Global Burden of Disease

Mental Disorders and Illicit Drug Use Expert Group

Summary of data collected and decision rules used in making regional and global estimates:

Depressive Disorders

An Pham, Amanda Baxter, Adele Somerville, Allison Ventura, Roman Scheurer, Bianca Calabria, Jen McLaren, Anna Roberts, Louisa Degenhardt and Harvey Whiteford

for the Mental Disorders and Illicit Drug Use Expert Group

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Working Paper

Acknowledgments:

The Mental Disorders and Illicit Drug Use Expert Group comprise: Prof Harvey Whiteford (Co-Chair), Prof Louisa Degenhardt (Co-Chair), Prof Oye Gureje, Prof Wayne Hall, Dr Cille Kennedy, Prof Ron Kessler, Prof John McGrath, Dr Maria Medina-Mora, Dr Guilherme Polanczyk, Prof Martin Prince, and Dr Shekhar Saxena.

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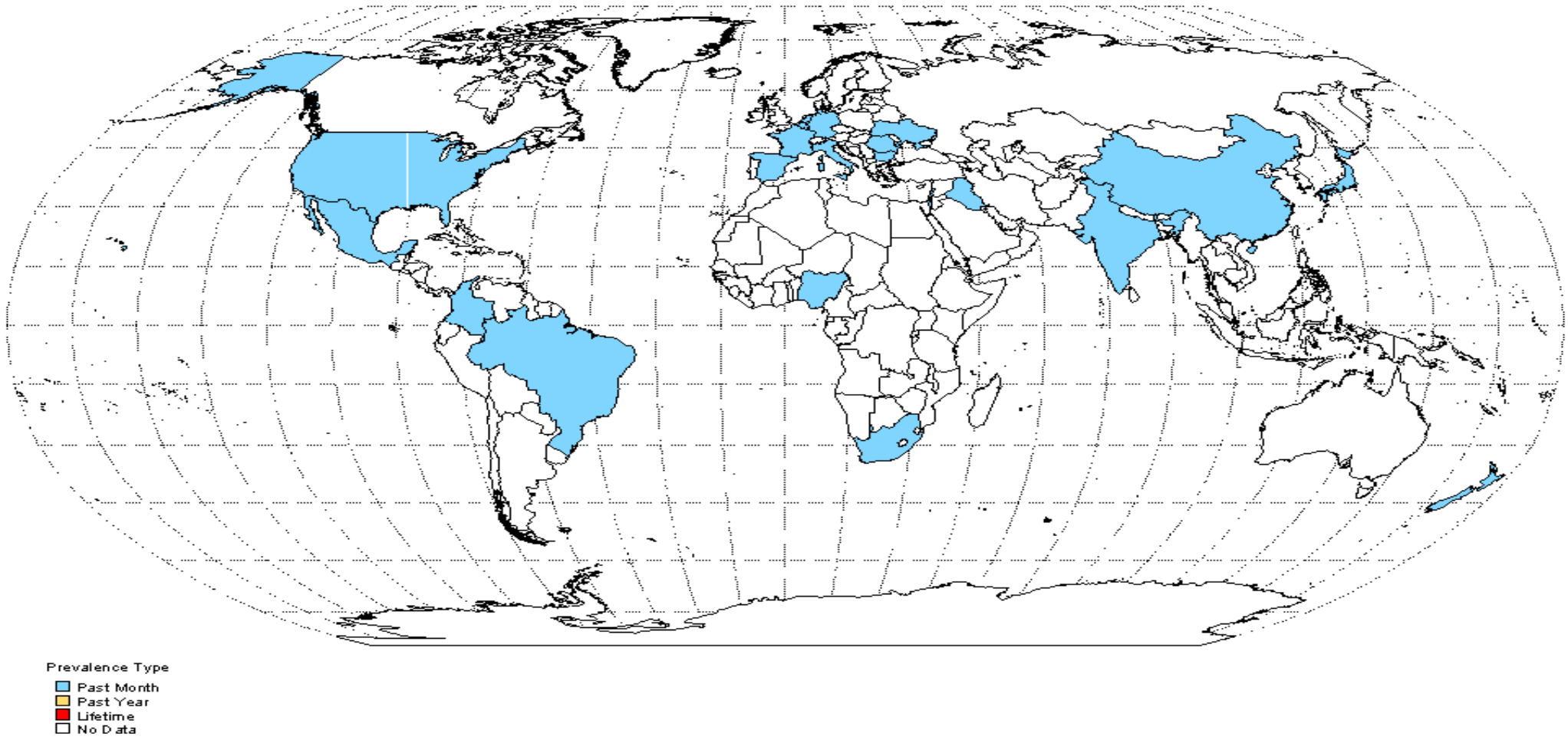
Table of Contents

Glossary

ARR	Annualised remission rate
CIDI	Composite International Diagnostic Interview
DALY	Disability-adjusted life year
DSM	Diagnostic and Statistical Manual of Mental Disorders
GBD	Global Burden of Disease Project
ICD	International Classification Diseases (World Health Organisation)
LP	Lifetime prevalence
MDD	Major Depressive Disorder
MDE	Major Depressive Episode
PYP	Past year prevalence
PMP	Past month prevalence
SDS	Sheehan Disability Scale
WHO	World Health Organisation
WMHS	World Mental Health Survey
WMH-CIDI	World Mental Health version of the WHO CIDI
GAF	Global Assessment of Functioning Scale
YLD	Years of life lived with disability
YLL	Years of life lost

