Global Burden of Disease in 2002: data sources, methods and results.

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1. Introduction

In 1993 the World Bank sponsored a study to assess the global burden of disease in collaboration with the World Health Organization (WHO) and the Harvard School of Public Health *(1-3)*. As well as generating comprehensive and consistent set of estimates of mortality and morbidity by age, sex and region for the world for the first time (4-6), the Global Burden of Disease (GBD) study also introduced a new metric – the disability adjusted life year (DALY) – to quantify the burden of disease.

The DALY is a summary measure of population health that combines in a single indicator years of life lost from premature death and years of life lived with disabilities. One DALY can be thought of as one lost year of 'healthy' life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability. In recent years, considerable international effort has been put into the development of summary measures of population health that combine information on mortality and non-fatal health outcomes into a single measure. International policy interest in such indicators is increasing *(7;8)*.

The World Health Organization is now undertaking a new assessment of the GBD for the year 2000 and subsequent years. The three goals articulated for the GBD 1990 *(9)* remain central:

(i) to decouple epidemiological assessment of the magnitude of health problems from advocacy by interest groups of particular health policies or interventions;

(ii) to include in international health policy debates information on non-fatal health outcomes along with information on mortality; and

(iii) to undertake the quantification of health problems in time-based units that can also be used in economic appraisal.

The specific objectives for GBD 2000 are similar to the original objectives:

- to quantify the burden of premature mortality and disability by age, sex, and region for 135 major causes or groups of causes;
- to develop internally consistent estimates of the incidence, prevalence, duration, and case-fatality for over 500 sequelae resulting from the above causes;
- to describe and value the health states associated with these sequelae of diseases and injuries;
- to analyze the contribution to this burden of major physiological, behavioural, and social risk factors by age, sex and region;
- to develop alternative projection scenarios of mortality and non-fatal health outcomes over the next 30 years, disaggregated by cause, age, sex and region.

The GBD 2000 draws on a wide range of data sources to develop internally consistent estimates of incidence, health state prevalence, severity and duration, and mortality for over 130 major causes, for 17 sub-regions of the world (10). WHO program participation in the development and finalization of these estimates ensures that estimates reflect all information and knowledge available to WHO. Version 2 estimates of incidence and point prevalence for selected major causes by sub-region were made available on the WHO website at www.who.int/evidence/bod at the time of the release of the World Health Report 2002 (11).

Version 2 of the GBD 2000 formed the basis for the comparative risk assessments for 25 major risk factors and the analyses of the cost-effectiveness of interventions for these risks

which were the main topic of the World Health Report 2002 (11;12). Full details of the CRA analyses for these risk factors will be available in a book to be published in early 2004 *(13)***.** A summary of the CRA methods is also available on the WHO website as a supplementary file to the World Health Report 2002.

WHO member States are increasingly requesting technical assistance and support to undertake country-level burden of disease measurement. Over 30 countries are in various stages of undertaking these assessments and WHO support to these efforts through the provision of best "prior" estimates of national burden of disease not only ensures better data for planning but also enables further development and testing of tools to facilitate burden of disease assessments. This iterative process builds a partnership between WHO and Member States, laying the groundwork for tackling the bigger challenge of integrating burden of disease data into country-level programming and health system performance assessment. In addition, this partnership contributes towards the ongoing updating of the global and regional burden of disease to estimates for the year 2000 and following years. National Burden of Disease (NBD) prior estimates and software tools for their updating and modification are being made available to NBD project teams and work is underway to develop associated national comparative risk assessment software tools for the assessment of the attributable burden of 25 major risk factors.

The World Health Report 2003 reports burden of disease estimates for 2002 based on Version 3 revisions of the GBD (14). The data sources and methods used for these Version 3 revisions are documented here, together with methods used to prepare country-specific estimates of burden of disease and healthy life expectancy.

2. GBD2000 study categories

2.1 Age groups

The 5 age groups used in the GBD 1990 for each sex have been expanded to 8 age groups as follows:

0-4, 5-14, 15-29, 30-44, 45-59, 60-69, 70-79, 80+ years

2.2 Regions

For geographic disaggregation of the global burden of disease, the six WHO regions of the world have been further divided into 14 subregions, based on levels of child (under five years) and adult (15-59 years) mortality for WHO Member States. The classification of WHO Member States into the mortality strata were carried out using population estimates for 1999 (UN Population Division 1998) and estimates of ${}_5q_0$ and ${}_{45}q_{15}$ based on WHO analyses of mortality rates for 1999 *(15)*.

Five mortality strata were defined in terms of quintiles of the distribution of ${}_5q_0$ and ${}_{45}q_{15}$ (for males) as shown in Table 2. Male ${}_{45}q_{15}$ was regressed on male ${}_5q_0$ and the regression line used to divide countries with high child mortality into high adult mortality (stratum D) and very high adult mortality (stratum E). Stratum E includes the countries in sub-Saharan Africa where HIV/AIDS has had a very substantial impact. When these mortality strata are applied to the six WHO regions, they produce 14 mortality subregions. These are listed in Annex Table 1, together with the WHO Member States in each subregion.

Table 2. Definitions of mortality strata used to define WHO subregions for the GBD2000

Mortality stratum	Child mortality	Definition	Adult mortality
A	Very low child mortality (1st quintile of ${}_5q_0$)	${}_5q_0 < 0.0122$	Low adult mortality
B	Low child mortality (2nd and 3rd quintile of ${}_5q_0$)	$0.0122 < {}_5q_0 < 0.062$	Low adult mortality
C	Low child mortality (2nd and 3rd quintile of ${}_5q_0$)	$0.0122 < {}_5q_0 < 0.062$	High adult mortality
D	High child mortality (4th and 5th quintile of ${}_5q_0$)	$0.062 < {}_5q_0$	High adult mortality
E	High child mortality (4th and 5th quintile of ${}_5q_0$)	$0.062 < {}_5q_0$	Very high adult mortality

For the purposes of burden of disease epidemiological analyses, 2 of these regions have been further subdivided: EURO B into EURO B1 and EURO B2 – the latter including the central Asian states; and WPRO B into WPRO B1 (mainly China), WPRO B2 (South east Asian countries) and WPRO B3 (Pacific Islands). Additionally, some Member States have been reclassified into subregions with similar epidemiological/geographic/ethnic patterns in order to maximise the epidemiological homogeneity of the subregions for the purposes of epidemiological analysis. The resulting 17 epidemiological subregions are listed in Annex Table 2. These subregions are used for analysis in the GBD 2000, but the resulting estimates are mapped back to the 14 subregions defined in Annex Table 1 for all reporting purposes.

Note that the total number of WHO Member States has risen to 192 with the addition in 2003 of the Democratic Republic of Timor Leste, which is classified in the high mortality developing region of SearD. In addition, the 2003 World Health Assembly has endorsed the inclusion of Cyprus in the European Region. Cyprus has thus moved from the Eastern Mediterranean (EmrB) to EurA.

It is important to note that the mortality strata were defined in terms of 1999 mortality estimates published in the World Health Report 2000 and some countries would be placed in different mortality strata now if these criteria were reapplied using latest mortality estimates. Due to improvements in child mortality over recent years, Egypt meets criteria for inclusion in the East Mediterranean subregion EmrB with low child and adult mortality. Although Cambodia, the Lao People's Democratic Republic and Papua New Guinea meet criteria for high child mortality, they have been included in the WprB region with other developing countries of the Western Pacific region for reporting purposes. To ensure comparability with previous World Health Reports and other WHO publications, the classification of countries into the 14 and 17 sub-regions has otherwise remained unchanged in the Version 3 of the GBD 2000.

2.3 Cause categories

Annex Table 3 lists the cause categories used in the GBD 2000 Version 2 and their definitions in terms of ICD-9 and ICD-10 codes *(16;17)*. The tree structure used for classification of disease and injury causes is similar to that used for the GBD 1990 but includes some revisions and additional cause categories. The cause list has four levels of disaggregation and includes 135 specific diseases and injuries. At the first level, overall mortality is divided into thee broad groups of causes: Group I, consisting of communicable diseases, maternal causes, conditions arising in the perinatal period and nutritional deficiencies, Group II encompassing the non-communicable diseases; and Group III, comprising intentional and unintentional injuries.

Deaths and health states are categorically attributed to one underlying cause using the rules and conventions of the International Classification of Diseases. In some cases, the ICD rules are ambiguous; in these cases, the GBD 2000 follows the conventions used in the GBD 1990 (*Table 3.3 in (4)*).

Annex Table 4 lists the sequelae analysed for each cause category and provides relevant case definitions.

In some cases, diseases may act as risk factors for other diseases, and the total burden attributable to a disease may be greater than that assigned under the ICD conventions. It is intended to separately estimate the total attributable burden for the following causes:

Hepatitis	Include attributable burden of liver cancer and renal failure
Diabetes	Include attributable burden of cardiovascular disease and renal failure
Depression	Include attributable burden of suicide
Hearing loss	Total burden of hearing loss sequelae for all causes
Vision disorders	Total burden of vision disorders resulting from all causes
Osteoporosis	Attributable burden of falls/fractures

3. Methods

3.1 Population

The population estimates used for all Member States are the 2002 revision of the estimated de-facto resident populations prepared by the UN Population Division (18)**.** Note that these estimates refer to de facto population (eg. including guest workers and refugees) rather than de jure population (citizens and, in some Member States, permanent residents).

3.2 All cause mortality

Introduction

The first analytical step in the GBD 2000 study is to estimate the age-specific death rates, by sex, for the GBD subregions for the year 2000. The importance of this step cannot be overemphasized. The number of deaths, by age and sex, provides an essential "envelope" which constrains individual disease and injury estimates of deaths. Competing claims for the magnitude of deaths from various causes must be reconciled within this envelope. The sum of deaths from all specific causes for any sex-age group must sum to the total number of deaths for that age-sex group estimated via the data sources and methods described below. From the estimated age-specific mortality rates, life tables for the populations of the subregions can be derived using standard methods.

According to data provided by 112 Member States, WHO estimates that only about one third of the estimated 56 million deaths occurring annually are recorded in vital registration systems. Although, if the sample registration systems of India and China are considered to provide information on their whole populations, then information is available for around 72% of the global population. In recent years, considerable attention has been placed on obtaining data on child and maternal mortality through instruments such as DHS and UNICEF Multiple Indicator Cluster Surveys (MICS) – not through strengthening in-country systems and building links at the country level among health ministries, statistics offices, and ministries of regional and local administration. Table 3 summarizes the coverage of child mortality by vital registration systems and surveys. While the majority of developing countries have produced data on child mortality through those types of surveys or from a census if it contains questions on mortality, evidence on adult mortality in developing countries remains limited, even in areas with successful child and maternal mortality surveys. Table 4 summarizes the coverage of adult mortality through vital registration systems. Complete information on data sources for levels of child and adult mortality for WHO Member States used for the preparation of Version 3 estimates for 2000 and 2002 are given in Annex Table 6.

The proportion of all deaths which are registered in the population covered by the vital registration system (referred to as *completeness*) has been estimated by WHO for each year and is given for the latest available year in Annex Tables 6 and 7. Vital registration data may be 100% complete for the population covered, but not include full coverage of deaths in a Member State.

