,688) | 8.7 | 371.6 | 27,169 | 19 | 825 |
| Uganda | AFR | 234 | (187-280) | 0.8 | 36.8 | 2,200 | (1,760-2,640) | 7.7 | 346.6 | 2,140 | (1,712-2,568) | 7.5 | 337.2 | 4,574 | 16 | 721 |
| Afghanistan | EMR | 239 | (191-286) | 1.0 | 43.7 | 2254 | (1,803-2,705) | 9.2 | 412.5 | 2134 | (1,707-2,561) | 8.7 | 390.5 | 4,627 | 19 | 847 |
| Pakistan | EMR | 1,950 | (1,560-2,340) | 1.2 | 50.7 | 18,211 | (14,569-21,853) | 11.0 | 473.4 | 16,323 | (13,058-19,587) | 9.8 | 424.3 | 36,484 | 22 | 948 |
| Somaliland | EMR | 89 | (71-107) | 1.1 | 44.3 | 838 | (671-1,006) | 10.0 | 416.5 | 784 | (627-941) | 9.4 | 389.7 | 1,712 | 20 | 850 |
| Tajikistan | EUR | 90 | (72-108) | 1.4 | 49.8 | 836 | (669-1,003) | 12.8 | 460.6 | 683 | (546-820) | 10.4 | 376.4 | 1,609 | 25 | 887 |
| Uzbekistan | EUR | 418 | (335-502) | 1.6 | 54.5 | 3,844 | (3,075-4,613) | 14.6 | 501.0 | 3,038 | (2,431-3,646) | 11.5 | 396.0 | 7,301 | 28 | 951 |
| Bangladesh | SEAR | 1,943 | (1,554-2,332) | 1.3 | 50.6 | 18,054 | (14,443-21,665) | 11.8 | 469.8 | 15,407 | (12,325-18,488) | 10.1 | 400.9 | 35,404 | 23 | 921 |
| Nepal | SEAR | 323 | (258-387) | 1.2 | 48.5 | 3,002 | (2,402-3,603) | 11.0 | 451.2 | 2,601 | (2,081-3,122) | 9.6 | 390.9 | 5,927 | 22 | 891 |
| Viet Nam | WPR | 1,723 | (1,379-2,068) | 2.0 | 71.1 | 15,459 | (12,367-18,551) | 18.4 | 637.7 | 11,307 | (9,045-13,568) | 13.4 | 466.4 | 28,489 | 34 | 1,175 |
| **Population-weighted average or total for LIC** | | **9,328** | | **1.2** | **49.7** | **86,244** | | **11.3** | **459.7** | **74,227** | | **9.8** | **398.4** | **169,798** | **22** | **908** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | |
| Congo | AFR | 31 | (24-37) | 0.9 | 39.8 | 307 | (246-369) | 9.0 | 400.3 | 236 | (189-284) | 6.9 | 308.0 | 574 | 17 | 748 |
| South Africa | AFR | 494 | (395-592) | 1.0 | 43.2 | 4,983 | (3,986-5,979) | 10.4 | 436.3 | 3,699 | (2,959-4,439) | 7.7 | 323.9 | 9,175 | 19 | 803 |
| Argentina | AMR | 758 | (607-910) | 2.0 | 57.7 | 7,682 | (6,146-9,219) | 19.8 | 584.3 | 4,887 | (3,910-5,865) | 12.6 | 371.8 | 13,328 | 34 | 1,014 |
| Belize | AMR | 4 | (3-4) | 1.3 | 43.1 | 38 | (30-45) | 13.4 | 435.7 | 27 | (22-33) | 9.6 | 311.9 | 69 | 24 | 791 |
| Bolivia | AMR | 126 | (101-151) | 1.4 | 45.0 | 1,273 | (1,018-1,528) | 13.9 | 455.1 | 898 | (719-1,078) | 9.8 | 321.2 | 2,297 | 25 | 821 |
| Chile | AMR | 300 | (240-360) | 1.8 | 54.2 | 3,040 | (2,432-3,649) | 18.7 | 549.1 | 1,982 | (1,585-2,378) | 12.2 | 357.9 | 5,322 | 33 | 961 |
| Costa Rica | AMR | 70 | (56-84) | 1.6 | 49.4 | 707 | (566-848) | 16.3 | 500.2 | 478 | (383-574) | 11.1 | 338.5 | 1,255 | 29 | 888 |
| Dominican Republic | AMR | 143 | (115-172) | 1.5 | 47.7 | 1,450 | (1,160-1,740) | 15.2 | 482.8 | 995 | (796-1,194) | 10.4 | 331.4 | 2,588 | 27 | 862 |
| Ecuador | AMR | 205 | (164-246) | 1.6 | 48.7 | 2,077 | (1,662-2,492) | 15.9 | 492.2 | 1,418 | (1,134-1,701) | 10.9 | 335.9 | 3,700 | 28 | 877 |

Table 8 (continued)

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff Needed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff needed | Confidence interval* | per 100,000 popula-tion | per 100,000 treated cases | FTE staff needed | Confidence interval* | per 100,000 popula-tion | per 100,000 treated cases | FTE Staff Needed | Confidence Interval* | per 100,000 popula-tion | per 100,000 treated cases | Total FTE Staff Needed | Total per 100,000 popula-tion | Total per 100,000 treated cases |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | |
| El Salvador | AMR | 93 | (74-111) | 1.5 | 48.5 | 936 | (749-1,124) | 15.5 | 490.5 | 637 | (510-765) | 10.5 | 333.9 | 1,666 | 27 | 873 |
| Guatemala | AMR | 162 | (129-194) | 1.3 | 42.8 | 1,631 | (1,305-1,957) | 12.8 | 432.0 | 1,175 | (940-1,409) | 9.2 | 311.2 | 2,967 | 23 | 786 |
| Guyana | AMR | 12 | (10-15) | 1.6 | 46.2 | 124 | (100-149) | 16.3 | 467.6 | 86 | (69-103) | 11.3 | 323.0 | 223 | 29 | 837 |
| Honduras | AMR | 89 | (72-107) | 1.3 | 43.0 | 904 | (723-1,085) | 13.1 | 434.2 | 648 | (518-777) | 9.4 | 311.3 | 1,641 | 24 | 788 |
| Jamaica | AMR | 44 | (35-53) | 1.7 | 51.9 | 447 | (358-537) | 16.8 | 525.3 | 297 | (237-356) | 11.1 | 348.5 | 788 | 30 | 926 |
| Nicaragua | AMR | 63 | (50-76) | 1.2 | 49.4 | 639 | (511-767) | 11.7 | 500.7 | 471 | (377-566) | 8.6 | 369.2 | 1,174 | 22 | 919 |
| Panama | AMR | 52 | (41-62) | 1.6 | 48.8 | 522 | (417-626) | 16.2 | 493.6 | 356 | (285-427) | 11.0 | 336.9 | 930 | 29 | 879 |
| Paraguay | AMR | 83 | (66-100) | 1.4 | 45.4 | 840 | (672-1,008) | 14.2 | 459.0 | 589 | (471-706) | 10.0 | 321.6 | 1,512 | 26 | 826 |
| Suriname | AMR | 8 | (6-10) | 1.6 | 47.9 | 81 | (65-97) | 16.3 | 485.2 | 55 | (44-66) | 11.1 | 331.3 | 144 | 29 | 864 |
| Uruguay | AMR | 75 | (60-90) | 2.3 | 63.0 | 762 | (609-914) | 22.9 | 637.9 | 469 | (375-562) | 14.1 | 392.3 | 1,306 | 39 | 1,093 |
| Djibouti | EMR | 8 | (7-10) | 1.0 | 46.4 | 85 | (68-102) | 10.6 | 470.2 | 65 | (52-78) | 8.1 | 357.8 | 159 | 20 | 874 |
| Egypt | EMR | 897 | (718-1,077) | 1.2 | 51.4 | 9,099 | (7,279-10,918) | 11.8 | 521.7 | 6,663 | (5,331-7,996) | 8.6 | 382.0 | 16,659 | 22 | 955 |
| Iran | EMR | 904 | (723-1,085) | 1.3 | 54.3 | 9,169 | (7,335-11,002) | 13.0 | 550.3 | 6,734 | (5,387-8,081) | 9.5 | 404.2 | 16,807 | 24 | 1,009 |
| Iraq | EMR | 294 | (235-353) | 1.0 | 44.4 | 2,973 | (2,379-3,568) | 10.5 | 448.8 | 2,283 | (1,826-2,739) | 8.1 | 344.6 | 5,551 | 20 | 838 |
| Jordan | EMR | 59 | (47-71) | 1.1 | 47.5 | 596 | (477-715) | 10.7 | 480.3 | 460 | (368-552) | 8.3 | 371.1 | 1,115 | 20 | 899 |
| Morocco | EMR | 493 | (394-592) | 1.6 | 58.5 | 5,020 | (4,016-6,024) | 16.5 | 595.4 | 3,130 | (2,504-3,757) | 10.3 | 371.3 | 8,644 | 28 | 1,025 |
| Sudan | EMR | 403 | (322-483) | 1.0 | 45.6 | 4,075 | (3,260-4,890) | 10.5 | 461.6 | 3,108 | (2,486-3,729) | 8.0 | 352.1 | 7,585 | 20 | 859 |
| Tunisia | EMR | 133 | (107-160) | 1.3 | 57.6 | 1,351 | (1,081-1,621) | 13.7 | 584.3 | 968 | (775-1,162) | 9.8 | 418.9 | 2,453 | 25 | 1,061 |
| Albania | EUR | 56 | (45-67) | 1.8 | 58.0 | 569 | (455-683) | 18.3 | 591.7 | 355 | (284-427) | 11.4 | 369.7 | 980 | 32 | 1,019 |
| Armenia | EUR | 64 | (51-77) | 2.1 | 66.2 | 656 | (525-788) | 21.4 | 675.4 | 392 | (314-470) | 12.8 | 403.4 | 1,113 | 36 | 1,145 |
| Azerbaijan | EUR | 139 | (111-167) | 1.6 | 55.2 | 1,417 | (1,133-1,700) | 16.8 | 563.1 | 903 | (723-1,084) | 10.7 | 359.0 | 2,459 | 29 | 977 |
| Georgia | EUR | 105 | (84-126) | 2.4 | 72.5 | 1,071 | (857-1,285) | 24.0 | 739.6 | 621 | (497-746) | 13.9 | 429.2 | 1,797 | 40 | 1,241 |
| Kyrgyzstan | EUR | 80 | (64-96) | 1.5 | 50.6 | 813 | (650-975) | 15.6 | 515.6 | 534 | (427-641) | 10.2 | 338.9 | 1,426 | 27 | 905 |
| Latvia | EUR | 62 | (49-74) | 2.7 | 72.7 | 628 | (503-754) | 27.4 | 741.1 | 366 | (293-439) | 16.0 | 431.8 | 1,056 | 46 | 1,246 |
| Republic of Moldova | EUR | 65 | (52-78) | 1.7 | 62.8 | 662 | (530-794) | 17.6 | 642.3 | 408 | (326-490) | 10.9 | 395.9 | 1,135 | 30 | 1,101 |
| Ukraine | EUR | 1,245 | (996-1,494) | 2.7 | 71.8 | 12,684 | (10,147-15,221) | 27.0 | 731.3 | 7,421 | (5,937-8,905) | 15.8 | 427.9 | 21,350 | 45 | 1,231 |
| Bhutan | SEAR | 8 | (6-9) | 1.2 | 47.2 | 79 | (63-94) | 12.1 | 479.4 | 56 | (45-67) | 8.6 | 341.3 | 142 | 22 | 868 |