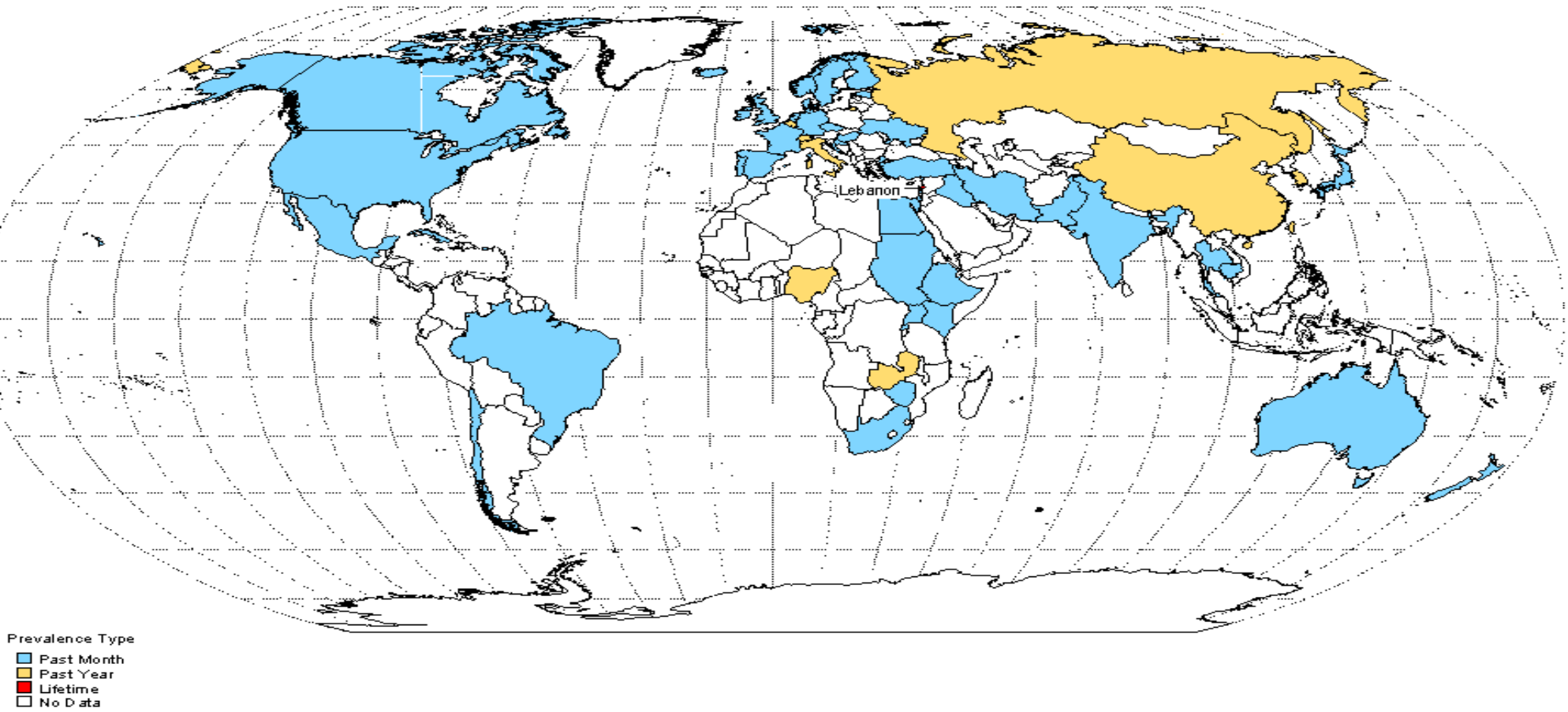
Preliminary data coverage identified for: Depressive Disorders

Figure 1. Past month, past year and lifetime prevalence estimate coverage for depressive disorders from WMHS data



Preliminary data coverage identified for: Major Depressive Disorder or Dysthymia

Figure 2. Past month, past year and lifetime prevalence estimate coverage for MDD or Dysthymia from Literature review



1.0 Data summary and decision rules overview

The new Global Burden of Disease study commenced in 2007 and is the first major effort since the original 1996 GBD study to produce systematic and comprehensive estimates of the burden of diseases and injuries. It will also update the comparative estimates of the burden of risk factors. While the original 1996 GBD study produced 1990 estimates for 107 diseases and injuries and ten risk factors for eight world regions, the new study will produce 1990 and 2005 estimates for 150 diseases and injuries and more than 40 risk factors for 21 regions of the world.

Important changes will be made to the scope and nature of the estimates for mental disorders and illicit drug use. More disorders are being considered because of significant advances in epidemiological research. The original study contained estimates for unipolar depression, bipolar disorder, panic disorder, obsessive compulsive disorder, post traumatic stress disorder and illicit drug use. The new estimates will include the mental disorders covered in the original study plus eating disorders (both anorexia and bulimia), dysthymia (as well as major depression), generalised anxiety disorder, agoraphobia, social phobia, specific phobia, separation anxiety disorder, pervasive developmental disorders (autism and Asperger's disorder), attention deficit hyperactivity disorder and conduct disorders.

In the 2005 update, Depressive disorders is defined as any diagnosis of major depressive disorder, dysthymic disorder and depressive disorder not otherwise specified.

Disability-adjusted life years (DALYs) will be calculated for depression and will comprise:

- major depressive disorder (comprising mild, moderate and severe health states), and
- dysthymic disorder

These will be summed to give overall burden of disease for depressive disorders.

1.1 Data sources

A systematic review was undertaken to identify sources of data containing epidemiologic parameters for depressive disorders. Papers identified in the search were sought and data containing these parameters were extracted, recorded and standardised.

Standardised approaches to literature searches, data collection, data extraction, consistency and error checking, and expert consultation and review were taken across mental disorders.

These methodologies are documented and detailed on the expert group's website: www.gbd.unsw.edu.au., but briefly can be summarised as follows:

The stages of the systematic review are as follows:

1. Search of peer-reviewed literature. The search strategy is consistent with the methodology recommended by the Meta-analysis of Observational Studies in Epidemiology (MOOSE) Group[1]. Three electronic databases were included in the search (Medline, PsychInfo and Embase) with searches limited to human subjects and publication dates of 1980 to 2007. Search strings are available for review at http://www.gbd.unsw.edu.au/gbdweb.nsf/page/Methodology

2. Identifying articles from peer-review literature that met inclusion criteria. An extensive list of articles were found by the search string. Country specific articles were reviewed for these inclusion criteria:

- Must include the specific disorder under review
- Must present primary data
- Must be an epidemiologic study (pharmacological treatment samples and case studies excluded)
- Presented data for the period 1980 onward
- When general population data at a national level were available sub-national data was excluded.
- Samples must be representative of the general population

3. Obtaining full-text copies of articles. The references of articles identified from the systematic review were compiled in Endnote. PDFs were sourced from on-line open access journals and through The Park, Centre for Mental Health, Library and the University of Queensland Library.

4. Data extraction. A three level Access database was designed to accommodate the data from the mental disorders systematic search. A random sample of articles was double-checked for accuracy and consistency of data extraction and entry. In-built quality assurance was a feature of the Access database through the use of drop-down boxes and coding protocols.

A Quality Index Score was developed based on a range of variables extracted from each identified source of data so that representativeness of studies can be quantified and used for comparison. The Quality Index Score is available for review at http://www.gbd.unsw.edu.au/gbdweb.nsf/resources/MD_Pt2_Appendicies/$file/GBD2005+Mental+Disorders+Quality+Index.pdf.

In this document we present an initial summary of the prevalence data identified for Depressive disorders.

We present the decision rules relating to:

- inclusion criteria for data sources,
- methodology of data extraction, and
- reporting of study characteristics and epidemiologic parameters.

Also presented here are some preliminary decision rules for:

- manipulating data,
- imputing missing data,
- pooling data within countries,
- pooling data for some parameters (for example remission and mortality), and
- our approach to production of regional prevalence estimates for mental disorders as a whole.