Table 3 Distribution of countries and the population according to the availability of the most data permitting the estimation of level of child mortality, by WHO Region

Period of most recent data available	*Developed countries[1]*	*Sub-Saharan Africa*	*AMRO Region[2]*	*EMRO Region*	*SEARO Region*	*WPRO Region[2]*	*Total*
	Number of countries						
No information	1	3	0	0	1	0	5
Before 1990	0	1	0	1	1	0	3
1990-1994	1	6	3	5	2	6	23
1995-1999	15	33	19	7	6	11	91
2000-2001	32	2	9	5	1	4	53
2002	8	1	2	3	0	3	17
Total	57	46	33	21	11	24	192
	Percentage of the population covered						
No information	0.0	1.1	0.0	0.0	0.0	0.0	0.1
Before 1990	0.0	0.3	0.0	0.1	1.4	0.0	0.4
1990-1994	5.2	10.1	0.4	45.4	1.2	6.9	8.0
1995-1999	28.6	83.1	55.2	33.1	95.8	89.6	69.7
2000-2001	52.0	3.9	42.0	14.9	1.5	3.5	17.8
2002	14.2	1.6	2.4	6.5	0.0	0.0	4.0
Total	100	100	100	100	100	100	100

Note (1) Developed countries include all countries in WHO European Region, USA, Canada, Japan, Australia, New Zealand

(2) Excluding developed countries

Source: WHO

Table 4 Distribution of countries and the population according to the availability of the most data permitting the estimation of level of adult mortality, by WHO Region

Period of most recent data available	*Developed countries[1]*	*Sub-Saharan Africa*	*AMRO Region[2]*	*EMRO Region*	*SEARO Region*	*WPRO Region[2]*	*Total*
	Number of countries						
No information	2	42	2	12	7	10	75
Before 1990	0	0	2	0	0	0	2
1990-1994	3	2	6	1	2	4	18
1995-1999	28	2	17	3	2	6	58
2000-2001	17	0	5	5	0	3	30
2002	7	0	1	0	0	1	9
Total	57	46	33	21	11	24	192
	Percentage of the population covered						
No information	0.0	91.2	2.9	61.0	25.9	6.8	23.4
Before 1990	0.0	0.0	0.6	0.0	0.0	0.0	0.0
1990-1994	6.3	8.6	2.1	6.0	67.2	6.6	21.8
1995-1999	70.0	0.2	62.2	15.3	7.0	83.4	44.6
2000-2001	9.9	0.0	31.5	17.7	0.0	3.3	7.1
2002	13.8	0.0	0.8	0.0	0.0	0.0	3.1
Total	100	100	100	100	100	100	100

Note (1) Developed countries include all countries in WHO European Region, USA, Canada, Japan, Australia, New Zealand

(2) Excluding developed countries

Source: WHO, 3 Nov 2003

The overall level of coverage for the latest available year is also listed in Annex Tables 6 and 7. Coverage is calculated by dividing the total deaths reported for a calendar year from the vital registration system by the total estimated deaths for that year for the national population (calculated by applying the age-sex specific mortality rates to the UN de-facto population for 2002). Best estimates of death rates by age and sex, adjusted for incompleteness and incomplete coverage), are applied to the national population data to obtain total estimated deaths. WHO estimated coverage for a Member State may be less than 100% due to incompleteness of registration, or to coverage of only some parts of the national population, or greater than or less than 100% due to differences between the vital registration population and the UN estimated de-facto population.

Methodology

For Member States with vital registration data, demographic techniques(Preston-Coale method, Brass Growth-Balance method, Generalized Growth-Balance method and Bennett-Horiuchi method) were first applied, as appropriate, to assess the level of completeness of the recorded mortality data for adults. If the data coverage estimate were high enough to be meaningful, death rates above age 5 were then adjusted accordingly. For Member States without exploitable vital registration data, other sources of adult mortality such as survey and census were used to estimate the level of adult mortality as measured by ${}_{45}q_{15}$ (the probability of dying between exact ages 15 and 60). For under-five mortality, again, all available survey, census and vital registration data were assessed, adjusted and averaged to estimate the probable trend in child mortality (${}_5q_0$) over the past few decades.

Procedures used to estimate the 2000 to 2002 life tables differed for Member States depending on the data availability to assess child and adult mortality. A full overview of methods used to construct life tables is given in (19-22). The Annex Table 6 at the end gives a country specific data source and method used.

Member States with a time series of life tables from vital registration data

Where 2002 vital registration data were available, these were used directly to construct the life table. For other countries where the vital registration systems, including sample vital registration system, were good enough to provide a time series of annual life tables (adjusted if the registration level is incomplete) between 1985 and 2001. For small countries with population size below 500 000, moving averages were used to smooth the time series. Levels of child mortality (${}_5q_0$) and adult mortality (${}_{45}q_{15}$), adjusted for completeness, and excluding HIV/AIDS deaths where necessary, were then used to predict levels of two life table parameters (l_5, l_{60}) for each available year.Life table parameters (l_5, l_{60}) from a time series of annual life tables since 1985 were projected using a weighted regression model giving more weight to recent years (using an exponential weighting scheme such that the weight for each year t was 25% less than the weight for year t+1). For Member States with total population less than 750,000 or where the root mean square error from this regression was greater than or equal to 0.011, a shorter-term trend was estimated by applying a weighting factor with 50% annual exponential decay. Projected values of the two life-table parameters were then applied to a modified logit life table model (22), using the most recent national data as the standard, to predict the full life table in 2002, and HIV/AIDS deaths added to total mortality rates where necessary.

Figure 3 shows the trend in life expectancy at birth and its projection for France in 2000.

For five additional Member States, time series data were not available, only the most recent year, and regional mortality trends were used to project life table parameters forward to 2002.

Fig. 3 Survivors at age 5 (l_5) and at age 60 (l_{60}), trend and projection, France, by sex, 1985-2000

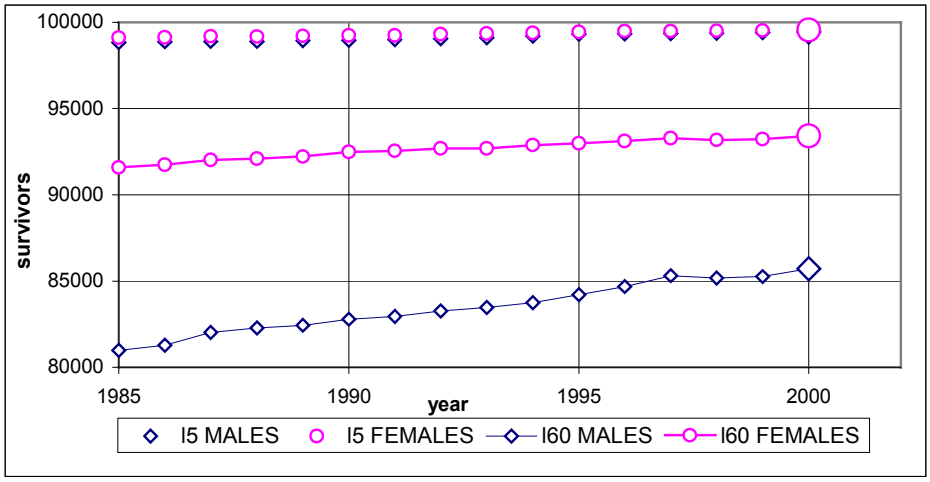
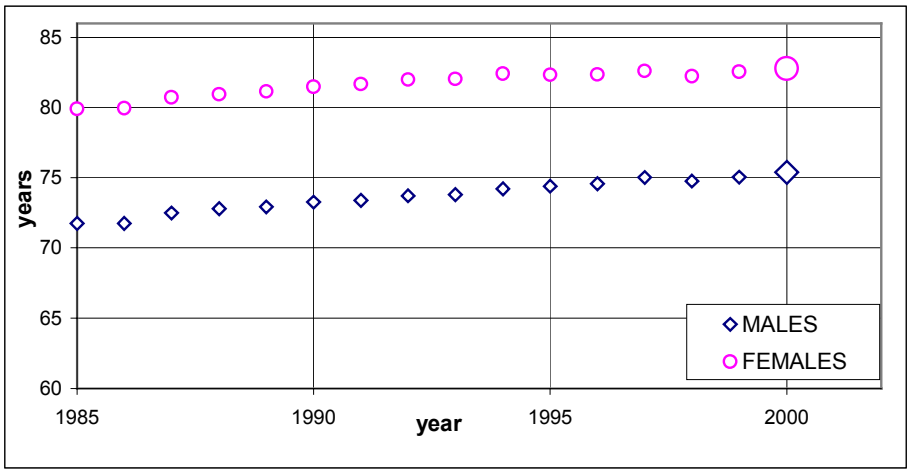


Fig. 4 Life expectancy at births, trend and projection, France, by sex, 1985-2000



Member States where other sources of information on 45q15 are available

Levels of child and adult mortality (excluding HIV/AIDS deaths where necessary) were estimated for 2002 based on the data sources shown in Annex Table 6. These estimated levels of child and adult mortality were then applied to a modified logit life table model, using a global standard, to estimate the full life table in 2002, and HIV/AIDS deaths and war deaths added to total mortality rates where necessary (22).

China

With the availability of data from the 2000 Census, direct estimation of age specific death rates and hence the life table was possible. Data on deaths by age and sex that occurred between November 1999 and November 2000 were recorded for every household in China. Application of the Hill General Growth Balance method (23) suggests that the extent of underreporting of deaths based on the 2000 census was about 11.3% for males and 18.1% for females. These estimates apply to the intercensal period, 1990 to 2000. We have therefore assumed that underreporting in 2000 was slightly less than this, about 15% for females and 10% for males. Recorded age specific death rates above age 5 years from the 2000 census were adjusted with these correction factors, and projected forward to 2002 assuming an annual rate of mortality decline of 1.5%, based on the estimated rates of mortality for the two

intercensal periods, 1982-1990 and 1990-2000. These estimated age specific death rates for 2002 were then converted into estimates of probability of death between ages 15 and 60 ($_{45}q_{15}$) and applied to the WHO modified logit life table system to estimate the full life table, together with projected values of child mortality (20).

India

For India, separate mortality recording systems for rural and urban areas were used to estimate all cause death rates by age and sex for rural and urban areas, and these were added to obtain national all cause deaths rates in order to construct a national life table. The all cause mortality envelope was derived from a time series analysis of age specific death rates from the Sample Registration System (SRS), after correcting them for under registration (88% completeness).

Turkey

The national life table was estimated from separate estimates of the urban and rural life tables. To estimate the urban life table, reported deaths for the period 1991 to 1999 in the 81 provincial and distict urban centres were evaluated for completeness using established demographic methods such as Brass Growth Balance and the Preston Coale technique. These methods suggested that for more recent years, adult deaths were about 80% complete for males and 78% complete for females. These correction factors were used to estimate the level of adult mortality(45q15) in 1999 and the rate was then projected forward to 2000. The resulting estimates(0.190 for males and 0.106 for females) were similar to the levels estimated from the 2002-2003 nationally representative mortality survey carried out by the Ministry of Health and Bashkent University. Together with estimated child mortality values from the 1998 DHS, projected to 2000, a full life table was estimated for urban Turkey, about two-thirds of the national population. Death rates to 2002 were projected assuming an annual rate of mortality decline of 1.25%. For Rural areas, child mortality was estimated from the DHS as for urban areas. Adult mortality was estimated from the WHO modified logit lifetable system(.235 for males, .189 for females), values which were broadly similar to the national mortality survey data, although the relatively small number of rural deaths(about 300) lead to substantial uncertainty about the true levels of adult mortality in rural areas. The urban and rural dearh rates were then weighted by population size to obtain estimated national death rates, and hence the lifetable.

Andorra

Age-specific death rates were estimated for Andorra from 2000 data for neighbouring regions of Spain (Aragon, Navarra and Catalonia).

Monaco

Age-specific death rates for Monaco were estimated from 1998 data for neighbouring regions of France (Languedoc-Roussillon, Rhônes Alpes, Provence Alpes Côte d'Azur).

Other Member States

Based on the predicted level of child mortality in 2002, the most likely corresponding level of adult mortality (excluding HIV/AIDS deaths where necessary) was selected, along with uncertainty ranges, based on regression models of child versus adult mortality as observed in a set of almost 2000 life tables judged to be of good quality (21;22). These estimated levels of child and adult mortality were then applied to a modified logit life table model, using a global standard, to estimate the full life table in 2002, and HIV/AIDS deaths and war deaths added to total mortality rates where necessary.

Deaths due to war in the years 2002 to 2002 can not generally be projected from time series mortality data for a country. Apart from the fact that wars are generally unpredictable and generally limited to a specific time period, vital registration systems often break down in periods of war. For these reasons, war deaths were excluded from time series for affected countries in projecting the life table "without war" for the years 2000 to 2002. Separate estimates of deaths due to war in 2000 were then added to the life table mortality estimates (see below).

Results

Figure 5 plots adult (${}_{45}q_{15}$) versus child (${}_{5}q_{0}$) mortality for males and females by country showing, for example, that some countries with low levels of child mortality have much higher than expected levels of adult male mortality. The bars show the estimated 95% uncertainty intervals for adult and child mortality *(24)*.All cause mortality estimates for Version 3 of the GBD 2000 are available on the WHO website at www.who.int/evidence/bod.

3.2 Cause distribution of deaths

The World Health Organization contacts Member states directly on a routine basis to obtain their latest data on cause-of-death from their vital registration sources. In the absence of complete and accurate vital registration system, countries are requested to submit data from other reliable sources as well. Those data submitted by Member states become part of WHO's unique historical data base on causes of death which contains data as far back as 1950. Computerization of data at country level and electronic transmission to WHO have considerably improved the timeliness of information received.