Table 8 (continued)

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff Needed | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff needed | Confidence interval* | per 100,000 popula-tion | per 100,000 treated cases | FTE staff needed | Confidence interval* | per 100,000 popula-tion | per 100,000 treated cases | FTE Staff Needed | Confidence Interval* | per 100,000 popula-tion | per 100,000 treated cases | Total FTE Staff Needed | Total per 100,000 popula-tion | Total per 100,000 treated cases |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | |
| India-Uttarakhand | SEAR | 109 | (87-130) | 1.2 | 46.9 | 1,103 | (882-1,324) | 12.2 | 476.3 | 785 | (628-942) | 8.7 | 338.9 | 1,997 | 22 | 862 |
| Maldives | SEAR | 3 | (3-4) | 1.2 | 46.2 | 35 | (28-42) | 11.8 | 468.8 | 25 | (20-30) | 8.5 | 337.6 | 63 | 22 | 853 |
| Sri Lanka | SEAR | 286 | (229-344) | 1.5 | 52.9 | 2,914 | (2,331-3,497) | 14.9 | 538.6 | 1,945 | (1,556-2,334) | 10.0 | 359.5 | 5,145 | 26 | 951 |
| Thailand | SEAR | 962 | (769-1,154) | 1.5 | 56.7 | 9,794 | (7,835-11,752) | 14.9 | 577.9 | 6,414 | (5,131-7,697) | 9.7 | 378.5 | 17,169 | 26 | 1,013 |
| Timor-Leste | SEAR | 9 | (7-11) | 0.9 | 40.1 | 95 | (76-114) | 9.6 | 405.3 | 72 | (58-87) | 7.3 | 309.2 | 176 | 18 | 755 |
| China-Hunan | WPR | 152 | (122-183) | 2.4 | 75.0 | 1,554 | (1,243-1,864) | 24.6 | 765.4 | 896 | (717-1,075) | 14.2 | 441.2 | 2,602 | 41 | 1,282 |
| Mongolia | WPR | 47 | (38-56) | 1.8 | 56.0 | 479 | (383-574) | 18.8 | 570.3 | 305 | (244-366) | 12.0 | 363.4 | 830 | 33 | 990 |
| Philippines | WPR | 1,274 | (1,019-1,529) | 1.5 | 47.6 | 12,896 | (10,317-15,476) | 15.1 | 482.2 | 8,894 | (7,115-10,673) | 10.4 | 332.5 | 23,065 | 27 | 862 |
| **Population-weighted average or total for MIC** | | **10,669** | | **1.5** | **52.7** | **108,258** | | **15.0** | **534.8** | **73,209** | | **10.2** | **365.8** | **192,136** | **27** | **953** |
| **Population-weighted average or total for LMIC** | | **19,996** | | **1.4** | **51.1** | **194,502** | | **13.1** | **496.2** | **147,436** | | **10.0** | **382.5** | **361,935** | **24** | **930** |

* Confidence interval was calculated by increasing and decreasing the inpatient and outpatient treatment services by 20%. The same confidence interval is produced if the MNS disorder prevalences were increased and decreased by 20%, or if target coverage rates were increased and decreased by 20%.

LIC - low income country

MIC - middle income country

LMIC - low and middle income countries.

Table 9. Shortage of mental health workers in 58 LMIC, 2005

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE Staff Supply | | Shortage | | FTE Staff Supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Low-income countries** | | | | | | | | | | | | | | | | | |
| Benin | AFR | 0.19 | 15 | 0.84 | 66 | 0.21 | 17 | 9.28 | 730 | 0.29 | 23 | 8.33 | 656 | 0.69 | 54 | 18.45 | 1,451 |
| Burundi | AFR | 0.01 | 1 | 0.91 | 67 | 0.42 | 31 | 8.23 | 607 | 1.13 | 83 | 6.95 | 513 | 1.57 | 116 | 16.09 | 1,187 |
| Eritrea | AFR | 0.06 | 2 | 0.84 | 37 | 0.33 | 15 | 8.04 | 360 | 0.44 | 20 | 7.44 | 333 | 0.83 | 37 | 16.31 | 730 |
| Ethiopia | AFR | 0.02 | 15 | 0.87 | 659 | 0.26 | 200 | 8.08 | 6,113 | 0.88 | 667 | 6.97 | 5,275 | 1.17 | 882 | 15.92 | 12,047 |
| Nigeria | AFR | 0.15 | 216 | 0.88 | 1,240 | 2.41 | 3,395 | 7.15 | 10,078 | 0.93 | 1,317 | 7.75 | 10,923 | 3.50 | 4,928 | 15.79 | 22,241 |
| Uganda | AFR | 0.08 | 23 | 0.73 | 211 | 0.79 | 226 | 6.88 | 1,974 | 0.27 | 77 | 7.19 | 2,063 | 1.14 | 326 | 14.80 | 4,247 |
| Afghanistan | EMR | 0.01 | 2 | 0.97 | 237 | 0.15 | 36 | 9.05 | 2,218 | 0.41 | 99 | 8.30 | 2,035 | 0.56 | 138 | 18.32 | 4,489 |
| Pakistan | EMR | 0.13 | 216 | 1.05 | 1,735 | 18.86 | 31,273 | 0.00 | 0 | 2.30 | 3,815 | 7.54 | 12,508 | 21.29 | 35,303 | 8.59 | 14,242 |
| Somaliland | EMR | 0.07 | 6 | 1.00 | 83 | 0.33 | 28 | 9.71 | 811 | 1.20 | 100 | 8.19 | 684 | 1.60 | 134 | 18.89 | 1,578 |
| Tajikistan | EUR | 1.12 | 73 | 0.26 | 17 | 1.93 | 126 | 10.86 | 710 | 6.33 | 414 | 4.12 | 269 | 9.38 | 613 | 15.23 | 996 |
| Uzbekistan | EUR | 3.56 | 936 | 0.00 | 0 | 6.54 | 1,722 | 8.06 | 2,122 | 6.37 | 1,676 | 5.17 | 1,362 | 16.47 | 4,335 | 13.24 | 3,484 |
| Bangladesh | SEAR | 0.07 | 112 | 1.20 | 1,831 | 0.20 | 301 | 11.59 | 17,753 | 0.22 | 340 | 9.84 | 15,066 | 0.49 | 752 | 22.63 | 34,651 |
| Nepal | SEAR | 0.13 | 35 | 1.06 | 288 | 0.27 | 75 | 10.76 | 2,928 | 0.19 | 52 | 9.36 | 2,549 | 0.59 | 162 | 21.18 | 5,765 |
| Viet Nam | WPR | 0.35 | 297 | 1.70 | 1,426 | 2.10 | 1,767 | 16.29 | 13,692 | 1.93 | 1,620 | 11.52 | 9,687 | 4.38 | 3,684 | 29.50 | 24,805 |
| **Population-weighted average for LIC** | | **0.26** | | **1.04** | | **5.15** | | **7.90** | | **1.35** | | **8.40** | | **6.76** | | **17.34** | |
| **Total for LIC** | | | **1,949** | | **7,897** | | **39,211** | | **60,095** | | **10,304** | | **63,922** | | **51,464** | | **131,915** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| Congo | AFR | 0.11 | 4 | 0.79 | 27 | 0.70 | 24 | 8.29 | 283 | 1.05 | 36 | 5.87 | 200 | 1.86 | 63 | 14.95 | 511 |
| South Africa | AFR | 0.28 | 133 | 0.75 | 361 | 10.08 | 4,848 | 0.28 | 135 | 1.58 | 762 | 6.11 | 2,937 | 12 | 5,742 | 7 | 3,433 |
| Argentina | AMR | 9.20 | 3,563 | 0.00 | 0 | 12.91 | 5,000 | 6.92 | 2,682 | 13.19 | 5,108 | 0.00 | 0 | 35 | 13,672 | 7 | 2,682 |
| Belize | AMR | 0.66 | 2 | 0.66 | 2 | 7.97 | 23 | 5.41 | 15 | 9.29 | 26 | 0.29 | 1 | 18 | 51 | 6 | 18 |
| Bolivia | AMR | 1.06 | 97 | 0.31 | 29 | 0.35 | 32 | 13.51 | 1,241 | 2.57 | 236 | 7.21 | 662 | 4 | 365 | 21 | 1,932 |
| Chile | AMR | 4.65 | 758 | 0.00 | 0 | 1.65 | 270 | 17.00 | 2,771 | 14.25 | 2,323 | 0.00 | 0 | 21 | 3,350 | 17 | 2,771 |
| Costa Rica | AMR | 3.06 | 132 | 0.00 | 0 | 4.13 | 179 | 12.20 | 528 | 12.22 | 529 | 0.00 | 0 | 19 | 840 | 12 | 528 |
| Dominican Republic | AMR | 2.08 | 198 | 0.00 | 0 | 1.61 | 154 | 13.59 | 1,296 | 8.01 | 764 | 2.42 | 231 | 12 | 1,116 | 16 | 1,527 |
| Ecuador | AMR | 2.51 | 328 | 0.00 | 0 | 0.93 | 122 | 14.97 | 1,956 | 5.84 | 763 | 5.01 | 655 | 9 | 1,212 | 20 | 2,610 |