Further work is currently underway to identify peer-reviewed and grey literature sources that may assist with missing age-, sex- and country-specific estimates. The process of applying the rules outlined below has begun, with the first steps presented in this document.

2.0 Principles for inclusion of data sources and reporting of data.

Presented here are general rules for the inclusion of articles and data identified through the peer-review literature and through expert review. We also present the general protocol and rules for reporting of data.

2.1 Inclusion of Data Sources (including Peer-review papers)

Peer-review literature versus grey literature

A preliminary search for epidemiologic data for mental disorders identified a range of sources, including grey literature (government reports, unpublished findings, dissertations), peer-review publications and non-government organisation (NGO) data collection. Due to the wealth of data available (including data from the World Mental Health Survey) and the available time frame, the decision was taken to focus the first stage of the data search on

peer-reviewed literature. Grey literature sources will be reviewed in the second stage of the project, as data sources to address the gaps in the preliminary dataset.

Justification: A large body of data is available through the peer-review literature, of sufficient quality to meet the expert group's criteria, to provide a preliminary dataset for the first round of estimates. It is anticipated that the circulation of these preliminary findings to experts in the field will yield a range of very useful suggestions for other data sources, including grey literature, to address the gaps in the data. In this way it is anticipated that maximum coverage will be achieved.

Representativeness

Where a large body of data is available for a country (e.g. for the US, Western Europe, Great Britain, New Zealand and Australia), only the nationally representative studies will be included.

Justification: Excluding studies that have small samples that are likely NOT representative of the national population will be a more time-efficient process. Studies with unrepresentative samples are unlikely to be used for this GBD Project.

Diagnostic Criteria

A broad rule was adopted for all mental disorders that initial data collection for prevalence, incidence and remission would be limited to data sources reporting rates based on DSM or ICD diagnostic criteria only. Papers that report use of a survey that could not demonstrate validity against either DSM or ICD criteria were excluded. If the validity of a survey is uncertain, the opinion of an expert in the field will be sought.

Justification: Inclusion of estimates based on alternative definitions may skew the final estimates for some countries, as narrower or broader definitions would result in lower or higher estimates.

Definition of Remission

For the Global Burden of Disease project, remission from a mental disorder is defined as no longer fulfilling the diagnostic criteria for this disorder. Partial remission is therefore considered as being no longer a "case". Follow-up period for the sample must be a minimum of two years.

Remission estimates were obtained from observational studies. Studies that reported samples from randomised controlled trials or treatment other than “as usual” will be excluded as not being representative of the average case. Remission among cases of mental disorders *in treatment* (that is, treatment “as usual”) will not be considered separately from out-of-treatment cases as so little data is available from community (non-treated) samples.

If several papers have been published for the same study (i.e same cohort) at different time points, only the paper reporting the longest follow-up period will be included in the dataset.

2.2 Data Extraction and Reporting

Prevalence rate

If prevalence type was unspecified, the diagnostic tool was sought in order to determine whether prevalence was point, past month, 12-month, lifetime or another period. If the diagnostic tool was unable to be accessed or unclear, prevalence was taken as point. An exception to this rule was for samples ascertained through case registries. As these were diagnosed with the disorder AT SOME PERIOD in their lives, but possibly some time ago, prevalence was taken as lifetime. As this was most frequently the case for disorders with zero remission in studies that used birth cohorts (e.g. autism), it is assumed that this will not make a significant difference to the rate.

Cohort

Cohort size was defined in different ways according to the methods used in the studies. Typically, cohort size was defined as the sample size, specifically the number of individuals for whom useable data was collected.
However, if the sample was derived from a case register or from medical records for a geographically defined area:

- the degree of coverage is difficult to ascertain due to inadequate reporting, or
- coverage appears to be poor (e.g. those who seek treatment in countries where a state-funded health system is not cheaply and easily accessible), or

- coverage is reliant on an individual actively seeking treatment for a disorder which is known to have a low level of treated prevalence (e.g. depression)

then the cohort size was recorded as the number of cases identified.

Alternatively, where health checks are legislated for infants and children at regular intervals (e.g. Norway and Japan) and coverage is close to 100% (95% or higher), cohort is taken as the number of children in that age group who fall within the defined area, as we can reasonably expect that data has been obtained for that number of people.

Time period (Epoch)

- ***Epoch not reported***

Where epoch (the year to which the estimate refers) is NOT reported within a paper, a note will be made of the fact and epoch recorded as the year two years prior to publication.

Justification: The GBD Project requires the year of the estimate in order to establish a time trend for calculation of burden. However the research team found that it is relatively common for authors to not report details such as epoch, response rate, etc. Rather than leave a gap in the data where epoch is not reported, an overall decision was taken to estimate the epoch as two years prior to publication, on the basis that it will generally take at least two years to clean data, carry out analysis and publish results.

- ***Longitudinal studies***

Where data collection is carried out over a period of time, the midpoint of the data collection period was taken as epoch start and midpoint of final follow-up period as epoch end. For example, if baseline data collection is 1980–1982 and final follow-up period is 2000–2004, epoch start is recorded as 1981 and epoch end as 2002. Greater detail of different time periods is recorded as text in the comments field of the database.

- ***Studies that give estimates for different time periods***

Where a longitudinal study gives year-specific estimates, the years that those estimates relate to are recorded as epoch start and epoch end. Again, greater detail is recorded as text in the comments field of the database. For example, if a longitudinal study reports 12-month

prevalence for two samples, one ascertained 1980–1981 and the other 1990–1991, epoch is recorded as 1980–1981 for the prevalence rate specific to that particular time period and 1990–1991 for the relevant prevalence estimate.

Age Range

Where an age range is not reported in the paper, 'dummy' variables of 0 (minimum) and 99 (maximum) are inserted. If the sample is reported as 'adult' the age range was recorded as 18-99.

Remission and Mortality - Secondary Data Sources

In all cases, the primary source of data was used for all surveys for data extraction purposes. However, due to time restrictions, when a study reported data from previous years this data was included with a note that it did not come from the primary data source. Similarly, where a good quality systematic review or meta-analysis was identified, the data reported was included and clearly identified as coming from a secondary data source.

3.0 Prevalence by severity level

Two of the mental disorders covered in the GBD Project, major depressive disorder and anxiety disorders, comprise health states that will be categorised into three levels of severity (mild, moderate, severe). Prevalence for these health states will be calculated through applying population proportions derived from severity-specific prevalence estimates obtained through the World Mental Health Survey (WMHS) using the WMHS CIDI Severity Scale {Demyttenaere, 2004; Wells, 2006).