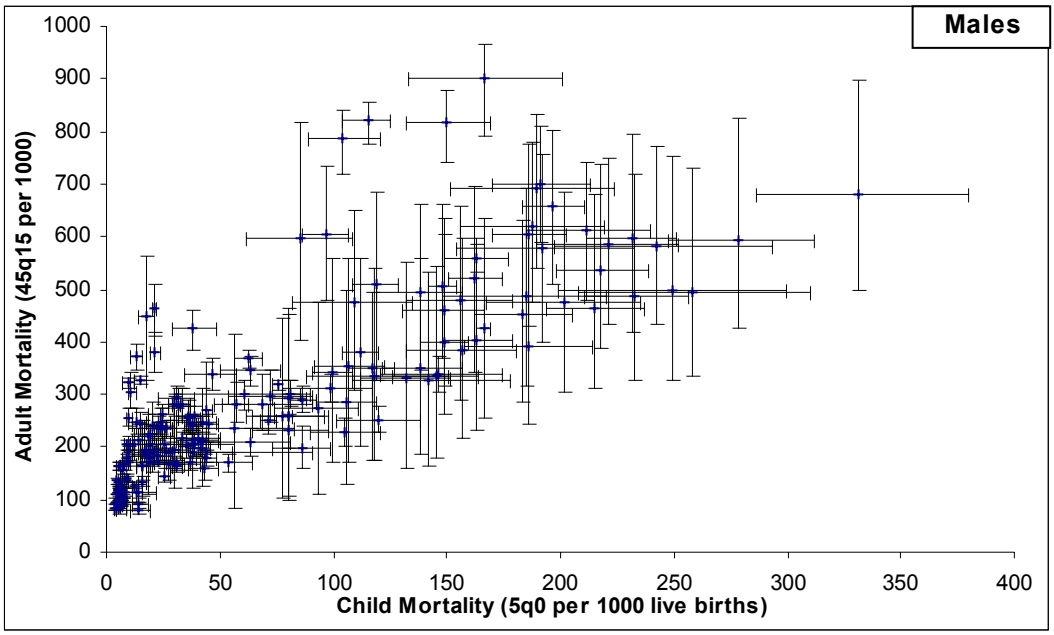
Vital registration data provided to WHO by 112 Member States capture about 18.6 millions deaths representing one third of all deaths occurring in the world. In the last two years, WHO has intensified efforts to support the collection of vital registration information and other mortality data for developing countries. In addition, information from sample registration systems, population laboratories and epidemiological analyses of specific conditions have been used to improve estimates of the cause of death patterns. Figure 6 provides a general overview of the process used to estimate deaths by cause for 191 Member States.

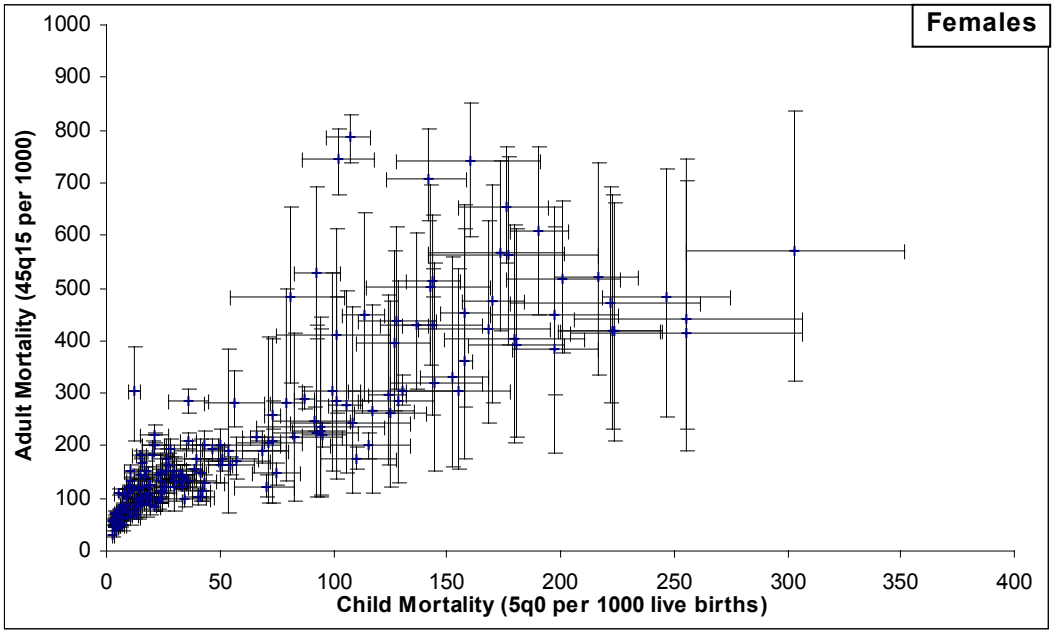
WHO uses data provided by Member States, together with all available other sources of information on causes of death, to estimate death rates by age, sex for underlying causes of death as defined by the ICD classification rules. These death rates are applied to the UN Population Division estimates of de-facto resident population for 2002 to give numbers of expected deaths by cause for each Member State.

Methods used for estimating death rates by cause

Comparability of cause of death data has been made possible worldwide through the development and revisions of the International Statistical Classification of Diseases and Related Health Problems (ICD). The ICD10th revision was adopted in 1990 by the WHA and came into effect as from 1993 *(17)***.** The number of countries submitting their underlying causes of death data to WHO using ICD10th revision has increased from 4 in 1995 to 64 in 2001. There are still around 50 countries reporting data using the 9th revision of ICD and only one country using the 8th revision.

Figure 5. Adult mortality versus child mortality for 191 WHO Member States, 2002

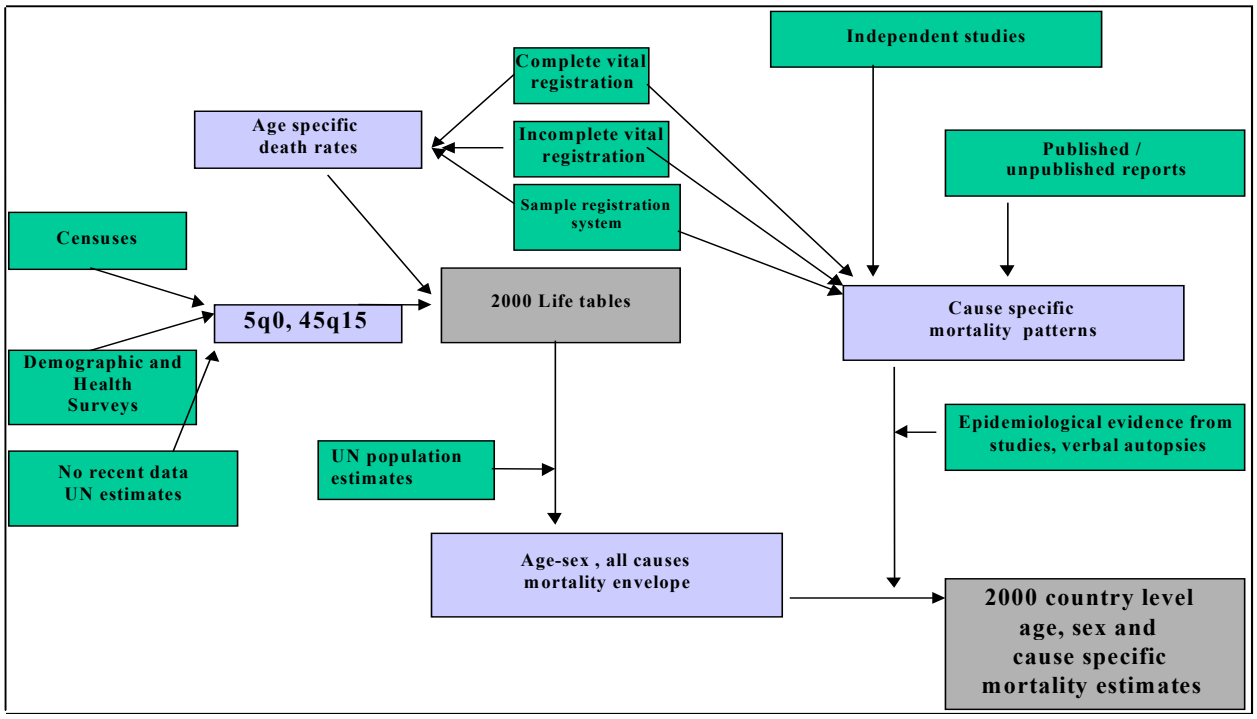




Accuracy in diagnosing causes of death still varies from one country to another. In addition the process of coding underlying causes of death involves some extent of misattribution or miscoding even in countries where causes are assigned by medically qualified staff. Main reasons are incorrect or systematic biases in diagnosis, incorrect or incomplete death certificates, misinterpretation of ICD rules for selection of the underlying cause, and variations in the degree of use of coding categories for unknown and ill-defined causes.

To produce unbiased estimates of cause-specific death rates, and to maximize comparability across Member States, deaths coded to general ill-defined categories (ICD- 9 Chapter XVI, ICD-10 Chapter XVIII) are redistributed pro-rata across all causes excluding injuries. Correction algorithms are also applied to resolve problems of miscoding for cardiovascular diseases (involving mainly redistribution of deaths coded to heart failure or ill-defined heart disease) (25), cancer (involving redistribution of deaths coded to secondary sites or ill-defined primary) (26), and injuries (involving redistribution of deaths coded as undetermined whether intentional or unintentional).

Figure 6: Overview of process in estimating causes of death



Several new features and changes from ICD9 to ICD10 have great impact on the interpretation of the statistical data. The implications of these changes in ICD10 are taken into account when making trend comparisons and estimations for causes of death. ICD10 is more detailed with about 10 000 conditions for classifying causes of death compared to around 5,100 in ICD9. The rules for selecting the underlying cause of death have been re-evaluated and sometimes changed. For example pneumonia is considered under ICD10 as a consequence of a much wider range of conditions and therefore would be less likely to be selected as the underlying cause.

Modification in the death certificate with the inclusion of an additional line in Part 1 of the certificate as recommended by WHO may also have had an impact on the selection of the underlying cause of death *(27)*. In the United States, the extent of the discontinuities from the change in ICD is measured using "comparability ratios," which result from double-coding the national mortality file, once by the old revision (ICD-9), and again by the new revision (ICD-10), and expressing the results of the comparison as a ratio of deaths for a particular cause classified by ICD-10 divided by the number of deaths for that same cause classified by ICD-9 *(28)*.

The cause categories used for the Global Burden of Disease 2000 are defined in Annex Table 3 and follow the principles of ICD that each death is categorically attributed to one underlying cause. With the more detailed level of information provided by most countries using the ICD9 four digit and ICD10 four character codes, the complete tabulation into each GBD category/condition is facilitated without having to estimate mortality due to some causes. In the case of some very few countries still reporting data in condensed ICD9 Basic Tabulation List (BTL), algorithms based on data from countries with more detailed coding were applied to estimate deaths due to asthma as there is no BTL code for asthma. China and some of the newly independent states of the former USSR still use some special condensed ICD9 cause of death classification which were then mapped to the GBD cause list. Missing values for some GBD conditions were estimated with the use of algorithms. Similarly algorithms were also applied for countries reporting data in the condensed ICD10 Mortality tabulation list 1.

Cause of death for countries with complete vital registration data

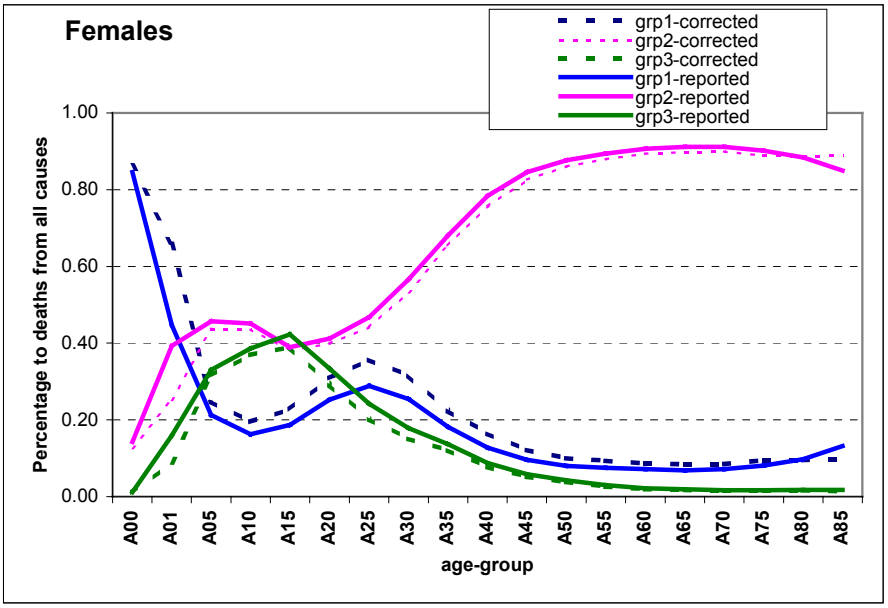
Vital registration data from 1980 up to latest available year were analyzed as a basis for projecting recent trends for specific causes, and these trend estimates were used to project the cause distribution for 2002 from the latest available year of vital registration data. When estimating death rates for very small countries, an average of the three last years of data from the vital registration were used to avoid spurious trends.