Table 9 (continued)

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE Staff Supply | | Shortage | | FTE Staff Supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| El Salvador | AMR | 1.39 | 84 | 0.14 | 8 | 2.12 | 128 | 13.33 | 808 | 6.51 | 395 | 4.01 | 243 | 10 | 607 | 17 | 1,059 |
| Guatemala | AMR | 0.57 | 73 | 0.70 | 89 | 1.28 | 162 | 11.55 | 1,469 | 0.57 | 73 | 8.67 | 1,102 | 2 | 308 | 21 | 2,659 |
| Guyana | AMR | 0.53 | 4 | 1.09 | 8 | 0.40 | 3 | 15.94 | 121 | 8.66 | 66 | 2.63 | 20 | 10 | 73 | 20 | 150 |
| Honduras | AMR | 0.82 | 57 | 0.48 | 33 | 2.58 | 178 | 10.54 | 726 | 2.70 | 186 | 6.70 | 461 | 6 | 421 | 18 | 1,220 |
| Jamaica | AMR | 1.13 | 30 | 0.53 | 14 | 9.55 | 255 | 7.22 | 192 | 16.09 | 429 | 0.00 | 0 | 27 | 714 | 8 | 207 |
| Nicaragua | AMR | 0.91 | 49 | 0.25 | 14 | 1.71 | 93 | 10.01 | 546 | 5.37 | 293 | 3.27 | 179 | 8 | 435 | 14 | 738 |
| Panama | AMR | 3.47 | 112 | 0.00 | 0 | 4.38 | 141 | 11.78 | 380 | 8.83 | 285 | 2.20 | 71 | 17 | 538 | 14 | 451 |
| Paraguay | AMR | 1.31 | 77 | 0.10 | 6 | 1.58 | 93 | 12.65 | 747 | 3.96 | 234 | 6.01 | 355 | 7 | 404 | 19 | 1,108 |
| Suriname | AMR | 1.45 | 7 | 0.16 | 1 | 13.96 | 69 | 2.35 | 12 | 34.38 | 171 | 0.00 | 0 | 50 | 247 | 3 | 12 |
| Uruguay | AMR | 19.36 | 644 | 0.00 | 0 | 0.69 | 23 | 22.20 | 739 | 10.57 | 352 | 3.52 | 117 | 31 | 1,019 | 26 | 856 |
| Djibouti | EMR | 0.33 | 3 | 0.72 | 6 | 0.83 | 7 | 9.79 | 79 | 0.33 | 3 | 7.75 | 62 | 1 | 12 | 18 | 147 |
| Egypt | EMR | 1.44 | 1,113 | 0.00 | 0 | 2.60 | 2,010 | 9.19 | 7,089 | 1.03 | 796 | 7.60 | 5,867 | 5 | 3,919 | 17 | 12,956 |
| Iran | EMR | 1.19 | 839 | 0.09 | 65 | 7.82 | 5,536 | 5.13 | 3,633 | 52.17 | 36,922 | 0.00 | 0 | 61 | 43,296 | 5 | 3,698 |
| Iraq | EMR | 0.34 | 95 | 0.70 | 199 | 0.54 | 152 | 9.99 | 2,822 | 0.65 | 184 | 7.43 | 2,099 | 2 | 431 | 18 | 5,120 |
| Jordan | EMR | 1.14 | 63 | 0.00 | 0 | 3.95 | 220 | 6.75 | 376 | 1.94 | 108 | 6.33 | 352 | 7 | 391 | 13 | 728 |
| Morocco | EMR | 1.02 | 312 | 0.59 | 181 | 2.17 | 661 | 14.30 | 4,359 | 1.71 | 520 | 8.56 | 2,610 | 5 | 1,493 | 23 | 7,150 |
| Sudan | EMR | 0.06 | 23 | 0.98 | 380 | 0.01 | 5 | 10.52 | 4,070 | 0.75 | 290 | 7.28 | 2,818 | 1 | 318 | 19 | 7,267 |
| Tunisia | EMR | 1.53 | 151 | 0.00 | 0 | 3.71 | 367 | 9.97 | 984 | 2.97 | 293 | 6.84 | 675 | 8 | 811 | 17 | 1,660 |
| Albania | EUR | 3.20 | 100 | 0.00 | 0 | 7.00 | 218 | 11.28 | 351 | 3.93 | 122 | 7.49 | 233 | 14 | 440 | 19 | 584 |
| Armenia | EUR | 5.88 | 180 | 0.00 | 0 | 5.42 | 166 | 16.00 | 490 | 22.91 | 702 | 0.00 | 0 | 34 | 1,049 | 16 | 490 |
| Azerbaijan | EUR | 5.18 | 437 | 0.00 | 0 | 8.36 | 706 | 8.42 | 711 | 8.63 | 729 | 2.07 | 175 | 22 | 1,872 | 10 | 886 |
| Georgia | EUR | 5.90 | 263 | 0.00 | 0 | 7.71 | 344 | 16.28 | 727 | 22.88 | 1,022 | 0.00 | 0 | 36 | 1,629 | 16 | 727 |
| Kyrgyzstan | EUR | 3.41 | 178 | 0.00 | 0 | 9.24 | 483 | 6.32 | 330 | 13.57 | 709 | 0.00 | 0 | 26 | 1,370 | 6 | 330 |
| Latvia | EUR | 8.31 | 191 | 0.00 | 0 | 35.72 | 819 | 0.00 | 0 | 28.52 | 654 | 0.00 | 0 | 73 | 1,663 | 0 | 0 |
| Republic of Moldova | EUR | 4.78 | 180 | 0.00 | 0 | 15.35 | 577 | 2.27 | 85 | 29.51 | 1,109 | 0.00 | 0 | 50 | 1,865 | 2 | 85 |
| Ukraine | EUR | 8.66 | 4,066 | 0.00 | 0 | 26.20 | 12,299 | 0.82 | 385 | 42.47 | 19,935 | 0.00 | 0 | 77 | 36,300 | 1 | 385 |
| Bhutan | SEAR | 0.45 | 3 | 0.75 | 5 | 1.49 | 10 | 10.63 | 69 | 2.86 | 19 | 5.77 | 37 | 5 | 31 | 17 | 111 |
| India-Uttarakhand | SEAR | 0.08 | 7 | 1.12 | 101 | 4.78 | 434 | 7.38 | 669 | 2.87 | 260 | 5.78 | 525 | 8 | 701 | 14 | 1,295 |

Table 9 (continued)

| Country | WHO Region | Psychiatrists | | | | Nurses in mental health settings | | | | Psychosocial Care Providers | | | | Total FTE Staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE Staff Supply | | Shortage | | FTE Staff Supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| Maldives | SEAR | 0.69 | 2 | 0.48 | 1 | 1.38 | 4 | 10.46 | 31 | 2.42 | 7 | 6.11 | 18 | 4 | 13 | 17 | 50 |
| Sri Lanka | SEAR | 0.18 | 35 | 1.29 | 251 | 1.91 | 372 | 13.01 | 2,542 | 3.55 | 693 | 6.41 | 1,252 | 6 | 1,101 | 21 | 4,045 |
| Thailand | SEAR | 0.66 | 438 | 0.79 | 524 | 3.81 | 2,515 | 11.04 | 7,278 | 2.81 | 1,856 | 6.91 | 4,559 | 7 | 4,809 | 19 | 12,361 |
| Timor-Leste | SEAR | 0.11 | 1 | 0.84 | 8 | 15.32 | 152 | 0.00 | 0 | 6.80 | 67 | 0.50 | 5 | 22 | 220 | 1 | 13 |
| China-Hunan | WPR | 1.41 | 89 | 1.00 | 63 | 3.19 | 202 | 21.37 | 1,352 | 4.13 | 261 | 10.03 | 634 | 9 | 552 | 32 | 2,050 |
| Mongolia | WPR | 0.51 | 13 | 1.33 | 34 | 7.62 | 194 | 11.15 | 284 | 8.49 | 216 | 3.47 | 89 | 17 | 424 | 16 | 407 |
| Philippines | WPR | 0.42 | 358 | 1.07 | 916 | 0.91 | 780 | 14.17 | 12,116 | 2.11 | 1,804 | 8.29 | 7,090 | 3 | 2,943 | 24 | 20,121 |
| **Population-weighted average for MIC** | | **2.15** | | **0.46** | | **5.70** | | **9.37** | | **11.43** | | **5.05** | | **19.28** | | **14.88** | |
| **Total for MIC** | | | **15,494** | | **3,324** | | **41,026** | | **67,479** | | **82,311** | | **36,333** | | **138,832** | | **107,137** |
| **Population-weighted average for LMIC** | | **1.18** | | **0.76** | | **5.42** | | **8.61** | | **6.25** | | **6.77** | | **12.85** | | **16.14** | |
| **Total for LMIC** | | | **17,443** | | **11,222** | | **80,237** | | **127,575** | | **92,615** | | **100,256** | | **190,296** | | **239,052** |

Notes:
When a country had a surplus of a particular type of health worker, the shortage was set equal to zero for that worker type.
When WHO-AIMS did not have supply data for a worker type, the WHO regional average per capita supply for that country's income level was used. Benin, Nigeria, Pakistan, Uzbekistan, Nepal, Paraguay, Uruguay, Egypt, Jordan, Armenia, Georgia, Bhutan, India Uttarakhand, Sri Lanka and China Hunan had missing values for at least one of psychosocial care providers. India Uttarakhand had a missing value for nurses.
LIC – low-income country
MIC– middle-income country
LMIC – low- and middle-income countries.