Justification: Issues identified in sourcing prevalence of mental disorders by severity level include the use of non-consistent definitions and differing measurement instruments across studies. The WMHS CIDI Severity Scale was administered across a range of mental disorders and across 23 cohorts in 22 countries as part of the World Mental Health Survey. Hence it is anticipated that proportions of mild, moderate, and severe cases can be derived for 22 developed and developing countries in 13 of the GBD regions. As the WMHS CIDI Severity Scale was applied consistently across these samples it can be used for imputing prevalence estimates by severity level for other countries and regions.

3.1 Health States

Major depressive disorder will comprise three health states – mild, moderate and severe. Proportions of cases will be calculated using the World Mental Health Survey CIDI Severity Scale [3, 4].

Classification as mild, moderate or severe is based on their composite score using the following criteria:

- two or more areas of severe role impairment in the Sheehan Disability Scale (SDS) domains
- overall functional impairment consistent with a GAF [5] score of 50 or less
- co-morbid substance dependence with serious role impairment
- a suicide attempt

4.0 Data sources for Depressive disorders

4.1 Prevalence data

The preliminary prevalence estimates provided in the current report do NOT currently include data available from the WMHS dataset. This preliminary depression dataset contains data specifically for major depressive disorders and dysthymic disorders identified in the literature review.

Estimates from the WMHS dataset are prevalence estimates for overall Depressive disorders (major depression and dysthymia combined). These estimates will be added to the dataset in the next phase of the project after MDD and dysthymia-specific estimates have been derived from the overall estimate.

Justification: Separate MDD and dysthymia estimates sourced from the literature review and the derived MDD and dysthymia estimates from the WMHS dataset will be pooled to produce an overall burden of depression (combining MDD and dysthymia)

Tables 1 and 2 present the available data identified from an extensive search of the peer review literature (see www.gbd.unsw.edu.au for methodology). All data sources can be obtained from the reference list at the end of this report. The last two columns indicate whether ANY sex- and age- specific estimates were reported for that country.

Table 1. Summary of data available for prevalence of depressive disorders (overall) from the WMHS

Region /Country	Depressive Disorders Past month	Depressive Disorders Past year	Depressive Disorders Lifetime	Age Estimate	Sex Estimate
Asia Pacific, High Income					
Brunei	-	-	-		
Japan	[6]	[6]	-	Yes	Yes
Republic of Korea (South Korea)	-	-	-		
Singapore	-	-	-		
Asia, Central					
Armenia	-	-	-		
Azerbaijan	-	-	-		
Georgia	-	-	-		
Kazakhstan	-	-	-		
Kyrgyzstan	-	-	-		
Mongolia	-	-	-		
Tajikistan	-	-	-		
Turkmenistan	-	-	-		
Uzbekistan	-	-	-		
Asia, East					
China	[6]	[6]	-	Yes	Yes
Hong Kong	-	-	-		
Democratic People's Republic of Korea (North Korea)	-	-	-		
Taiwan	-	-	-		
Asia, South					
Afghanistan	-	-	-		
Bangladesh	-	-	-		
Bhutan	-	-	-		
India	[6]	[6]	-	Yes	Yes
Nepal	-	-	-		
Pakistan	-	-	-		
Asia, Southeast					
Cambodia					
Indonesia	-	-	-		
Laos People's Democratic Republic	-	-	-		
Malaysia	-	-	-		
Maldives	-	-	-		
Mauritius	-	-	-		
Mayotte	-	-	-		
Myanmar	-	-	-		
Philippines	-	-	-		
Reunion Island	-	-	-		
Seychelles	-	-	-		
Sri Lanka	-	-	-		
Thailand	-	-	-		
Timore Leste	-	-	-		
Viet Nam	-	-	-		
Australasia					
Australia	-	-	-		
New Zealand	[6]	[6]		Yes	Yes

Region /Country	Depressive Disorders Past month	Depressive Disorders Past year	Depressive Disorders Lifetime	Age Estimate	Sex Estimate
Caribbean					
Anguilla	-	-	-		
Antigua and Barbuda	-	-	-		
Aruba	-	-	-		
Bahamas	-	-	-		
Barbados	-	-	-		
Belize	-	-	-		
Bermuda	-	-	-		
British Virgin Islands	-	-	-		
Cayman Islands	-	-	-		
Cuba	-	-	-		
Dominica	-	-	-		
Dominican Republic	-	-	-		
French Guiana	-	-	-		
Grenada	-	-	-		
Guadaloupe	-	-	-		
Guyana	-	-	-		
Haiti	-	-	-		
Jamaica	-	-	-		
Martinique	-	-	-		
Montserrat	-	-	-		
Netherlands Antilles	-	-	-		
Puerto Rico	-	-	-		
Saint Kitts and Nevis	-	-	-		
St. Lucia	-	-	-		
St. Vincent	-	-	-		
Suriname	-	-	-		
Trinidad and Tobago	-	-	-		
Turks and Caicos Islands	-	-	-		
Europe, Central					
Albania	-	-	-		
Bosnia and Herzegovina	-	-	-		
Bulgaria	[6]	[6]		Yes	Yes
Croatia	-	-	-		
Czech Republic	-	-	-		
Hungary	-	-	-		
Kosovo	-	-	-		
Poland	-	-	-		
Romania	[6]	[6]	-	Yes	Yes
Serbia and Montenegro	-	-	-		
Slovakia	-	-	-		
Slovenia	-	-	-		
The Former Yugoslav Republic of Macedonia	-	-	-		
Yugoslavia	-	-	-		
Europe, Eastern					
Belarus	-	-	-		
Estonia	-	-	-		
Latvia	-	-	-		
Lithuania	-	-	-		
Republic of Moldova	-	-	-		
Russian Federation	-	-	-		