Deaths resulting from war operations are not systematically included in the causes of death data from the vital registration system. For example, in the United States deaths resulting from war operations are recorded by the Ministry of Defence for security reasons and are therefore not included in the causes of death data from the vital registration system. Deaths due to AIDS and drug use are undercounted in some vital registration data partly because of miscoding and partly due to reluctance to record these diagnoses. In some cases, adjustments for deaths due to war operations, AIDS and drug use have been made using other sources of information as described below.

Cause of death for countries with incomplete vital registration data

Cause of death data have been carefully analysed to take into account incomplete coverage of vital registration and the likely differences in cause of death patterns that would be expected in the uncovered and often poorer sub-populations. Techniques to undertake this analysis have been developed based on the global burden of disease study and further refined using a much more extensive database and more robust modelling techniques (29;30). These analyses are used to adjust the proportions of deaths occuring in cause groups I (communicable diseases, maternal, perinatal and nutritional deficiency causes), II (non-communicable diseases) and III (injuries). Supplementary information from epidemiological studies and WHO technical Programmes on specific diseases has also been taken into account when making final estimates (see below).

Figure 7 : Corrected levels of Group I, II and III from the causes of death models for a country with data capturing 83% of all deaths.



China

Cause-specific mortality data for China is available from two sources - the sample Vital Registration system (VR) monitored by the Ministry of Health and the Disease Surveillance Point System (DSP), monitored by the Chinese Center for Disease Control. The following table gives a brief summary of the design and operational characteristics of these systems.

Table 5. Characteristics of the Chinese sample vital registration system (VR) and the Disease Surveillance Point System (DSP).

Characteristic	VR	DSP
Population covered	120 million	11 million
Sample sites	137	145
Representative	Not nationally representative	representative
Socio economic strata	3 urban, three rural	1 urban, four rural
Annual number of deaths	700,000	50,000
COD assignment	Med cert / lay reporting	Med certificate\verbal autopsy
Cause specific codes	103 cause groups	152 cause groups
Prop of ill defined	5 %	4 %

The DSP sample sites are classified by the Chinese Ministry of Health into an urban stratum and four socioeconomic strata for rural areas, based on an analysis of nine indicators for rural counties from the 1990 national census. These indicators include birth and mortality rates, dependency ratios, literacy rates, and proportions of agricultural/industrial occupations in the overall workforce. The VR sample sites are classified into one urban and three rural socioeconomic strata. As the DSP sample sites are considered nationally representative, the

fraction of the national population in each socioeconomic strata was assumed to follow the same population distribution as the DSP sites (Table 6)

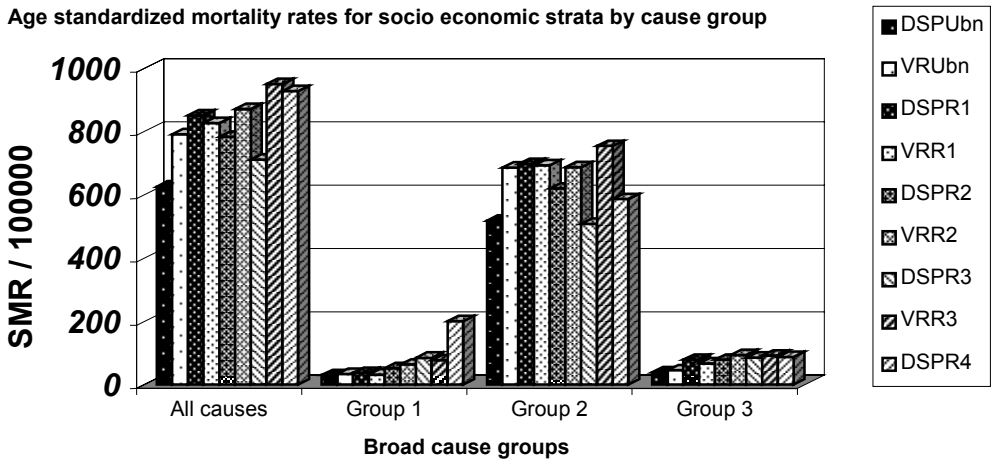
Table 6. Population distribution by socioeconomic stratum, China 2000.

Urban	*Rural 1*	*Rural 2*	*Rural 3*	*Rural 4*
31 %	18 %	27%	20 %	4 %

We analysed the cause of death data at sub national level (the socioeconomic strata described above), and applied these analyses to produce national level estimates of cause specific mortality for the year 2000 to 2002.

Data from the VR for the year 2000, and a three year average for the DSP from 1997 – 1999, were separately appraised for their usability in estimating national level cause specific mortality for China. From the two systems, a comparison of age standardized mortality rates for specific conditions for each socio economic strata was carried out, as shown in Figure 8. In summary, we found that the DSP mortality rates more truly reflected the broad cause group specific mortality distribution, especially in the rural areas. Also, the sampling distribution of sites in the DSP is more nationally representative than the VR. Hence, we chose the broad cause group mortality proportionate distribution for each socioeconomic strata, from the DSP data However, mortality at sub group level and specific cause were better described from the VR data, and showed more plausible age patterns for specific causes, being based on a significantly larger sample of deaths. Hence we used the specific cause proportionate mortality distribution from the VR data.

Figure 8. Group-specific age-standardized mortality rates for each socio economic stratum, for the two mortality data systems (DSP and VR), China 2000



To each stratum specific mortality envelope, we applied the broad cause group proportionate mortality for each age sex group from the DSP, to derive the age sex broad cause group mortality in absolute numbers of deaths. To this broad cause group envelope, we applied the specific cause proportionate mortality from the vital registration data, for that specific stratum. We used the *rural 3* VR proportionate mortality for both the *rural 3* and *rural 4* mortality envelopes. Finally, we summed the mortality from each stratum, to get a national estimate of

cause specific mortality, that had not been corrected for under registration. We then inflated this cause specific mortality to the national all cause mortality envelope from the life table analysis, to get the final national estimate of cause specific mortality for years 2000 through 2002.

These estimates were then adjusted with information from WHO technical programs on maternal, perinatal and childhood cluster conditions, as well as epidemiological estimates for tuberculosis, HIV, illicit drug dependence and problem use, rheumatoid arthritis and war deaths (see below).

India

For India, cause patterns of mortality were based on the Medical Certificate of Cause of Death (MCCD) for urban India and the Annual Survey of Causes of Death (SCD) for rural areas of India. The all causes mortality envelope was split into separate ones for urban and rural populations, using a 70:30 ratio. Data on cause specific mortality from separate sources for rural and urban areas were used with these mortality envelopes to build up independent estimates for urban and rural areas, which were summed to get the national cause specific mortality estimates.

For rural areas, data from the Survey of Causes of Death – rural for the years 1996-1998 were averaged, and mapped onto the GBD classification using an algorithm based on that developed in the Andhra Pradesh Burden of Disease study *(31)*. This includes the redistribution of ill defined deaths to specific causes, based on a verbal autopsy retest survey, conducted as part of the field studies in this project. For urban areas, data from the Medical Certification of Cause of Death System (1996) were used, which provides data on about 400,000 deaths annually, coded to a national list of ICD 9 causes groups that approximates the ICD 9 Basic Tabulation List. These data were mapped onto the GBD classification, and inflated to the urban mortality envelope. The proportion of urban deaths due to injuries was adjusted, based on results from a large scale verbal autopsy study in the city of Chennai, which detected that about 2.5 % of deaths certified as due to ill defined medical causes were actually due to injuries *(32)*.

The summed national level cause-specific mortality estimates were adjusted with information from WHO technical programs on maternal, perinatal and childhood cluster conditions, as well as epidemiological estimates for tuberculosis, HIV, illicit drug dependence and problem use, rheumatoid arthritis and war deaths (see below).

Thailand

Vital registration data were available for the year 2000, which had an estimated coverage of over 80%. However, the proportion of ill defined conditions was nearly 50 %, since many deaths in Thailand occur at home, and the cause of death is reported by lay persons. In order to improve the usability of the VR data, the Thai Ministry of Health had conducted a retest survey on a sample of about 33,000 deaths, using verbal autopsy methods, to verify/ascertain the true cause of death. This included a sample of 12000 deaths with ill defined causes. The study detected that about 66% of deaths with ill defined causes were reallocated to specific causes, including reclassification of many deaths to HIV. We used the reallocation algorithm for ill defined causes from the verbal autopsy study, to correct the high proportion of ill defined deaths from the vital registration data, and then inflated the resultant cause specific proportionate mortality to the national mortality envelope derived from the life table analysis.

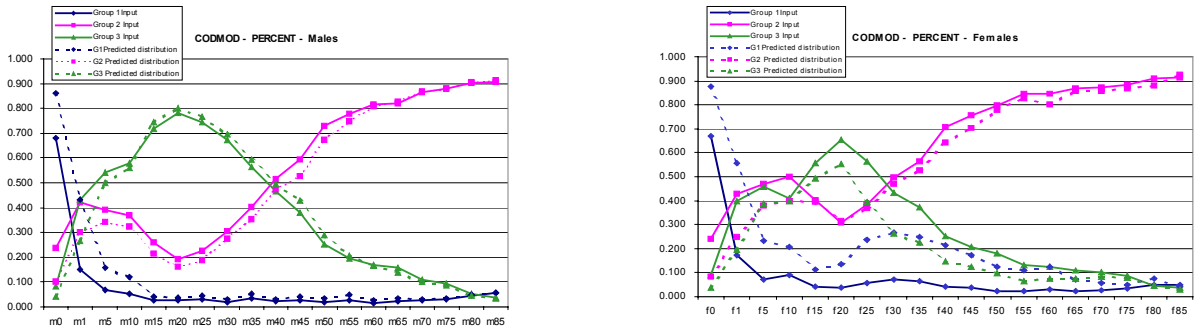
Egypt

Although data from Egypt for the year 2000 was near complete vital registration (> 80%), it contained high proportions of deaths coded to symptoms and ill defined conditions, as well as to conditions such as heart failure, and cardiac arrest, which are essentially not underlying causes of death. Hence, we used a model-based prediction of the broad cause proportionate distribution by age and sex (29;30), and applied the cause specific mortality structure from the country data, after excluding a major proportion of the ill defined deaths, and inflated this to the national mortality envelope.

Iran

Data from the vital registration system in Iran was compiled for 18 of the 23 provinces for the year 2001. This was coded to a condensed list of 150 cause categories, using the ICD 10 classification system. Since the population covered by registration was partial, we used a model based prediction of the broad cause proportionate mortality for the whole country, as shown in Figure 9 (29;30).

Figure 9. Model based prediction of GBD group proportionate mortality for Iran, 2000.



We observed that the model correctly predicted a higher proportion of Group 1 causes for both males and females in childhood age groups, and a higher proportion of group 1 causes or females aged 15-44, which reflects the expectation of higher maternal mortality in the non registered population. To this predicted distribution, we applied the specific cause proportionate mortality from the reported data and inflated the results to the national mortality envelope derived from the life table analysis for 2002.

Turkey

Data on causes of death are only available for urban areas of Turkey. These data were systematically reviewed for cause miscoding and were adjusted based on clinical opinion and evidence on a sample of deaths from urban hospitals in Ismir and Ankara. In particular, the very high proportions of deaths coded to "Other heart disease" were largely reassigned to specific vascular pathologies based on this clinical evidence. For rural areas, causes of death have been estimated using CODMOD, as described by Murray and Salomon (29;30). Adjusted proportions of Group 1, 2 and 3 deaths by age and sex were first estimated, and then the same proportionate distribution of deaths by cause as observed for urban areas was applied, after adjustment, to estimate the detailed pattern of causes of death.