Table 11. Scaling-up cost (wage bill) estimates to remove current shortage of mental health workers in 58 LMIC in 2005 (In thousands of 2005 US dollars)

| Country | WHO Region | Psychiatrists | | Nurses in mental health settings | | Psychosocial Care Providers | | Total FTE Staff |
|---|---|---|---|---|---|---|---|---|
| | | Annual average wage | Scale-up costs | Annual average wage | Scale-up costs | Annual average wage | Scale-up costs | Scale-up costs |
| **Low-income countries** | | | | | | | | |
| Benin | AFR | 7,435 | 489 | 3,059 | 2,233 | 3,059 | 2,006 | 4,728 |
| Burundi | AFR | 5,547 | 373 | 2,282 | 1,386 | 2,282 | 1,170 | 2,929 |
| Eritrea | AFR | 4,811 | 180 | 1,979 | 712 | 1,979 | 659 | 1,551 |
| Ethiopia | AFR | 3,741 | 2,465 | 1,539 | 9,410 | 1,539 | 8,120 | 19,996 |
| Nigeria | AFR | 11,961 | 14,834 | 4,921 | 49,595 | 4,921 | 53,754 | 118,183 |
| Uganda | AFR | 9,059 | 1,907 | 3,727 | 7,356 | 3,727 | 7,690 | 16,953 |
| Afghanistan | EMR | 3,525 | 835 | 1,450 | 3,217 | 1,450 | 2,951 | 7,002 |
| Pakistan | EMR | 7,080 | 12,283 | 2,913 | 0 | 2,913 | 36,437 | 48,720 |
| Somaliland | EMR | 2,700 | 225 | 1,111 | 900 | 1,111 | 760 | 1,885 |
| Tajikistan | EUR | 1,524 | 26 | 627 | 445 | 627 | 169 | 640 |
| Uzbekistan | EUR | 1,907 | 0 | 785 | 1,665 | 785 | 1,069 | 2,734 |
| Bangladesh | SEAR | 4,560 | 8,351 | 1,876 | 33,306 | 1,876 | 28,265 | 69,921 |
| Nepal | SEAR | 3,954 | 1,138 | 1,627 | 4,763 | 1,627 | 4,147 | 10,048 |
| Viet Nam | WPR | 3,846 | 5,484 | 1,582 | 21,665 | 1,582 | 15,327 | 42,475 |
| **Scale-up costs for 14 low-income countries** | | | **48,588** | | **136,652** | | **162,523** | **347,764** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | |
| Congo | AFR | 13,313 | 359 | 5,477 | 1,552 | 5,477 | 1,098 | 3,009 |
| South Africa | AFR | 24,153 | 8,715 | 9,938 | 1,340 | 9,938 | 29,187 | 39,243 |
| Argentina | AMR | 17,581 | 0 | 7,234 | 19,400 | 7,234 | 0 | 19,400 |
| Belize | AMR | 16,635 | 31 | 6,844 | 105 | 6,844 | 6 | 142 |
| Bolivia | AMR | 8,399 | 240 | 3,455 | 4,288 | 3,455 | 2,289 | 6,817 |
| Chile | AMR | 21,046 | 0 | 8,659 | 23,992 | 8,659 | 0 | 23,992 |
| Costa Rica | AMR | 16,448 | 0 | 6,767 | 3,574 | 6,767 | 0 | 3,574 |
| Dominican Republic | AMR | 16,137 | 0 | 6,639 | 8,605 | 6,639 | 1,534 | 10,139 |
| Ecuador | AMR | 13,786 | 0 | 5,672 | 11,092 | 5,672 | 3,713 | 14,805 |
| El Salvador | AMR | 13,020 | 108 | 5,357 | 4,329 | 5,357 | 1,301 | 5,738 |
| Guatemala | AMR | 14,191 | 1,257 | 5,839 | 8,575 | 5,839 | 6,432 | 16,263 |
| Guyana | AMR | 10,508 | 87 | 4,323 | 525 | 4,323 | 86 | 698 |
| Honduras | AMR | 9,415 | 310 | 3,874 | 2,812 | 3,874 | 1,788 | 4,910 |
| Jamaica | AMR | 17,752 | 249 | 7,304 | 1,406 | 7,304 | 0 | 1,655 |
| Nicaragua | AMR | 7,907 | 107 | 3,253 | 1,777 | 3,253 | 581 | 2,465 |
| Panama | AMR | 17,145 | 0 | 7,054 | 2,683 | 7,054 | 502 | 3,185 |
| Paraguay | AMR | 9,478 | 56 | 3,900 | 2,913 | 3,900 | 1,383 | 4,352 |
| Suriname | AMR | 15,876 | 13 | 6,532 | 76 | 6,532 | 0 | 89 |
| Uruguay | AMR | 18,217 | 0 | 7,495 | 5,537 | 7,495 | 877 | 6,414 |
| Djibouti | EMR | 5,986 | 35 | 2,463 | 194 | 2,463 | 153 | 382 |
| Egypt | EMR | 10,602 | 0 | 4,362 | 30,923 | 4,362 | 25,592 | 56,515 |
| Iran | EMR | 15,063 | 982 | 6,198 | 22,516 | 6,198 | 0 | 23,498 |

Table 11 (continued)

| Country | WHO Region | Psychiatrists | | Nurses in mental health settings | | Psychosocial Care Providers | | Total FTE Staff |
|---|---|---|---|---|---|---|---|---|
| | | Annual average wage | Scale-up costs | Annual average wage | Scale-up costs | Annual average wage | Scale-up costs | Scale-up costs |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | |
| Iraq | EMR | 8,358 | 1,663 | 3,439 | 9,704 | 3,439 | 7,218 | 18,585 |
| Jordan | EMR | 14,427 | 0 | 5,936 | 2,231 | 5,936 | 2,091 | 4,322 |
| Morocco | EMR | 10,353 | 1,873 | 4,259 | 18,567 | 4,259 | 11,118 | 31,558 |
| Sudan | EMR | 7,497 | 2,846 | 3,085 | 12,554 | 3,085 | 8,691 | 24,092 |
| Tunisia | EMR | 15,622 | 0 | 6,428 | 6,327 | 6,428 | 4,340 | 10,667 |
| Albania | EUR | 8,661 | 0 | 3,563 | 1,251 | 3,563 | 831 | 2,082 |
| Armenia | EUR | 5,462 | 0 | 2,247 | 1,102 | 2,247 | 0 | 1,102 |
| Azerbaijan | EUR | 5,402 | 0 | 2,222 | 1,581 | 2,222 | 388 | 1,969 |
| Georgia | EUR | 5,032 | 0 | 2,070 | 1,504 | 2,070 | 0 | 1,504 |
| Kyrgyzstan | EUR | 1,754 | 0 | 722 | 238 | 722 | 0 | 238 |
| Latvia | EUR | 20,603 | 0 | 8,477 | 0 | 8,477 | 0 | 0 |
| Republic of Moldova | EUR | 2,520 | 0 | 1,037 | 89 | 1,037 | 0 | 89 |
| Ukraine | EUR | 5,778 | 0 | 2,377 | 916 | 2,377 | 0 | 916 |
| Bhutan | SEAR | 5,348 | 26 | 2,200 | 152 | 2,200 | 82 | 260 |
| India-Uttarakhand | SEAR | 5,763 | 583 | 2,371 | 1,587 | 2,371 | 1,244 | 3,414 |
| Maldives | SEAR | 8,717 | 12 | 3,586 | 110 | 3,586 | 64 | 186 |
| Sri Lanka | SEAR | 6,528 | 1,640 | 2,686 | 6,826 | 2,686 | 3,363 | 11,829 |
| Thailand | SEAR | 7,401 | 3,875 | 3,045 | 22,162 | 3,045 | 13,880 | 39,917 |
| Timor-Leste | SEAR | 2,871 | 24 | 1,181 | 0 | 1,181 | 6 | 30 |
| China-Hunan | WPR | 5,941 | 376 | 2,444 | 3,304 | 2,444 | 1,551 | 5,231 |
| Mongolia | WPR | 4,021 | 136 | 1,654 | 470 | 1,654 | 146 | 753 |
| Philippines | WPR | 6,817 | 6,242 | 2,805 | 33,984 | 2,805 | 19,886 | 60,112 |
| **Scale-up costs for 44 middle-income countries** | | | **31,845** | | **282,871** | | **151,423** | **466,139** |
| **Scale-up costs for 58 LMIC** | | | **80,433** | | **419,523** | | **313,947** | **813,903** |

Note:
When a country had a surplus of a particular type of health worker, the wage bill cost was set equal to zero for that worker type.