Region /Country	Depressive Disorders Past month	Depressive Disorders Past year	Depressive Disorders Lifetime	Age Estimate	Sex Estimate
Ukraine	[6]	[6]		Yes	Yes
Europe, Western					
Andorra	-	-	-		
Austria	-	-	-		
Belgium	[6]	[6]		Yes	Yes
Channel Islands	-	-	-		
Cyprus	-	-	-		
Denmark	-	-	-		
Faeroe Islands	-	-	-		
Finland	-	-	-		
France	[6]	[6]	-	Yes	Yes
Germany	[6]	[6]	-	Yes	Yes
Gibraltar	-	-	-		
Greece	-	-	-		
Greenland	-	-	-		
Holy See	-	-	-		
Iceland	-	-	-		
Ireland	-	-	-		
Isle of Man	-	-	-		
Israel	[6]	[6]	-	Yes	Yes
Italy	[6]	[6]	-	Yes	Yes
Liechtenstein	-	-	-		
Luxembourg	-	-	-		
Malta	-	-	-		
Monaco	-	-	-		
Netherlands	[6]	[6]	-	Yes	Yes
Norway	-	-	-		
Portugal	-	-	-		
Saint Pierre et Miquelon	-	-	-		
San Marino	-	-	-		
Spain	[6]	[6]		Yes	Yes
Sweden	-	-	-		
Switzerland	-	-	-		
United Kingdom	-	-	-		
Latin America, Andean					
Bolivia	-	-	-		
Ecuador	-	-	-		
Peru	-	-	-		
Latin America, Central					
Colombia	[6]	[6]	-	Yes	Yes
Costa Rica	-	-	-		
El Salvador	-	-	-		
Guatemala	-	-	-		
Honduras	-	-	-		
Mexico	[6]	[6]	-	Yes	Yes
Nicaragua	-	-	-		
Panama	-	-	-		
Venezuela	-	-	-		
Latin America, Southern					
Argentina	-	-	-		
Chile	-	-	-		
Falkland Islands (Malvinas)	-	-	-		
Uruguay	-	-	-		

Region /Country	Depressive Disorders Past month	Depressive Disorders Past year	Depressive Disorders Lifetime	Age Estimate	Sex Estimate
Latin America, Tropical					
Brazil	[6]	[6]	-	Yes	Yes
Paraguay	-	-	-		
North Africa/Middle East					
Algeria	-	-	-		
Bahrain	-	-	-		
Egypt	-	-	-		
Iran (Islamic Republic of)	-	-	-		
Iraq	[6]	[6]	-	Yes	Yes
Jordan	-	-	-		
Kuwait	-	-	-		
Lebanon	[6]	[6]	-	Yes	Yes
Libyan Arab Jamahiriya	-	-	-		
Morocco	-	-	-		
Occupied Palestinian Territory	-	-	-		
Oman	-	-	-		
Qatar	-	-	-		
Saudi Arabia	-	-	-		
Syrian Arab Republic	-	-	-		
Tunisia	-	-	-		
Turkey	-	-	-		
United Arab Emirates	-	-	-		
Western Sahara	-	-	-		
Yemen	-	-	-		
North America, High Income					
Canada	-	-	-		
United States of America	[6]	[6]	-	Yes	Yes
Oceania					
American Samoa	-	-	-		
Cook Islands	-	-	-		
Fiji	-	-	-		
French Polynesia	-	-	-		
Guam	-	-	-		
Kiribati	-	-	-		
Marshall Islands	-	-	-		
Micronesia (Federated States of)	-	-	-		
Nauru	-	-	-		
New Caledonia	-	-	-		
Niue	-	-	-		
Northern Mariana Islands	-	-	-		
Palau	-	-	-		
Papua New Guinea	-	-	-		
Pitcairn	-	-	-		
Samoa	-	-	-		
Solomon Islands	-	-	-		
Tokelau	-	-	-		
Tonga	-	-	-		
Tuvalu	-	-	-		
Vanuatu	-	-	-		
Wallis and Futuna Islands	-	-	-		
Sub-Saharan Africa, Central					
Angola	-	-	-		

Region /Country	Depressive Disorders Past month	Depressive Disorders Past year	Depressive Disorders Lifetime	Age Estimate	Sex Estimate
Central African Republic	-	-	-		
Congo	-	-	-		
Congo (Democratic Republic of)	-	-	-		
Equatorial Guinea	-	-	-		
Gabon	-	-	-		
Sub-Saharan Africa, East					
Burundi	-	-	-		
Comoros	-	-	-		
Djibouti	-	-	-		
Eritrea	-	-	-		
Ethiopia	-	-	-		
Kenya	-	-	-		
Madagascar	-	-	-		
Malawi	-	-	-		
Mozambique	-	-	-		
Rwanda	-	-	-		
Somalia	-	-	-		
Sudan	-	-	-		
Tanzania (United Republic of)	-	-	-		
Uganda	-	-	-		
Zambia	-	-	-		
Sub-Saharan Africa, Southern					
Botswana	-	-	-		
Lesotho	-	-	-		
Namibia	-	-	-		
South Africa	[6]	[6]	-	Yes	Yes
Swaziland					
Zimbabwe					
Sub-Saharan Africa, West					
Benin	-	-	-		
Burkina Faso	-	-	-		
Cameroon	-	-	-		
Cape Verde	-	-	-		
Chad	-	-	-		
Cote d'Ivoire	-	-	-		
Gambia	-	-	-		
Ghana	-	-	-		
Guinea	-	-	-		
Guinea-Bissau	-	-	-		
Liberia	-	-	-		
Mali	-	-	-		
Mauritania	-	-	-		
Niger	-	-	-		
Nigeria	[6]	[6]	-	Yes	Yes
Saint Helena					
Sao Tome and Principe	-	-	-		
Senegal	-	-	-		
Sierra Leone	-	-	-		
Togo	-	-	-		

Table 2. Summary of data available for prevalence of MDD or Dysthymia from literature review

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
Asia Pacific, High Income					
Brunei	-	-	-		
Japan	[7-9]	[7, 8]	[7, 8]	Yes	Yes
Republic of Korea (South Korea)	-	[10]	[11]	Yes	Yes
Singapore					
Asia, Central					
Armenia	-	-	-		
Azerbaijan	-	-	-		
Georgia	-	-	-		
Kazakhstan	-	-	-		
Kyrgyzstan	-	-	-		
Mongolia	-	-	-		
Tajikistan	-	-	-		
Turkmenistan	-	-	-		
Uzbekistan					
Asia, East					
China	-	[12]	[13]	Yes	No
Hong Kong	-	-	-		
Democratic People's Republic of Korea (North Korea)	-	-	-		
Taiwan	-	[14, 15]	[14, 16]	Yes	Yes
Asia, South					
Afghanistan	-	-	-		
Bangladesh	-	-	-		
Bhutan	-	-	-		
India	[17]	-	-	No	No
Nepal	-	-	-		
Pakistan	[18]	-	-	No	No
Asia, Southeast					
Cambodia	[19]	-	-	No	No
Indonesia	-	-	-		
Laos People's Democratic Republic	-	-	-		
Malaysia	-	-	-		
Maldives	-	-	-		
Mauritius	-	-	-		
Mayotte	-	-	-		
Myanmar	-	-	-		
Philippines	-	-	-		
Reunion Island	-	-	-		
Seychelles	-	-	-		
Sri Lanka	-	-	-		
Thailand	[20]	-	-	Yes	Yes
Timore Leste	-	-	-		
Viet Nam	-	-	-		
Australiasia					
Australia	[21-23]	[21, 24]	-	Yes	Yes