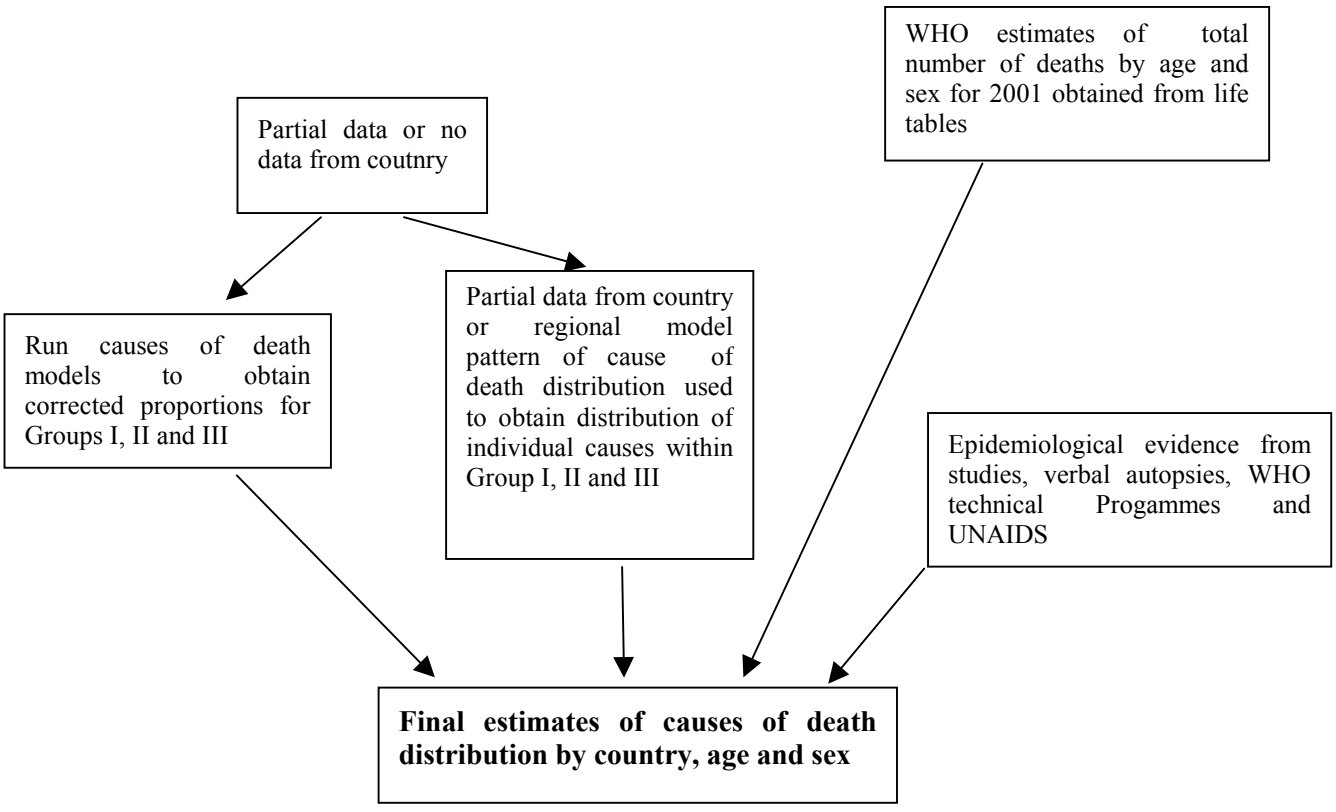
Cause of death for countries without vital registration data

Cause of death models have been used to estimate the maximum likelihood distribution of deaths across cause groups 1 (communicable diseases, maternal and perinatal conditions and

nutritional deficiencies), II (non-communicable diseases) and III (injuries) based on estimated total mortality rates and average per capita income (29;30). Regional model patterns of specific causes of death within each cause group have been constructed from vital registration data from neighbouring countries with similar pattern of mortality levels and income in the region. Specific causes are further adjusted on the basis of epidemiological evidence from registries, verbal autopsy studies, disease surveillance systems, and analyses from WHO technical Programmes (see below).

For the purpose of estimating causes of death, the six WHO regions of the world have been further divided into 14 subregions, as described in Section 2 above. In the case of WHO African region where good vital registration data is existent for only 3 countries, a regional model pattern of specific causes of deaths was based on vital registration data from urban and rural South Africa. In Emro, a similar pattern was built for the Gulf States based on four latest years of data from Bahrain and Kuwait, the only two countries for which we have data from vital registration system. For EmrB and EmrD, regional models were based on weighted death rates using the Iranian and Egyptian vital registration data. The weights used were determined by the income level of the individual countries and overall mortality death rates. In WprB Pacific islands a regional pattern was based on data from data available from reporting islands. All these regional model patterns of specific causes are then reconciled with estimates from various epidemiological studies and evidence.

Figure 10: Methodology used for estimating causes of death distribution for countries with partial or no data.



Below is a summary table of the description of each method as described above used in each 14 subregions.

Table 7. Methods for cause of death estimation for the GBD for 2002, by subregion

Subregion	Method for estimating causes of death distribution					
	Number of Member States	Vital Registration (coverage of 85%+)[x]	Vital registration data (coverage <85%) – use of causes of death models	Sample registration and surveillance	No data- use of causes of death models and regional model pattern of causes of death	Epidemiological estimates for the following diseases used where applicable
AfrD	26	2	-	-	24	a
AfrE	20	-	5	-	15	a
AmrA	3	3	-	-	-	b
AmrB	26	17	8	-	1	a
AmrD	6	-	3	-	3	a
EmrB	13	2	3	-	8	a
EmrD	9	-	2	-	7	a
EurA	26	24	-	-	2	b
EurB	16	7	9	-	-	a
EurC	9	8	1	-	-	c
SearB	3	1	2	-	-	a
SearD	7	-	-	1	6	a
WprA	5	5	-	-	-	b
WprB	22	3	5	1	13	a
Total	**191**	72	38	2	79	

[a] AIDS, tuberculosis, measles, pertussis, poliomyelitis, tetanus, acute lower respiratory infections, chagas ,maternal conditions, perinatal conditions, cancers, drug use disorders, rhumathoid arthritis and war

[b] Drug use disorders and war

[c] AIDS, drug use disorders and war

[d] The threshold of coverage of 85% used for causes of death differs from that used for registration of deaths(95%) since the biases from underreporting of the fact of death are more serious for BOD assessment than for cause of death coverage

Epidemiological estimates for specific causes

As outlined in Table 7 above, specific epidemiological estimates for some causes were also taken into account in analysing cause of death for WHO Member States. The data sources and methods used to estimate deaths for certain specific causes are summarized below.

Tuberculosis

Starting in 1997, the World Health Organization began a study to develop country estimates of incidence, prevalence and mortality from tuberculosis. Data sources and methods used in that study have been described in detail elsewhere *(33)*. In brief, estimates of incidence were derived from case notifications adjusted by estimated case detection rates, prevalence data on active disease combined with estimates of average case durations, or estimates of infection risk multiplied by a scalar factor relating incidence of smear-positive pulmonary tuberculosis to annual risks of infection.

Since the original estimates for 1997 were completed, revised and updated estimates have been prepared. The majority of countries reporting to WHO have provided notification data with interpretable trends, and with no other evidence for any significant change in the case detection rate. We therefore assumed for most countries, except those with evidence of changes in case detection rates, that trends in notifications rates represent trends in incidence rates.

China carried out a country-wide disease prevalence survey during 2000, and the results were used to re-evaluate incidence for 1999. For remaining countries, case notifications could not be used to assess trends in incidence, either because they were too inconsistent, or because independent information suggested that the case detection rate has changed through time. For these countries, the trend for one of eight groups of epidemiologically similar countries *(34)*. Annual reports on tuberculosis control have included further details on surveillance methods, case notifications and incidence estimates by country (35).

Seaths due to all forms of tuberculosis (excluding HIV-infected persons) were estimated for 2000 to 2002. For countries with vital registration data, these estimates are based on the most recently available vital registration data. For other countries, estimates are based on the estimated TB incidence rates (excluding HIV-infected persons) multiplied by the estimated case fatality rates, weighted for the proportion of cases treated and the proportion smear-positive.

HIV/AIDS

Country-specific estimates of HIV and AIDS mortality have been developed by UNAIDS and WHO and revised periodically to account for new data and improved methods *(36;37)*. For the most recent round of estimates, two different types of models have been used depending on the nature of the epidemic in a particular country. For generalized epidemics, in which infection is spread primarily through heterosexual contact, a simple epidemiologic model was used to estimate epidemic curves based on sentinel surveillance data on HIV sero-prevalence *(38)*. For countries with epidemics concentrated in high-risk groups, prevalence estimates were derived from the estimated population size and prevalence surveillance data in each high-risk category, and simple models then used to back-calculate incidence and mortality based on these estimated prevalence trends *(39)*.

For countries with vital registration data, HIV/AIDS mortality estimates are generally based on the most recently available vital registration data except where there is evidence of miscoding of HIV/AIDS deaths. For other countries, estimates are based on UNAIDS and WHO estimated HIV/AIDS mortality for 2002, or in some cases where that was not available, on estimated prevalence of HIV and AIDS in 2002 multiplied by the average sub-regional mortality to prevalence ratio.

Diarrhoeal diseases

Depending on the availability and quality of data on detailed causes of deaths under five, the approaches to estimating the proportional mortality from diarrhoeal diseases were different (i.e., direct estimation from vital statistics, and indirect estimation from epidemiological studies and models). For countries without vital statistics, both nationally reported data and specific criteria for a regression model were used to estimate mortality from diarrhoea. The regression model included the logit of the proportional mortality from diarrhoeal diseases in children 0-4 years as an dependent variable and GDP per capita in international dollars, time trends, and region indicator variables as explanatory variables. More than 60 community based studies since 1980 were used to estimate the proportional mortality from diarrhoeal diseases in children 0-4 years in developing countries (40). This model was validated and supplemented with vital statistics from developing countries where coverage is high.

Vaccine-preventable childhood diseases

The method to estimate *measles* was based on two approaches: in countries where routine vaccine coverage is low (<80%), incidence data were derived from a natural history model using country specific vaccine coverage and attack rates from population-based studies (41;42). For countries with higher routine coverage and in the elimination phase, case notifications and country-specific correction factors were used to estimate incidence. Subsequently, age- and region-specific case fatality rates from community-based and outbreak studies were applied to incidence derived from both approaches to obtain mortality in countries where vital registration is not available.

Pertussis cases and deaths were based on a natural history model using vaccine coverage and age-specific case fatality rates from community based studies, where available(43). The model is a revision of the approach previously proposed by Galezka (44).

The incidence estimates for polio and diphtheria (45;46) were based on reported cases with adjustments for under-reporting (country-specific AFP rate for polio, and notification efficiency of 20% for diphtheria cases). A case-fatality rate of 10% was assumed for diphtheria in countries without high vital events coverage.

Acute lower respiratory infections

Community based studies were used to estimate the proportional mortality from acute lower respiratory infections in children 0-4 years in developing countries *(47)*. This model was validated and supplemented with vital statistics from developing countries where coverage is high.

Malaria

Malaria mortality estimates for all regions except AFRO were derived from the cause of death data sources described above. For Africa, country-specific estimates of malaria mortality were based on analyses by Snow et al. *(48)* and updated using the most recent geographical distributions of risks in MARA mapping. Subsequently adjustments were made to ensure that total mortality for Group 1 causes, particularly in the 0-4 year age group, and including estimates for other specific causes such as TB, HIV/AIDS and measles, added to the total all cause mortality envelopes for the countries. Work is currently under way in collaboration with other WHO programs and external expert groups to refine and revise these country-specific estimates of malaria mortality.

Chagas disease

Chagas' disease estimates were obtained from recent intensive surveillance activities in the Southern Cone American countries and community-based studies *(49)*. These estimates were supplemented with and validated against vital statistics from Latin American countries where coverage is high.

Maternal mortality

Mortality from maternal conditions was estimated as previously described (50;51), but the latest estimate has employed the most recently available mortality data in developing countries, together with improved estimates of the impact of HIV/AIDS as a competing cause of mortality (52). Depending on the availability and quality of data on detailed causes of maternal death, the methods to estimate the proportion of deaths of women in a reproductive age that are due to maternal causes (PMDF) were different (i.e., vital records, various surveys including DHS and RAMOS, and epidemiological models). For countries without death registration data, the present approach uses both nationally reported data and specific criteria for a regression model to estimate maternal mortality. The dependent variable in this model was the logit of the PMDF after subtracting HIV deaths and the explanatory variables were the

proportion of deliveries with skilled birth attendance, GDP per capita in international dollars, general fertility rate, and region dummy variables. The total number of deaths from maternal causes for each country was estimated by multiplying PMDF by the overall mortality envelope for women aged 15 to 49 after subtracting HIV deaths. Collaborative work is currently underway to revise and improve the estimates of maternal deaths for each cause within this category.