Table 12. Expected full-time equivalent staff needed to treat mental disorders for 58 LMIC, 2015

| Country | WHO Region | Psychiatrists | | Nurses in mental health settings | | Psychosocial care providers | | Total FTE staff needed | |
|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population |
| **Low-income countries** | | | | | | | | | |
| Benin | AFR | 110 | 1.04 | 1,023 | 9.609 | 928 | 8.71 | 2,061 | 19.36 |
| Burundi | AFR | 92 | 0.97 | 858 | 9.115 | 788 | 8.37 | 1,738 | 18.46 |
| Eritrea | AFR | 54 | 0.90 | 510 | 8.488 | 478 | 7.95 | 1,042 | 17.34 |
| Ethiopia | AFR | 893 | 0.93 | 8,355 | 8.682 | 7,756 | 8.06 | 17,004 | 17.67 |
| Nigeria | AFR | 1,861 | 1.06 | 17,222 | 9.789 | 15,539 | 8.83 | 34,623 | 19.68 |
| Uganda | AFR | 325 | 0.82 | 3,065 | 7.719 | 2,978 | 7.50 | 6,368 | 16.04 |
| Afghanistan | EMR | 347 | 1.01 | 3,272 | 9.555 | 3,059 | 8.93 | 6,678 | 19.50 |
| Pakistan | EMR | 2,542 | 1.24 | 23,694 | 11.530 | 20,950 | 10.19 | 47,186 | 22.96 |
| Somaliland | EMR | 114 | 1.06 | 1,073 | 10.000 | 1,006 | 9.38 | 2,194 | 20.44 |
| Tajikistan | EUR | 114 | 1.47 | 1,055 | 13.600 | 849 | 10.94 | 2,019 | 26.01 |
| Uzbekistan | EUR | 507 | 1.72 | 4,655 | 15.803 | 3,611 | 12.26 | 8,773 | 29.78 |
| Bangladesh | SEAR | 2,604 | 1.49 | 23,914 | 13.648 | 19,489 | 11.12 | 46,007 | 26.26 |
| Nepal | SEAR | 414 | 1.28 | 3,852 | 11.853 | 3,275 | 10.07 | 7,542 | 23.20 |
| Viet Nam | WPR | 2,026 | 2.16 | 18,185 | 19.418 | 13,169 | 14.06 | 33,379 | 35.64 |
| **Population-weighted average for LIC** | | | **1.29** | | **11.95** | | **10.13** | | **23.37** |
| **Total for LIC** | | **12,005** | | **110,734** | | **93,874** | | **216,613** | |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | |
| Congo | AFR | 39 | 0.91 | 389 | 9.211 | 298 | 7.04 | 725 | 17.17 |
| South Africa | AFR | 559 | 1.08 | 5,642 | 10.917 | 4,112 | 7.96 | 10,312 | 19.95 |
| Argentina | AMR | 874 | 2.05 | 8,856 | 20.814 | 5,571 | 13.09 | 15,300 | 35.96 |
| Belize | AMR | 5 | 1.43 | 50 | 14.425 | 35 | 10.16 | 89 | 26.01 |
| Bolivia | AMR | 158 | 1.46 | 1,601 | 14.751 | 1,114 | 10.27 | 2,874 | 26.48 |
| Chile | AMR | 359 | 2.00 | 3,643 | 20.323 | 2,324 | 12.97 | 6,327 | 35.29 |
| Costa Rica | AMR | 87 | 1.76 | 882 | 17.797 | 584 | 11.79 | 1,554 | 31.34 |
| Dominican Republic | AMR | 173 | 1.59 | 1,749 | 16.093 | 1,184 | 10.89 | 3,106 | 28.58 |
| Ecuador | AMR | 248 | 1.70 | 2,515 | 17.229 | 1,682 | 11.52 | 4,445 | 30.45 |
| El Salvador | AMR | 108 | 1.69 | 1,090 | 17.087 | 726 | 11.37 | 1,924 | 30.14 |
| Guatemala | AMR | 215 | 1.33 | 2,174 | 13.396 | 1,552 | 9.57 | 3,941 | 24.29 |
| Guyana | AMR | 13 | 1.77 | 135 | 17.919 | 91 | 12.10 | 240 | 31.79 |
| Honduras | AMR | 117 | 1.39 | 1,181 | 14.079 | 834 | 9.94 | 2,131 | 25.41 |
| Jamaica | AMR | 48 | 1.72 | 485 | 17.408 | 320 | 11.50 | 853 | 30.62 |
| Nicaragua | AMR | 78 | 1.24 | 790 | 12.608 | 572 | 9.13 | 1,440 | 22.98 |
| Panama | AMR | 64 | 1.70 | 649 | 17.207 | 436 | 11.55 | 1,149 | 30.46 |
| Paraguay | AMR | 105 | 1.50 | 1,064 | 15.190 | 734 | 10.47 | 1,903 | 27.16 |
| Suriname | AMR | 9 | 1.70 | 94 | 17.202 | 63 | 11.61 | 167 | 30.51 |
| Uruguay | AMR | 77 | 2.25 | 782 | 22.788 | 483 | 14.09 | 1,342 | 39.13 |

Table 12 (continued)

| Country | WHO Region | Psychiatrists | | Nurses in mental health settings | | Psychosocial care providers | | Total FTE staff needed | |
|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population | FTE staff needed | per 100,000 population |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | |
| Djibouti | EMR | 11 | 1.13 | 109 | 11.428 | 81 | 8.51 | 201 | 21.07 |
| Egypt | EMR | 1,109 | 1.21 | 11,255 | 12.263 | 8,146 | 8.88 | 20,510 | 22.35 |
| Iran | EMR | 1,026 | 1.29 | 10,414 | 13.107 | 7,648 | 9.63 | 19,088 | 24.02 |
| Iraq | EMR | 389 | 1.08 | 3,933 | 10.960 | 2,996 | 8.35 | 7,318 | 20.39 |
| Jordan | EMR | 79 | 1.13 | 796 | 11.435 | 604 | 8.68 | 1,478 | 21.24 |
| Morocco | EMR | 584 | 1.70 | 5,952 | 17.338 | 3,666 | 10.68 | 10,202 | 29.72 |
| Sudan | EMR | 529 | 1.11 | 5,358 | 11.226 | 4,014 | 8.41 | 9,901 | 20.74 |
| Tunisia | EMR | 152 | 1.40 | 1,547 | 14.210 | 1,100 | 10.11 | 2,799 | 25.72 |
| Albania | EUR | 70 | 2.14 | 711 | 21.825 | 424 | 13.03 | 1,205 | 36.99 |
| Armenia | EUR | 66 | 2.09 | 671 | 21.362 | 401 | 12.78 | 1,137 | 36.23 |
| Azerbaijan | EUR | 159 | 1.69 | 1,625 | 17.238 | 1,030 | 10.93 | 2,814 | 29.86 |
| Georgia | EUR | 101 | 2.48 | 1,031 | 25.250 | 591 | 14.48 | 1,723 | 42.21 |
| Kyrgyzstan | EUR | 91 | 1.56 | 933 | 15.879 | 612 | 10.41 | 1,637 | 27.85 |
| Latvia | EUR | 62 | 2.83 | 633 | 28.804 | 364 | 16.56 | 1,059 | 48.19 |
| Republic of Moldova | EUR | 63 | 1.83 | 649 | 18.747 | 393 | 11.37 | 1,106 | 31.95 |
| Ukraine | EUR | 1,192 | 2.70 | 12,146 | 27.502 | 7,071 | 16.01 | 20,410 | 46.21 |
| Bhutan | SEAR | 10 | 1.28 | 100 | 12.984 | 70 | 9.09 | 180 | 23.35 |
| India-Uttarakhand | SEAR | 130 | 1.26 | 1,321 | 12.787 | 929 | 8.99 | 2,380 | 23.04 |
| Maldives | SEAR | 4 | 1.27 | 44 | 12.954 | 31 | 9.12 | 79 | 23.35 |
| Sri Lanka | SEAR | 323 | 1.52 | 3,283 | 15.512 | 2,162 | 10.22 | 5,769 | 27.25 |
| Thailand | SEAR | 1,048 | 1.50 | 10,680 | 15.271 | 6,947 | 9.93 | 18,675 | 26.70 |
| Timor-Leste | SEAR | 14 | 0.98 | 137 | 9.897 | 104 | 7.48 | 254 | 18.35 |
| China-Hunan | WPR | 175 | 2.57 | 1,783 | 26.204 | 1,014 | 14.90 | 2,971 | 43.67 |
| Mongolia | WPR | 56 | 1.96 | 571 | 20.010 | 359 | 12.58 | 987 | 34.55 |
| Philippines | WPR | 1,626 | 1.60 | 16,480 | 16.199 | 11,163 | 10.97 | 29,270 | 28.77 |
| **Population-weighted average for MIC** | | | **1.53** | | **15.50** | | **10.42** | | **27.44** |
| **Total for MIC** | | **12,406** | | **125,932** | | **84,636** | | **222,974** | |
| **Population-weighted average for LMIC** | | | **1.40** | | **13.61** | | **10.26** | | **25.27** |
| **Total for LMIC** | | **24,410** | | **236,667** | | **178,510** | | **439,587** | |

LIC – low-income country
MIC – middle-income country
LMIC – low- and middle-income countries