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
New Zealand	[25-29]	[3, 25-27, 29]	[3, 30]	Yes	Yes
Caribbean					
Anguilla	-	-	-		
Antigua and Barbuda	-	-	-		
Aruba	-	-	-		
Bahamas	-	-	-		
Barbados	-	-	-		
Belize	-	-	-		
Bermuda	-	-	-		
British Virgin Islands	-	-	-		
Cayman Islands	-	-	-		
Cuba	[31]	[31]	[31]	Yes	Yes
Dominica	-	-	-		
Dominican Republic	-	-	-		
French Guiana	-	-	-		
Grenada	-	-	-		
Guadaloupe	-	-	-		
Guyana	-	-	-		
Haiti	-	-	-		
Jamaica	-	-	-		
Martinique	-	-	-		
Montserrat	-	-	-		
Netherlands Antilles	-	-	-		
Puerto Rico	[32]	[32]	[32]	Yes	Yes
Saint Kitts and Nevis	-	-	-		
St. Lucia	-	-	-		
St. Vincent	-	-	-		
Suriname	-	-	-		
Trinidad and Tobago	-	-	-		
Turks and Caicos Islands	-	-	-		
Europe, Central					
Albania	-	-	-		
Bosnia and Herzegovina	-	-	-		
Bulgaria	-	-	-		
Croatia	[33]	[33]	-	Yes	Yes
Czech Republic	[9]	-		No	No
Hungary	[16]	[16]	[16]	Yes	Yes
Kosovo	-	-	-		
Poland	-	-	-		
Romania	-	-	-		
Serbia and Montenegro	-	-	-		
Slovakia	-	-	-		
Slovenia	-	-	-		
The Former Yugoslav Republic of Macedonia	-	-	-		
Yugoslavia	-	-	-		
Europe, Eastern					
Belarus	-	-	-		
Estonia	[34, 35]			No	Yes

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
Latvia	-	-	-		
Lithuania	-	-	-		
Republic of Moldova	-	-	-		
Russian Federation	-	[36]	-	Yes	Yes
Ukraine	[37]	[37]	[37]	Yes	Yes
Europe, Western					
Andorra	-	-	-		
Austria	-	-	-		
Belgium	-	[38, 39]	-	Yes	Yes
Channel Islands	-	-	-		
Cyprus	-	-	-		
Denmark	[40]	-	-	No	Yes
Faeroe Islands	-	-	-		
Finland	[40-42]	-	-	No	Yes
France	[43-46]	[38, 43, 47, 48]	[45-47]	No	Yes
Germany	[9, 38, 49-51]	[52, 53]	[49, 52]	Yes	Yes
Gibraltar	-	-	-		
Greece	-	-	-		
Greenland	-	-	-		
Holy See	-	-	-		
Iceland	[54, 55]	[54]	[54, 56]	Yes	Yes
Ireland	[42]	[27]	-	Yes	Yes
Isle of Man	-	-	-		
Israel	-	-	-		
Italy	-	[47]	[47]	No	No
Liechtenstein	-	-	-		
Luxembourg	-	-	-		
Malta	-	-	-		
Monaco	-	-	-		
Netherlands	[9, 35, 57]	[38]	-	Yes	Yes
Norway	[40, 42]	[58]	[58]	Yes	Yes
Portugal	[35]	-	-	No	Yes
Saint Pierre et Miquelon	-	-	-		
San Marino	-	-	-		
Spain	[35, 42]	[38]	-	No	Yes
Sweden	[40]	[59]	-	No	Yes
Switzerland	-	[60]	[61]	Yes	Yes
United Kingdom	[35, 42, 62, 63]	[38, 64]	-	Yes	Yes
Latin America, Andean					
Bolivia	-	-	-		
Ecuador	-	-	-		
Peru	-	-	-		
Latin America, Central					
Colombia	-	-	-		
Costa Rica	-	-	-		
El Salvador	-	-	-		
Guatemala	-	-	-		
Honduras	-	-	-		

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
Mexico	[9, 65]	[65, 66]	[65]	No	Yes
Nicaragua	-	-	-		
Panama	-	-	-		
Venezuela	-	-	-		
Latin America, Southern					
Argentina	-	-	-		
Chile	[9, 67]	[68]	-	No	Yes
Falkland Islands (Malvinas)	-	-	-		
Uruguay	-	-	-		
Latin America, Tropical					
Brazil	[69, 70]	[69]	[69]	Yes	Yes
Paraguay	-	-	-		
North Africa/Middle East					
Algeria	-	-	-		
Bahrain	-	-	-		
Egypt	[71]	-	-	No	No
Iran (Islamic Republic of)	[72]	-	-	No	Yes
Iraq	[73]	-	-	Yes	Yes
Jordan	-	-	-		
Kuwait	-	-	-		
Lebanon	-	-	[74]	Yes	No
Libyan Arab Jamahiriya	-	-	-		
Morocco	-	-	-		
Occupied Palestinian Territory	-	-	-		
Oman	-	-	-		
Qatar	-	-	-		
Saudi Arabia	-	-	-		
Syrian Arab Republic	-	-	-		
Tunisia	-	-	-		
Turkey	[9]	-	-	No	No
United Arab Emirates	-	-	-		
Western Sahara	-	-	-		
Yemen	-	-	-		
North America, High Income					
Canada	[9, 75-78]	[76, 79-81]	[80, 82, 83]	Yes	Yes
United States of America	[9, 84-88]	[86, 87, 89-94]	[84, 86-88, 92, 94]	Yes	Yes
Oceania					
American Samoa	-	-	-		
Cook Islands	-	-	-		
Fiji	-	-	-		
French Polynesia	-	-	-		
Guam	-	-	-		
Kiribati	-	-	-		
Marshall Islands	-	-	-		
Micronesia (Federated	-	-	-		

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
States of)					
Nauru	-	-	-		
New Caledonia	-	-	-		
Niue	-	-	-		
Northern Mariana Islands	-	-	-		
Palau	-	-	-		
Papua New Guinea	-	-	-		
Pitcairn	-	-	-		
Samoa	-	-	-		
Solomon Islands	-	-	-		
Tokelau	-	-	-		
Tonga	-	-	-		
Tuvalu	-	-	-		
Vanuatu	-	-	-		
Wallis and Futuna Islands	-	-	-		
Sub-Saharan Africa, Central					
Angola	-	-	-		
Central African Republic	-	-	-		
Congo	-	-	-		
Congo (Democratic Republic of)	-	-	-		
Equatorial Guinea	-	-	-		
Gabon	-	-	-		
Sub-Saharan Africa, East					
Burundi	-	-	-		
Comoros	-	-	-		
Djibouti	-	-	-		
Eritrea	-	-	-		
Ethiopia	[95]	-	[95]	No	Yes
Kenya	[96]	-	-	No	No
Madagascar	-	-	-		
Malawi	-	-	-		
Mozambique	-	-	-		
Rwanda	[97]	-	-	No	Yes
Somalia	-	-	-		
Sudan	[98, 99]	-	-	No	No
Tanzania (United Republic of)	-	-	-		
Uganda	[100]	-	-	No	No
Zambia	-	[101]	-	No	No
Sub-Saharan Africa, Southern					
Botswana	-	-	-		
Lesotho	-	-	-		
Namibia	-	-	-		
South Africa	[102]	-	-	No	No
Swaziland	-	-	-		
Zimbabwe	[103]	[103]	-	No	No
Sub-Saharan Africa, West					