Perinatal causes

The cause category *Perinatal causes* refers to the ICD cause group "Conditions arising in the perinatal period" (chapter 16, P-codes). Deaths from these causes (primarily low birthweight and prematurity and birth trauma/ asphyxia) may occur at any age, can include some maternal/placental causes (e.g. multiple pregnancy) and should not be confused with deaths occurring during the perinatal period (which includes stillbirths and neonatal deaths from any cause, including tetanus and congenital malformations). However, acknowledging that nearly all perinatal causes deaths occur in the neonatal period, we first estimated the envelope of neonatal mortality for each country in the world. The method used is described in detail in Volume 3 of the Global Burden of Disease 1990 (53). The analysis is currently updated using recent vital statistics and Demographic and Health Survey data. Work is currently underway in collaboration with other WHO programs and external expert groups to refine and revise these country-specific estimates of mortality due to perinatal causes.

Cancer

For Member States without good vital registration data to estimate the site-specific distribution of cancer mortality, we developed a site-specific model for relative interval survival adjusted for each region and applied it to the regional incidence estimated to calculate the mortality distribution by site for the year 2000 (54;55;55)**.** Our age-period-cohort model of cancer survival is based on data from the Surveillance, Epidemiology, and End Results (SEER)(56).

The model was further adjusted for the level of economic development (GDP per capita in international dollars) and survival probabilities in each region (56-58;58;59;59;60;60-62;62-64). Combined with the available incidence data from the Globocan 2000 of the International Agency for Research on Cancer (IARC) (65), cancer death distributions were estimated and the model estimates were validated against available vital registration data from countries other than the USA.

Drug dependence

Estimating mortality directly attributable to illicit drug use such as overdose death - the most tangible adverse heath effect of illicit drug use - is difficult because of variations in the quality and quantity of mortality data. For some regions where there is known to be a substantial prevalence of illicit drug dependence, no deaths are recorded in available data sources as due to drug dependence. As a result, it is necessary to make indirect estimates, involving estimates of the prevalence of illicit drug use and case fatality rates. However, it is difficult to make even indirect estimates because the use of these drugs is illegal, stigmatised and hidden.

As part of the Comparative Risk Assessment work carried out for the World Health Report 2002, estimates of the prevalence of illicit drug dependence and direct mortality were made based on available data (12;66). Data on the prevalence of problematic illicit drug use were derived from a range of sources. A formal literature search was conducted in which all studies estimating the prevalence of problematic drug use were examined. Other data sources included the United Nations Drug Control Program and European Monitoring Centre for Drugs and Drug Addiction (67).

A search was also completed for cohort studies of drug users that had estimated mortality due to the individual causes of death (overdose, suicide, and trauma), and to all causes of death (updating previous systematic reviews). Data on the number of years of follow up were extracted from each study and a weighted average annual mortality rate was calculated for each cause of death, and for their sum.

The total regional deaths due directly to drug use disorders were then distributed among countries in each region in proportion to the estimated prevalences of drug dependence and problem use. For developed countries with good vital registration data, there is evidence that drug dependence deaths are under-recorded (67;68). For these countries, drug dependence deaths were adjusted for age groups in which the estimated deaths derived from the CRA analysis exceeded the recorded deaths. These additional deaths were assumed to have been originally miscoded either as accidental poisoning or ill-defined causes.

War deaths

Country-specific estimates of war deaths and corresponding uncertainty ranges were obtained from a variety of published and unpublished war mortality databases. Primarily, the Project Ploughshares Armed Conflict Report 2001 and 2002 (69), a report which in turn supplies several databases with mortality estimates (such as the CRED EM-DAT file (70), was used for time trend and mortality level estimates. This report was preferable as a source of information as it includes war deaths by country and year, a departure from the typical practice of supplying estimates by conflict, across years. These were vetted against the historical and current estimates of other research groups, such as that of the Uppsala Conflict Data Project (71) and the Center for International Development and Conflict Management at the University of Maryland (72). These datasets rely on press reports of eyewitness accounts and official announcements of combatants, which are, unfortunately, the main and often only possible method of casualty estimation in armed conflicts (73).

Deaths due to landmines and unexploded ordinance has been estimated separately by country. The primary sources for these data were the Landmine Monitor of the International Campaign to Ban Landmines (74) and Handicap International's annual report on landmine victims (75).

Uncertainty estimates

We have also estimated 95% uncertainty ranges for expected deaths due to each cause. These uncertainty ranges take into account uncertainty in the expected number of total deaths for 2002 (life table uncertainty), uncertainty in the estimated proportions of broad cause groups I, II and III (where relevant for countries without vital registration data or with incomplete coverage), uncertainty in the diagnosis of underlying cause, uncertainty arising from the miscoding of underlying cause, and fundamental Poisson uncertainty in the estimated death rate arising from the observation of a finite number of deaths in a fixed time interval. It must be emphasised that these ranges provide guidance on uncertainty in the underlying cause-specific death rates, as expressed in terms of expected deaths in the population in 2002. Uncertainty in population estimates is not included and the uncertainty ranges relate to underlying death rates not to the realized numbers of deaths actually occurring in 2002.

A total of 1000 life tables were developed for each WHO Member State in order to quantify the uncertainty distribution of key life table parameters arising from uncertainty in the projection to 2002 or uncertainty in the measurement of mortality risks (76). In countries with a substantial HIV epidemic, estimates of the level and uncertainty range of the magnitude of the HIV epidemic were incorporated into the life table uncertainty analysis. In countries with substantial numbers of war deaths, estimates of their uncertainty range were also incorporated into the life table uncertainty analysis. The age-specific mortality rates from the 1000 life

tables were then used to estimate the uncertainty distribution of the expected number of total deaths for 2002.

Uncertainty in the underlying cause attribution was estimated in terms of the relative uncertainty of the proportion of deaths due to each specific cause. For cause distributions derived from vital registration data coded using ICD-10, it was generally assumed that diagnostic uncertainty and coding uncertainty together resulted in approximate relative 95% uncertainty ranges of ±3% for Group I causes (communicable diseases, maternal and perinatal conditions and nutritional deficiencies), ±7% for Group II causes (non-communicable diseases), and ±2% for Group III causes (injuries). Larger uncertainty ranges were assumed for specific causes known to have greater levels of diagnostic or coding error, Member States which have been using ICD-10 coding for less than 3 years, Member States still using ICD-9 coding (with particular attention to causes where coding rates are known to differ between ICD-9 and ICD-10), and Member States using other cause coding systems or verbal autopsy methods, or where cause of death models were used to estimate death distributions across Groups I, II and III.

Uncertainty estimates also took into account the redistribution of general, cancer, cardiovascular, and injury ill-defined cause codes and incomplete coverage of vital registration data. Uncertainty bounds are reported in Attachment 2 for each cause in terms of the estimated 2.5th percentile and the 97.5th percentile of expected deaths in 2002.

3.3 YLD estimation

Estimating the years lived with a disability (YLD) is the most difficult component of burden of disease analysis. Various methods have been developed to reconcile often fragmented and partial estimates available from different studies. A specific software tool, DisMod, has been developed to assist in the development of internally consistent estimates *(77)*.

YLD are the disability component of DALYs. The basic formula for calculating YLD is:

$$YLD = I \times DW \times L$$

where I is the number of incident cases in the reference period, DW is the disability weight (in the range 0-1) and L is the average duration of disability (measured in years).

The full formula with discounting and non-uniform age weights is given elsewhere *(9;77)*. Consistent and meaningful YLD estimates depend on a clear definition of the condition under consideration in terms of case or episode, and severity level or disease stage. It is then necessary to ensure that the disability weight and the population incidence or prevalence data relate to the same case definition. The data required to estimate YLD are: disability incidence, disability duration, age of onset, and distribution by severity class, all of which must be disaggregated by age and sex. These in turn require estimates of incidence, remission, case-fatality rates or relative risks, by age and sex.

The key to estimation of YLD is to develop comprehensive and consistent estimates for incidence and point prevalence. WHO program participation in the development and finalisation of these estimates ensures that final estimates reflect all information and knowledge available to WHO. Version 3 incidence and prevalence estimates by subregion for selected causes are available on the WHO website at www.who.int/evidence/bod.

A wide range of data sources are used for the analysis of incidence, prevalence and YLD. These include:

(1) Disease registers

Disease registers record new cases of disease based on reports by physicians and/or laboratories. Registers are common in infectious diseases (e.g. tuberculosis), cancer, congenital anomalies, a number of relatively rare diseases (e.g. cystic fibrosis or thallassaemia), and sometimes conditions such as diabetes, schizophrenia and epilepsy. For many Group I conditions, WHO programs maintain up-to-date databases based on diseases registers, population surveys and epidemiological studies. These have been used where available.

(2) Population surveys

Interview surveys such as the National Health Interview Survey in the USA can provide self-reported information on disabilities, impairments and diseases. However, self-report data is generally not comparable across countries *(78;79)*; it is also often difficult to attribute impairment to the underlying causes, and, there are often considerable differences between the disease concept the 'general public' has and the 'medically' defined disease category for which information is intended to be collected.

In general, the results of measurement surveys contribute more to YLD calculations than self-reported interview surveys. This may even be the case if the measurement survey was conducted in only part of the country or in a specific subpopulation. The CIDI and DIS questionnaires used in mental health surveys are examples of standard questionnaires based on self-report that have undergone validity testing and have been used widely.

(3) Epidemiological studies

Some of the most useful sources of information for the GBD 2000 are population-based epidemiological studies. Particularly, longitudinal studies of the 'natural' history of a disease can provide a wealth of information on the incidence, average duration, levels of severity, remission and case fatality. Such studies are rare because they are very costly to undertake. As they are often conducted in a particular region or town, judgment is needed to extrapolate results to the whole population.

(4) Health facility data

In the majority of cases, routine data on consultations by diagnosis is not be very helpful in estimating burden. Facility based data — unless the coverage of the health system is near complete — will always be based on biased samples of the disability present in the community. Likewise, hospital deaths are unlikely to be useful due to the same problems of selection bias. Examples of conditions that can be estimated from hospital data if there is good coverage and data are available include: perinatal and maternal conditions, meningitis, stroke, myocardial infarction, surgical conditions and the more serious injuries.

The epidemiological reviews underlying the GBD 2000 estimates of YLD are being progressively documented and published on the WHO website (www.who.int/evidence/bod) and in peer reviewed publication. Summary notes on prevalence estimates for specific conditions are provided below together with references to more detailed documentation.

Communicable diseases, maternal, perinatal and nutritional conditions

Tuberculosis

Estimates of incidence and deaths due to tuberculosis (excluding HIV-infected persons) for Member States in 2002 form the basis of estimates of TB prevalence in 2002. The methods and data used to estimate incidence and mortality for each Member State are described in Section 5.2 above and in (80). For Member States with vital registration data for TB deaths,

incidence estimates have been revised to be consistent with estimated deaths, estimated case fatality rates for treated and untreated cases, and proportion of incident cases treated.

Estimated prevalence of all forms of tuberculosis (excluding HIV-infected persons) for 2002 were calculated by multiplying estimated incidence by estimated duration. Country-specific estimates of duration were weighted for the proportion of cases treated and the proportion smear-positive.

HIV/AIDS

Estimates of HIV and AIDS prevalence have been developed by UNAIDS and WHO for most Member States and revised periodically to account for new data and improved methods (81-83). For the most recent round of estimates, two different types of models have been used depending on the nature of the epidemic in a particular country. For generalized epidemics, in which infection is spread primarily through heterosexual contact, a simple epidemiologic model was used to estimate epidemic curves based on sentinel surveillance data on HIV sero-prevalence *(38)*. For countries with epidemics concentrated in high-risk groups, prevalence estimates were derived from the estimated population size and prevalence surveillance data in each high-risk category *(39)*.

For a few countries where prevalence estimates for HIV sero-positive cases (including AIDS) are not directly available, they have been derived by scaling regional prevalence estimates by the ratio of country-specific HIV mortality to regional HIV mortality. Because different countries may be at different phases of the epidemic, the relationship between prevalence and mortality may vary across countries.