Table 13. Shortage of mental health workers in 58 LMIC, 2015

| Country | WHO Region | Psychiatrists per 100,000 | | | | Nurses in mental health settings per 100,000 | | | | Psychosocial care providers per 100,000 | | | | Total FTE staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Low-income countries** | | | | | | | | | | | | | | | | | |
| Benin | AFR | 0.19 | 15 | 0.97 | 103 | 0.21 | 17 | 10.68 | 1,138 | 0.29 | 23 | 10.94 | 1,165 | 0.69 | 54 | 22.59 | 2,406 |
| Burundi | AFR | 0.01 | 1 | 1.07 | 101 | 0.42 | 31 | 9.82 | 925 | 1.13 | 83 | 9.46 | 890 | 1.57 | 116 | 20.35 | 1,915 |
| Eritrea | AFR | 0.06 | 2 | 0.97 | 58 | 0.33 | 15 | 9.40 | 565 | 0.44 | 20 | 9.96 | 598 | 0.83 | 37 | 20.33 | 1,221 |
| Ethiopia | AFR | 0.02 | 15 | 1.03 | 991 | 0.26 | 200 | 9.68 | 9,319 | 0.88 | 667 | 9.66 | 9,296 | 1.17 | 882 | 20.37 | 19,606 |
| Nigeria | AFR | 0.15 | 216 | 1.03 | 1,804 | 2.41 | 3,395 | 8.64 | 15,192 | 0.93 | 1,317 | 10.36 | 18,228 | 3.50 | 4,928 | 20.02 | 35,224 |
| Uganda | AFR | 0.08 | 23 | 0.88 | 349 | 0.79 | 226 | 8.39 | 3,333 | 0.27 | 77 | 10.10 | 4,010 | 1.14 | 326 | 19.37 | 7,692 |
| Afghanistan | EMR | 0.01 | 2 | 1.14 | 389 | 0.15 | 36 | 10.78 | 3,690 | 0.41 | 99 | 11.21 | 3,840 | 0.56 | 138 | 23.12 | 7,919 |
| Pakistan | EMR | 0.13 | 216 | 1.21 | 2,486 | 18.86 | 31,273 | 0.00 | 0 | 2.30 | 3,815 | 10.00 | 20,554 | 21.29 | 35,303 | 11.21 | 23,041 |
| Somaliland | EMR | 0.07 | 6 | 1.12 | 121 | 0.33 | 28 | 11.03 | 1,183 | 1.20 | 100 | 10.84 | 1,163 | 1.60 | 134 | 22.98 | 2,467 |
| Tajikistan | EUR | 1.12 | 73 | 0.45 | 35 | 1.93 | 126 | 12.72 | 987 | 6.33 | 414 | 6.66 | 517 | 9.38 | 613 | 19.83 | 1,539 |
| Uzbekistan | EUR | 3.56 | 936 | 0.00 | 0 | 6.54 | 1,722 | 10.08 | 2,968 | 6.37 | 1,676 | 7.49 | 2,206 | 16.47 | 4,335 | 17.56 | 5,174 |
| Bangladesh | SEAR | 0.07 | 112 | 1.50 | 2,621 | 0.20 | 301 | 14.31 | 25,078 | 0.22 | 340 | 12.59 | 22,059 | 0.49 | 752 | 28.40 | 49,757 |
| Nepal | SEAR | 0.13 | 35 | 1.24 | 404 | 0.27 | 75 | 12.58 | 4,088 | 0.19 | 52 | 11.84 | 3,849 | 0.59 | 162 | 25.66 | 8,340 |
| Viet Nam | WPR | 0.35 | 297 | 1.88 | 1,758 | 2.10 | 1,767 | 18.02 | 16,879 | 1.93 | 1,620 | 13.52 | 12,663 | 4.38 | 3,684 | 33.42 | 31,300 |
| **Population-weighted average for LIC** | | **0.24** | | **1.21** | | **5.20** | | **9.21** | | **1.34** | | **10.90** | | **6.78** | | **21.32** | |
| **Total for LIC** | | | **1,949** | | **11,220** | | **39,211** | | **85,343** | | **10,304** | | **101,038** | | **51,464** | | **197,601** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| Congo | AFR | 0.11 | 4 | 0.95 | 40 | 0.70 | 24 | 9.84 | 416 | 1.05 | 36 | 7.98 | 337 | 1.86 | 63 | 18.77 | 793 |
| South Africa | AFR | 0.28 | 133 | 0.92 | 473 | 10.08 | 4,848 | 1.86 | 962 | 1.58 | 762 | 7.91 | 4,087 | 11.95 | 5,742 | 10.68 | 5,522 |
| Argentina | AMR | 9.20 | 3,563 | 0.00 | 0 | 12.91 | 5,000 | 8.73 | 3,715 | 13.19 | 5,108 | 1.14 | 485 | 35.30 | 13,672 | 9.87 | 4,200 |
| Belize | AMR | 0.66 | 2 | 0.88 | 3 | 7.97 | 23 | 7.56 | 26 | 9.29 | 26 | 2.52 | 9 | 17.92 | 51 | 10.96 | 38 |
| Bolivia | AMR | 1.06 | 97 | 0.52 | 57 | 0.35 | 32 | 15.57 | 1,690 | 2.57 | 236 | 9.44 | 1,024 | 3.98 | 365 | 25.53 | 2,771 |
| Chile | AMR | 4.65 | 758 | 0.00 | 0 | 1.65 | 270 | 19.40 | 3,477 | 14.25 | 2,323 | 0.00 | 0 | 20.56 | 3,350 | 19.40 | 3,477 |
| Costa Rica | AMR | 3.06 | 132 | 0.00 | 0 | 4.13 | 179 | 14.48 | 718 | 12.22 | 529 | 0.79 | 39 | 19.41 | 840 | 15.27 | 757 |
| Dominican Republic | AMR | 2.08 | 198 | 0.00 | 0 | 1.61 | 154 | 15.51 | 1,685 | 8.01 | 764 | 4.41 | 479 | 11.70 | 1,116 | 19.92 | 2,165 |

Table 13 (continued)

| Country | WHO Region | Psychiatrists per 100,000 | | | | Nurses in mental health settings per 100,000 | | | | Psychosocial care providers per 100,000 | | | | Total FTE staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| Ecuador | AMR | 2.51 | 328 | 0.00 | 0 | 0.93 | 122 | 17.28 | 2,522 | 5.84 | 763 | 7.15 | 1,043 | 9.28 | 1,212 | 24.42 | 3,565 |
| El Salvador | AMR | 1.39 | 84 | 0.40 | 0 | 2.12 | 128 | 15.96 | 1,018 | 6.51 | 395 | 6.33 | 404 | 10.02 | 607 | 22.69 | 1,422 |
| Guatemala | AMR | 0.57 | 73 | 0.90 | 146 | 1.28 | 162 | 13.49 | 2,189 | 0.57 | 73 | 11.04 | 1,791 | 2.43 | 308 | 25.43 | 4,127 |
| Guyana | AMR | 0.53 | 4 | 1.34 | 10 | 0.40 | 3 | 18.41 | 139 | 8.66 | 66 | 4.78 | 36 | 9.59 | 73 | 24.53 | 185 |
| Honduras | AMR | 0.82 | 57 | 0.70 | 59 | 2.58 | 178 | 12.68 | 1,064 | 2.70 | 186 | 9.00 | 755 | 6.10 | 421 | 22.39 | 1,878 |
| Jamaica | AMR | 1.13 | 30 | 0.69 | 19 | 9.55 | 255 | 8.79 | 245 | 16.09 | 429 | 0.00 | 0 | 26.77 | 714 | 9.48 | 264 |
| Nicaragua | AMR | 0.91 | 49 | 0.45 | 29 | 1.71 | 93 | 12.01 | 753 | 5.37 | 293 | 5.42 | 340 | 7.98 | 435 | 17.89 | 1,121 |
| Panama | AMR | 3.47 | 112 | 0.00 | 0 | 4.38 | 141 | 13.77 | 520 | 8.83 | 285 | 4.14 | 156 | 16.68 | 538 | 17.91 | 676 |
| Paraguay | AMR | 1.31 | 77 | 0.31 | 22 | 1.58 | 93 | 14.71 | 1,031 | 3.96 | 234 | 8.15 | 571 | 6.84 | 404 | 23.17 | 1,623 |
| Suriname | AMR | 1.45 | 7 | 0.35 | 2 | 13.96 | 69 | 4.16 | 23 | 34.38 | 171 | 0.00 | 0 | 49.79 | 247 | 4.51 | 25 |
| Uruguay | AMR | 19.36 | 644 | 0.00 | 0 | 0.69 | 23 | 22.84 | 783 | 10.57 | 352 | 4.63 | 159 | 30.62 | 1,019 | 27.47 | 942 |
| Djibouti | EMR | 0.33 | 3 | 0.92 | 9 | 0.83 | 7 | 11.76 | 112 | 0.33 | 3 | 9.92 | 94 | 1.49 | 12 | 22.61 | 215 |
| Egypt | EMR | 1.44 | 1,113 | 0.00 | 0 | 2.60 | 2,010 | 10.74 | 9,856 | 1.03 | 796 | 9.46 | 8,679 | 5.08 | 3,919 | 20.19 | 18,535 |
| Iran | EMR | 1.19 | 839 | 0.20 | 0 | 7.82 | 5,536 | 6.13 | 4,867 | 52.17 | 36,922 | 0.00 | 0 | 61.18 | 43,296 | 6.32 | 4,867 |
| Iraq | EMR | 0.34 | 95 | 0.89 | 318 | 0.54 | 152 | 11.73 | 4,208 | 0.65 | 184 | 9.64 | 3,461 | 1.53 | 431 | 22.26 | 7,987 |
| Jordan | EMR | 1.14 | 63 | 0.11 | 0 | 3.95 | 220 | 8.61 | 599 | 1.94 | 108 | 8.42 | 586 | 7.03 | 391 | 17.14 | 1,185 |
| Morocco | EMR | 1.02 | 312 | 0.78 | 267 | 2.17 | 661 | 16.10 | 5,528 | 1.71 | 520 | 10.36 | 3,558 | 4.90 | 1,493 | 27.24 | 9,353 |
| Sudan | EMR | 0.06 | 23 | 1.18 | 565 | 0.01 | 5 | 12.47 | 5,954 | 0.75 | 290 | 9.54 | 4,553 | 0.82 | 318 | 23.20 | 11,073 |
| Tunisia | EMR | 1.53 | 151 | 0.00 | 0 | 3.71 | 367 | 11.26 | 1,226 | 2.97 | 293 | 8.28 | 901 | 8.21 | 811 | 19.54 | 2,127 |
| Albania | EUR | 3.20 | 100 | 0.00 | 0 | 7.00 | 218 | 15.55 | 506 | 3.93 | 122 | 10.18 | 331 | 14.13 | 440 | 25.72 | 838 |
| Armenia | EUR | 5.88 | 180 | 0.00 | 0 | 5.42 | 166 | 16.68 | 523 | 22.91 | 702 | 0.00 | 0 | 34.21 | 1,049 | 16.68 | 523 |
| Azerbaijan | EUR | 5.18 | 437 | 0.00 | 0 | 8.36 | 706 | 9.72 | 916 | 8.63 | 729 | 3.55 | 334 | 22.17 | 1,872 | 13.26 | 1,250 |
| Georgia | EUR | 5.90 | 263 | 0.00 | 0 | 7.71 | 344 | 18.14 | 741 | 22.88 | 1,022 | 0.00 | 0 | 36.49 | 1,629 | 18.14 | 741 |
| Kyrgyzstan | EUR | 3.41 | 178 | 0.00 | 0 | 9.24 | 483 | 7.62 | 448 | 13.57 | 709 | 0.00 | 0 | 26.22 | 1,370 | 7.62 | 448 |
| Latvia | EUR | 8.31 | 191 | 0.00 | 0 | 35.72 | 819 | 0.00 | 0 | 28.52 | 654 | 0.00 | 0 | 72.56 | 1,663 | 0.00 | 0 |
| Republic of Moldova | EUR | 4.78 | 180 | 0.00 | 0 | 15.35 | 577 | 3.99 | 138 | 29.51 | 1,109 | 0.00 | 0 | 49.65 | 1,865 | 3.99 | 138 |
| Ukraine | EUR | 8.66 | 4,066 | 0.00 | 0 | 26.20 | 12,299 | 1.82 | 802 | 42.47 | 19,935 | 0.00 | 0 | 77.34 | 36,300 | 1.82 | 802 |