Region /Country	MDD or Dysthymia Past Month	MDD or Dysthymia Past Year	MDD or Dysthymia Lifetime	Age Estimate	Sex Estimate
Benin	-	-	-		
Burkina Faso	-	-	-		
Cameroon	-	-	-		
Cape Verde	-	-	-		
Chad	-	-	-		
Cote d'Ivoire	-	-	-		
Gambia	-	-	-		
Ghana	-	-	-		
Guinea	-	-	-		
Guinea-Bissau	-	-	-		
Liberia	-	-	-		
Mali	-	-	-		
Mauritania	-	-	-		
Niger	-	-	-		
Nigeria	-	[104]	[104]	No	No
Saint Helena					
Sao Tome and Principe	-	-	-		
Senegal	-	-	-		
Sierra Leone	-	-	-		
Togo	-	-	-		

4.2 Remission data

Data pertaining to remission of Depressive disorders were derived from general population cohort studies, and naturalistic longitudinal studies of outpatient samples or samples identified through case registers. Remission was defined as no longer meeting diagnostic criteria for the Depressive disorder. Studies that reported a follow-up of less than one year were excluded, as were those reporting on the same cohort.

Work is continuing on sourcing and extracting data for remission of Depressive disorders. Preliminary estimates and calculations will be available in January 2009.

4.3 Mortality data

Estimates of excess mortality are sought for each disorder. Where a high quality meta-analysis of excess mortality has been carried out, the derived mortality measurement will be used, with clear documentation of the source of data and authors of the study.

The data is currently being collated and revised estimates will be available in January 2009.

5.0 Principles for data manipulation and imputation

5.1 Prevalence estimates - data manipulation and imputation

Missing past month prevalence estimates.

Many studies report the "lifetime" risk of mental disorders but not past month prevalence. A decision was made to apply the observed proportions, derived from studies that reported prevalence of lifetime, 12-month and past month mental disorders, to countries that only reported lifetime or 12-month cases. Where possible, and based upon studies rated as being of sufficiently high quality, region-specific proportions of past year cases among lifetime cases were applied (population-weighted if estimates were available from more than one country).

Prevalence estimates for specific diagnoses for Depressive disorders

Studies have been identified that report an overall estimate for the broad disorder but not the specific diagnoses within the disorder. For some mental disorders the decision was taken to disaggregate a broad disorder into specific subtypes for the GBD purpose of capturing different levels of disability (for example MDD and dysthymic disorder). Many studies report the prevalence for the broad disorder rather than the specific diagnoses or health states required for DALY calculations. A decision was made to apply the observed proportion of prevalence for the specific diagnoses (in this case MDD and dysthymia) from studies that reported prevalence of both broad disorder and specific diagnoses. Where possible, and based upon studies rated as being of sufficiently high quality, region-specific rate ratios will be applied.

Missing age-specific estimates

Many studies only report an estimate for one overall age range, whereas the GBD study requires more age-specific estimates. A decision was made to apply the observed age pattern from countries that reported age-specific prevalence to countries where that data is not available. Where possible, and based upon studies rated as being of sufficiently high quality, region-specific rate ratios will be applied.

Missing sex-specific estimates

Some studies do not report a male/female specific estimate. A decision was made to apply the observed sex ratios from countries that reported male and female estimates to countries

that reported only an overall prevalence estimate. Where possible and based on studies rated as being of sufficiently high quality, region-specific sex ratios will be applied (population-weighted if estimates were available from more than one country).

No direct country-specific estimates of prevalence of any sort

Further attempts will be made to source prevalence data for countries for which no data has yet been found through searching all available sources (grey literature, contacting experts, national and NGO websites). Where no direct estimates of any sort are available, the weighted region-specific estimate, derived from studies in other countries within the region, will be applied (population-weighted if estimates were available from more than one country). In the case of depression and anxiety (which includes PTSD) countries with comparable characteristics (e.g. engaged in conflict, suffering recent natural disasters) within the same region or nearby regions will be used as the basis for a derived estimate.

No direct region-specific estimates of prevalence of any sort

Further attempts will be made to source any prevalence data for that region through all available routes (grey literature, contacting experts, national and NGO websites). Where no direct estimates of any sort are available, the region will be matched to other regions (based on population characteristics identified through sensitivity analysis), and the weighted region-specific estimate will be applied (population-weighted if estimates were available from more than one country).

Data for 1990 or 2005 are not available.

If no direct estimates are available for 1990 or 2005, but data is available for other years, attempts will be made to estimate any trend across time. If only one estimate is available and no direct estimates of trend could be made, data on trends from other countries within the same region will be used.

Multiple data sources are available for the same country and time period.

Where multiple studies have been reported for the same country in the same time period, those of low quality or not considered representative will be excluded after careful consideration, and the estimates from the remaining countries will be pooled and the median value calculated. Statistical advice will be sought on the calculation of confidence intervals around the derived median value.

Implausible estimates

Where estimates reported are thought to be implausible, based on expert opinion, possibly due to cultural differences within the survey instrument, case ascertainment or sample selection, researchers will use indirect sources to compile estimates of what the prevalence might look like if imputations are required. This can then be used as a baseline comparison for the reported estimates.

5.2 First steps of data manipulation and imputation

The first steps of data manipulation, using decision rules agreed upon by the Expert group, have begun. Each study reporting prevalence for overall depressive disorders, was reviewed to determine whether multiple prevalence types were reported. Where a study was identified as reporting a past month **and** past year/lifetime prevalence estimate, all prevalence types from that study were collected. These estimates, which were assumed to have been calculated from the same sample using the same methodology, were used to calculate a ratio relative to the past month prevalence. Table 2 presents the ratios calculated for lifetime to past year to past month prevalence. Where data was collected AND REPORTED as part of a large international collaborative study, these ratios are reported together for the ease of comparison. The mean and median of the observed ratios are presented at the end of each list.

Further investigations will be carried out to determine if region-specific ratios can be calculated. The median of these ratios will be used to impute data from surveys that only report on past year or lifetime prevalence of anxiety disorders. Median rather than mean will be used to minimize the influence of extreme ratios. Sex specific ratios will be used for studies that report prevalence of depressive disorders disaggregated by sex.