Diarrhoeal diseases

Community based studies and population surveys were used to estimate the incidence of diarrhoeal diseases in children 0-4 years in developing and developed countries (5;84). Point prevalences were estimated assuming an average duration of 6 days per episode. Work is currently in progress to update these estimates with more recent evidence from community-based studies.

Malaria

Malaria prevalence is based on regional prevalence rates for acute symptomatic episodes estimated by Murray and Lopez (5). Country-specific estimates of malaria prevalence were derived by adjusting sub-regional prevalence by the ratio of country to sub-regional malaria mortality. Work is currently under way in collaboration with other WHO programs and external expert groups to refine and revise these country-specific estimates of malaria prevalence.

Schistosomiasis

The CEGET/WHO *Atlas of the Global Distribution of Schistosomiasis* (85) and population based prevalence studies were used to estimate country-specific prevalence rates. Prevalence estimates are based on regional prevalence rates for schistosomiasis infection applied to country-specific population estimates for 2002 (5). Work is currently underway to review and update this information.

Lymphatic filariasis

Estimates were developed for 6 out of the 8 regions defined for the Global Burden of Disease Study (5). The Established Market Economies and Formerly Socialist Economies of Europe are excluded as infection was not considered endemic in these regions. The prevalence data were obtained from community-based surveys and complemented with reports held by the Information and Reference Service of the Parasitic Diseases Programme, WHO. Prevalence

estimates are based on regional prevalence rates for cases of hydrocele or lymphodoaema caused by infection with filariae, applied to country-specific population estimates for 2002.

Onchocerciasis

In the early 1990s, WHO estimated the prevalence of blindness due to onchocerciasis from surveys and national reports (86). After the continuos success of Onchocerciasis Control Programme (OCP) in western African countries and the introduction of population wide administration of ivermectin in other endemic areas, prevalence of onchocerciasis and its disabling sequelae have been dramatically reduced in all 36 endemic countries in AFRO and AMRO regions (87)). Therefore, the prevalence of blindness from onchocerciasis was re-estimated by taking into account the declining trends of prevalence along with the coverage and duration of onchocerciasis control programmes (88). Several population-based studies which are usually a part of overall blindness survey are the reliable sources of information on prevalence of blindness due to onchocerciasis. However, many prevalence studies are often carried out in hyper-endemic and/or restricted areas and thus the estimated prevalence may not be generalizable to the whole country. For this reason, the current prevalence of blindness due to onchocerciasis was estimated by nationally reported data, if available, and the extrapolation of 1993 estimates by the trend analysis of control programmes of onchocerciasis in each endemic country (89).

Trachoma

Baseline regional and sub-regional prevalence of blinding trachoma was first estimated as previously described (90;91) and several latest population-based studies in AFRO and EMOR regions were included in the present analysis. Since the prevalence of blinding trachoma declines along with the improvement of health and socio-economic status even without a specific trachoma control programme (92), the application of the regional prevalence estimates made in the 1980s would overestimate the current prevalence. For this reason, both nationally reported data and specific criteria for a regression model of time-series data were used to estimate prevalence of blinding trachoma. The model estimates were applied to countries where blinding trachoma cases have been reported.(93) Country-specific prevalence estimates

Lower respiratory infections

Prevalence estimates are based on regional prevalence rates for episodes of lower respiratory infection estimated by Murray and Lopez (5). Most studies used were longitudinal and conducted over long enough periods to account for seasonal variation; studies over short periods of time were excluded. Country-specific prevalence estimates were derived by adjusting sub-regional prevalence by the ratio of country to sub-regional lower respiratory infection mortality. (47). Work is currently under way in collaboration with other WHO programs and external expert groups to refine and revise these country-specific estimates.

Protein-energy malnutrition

Epidemiological data from the WHO Global Database on Child Growth and Malnutrition (http://www.who.int/nutgrowthdb/) were used to estimate prevalence of malnutrition for each country in the world. This database contains recent nationally representative studies. Where country estimates were not available from the database, the regional average calculated from the available studies was used or data from other countries with similar epidemiological characteristics (94).

Iodine deficiency

Country-specific estimates were obtained and used to calculate regional estimates for total goitre rates (TGR). The primary data source was the WHO Nutrition and Health for Development Program, which is in the process of developing and refining a comprehensive

database of country-specific estimates of both clinical and sub-clinical Iodine Deficiency Disorders from national level and subnational nutrition surveys (95).

Iron-deficiency anaemia (IDA)

Country-specific prevalence estimates were obtained and used to calculate regional age and sex-specific prevalence rate estimates for mild, moderate and severe anaemia. The primary data source was the WHO Nutrition and Health for Development Program. The program is preparing a comprehensive database of country-specific prevalence estimates of both clinical and sub-clinical IDA from national level and sub-national nutrition surveys.

All prevalence estimates were reviewed with priority being given to the most recent national level estimates (majority are obtained from studies conducted in last 10 years). For countries where no studies were available, we applied the regional average that was calculated from available data within each group (96).

Non-communicable diseases

Malignant neoplasms

Survival models were developed for each cancer site for each of the 17 GBD 2000 epidemiological subregions and were used to estimate numbers of incident cases from the estimated deaths by site for each Member State (54;97). The same models were used to estimate numbers of prevalent cases, defined as cases of malignant neoplasms which will result in death within 15 years, and cases of non-fatal malignant neoplasms (where the person will survive 15 years of more) diagnosed within the last 5 years.

Diabetes mellitus

Diabetes prevalence estimates were based on an analysis of 41 representative population-based studies that used oral glucose tolerance tests and either 1980 WHO criteria to define diabetes cases or similar criteria producing comparable prevalences (98). For countries for which eligible data were not available, data from a proxy country believed to have similar diabetes prevalence were used. The majority of studies of diabetes prevalence did not indicate the type of diabetes and consequently the estimates refer to all diabetes. Prevalence of diabetes among people under 20 years of age was estimated from incidence data derived from published studies.

Depressive disorders

Point prevalence estimates for episodes of unipolar major depression were derived from a systematic review of all available published and non-published papers of population studies on depressive disorders which identified 76 studies from all 6 WHO regions (99). Variations in the prevalence of unipolar depressive disorders in some European countries, Australia, New Zealand and Japan were estimated directly from relevant population studies. For other Member States in the A regions, country-specific prevalences were estimated using a regression model on suicide rates (ages 15-59 both sexes combined) (100). For other regions, prevalence estimates were based on regional prevalence rates applied to country-specific population estimates for 2002.

Anxiety disorders

Subregional prevalence rates for panic disorder, obsessive-compulsive disorder and post-traumatic stress disorder were derived from systematic reviews of all available published and non-published population studies using case definitions which met ICD-10 or DSM-IV criteria (101). Persons with comorbid depressive disorder or alcohol or drug use disorders were excluded from prevalence estimates.(102-105)

Alcohol and drug use disorders

The case definition for alcohol use disorders is based on ICD 10 criteria for alcohol dependence and harmful use (F10.1 and F 10.2), excluding cases with comorbid depressive episode 55 population-based studies. DSM IV alcohol abuse is included in the case definition. All available population-based surveys using diagnostic criteria that could be mapped to this case definition were identified. Population estimates of the point prevalence of alcohol use disorders were obtained from 55 studies (106).

Estimates of average volume of drinking were made from published data on production , trade and sales, adjusted for estimates of illegally produced alcohol. These preliminary estimates were then further adjusted on the basis of the survey data on alcohol consumption to estimate prevalence of alcohol use disorders for Member States where recent population-based survey data were not available (107).

Estimating the prevalence of illicit drug use is difficult because the use of these drugs is illegal, stigmatised and hidden. Definitions of the variable of interest are difficult because of deficiencies in the data collected by countries on illicit drug use, and by disagreements over what constitutes "problematic" illicit drug use. The definition used here is based on ICD 10 criteria for opioid dependence and harmful use (F11.1 and F 11.2) or cocaine dependence and harmful use (F14.1 and F 14.2), excluding cases with comorbid depressive episode. Data on the prevalence of problematic illicit drug use were derived from a range of sources (66). A literature search was conducted of all studies that estimated the prevalence of problematic drug use and over 100 studies were identified. Other data sources included the United Nations Drug Control Program and European Monitoring Centre for Drugs and Drug Addiction. The existing sex ratios of drug use prevalence were from developed countries. These ratios were adjusted based on the prevalence of other addictive substances (tobbaco) for developing countries.

Insomnia (primary)

Subregional prevalence rates for primary insomnia were derived from systematic reviews of all available published and non-published population studies using case definitions which met ICD-10 or DSM-IV criteria, where the insomnia causes problems with usual activity and is not secondary to other diseases. Persons with comorbid depressive disorder or alcohol or drug use disorders were excluded from prevalence estimates.

Epilepsy

Subregional prevalence rates for epilepsy (excluding epilepsy or seizure disorder secondary to other diseases or injury) were derived from systematic reviews of available published and non-published population studies.

Alzheimer and other dementias

Sub-regional prevalence rates for Alzheimer and other dementias were estimated based on available population prevalence studies and assumed to apply for Member States within each sub-region (108).

Parkinson disease

Regional incidence to mortality rates estimated by Murray and Lopez (5) were used to derive country-specific estimates for incidence from the estimated country-specific mortality rates for Parkison disease. Prevalence numbers were estimated using these incidence estimates together with estimated average durations by region (5).

Migraine

Regional prevalence rates for people who experience migraine were estimated from available population studies and assumed to apply for Member States within each sub-region (109). Migraine has been treated as a chronic disease lasting from 15 years to around 45 years with

sporadic episodes; the case definition has been taken from the International Headache Society agreed definition of migraine. Available population studies using this definition provided very consistent regional prevalence estimates.

Low vision and blindness

Both regional and sub-regional prevalence of blindness and low vision was updated as described previously by using all available data since 1980 (110-112). The data from more than 50 cross-sectional population-based surveys on blindness and low vision (both published and unpublished) were compiled by WHO's sub-region. For the countries where no data were available, an extrapolation algorithm of the available results from neighbouring regions or countries in a similar epidemiological and socio-economic environment was employed. Sub-regional overall prevalence was then estimated as a population-weighted average of the national prevalence estimates within the same sub-region (111;112). To obtain the internally consistent age- and sex- specific estimates of incidence, prevalence, remission, and mortality rates, we re-analysed the compiled crude prevalence data with the help of DisMod software. Blindness-to-low vision ratio for each region was used to estimate prevalence of low vision and the same analysis was carried out by DisMod for ensuring the internal consistency among parameters (113)..

Hearing loss

In spite of the number of published studies on hearing loss, the currently available data is mostly incomplete and use different criteria, which causes difficulties in comparison and estimation of prevalences. Also, only relatively few studies have been carried out to date in representative population samples. Data from representative population surveys of measured hearing loss (19 surveys for adults and 14 surveys for children) were used to estimate sub-regional prevalences of moderate or greater hearing loss according to the WHO definition (hearing threshold level in the better ear is 41 dB or greater averaged over 0.5, 1, 2, 4kHz) and of severe or greater hearing loss (hearing threshold level in the better ear is 61 dB or greater averaged over 0.5, 1, 2, 4kHz) (114).

Congestive heart failure

Incidence of congestive heart failure (CHF) following acute myocardial infarction (AMI) was estimated using a model for ischaemic heart disease based on available population data on the incidence and case fatality rates for AMI and on the proportion of AMI cases who go on to develop CHF (115). The incidence of congestive heart failure as a sequela to rheumatic heart disease, hypertensive heart disease and inflammatory heart diseases was estimated using incidence/mortality ratios from the Global Burden of Disease 1990 study (5). Prevalence numbers were estimated by multiplying incidence numbers by estimated average durations.

Angina pectoris

The GBD 2000 study has developed a model for ischaemic heart disease based on available population data on the incidence and case fatality rates for acute myocardial infarction and on the prevalence and case fatality of angina pectoris (115). Sub-regional age and sex specific ratios of angina prevalence to ischaemic heart disease mortality were used together with country-specific mortality to estimate angina prevalence for each Member State. It is planned to update these estimates with angina prevalence data collected in the World Health Survey in 2003. Any additional information that Member States can provide on population prevalence of angina pectoris will also be incorporated.

Stroke

The GBD 2000 study has developed a model for stroke based on available population data on case fatality (CF) within 28 days for incident cases of first-ever stroke and on long-term survival in cases surviving this initial period in which the risk of mortality is highest (116). A

consistent relationship between incidence, prevalence and mortality was established using data from the USA and the resulting age- and sex-specific 28-day and survivor CFs were used as the basis for sub-regional CFs after adjustment for the observed relationship between GDP and overall 28-day CF in published studies from various countries. Consistent epidemiological models for each sub-region were then estimated using these CFs and observed mortality after adjustment to account for the fact that the true excess risk of mortality in survivors is not fully reflected in deaths recorded as resulting from stroke in vital statistics. Observed to modelled mortality ratios in US survivors were used as the basis for these adjustments. Sub-regional age- and sex-specific ratios of survivor prevalence to stroke mortality were used together with country-specific mortality to estimate the prevalence of stroke survivors for each Member State.