Table 13 (continued)

| Country | WHO Region | Psychiatrists per 100,000 | | | | Nurses in mental health settings per 100,000 | | | | Psychosocial care providers per 100,000 | | | | Total FTE staff | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | | FTE staff supply | | Shortage | |
| | | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N | per 100,000 | N |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | | | | | | | | | | | | | |
| Bhutan | SEAR | 0.45 | 3 | 0.93 | 7 | 1.49 | 10 | 12.46 | 96 | 2.86 | 19 | 7.67 | 59 | 4.79 | 31 | 21.07 | 162 |
| India-Uttarakhand | SEAR | 0.08 | 7 | 1.29 | 134 | 4.78 | 434 | 9.10 | 940 | 2.87 | 260 | 7.75 | 801 | 7.73 | 701 | 18.14 | 1,875 |
| Maldives | SEAR | 0.69 | 2 | 0.68 | 2 | 1.38 | 4 | 12.44 | 42 | 2.42 | 7 | 7.99 | 27 | 4.49 | 13 | 21.11 | 71 |
| Sri Lanka | SEAR | 0.18 | 35 | 1.44 | 304 | 1.91 | 372 | 14.46 | 3,060 | 3.55 | 693 | 7.94 | 1,680 | 5.64 | 1,101 | 23.83 | 5,044 |
| Thailand | SEAR | 0.66 | 438 | 0.91 | 638 | 3.81 | 2,515 | 12.18 | 8,517 | 2.81 | 1,856 | 8.19 | 5,730 | 7.29 | 4,809 | 21.28 | 14,885 |
| Timor-Leste | SEAR | 0.11 | 1 | 1.03 | 14 | 15.32 | 152 | 0.00 | 0 | 6.80 | 67 | 2.92 | 40 | 22.22 | 220 | 3.95 | 55 |
| China-Hunan | WPR | 1.41 | 89 | 1.22 | 83 | 3.19 | 202 | 23.57 | 1,603 | 4.13 | 261 | 11.61 | 790 | 8.73 | 552 | 36.40 | 2,476 |
| Mongolia | WPR | 0.51 | 13 | 1.54 | 44 | 7.62 | 194 | 13.24 | 378 | 8.49 | 216 | 5.36 | 153 | 16.62 | 424 | 20.14 | 575 |
| Philippines | WPR | 0.42 | 358 | 1.30 | 1,321 | 0.91 | 780 | 16.38 | 16,669 | 2.11 | 1,804 | 10.50 | 10,683 | 3.44 | 2,943 | 28.18 | 28,672 |
| **Population-weighted average for MIC** | | **2.03** | | **0.59** | | **5.32** | | **11.16** | | **10.84** | | **6.67** | | **18.19** | | **18.42** | |
| **Total for MIC** | | | **15,494** | | **4,567** | | **41,026** | | **90,704** | | **82,311** | | **54,174** | | **138,832** | | **149,445** |
| **Population-weighted average for LMIC** | | **1.08** | | **0.92** | | **5.26** | | **10.12** | | **5.77** | | **8.92** | | **12.11** | | **19.96** | |
| **Total for LMIC** | | | **17,443** | | **15,787** | | **80,237** | | **176,047** | | **92,615** | | **155,213** | | **190,296** | | **347,046** |

Notes:
When a country had a surplus of a particular type of health worker, the shortage was set equal to zero for that worker type.
When WHO-AIMS did not have supply data for a worker type, the WHO regional average per capita supply for that country's income level was used. Benin, Nigeria, Pakistan, Uzbekistan, Nepal, Paraguay, Uruguay, Egypt, Jordan, Armenia, Georgia, Bhutan, India Uttarakhand, Sri Lanka and China Hunan had missing values for at least one of psychosocial care providers. India Uttarakhand had a missing value for nurses.
LIC – low-income country
MIC – middle-income country
LMIC – low- and middle-income countries.

Table 14. Scaling-up cost (wage bill) estimates to remove shortage of mental health workers in 58 LMIC in 2015 (in thousands of 2005 US dollars)

| Country | WHO Region | Psychiatrists | Nurses in mental health settings | Psychosocial care providers | Total FTE staff |
|---|---|---|---|---|---|
| **Low-income countries** | | | | | |
| Benin | AFR | 769 | 3,480 | 3,564 | 7,812 |
| Burundi | AFR | 558 | 2,110 | 2,031 | 4,700 |
| Eritrea | AFR | 280 | 1,118 | 1,184 | 2,582 |
| Ethiopia | AFR | 3,708 | 14,345 | 14,310 | 32,363 |
| Nigeria | AFR | 21,577 | 74,759 | 89,703 | 186,040 |
| Uganda | AFR | 3,159 | 12,422 | 14,948 | 30,529 |
| Afghanistan | EMR | 1,373 | 5,352 | 5,569 | 12,295 |
| Pakistan | EMR | 17,605 | 0 | 59,878 | 77,483 |
| Somaliland | EMR | 325 | 1,314 | 1,292 | 2,931 |
| Tajikistan | EUR | 53 | 619 | 324 | 996 |
| Uzbekistan | EUR | 0 | 2,328 | 1,731 | 4,059 |
| Bangladesh | SEAR | 11,950 | 47,046 | 41,383 | 100,379 |
| Nepal | SEAR | 1,596 | 6,650 | 6,261 | 14,507 |
| Viet Nam | WPR | 6,762 | 26,707 | 20,036 | 53,505 |
| **Total for 14 LIC** | | **69,715** | **198,252** | **262,214** | **530,180** |
| **Middle-income countries (lower-middle and upper-middle)** | | | | | |
| Congo | AFR | 536 | 2,277 | 1,846 | 4,659 |
| South Africa | AFR | 11,431 | 9,565 | 40,610 | 61,606 |
| Argentina | AMR | 0 | 26,873 | 3,507 | 30,380 |
| Belize | AMR | 51 | 178 | 59 | 288 |
| Bolivia | AMR | 478 | 5,839 | 3,539 | 9,855 |
| Chile | AMR | 0 | 30,105 | 0 | 30,105 |
| Costa Rica | AMR | 0 | 4,858 | 263 | 5,121 |
| Dominican Republic | AMR | 0 | 11,189 | 3,183 | 14,373 |
| Ecuador | AMR | 0 | 14,304 | 5,916 | 20,220 |
| El Salvador | AMR | 0 | 5,455 | 2,164 | $7,619 |
| Guatemala | AMR | 2,071 | 12,784 | 10,459 | 25,314 |
| Guyana | AMR | 106 | 600 | 156 | 862 |
| Honduras | AMR | 553 | 4,121 | 2,925 | 7,599 |
| Jamaica | AMR | 341 | 1,789 | 0 | 1,789 |
| Nicaragua | AMR | 225 | 2,449 | 1,105 | 3,780 |
| Panama | AMR | 0 | 3,666 | 1,101 | 4,767 |
| Paraguay | AMR | 207 | 4,019 | 2,226 | 6,452 |
| Suriname | AMR | 30 | 149 | 0 | 149 |
| Uruguay | AMR | 0 | 5,871 | 1,191 | 7,062 |
| Djibouti | EMR | 53 | 276 | 233 | 561 |
| Egypt | EMR | 0 | 42,994 | 37,858 | 80,852 |
| Iran | EMR | 0 | 30,165 | 0 | 30,165 |
| Iraq | EMR | 2,659 | 14,471 | 11,901 | 29,031 |
| Jordan | EMR | 0 | 3,556 | 3,476 | 7,032 |
| Morocco | EMR | 2,768 | 23,546 | 15,154 | 41,468 |

Table 14 (continued)

| Country | WHO Region | Psychiatrists | Nurses in mental health settings | Psychosocial care providers | Total FTE staff |
|---|---|---|---|---|---|
| **Middle-income countries (lower-middle and upper-middle)** | | | | | |
| Sudan | EMR | 4,238 | 18,367 | 14,045 | 36,650 |
| Tunisia | EMR | 0 | 7,880 | 5,791 | 13,671 |
| Albania | EUR | 0 | 1,804 | 1,181 | 2,985 |
| Armenia | EUR | 0 | 1,176 | 0 | 1,176 |
| Azerbaijan | EUR | 0 | 2,036 | 743 | 2,779 |
| Georgia | EUR | 0 | 1,533 | 0 | 1,533 |
| Kyrgyzstan | EUR | 0 | 323 | 0 | 323 |
| Latvia | EUR | 0 | 0 | 0 | 0 |
| Republic of Moldova | EUR | 0 | 143 | 0 | 143 |
| Ukraine | EUR | 0 | 1,907 | 0 | 1,907 |
| Bhutan | SEAR | 38 | 211 | 130 | 379 |
| India-Uttarakhand | SEAR | 771 | 2,229 | 1,899 | 4,899 |
| Maldives | SEAR | 20 | 150 | 97 | 267 |
| Sri Lanka | SEAR | 1,985 | 8,219 | 4,512 | 14,716 |
| Thailand | SEAR | 4,722 | 25,932 | 17,447 | 48,101 |
| Timor-Leste | SEAR | 41 | 0 | 48 | 89 |
| China-Hunan | WPR | 494 | 3,919 | 1,930 | 6,343 |
| Mongolia | WPR | 177 | 625 | 253 | 1,055 |
| Philippines | WPR | 9,004 | 46,754 | 29,964 | 85,721 |
| **Total for 44 MIC** | | **42,997** | **384,307** | **226,912** | **653,846** |
| **Total for 58 LMIC** | | **112,713** | **582,559** | **489,126** | **1,184,026** |

Notes:
When a country had a surplus of a particular type of health worker, the wage bill cost was set equal to zero for that worker type.
LIC – low-income country
MIC – middle-income country
LMIC – low- and middle-income countries.