Table 3.Ratios of lifetime, past year and past month prevalence of Depressive Disorders.

Depression			
Source	**LP:PYP:PMP**		
	Male	**Female**	**Total**
NEMESIS study (Bijl, 1998)	5.70:2.20:1	5.90:2.20:1	5.70:2.10:1
Major Depressive Disorders in Mexico (Slone, 2006)	2.72:1.30:1	2.79:1.33:1	2.78:1.33:1
Icelandic Cohort Study (Stefansson, 1991 & 1994)	2.71:1.71:1	2.90:1.35:1	2.81:1.44:1
NIMH Epidemiologic Catchment Area Study (ECA) (Weissman, 1988)	-	-	2.75:1.63:1
Depressive and Bipolar Disorders in Hungary (Szadoczky, 1998)	5.11:2.61:1	6.16:2.73:1	5.81:2.73:1
Mood Disorders in Rural Udmurtia, Russia (Pakriev, 1998)	-	-	1.56:1.12:1
German Health Interview and Examination Survey (Jacobi, 2004)	2.64:2.03:1	3.38:2.03:1	3.05:1.91:1
Major depression in Kunming, China (Lu, 2008)	2.39:1.21:1	2.13:1.30:1	2.11:1.17:1
Ukraine WMH survey (Bromet,2005)	3.30:1.87:1	2.95:1.72:1	3.03:1.75:1
Major Depressive Disorder in Edmonton, Canada (Spaner, 1994)	-	-	3.74:2.00:1
Epidemiological Community Study of Urban Japan (Kawakami, 2004 & 2005)	-	-	2.42:2.42:1
ICPE Surveys			
Brazil - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	3.20:1.49:1
Canada - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	4.37:2.26:1
Chile - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	2.73:1.70:1
Czech Republic - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	7.80:2.00:1
Germany - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	8.85:4.00:1
Japan - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	3.33:1.33:1
Mexico - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	3.68:2.05:1
Netherlands - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	5.82:2.16:1
Turkey - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	2.03:1.13:1
United States - International Consortium of Psychiatric Epidemiology (ICPE) Surveys (Andrade, 2003)	-	-	3.67:2.17:1
	LP:PMP		
Major mental disorders in Addis Ababa, Ethiopia (Kebede, 1999)	1.43:1	1.29:1	1.26:1
Major Depression in a National Community Sample (NCS) National Comorbidity Survey (Blazer, 1994)	3.34:1	3.61:1	3.48:1

Depression			
Epidemiological Community Study of Urban Japan (Kawakami, 2004 & 2005)	3.44:1	2.00:1	-
	PYP:PMP		
Epidemiology of Mood Disorders in Florence (Faravelli, 1990) (DSM-III)	2.66:1	2.13:1	2.25:1
Epidemiology of Mood Disorders in Florence (Faravelli, 1990) (DSM-III-R)	-	-	2.21:1
Australian National Mental Health Survey (Andrews, 2001)	-	-	1.97:1
Median	**3.01:1.95:1**	**2.92:1.88:1**	**3.05:1.95:1**
Mean	**3.26:1.95:1**	**3.45:1.85:1**	**3.74:1.93:1**

Table 4.Ratios of lifetime, past year and past month prevalence of Dysthymic Disorders.

Dysthymia			
Source	**LP:PYP:PMP**		
	Male	**Female**	**Total**
NEMESIS study (Bijl, 1998)	3.80:1.40:1	2.60:1.40:1	3.00:1.80:1
Ukraine WMH survey (Bromet,2005)	2.15:1.33:1	2.28:1.47:1	2.22:1.42:1
Epidemiological Community Study of Urban Japan (Kawakami, 2004 & 2005)	-	-	2.33:1.67:1
	LP:PMP		
Epidemiological Community Study of Urban Japan (Kawakami, 2004 & 2005)	1.57:1	3.2:1	
	PYP:PMP		
Epidemiology of Mood Disorders in Florence (Faravelli, 1990) (DSM-III)	9.81:1	2.21:1	3.00:1
Epidemiology of Mood Disorders in Florence (Faravelli, 1990) (DSM-III-R)	-	-	3.25:1
Australian National Mental Health Survey (Andrews, 2001)	-	-	1.22:1
Median	**2.15:1.4:1**	**2.60:1.47:1**	**2.33:1.74:1**

Table 5.Ratios of Depressive Disorders to Dysthymic Disorders.

MDD:Dysthymia	Ratio
Norwegian psychiatric epidemiological study (Kringlen, 2001)	1.78:1
Epidemiology of Mood Disorders in Florence (Faravelli, 1990)	2.80:1
Depressive and Bipolar Disorders in Hungary (Szadoczky, 1998)	3.36:1
NIMH Epidemiologic Catchment Area Study (ECA) (Weissman, 1988)	1.42:1
Major Depressive Disorder in Edmonton, Canada (Spaner, 1994)	5.73:1
Ukraine WMH survey (Bromet,2005)	4.85:1
Edmonton Epidemiological Catchment Area Study (Bland,1988)	0.87:1
Australian National Mental Health Survey (Andrews, 2001)	3.56:1
Dunedin Multidisciplinary Health and Development Study (DMHDS) (Feehan, 1994)	4.16:1
Median	**3.36:1**
Mean	**3.17:1**

Table 6.Depressive disorders Urban/Rural ratios.

Depression Urbanicity (U:R)	Ratio
Canadian Community Health Survey (Nguyen, 2005)	1.23:1
Korean Psychiatric Epidemiology Study (Lee, 1990)	0.95:1
Median	**1.09:1**
Mean	**1.09:1**

5.2 Remission estimates - data manipulation and imputation

Remission rates

Where several remission data sources are available across different follow-up periods, the annualised remission rates (ARR) will be calculated and pooled as per methodology described by Mathers and colleagues [106] and Saha and colleagues[107].

ARR weighted (%)

$$d = \sum[a*\{(-\ln(1 - b))/c\}]/\sum a$$

The pooled annualised remission rate will be used across all countries. While it is acknowledged that remission may differ in countries where treated prevalence differs, insufficient data (country-specific treated prevalence and difference in remission rate by country) are available to estimate country- or region-specific remission rates.

5.3 Mortality estimates - data manipulation and imputation

Mortality rates

The derived estimate for excess mortality will be used across all countries. While it is acknowledged that mortality may differ in countries where treated prevalence differs, insufficient data (country-specific treated prevalence and country-specific excess mortality estimates) are available to estimate country- or region-specific remission rates.

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Appendix A

Flowchart of systematic data search for Mental Disorders