## Appendix 2. Other medical doctors in mental health settings

This appendix reports information about medical doctors who do not specialize in psychiatry but work in mental health settings (hereafter, referred to as "other medical doctors"). Table A1 shows, by country, the number of other medical doctors per 100,000 population in mental health settings, the number of psychiatrists per 100,000 population and the estimated shortage of psychiatrists per 100,000 population. The countries in the table are sorted by the proportion of physicians (i.e., psychiatrists and other medical doctors) in mental health settings that are other medical doctors. For example, in Afghanistan, there are 0.24 other medical doctors per 100,000 population in mental health settings, while there are only 0.01 psychiatrists per 100,000 population; therefore, other medical doctors represent 97% of the physicians.

Table 17. Other medical doctors in mental health settings by country

| Country | WHO Region | Income classification | Other medical doctors per 100,000 population | Psychiatrists per 100,000 population | Other medical doctors / total (1) | Shortage of psychiatrists per 100,000 population |
|---|---|---|---|---|---|---|
| Afghanistan | EMR | LIC | 0.24 | 0.01 | 97% | 0.97 |
| Timor-Leste | SEAR | MIC | 1.40 | 0.11 | 93% | 0.84 |
| Mongolia | WPR | MIC | 4.74 | 0.51 | 90% | 1.33 |
| Iran | EMR | MIC | 10.74 | 1.19 | 90% | 0.09 |
| Sri Lanka | SEAR | MIC | 0.62 | 0.18 | 78% | 1.29 |
| Nigeria | AFR | LIC | 0.49 | 0.15 | 76% | 0.88 |
| Viet Nam | WPR | LIC | 0.90 | 0.35 | 72% | 1.70 |
| Bangladesh | SEAR | LIC | 0.18 | 0.07 | 71% | 1.20 |
| Burundi | AFR | LIC | 0.03 | 0.01 | 67% | 0.91 |
| South Africa | AFR | MIC | 0.45 | 0.28 | 62% | 0.75 |
| Sudan | EMR | MIC | 0.09 | 0.06 | 60% | 0.98 |
| Eritrea | AFR | LIC | 0.06 | 0.06 | 50% | 0.84 |
| Maldives | SEAR | MIC | 0.69 | 0.69 | 50% | 0.48 |
| Ethiopia | AFR | LIC | 0.02 | 0.02 | 46% | 0.87 |
| Honduras | AMR | MIC | 0.67 | 0.82 | 45% | 0.48 |
| El Salvador | AMR | MIC | 1.07 | 1.39 | 43% | 0.14 |
| Morocco | EMR | MIC | 0.70 | 1.02 | 41% | 0.59 |
| Congo | AFR | MIC | 0.07 | 0.11 | 40% | 0.79 |
| Suriname | AMR | MIC | 0.83 | 1.45 | 36% | 0.16 |
| Armenia | EUR | MIC | 3.19 | 5.88 | 35% | 0.00 |
| Nepal | SEAR | LIC | 0.06 | 0.13 | 33% | 1.06 |
| Jamaica | AMR | MIC | 0.56 | 1.13 | 33% | 0.53 |
| Guyana | AMR | MIC | 0.26 | 0.53 | 33% | 1.09 |
| Ukraine | EUR | MIC | 3.95 | 8.66 | 31% | 0.00 |
| Uganda | AFR | LIC | 0.04 | 0.08 | 31% | 0.73 |
| Jordan | EMR | MIC | 0.50 | 1.14 | 30% | 0.00 |
| Nicaragua | AMR | MIC | 0.39 | 0.91 | 30% | 0.25 |
| Somaliland | EMR | LIC | 0.03 | 0.07 | 30% | 1.00 |
| Philippines | WPR | MIC | 0.17 | 0.42 | 29% | 1.07 |
| Republic of Moldova | EUR | MIC | 1.78 | 4.78 | 27% | 0.00 |
| Paraguay | AMR | MIC | 0.48 | 1.31 | 27% | 0.10 |

Table 17 (continued)

| Country | WHO Region | Income classification | Other medical doctors per 100,000 population | Psychiatrists per 100,000 population | Other medical doctors / total (1) | Shortage of psychiatrists per 100,000 population |
|---|---|---|---|---|---|---|
| Thailand | SEAR | MIC | 0.17 | 0.66 | 21% | 0.79 |
| Tajikistan | EUR | LIC | 0.29 | 1.12 | 21% | 0.26 |
| Georgia | EUR | MIC | 1.41 | 5.90 | 19% | 0.00 |
| Kyrgyzstan | EUR | MIC | 0.77 | 3.41 | 18% | 0.00 |
| Bolivia | AMR | MIC | 0.22 | 1.06 | 17% | 0.31 |
| Dominican Republic | AMR | MIC | 0.37 | 2.08 | 15% | 0.00 |
| Azerbaijan | EUR | MIC | 0.77 | 5.18 | 13% | 0.00 |
| Egypt | EMR | MIC | 0.21 | 1.44 | 13% | 0.00 |
| Chile | AMR | MIC | 0.68 | 4.65 | 13% | 0.00 |
| Costa Rica | AMR | MIC | 0.43 | 3.06 | 12% | 0.00 |
| Latvia | EUR | MIC | 1.11 | 8.31 | 12% | 0.00 |
| Albania | EUR | MIC | 0.42 | 3.20 | 12% | 0.00 |
| Argentina | AMR | MIC | 1.08 | 9.20 | 11% | 0.00 |
| Tunisia | EMR | MIC | 0.17 | 1.53 | 10% | 0.00 |
| Uruguay | AMR | MIC | 2.03 | 19.36 | 9% | 0.00 |
| Iraq | EMR | MIC | 0.03 | 0.34 | 7% | 0.70 |
| Ecuador | AMR | MIC | 0.18 | 2.51 | 7% | 0.00 |
| Uzbekistan | EUR | LIC | 0.24 | 3.56 | 6% | 0.00 |
| Guatemala | AMR | MIC | 0.03 | 0.57 | 5% | 0.70 |
| Benin | AFR | LIC | 0.01 | 0.19 | 5% | 0.84 |
| Panama | AMR | MIC | 0.16 | 3.47 | 4% | 0.00 |
| Belize | AMR | MIC | 0.00 | 0.66 | 0% | 0.66 |
| Bhutan | SEAR | MIC | 0.00 | 0.45 | 0% | 0.75 |
| India-Uttarakhand | SEAR | MIC | 0.00 | 0.08 | 0% | 1.12 |
| Djibouti | EMR | MIC | 0.00 | 0.33 | 0% | 0.72 |

(1) Total is defined as the number of psychiatrists plus the number of other medical doctors working in mental health settings.

The practice of medical doctors working in mental health settings who do not specialize in psychiatry could be the result of psychiatrist shortages. To examine this relationship at the country level, we regressed the proportion of the physicians (i.e., psychiatrists and other medical doctors) represented by other medical doctors on the estimated shortage of psychiatrists per 100,000 population. The dependent variable was transformed with the arcsine function, because proportions violate the variance homogeneity assumption across observations *(44)*. The results of the regression model were as follows:

$$\sin\left(\sqrt{OMD\_proportion}\right)^{-1} = 0.43 + 0.30\ psychiatrist\_shortage$$

Variable definitions

*OMD_proportion*: other medical doctors proportion of all physicians (psychiatrists and other medical doctors) working in mental health settings

*psychiatrist_shortage*: estimated psychiatrist shortage per 100,000 population

$R^2 = 0.18$, $F$ - statistic ($p = 0.001$), N = 56 countries[30]

[30] The regression would have included all 58 LMIC, but the number of other medical doctors was missing for China (Hunan) and Pakistan.

The parameter estimate for psychiatrist shortage per 100,000 population had a standard error of 0.09 and its p-value was less than 0.001. The results are consistent with a higher proportion of other medical doctors working in mental health settings as psychiatrist shortages increase. Because the proportion of other medical doctors was transformed, for ease of interpretation, Table A2 shows the predicted proportion of other medical doctors for different psychiatrist shortage levels, ranging from 0.0 per 100,000 population to 1.7 per 100,000 population, which is the psychiatrist shortage range among the countries reported in Table 9 (page 31). For example, countries without a shortage of psychiatrists are predicted to have 17% of the physicians (i.e., psychiatrists and other medical doctors) working in mental health settings being other medical doctors. At the other extreme, countries with a shortage of 1.7 psychiatrists per 100,000 population are predicted to have 65% of the physicians working in mental health settings being other medical doctors.

Table 18. Predicted proportion of other medical doctors

| Shortage of psychiatrists per 100,000 population | Predicted proportion: other medical doctors / total (1) % |
|---|---|
| 0.0 | 17 |
| 0.1 | 19 |
| 0.2 | 22 |
| 0.3 | 24 |
| 0.4 | 27 |
| 0.5 | 30 |
| 0.6 | 32 |
| 0.7 | 35 |
| 0.8 | 38 |
| 0.9 | 41 |
| 1.0 | 44 |
| 1.1 | 47 |
| 1.2 | 50 |
| 1.3 | 53 |
| 1.4 | 56 |
| 1.5 | 59 |
| 1.6 | 62 |
| 1.7 | 65 |

(1) Total is defined as the number of psychiatrists plus the number of other medical doctors working in mental health settings.

Mental, neurological and substance use (MNS) disorders account for an estimated 14% of the global burden of disease, yet mental health routinely receives a low funding priority from governments. While evidence indicates there are insufficient numbers of mental health workers in low- and middle-income countries (LMIC) to meet the population needs, there are no rigorous estimates of the size of the mental health workforce shortage and the wage bill that would be required to remove the shortage. This report aims to fill that gap by estimating the number of mental health workers required to treat MNS conditions. In 2005, for the 144 LMIC, there was an estimated shortage of 1.18 million workers, including 55,000 psychiatrists, 628,000 nurses in mental health settings and 493,000 psychosocial care providers. The annual wage bill to remove this shortage would be about US$ 4.4 billion (2009 dollars). In 2015, if the supply of mental health workers were to remain unchanged from 2005, the shortage of mental health workers would increase by an estimated 45%. To meet the treatment needs for MNS disorders, our analysis provides benchmarks for human resources for mental health well into the future.

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