Chronic obstructive lung disease (COPD)

COPD is characterised by airway obstruction with lung function levels of $FEV_1/FVC < 70\%$ and presence of a post-bronchodilator $FEV_1<80\%$ of the predicted value that is not fully reversible (117). Since accurate prevalence data based on spirometry are not available in many regions, an alternative approach was used to infer disease occurrence from regional COPD mortality estimates with the help of the mathematical constraints imposed on the consistent epidemiological relationships among prevalence/incidence, remission, case fatality and mortality rates (118)**.** The relative risk of COPD mortality across the 17 sub-regions was estimated as a function of the two leading risk factors of COPD (tobacco smoking and indoor air pollution from solid fuel use for cooking) along with regional fixed-effects. Data on risk factors were derived from the comparative risk assessment carried out for the World Health report 2002 (11;12). The estimated relative risks were validated by comparing estimated regional prevalence to data from available population studies for validation (117). For the regions where surveys of representative populations based on spirometry are available, both direct estimation and model estimation were used.

Asthma

Asthma prevalence estimates are based on a case definition requiring a positive airway hyper-responsiveness test in addition to symptoms in the last 12 months. Specifically, the prevalence estimates shown in Attachment 3 related to cases defined in terms of reported wheeze in the last 12 months plus current bronchial hyper-responsiveness, defined as a 20% fall in FEV1 with a provoking concentration of histamine (PC20) at 8 mg/ml or less.

While epidemiological studies commonly take a broader definition of asthma based on symptom reporting, a narrower definition has been used in the Global Burden of Disease study in order to identify cases experiencing significant loss of health. The disability threshold for inclusion in the prevalence estimates is mild asthma, defined as occasional wheeze that does not affect usual activities, but which if untreated, may result in occasional episodes that cause sleep disturbance and/or speech limitations.

A review of published literature identified studies using the above definition, but also many studies using self-reported symptoms only, self-reported current asthma (asthma attack in last 12 months or currently on treatment), or physician diagnosis of current asthma in last 12 months. Based on countries and centres where prevalence data were available according to one of these alternate definitions, and the above stricter definition, we estimated adjustment factors to estimate asthma prevalence from community surveys based on self-report symptoms and other definitions.

A total of 150 population-based studies were used to derive provisional estimates of asthma prevalence for a wide range of countries for children, teenagers and adults. In particular, extensive use was made to two multi-country studies: the ISAAC study using self-report

symptoms in children aged 6-7 and 13-14 (119;120), and the ECRHS survey of adults 20-44 years using self-report symptoms and also bronchial hyper-responsiveness (121;122). These estimates were then used to derive subregional average prevalence rates, which were assumed to apply in Member States without specific population studies.

Rheumatoid arthritis

Sub-regional prevalence rates for rheumatoid arthritis were derived from available published population studies using case definitions for definite or classical rheumatoid arthritis (123).

Osteoarthritis

Sub-regional prevalence rates for osteoarthritis were derived from available published population studies which provided prevalence data for symptomatic osteoarthritis of the hip, radiologically confirmed as Kellgren-Lawrence grade 2 or greater (124)

Edentulism

Prevalence numbers are based on regional prevalence rates for edentulism estimated by Murray and Lopez (5). New data from the World Health Survey will enable these estimates to be revised in the future.

Injuries

An incident episode of a non-fatal injury is defined as an episode that is severe enough for the person to be hospitalized, or which requires emergency room care (if such care is available). Methods used to estimate injury-related prevalences and prevalence YLD are described by Begg and Tomijima (125). In brief, the incidence of non-fatal injuries by external cause category, age and sex was estimated by applying death-to-incidence ratios to the injury deaths estimated for each Member State in 2002.

Age- and sex-specific ratios were based on new analyses of health facility data provided by 18 Member States in 5 of the 6 WHO regions. For most cause categories, extrapolations from observed death-to-incidence ratios were derived for all Member States at a regional level, with final adjustments using mortality and per capita GDP as predictors of expected variability in case-fatality.

Prevalences for disabling injuries were estimated from the proportions of cases by injury type estimated to result in long-term disability, together with estimates of short and long-term disability durations. The latter were based on analyses of excess mortality risks from epidemiological studies (125).

3.4 Disability weights

During the last two years, WHO has embarked on large-scale efforts to improve the methodological and empirical basis for the valuation of health states *(126)*. Thus far, there has been a scarcity of empirical data on health state valuations, and a number of methodological problems have emerged from various research efforts. In order to address both of these challenges WHO, in collaboration with Member States, has initiated a two-tiered data collection strategy involving general population surveys, combined with more detailed surveys among respondents with high levels of educational attainment in the same sites *(127)*.

In the household surveys, individuals provide descriptions for a series of hypothetical health states along seven core domains of health, followed by valuations of these states using a simple thermometer-type (visual analog) scale. The more detailed surveys include more abstract and cognitively demanding valuation tasks that have limited reliability in general population surveys but have been applied widely in industrialized countries among convenience samples of educated respondents.

Statistical methods have been used to estimate the relationships between valuations elicited using visual analog scale and those elicited with other valuation techniques in order to measure the underlying health state severities that inform responses on each of the different

measurement methods. A valuation function based on estimation of the relationships between levels on the core domains of health for a particular health state and the valuation of that health state has then been used together with the calibrated prevalences of health states to estimate the overall severity-weighted prevalence of health states for the 71 surveys in 61 countries.

The experience gained in the WHO Household Survey Study in eliciting health state valuations from general population samples has been used in designing the health status and health state valuation modules for the World Health Survey, which has been carried out in 73 Member States in 2003.

The disability weights used in Version 3 of the GBD 2000 are still largely based on the GBD 1990 disability weights and are summarized in Annex Table 5. It is planned to use results from the World Health Survey to comprehensively revise the disability weights used in the GBD 2000.

3.5 GBD estimates for 2002

This discussion paper focuses on the methods used in the GBD 2000 study to develop estimates of mortality and burden of disease for the year 2000. These methods have also been used to develop estimates of mortality and burden of disease for the year 2002, published in Annex Tables to the World Health Report 2003. This section briefly describes the methods used.

Life tables for all Member States for the year 2002 were developed using the same methods as for 2000 (see Section 3.1). Deaths by age, sex and cause were estimated for each Member State using the same general methods as for 2000 (see Section 3.2).

In order to estimate YLDs by cause, age, sex and region for 2002, incidence and prevalence rates were imputed from subregion level to country level for 2000 as shown in Table 8 for every disease and injury sequela (listed in Annex Table 4). Incidence and prevalence rates for 2002 were then imputed by age and sex for each country using cause-specific methods as shown in Table 8. Absolute incidence and prevalence numbers by age and sex were then added for all countries in a region to provide regional estimates for 2002. YLDs for 2002 were then calculated assuming that disability weights and durations were the same in 2002 as in 2000.

3.6 Methods for calculation of healthy life expectancy for 2002

Annex Table 4 of the World Health Report 2003 reports the average level of population health for WHO Member States in terms of healthy life expectancy (HALE). HALE is based on life expectancy at birth, but includes an adjustment for *time spent in poor health*. It is most easily understood as the equivalent number of years in full health that a newborn can expect to live based on current rates of ill-health and mortality. [22, 23]

The WHO methods used to calculate HALE have been developed to maximise its comparability across populations. Other approaches to the calculation of HALE have used prevalence data derived either from health surveys (28;128) or from burden of disease analysis (129;130). Analyses of over 50 national health surveys for the calculation of healthy life expectancy carried out by WHO (78) identified severe limitations in the comparability of self-reported health status data from different populations, even when identical survey instruments and methods are used. These comparability problems relate more fundamentally to unmeasured differences in expectations and norms for health, so that the meaning different populations attach to the labels used for response categories in self-reported questions, such as

mild, moderate or severe, can vary greatly (131). To address these problems, WHO undertook a Multi-Country Survey Study in 2000-2001 in collaboration with Member States using a standardized health status survey instrument together with new statistical methods for adjusting biases in self-reported health (79;132).

Table 8. Methods used to estimate YLD for 2002

Method	Imputation of country-specific incidence rates from regional incidence rates for 2000	Imputation of 2002 incidence rates from 2000 incidence rates at country level	Causes
Country-specific data	Country-specific prevalence or incidence data used	Country-specific prevalence or incidence data used	Tuberculosis, HIV/AIDS, pertussis, diphtheria, measles, tetanus, schistosomiasis, lymphatic filariasis, onchocerciasis, trachoma, abortion, protein-energy malnutrition, iodine deficiency, diabetes mellitus, unipolar depressive disorders*, alcohol use disorders, drug use disorders, sense organ disorders excluding others, asthma
Incidence/ mortality ratio – short duration	Regional age-sex specific incidence/mortality ratio applied to country-specific mortality to estimate incidence. Same approach used for prevalence	Incidence and prevalence for 2000 adjusted by ratio of 2002 to 2000 cause-specific mortality by age and sex	Hepatitis B, hepatitis C, malaria, lower respiratory infections, malignant neoplasms, rheumatic heart disease, hypertensive heart disease, inflammatory heart disease, other cardiovascular diseases, peptic ulcer disease, cirrhosis of the liver, nephritis and nephrosis
Incidence/ mortality ratio – long duration	Regional age-sex specific incidence/mortality ratio applied to country-specific mortality to estimate incidence. Resultant country/regional sex specific all-ages YLD[0,0] ratio applied to regional prevalence YLD total for that sex to estimate country-specific prevalences by age and sex	Incidence for 2000 adjusted by ratio of 2002 to 2000 cause-specific mortality by age and sex. Resultant 2002/2000 sex specific all-ages YLD[0,0] ratio applied to 2000 country prevalence YLD total for that sex to estimate country-specific prevalences by age and sex for 2002	Meningitis, endocrine disorders, ischaemic heart disease, cerebrovascular disease, COPD, other respiratory diseases, other digestive diseases, other genitourinary system diseases
Group cause incidence/ mortality ratio	Regional age-sex specific incidence/mortality ratio applied to country-specific mortality of the cause group to estimate incidence	Incidence and prevalence for 2000 adjusted by ratio of 2002 to 2000 group mortality by age and sex	Maternal haemorrhage and sepsis, hypertensive disoders of pregnancy, perinatal causes, congenital malformations excluding cleft lip and palate and Down syndrome, , road traffic accidents, poisonings, falls, fires, drownings, other unintentional injuries, self-inflicted injuries, violence, other intentional injuries
Regional rates	Regional age-sex specific incidence and prevalence rates applied to countries	Regional age-sex specific incidence and prevalence rates applied to countries, with time-trend adjustments where evidence for incidence or prevalence trends is available	Sexually transmitted diseases excluding HIV, diarrhoeal diseases, poliomyelitis, trypanosomiasis, Chagas disease, leishmaniasis, leprosy, dengue, Japanese encephalitis, intestinal nematode infections, other infectious diseases, upper respiratory infections, otitis media, obstructed labor, vitamin A deficiency, iron-deficiency anaemia, other nutritional disorders, other neoplasms, bipolar affective disorder, schizophrenia, epilepsy, Alzheimer and other dementias, multiple sclerosis, post-traumatic stress disorder, obsessive-compulsive disorder, panic disorder, insomnia (primary), migraine, mild mental retardation attributable to lead exposure, other neuropsychiatric disorders, other sense organ disorders, appendicitis, benign prostatic hypertrophy, skin diseases, musculoskeletal diseases, cleft lip and palate, Down syndrome, oral conditions
Average of ratio and rate method results	Regional age-sex specific incidence and prevalence rates and incidence and prevalence rates from	Regional age-sex specific incidence and prevalence rates with time-trends and incidence and	Other maternal conditions, Parkinson disease, war

		the ratio methods are averaged and applied to countries	prevalence rates from the ratio methods are averaged and applied to countries

* Some country data plus regression model based on suicide rates.

The methods used by WHO to calculate healthy life expectancy were peer-reviewed during 2001 and 2002 by the Scientific Peer Review Group (SPRG) constituted by the Director General, in response to a request by the WHO Executive Board (EB107.R8). SPRG reviewed all the methods proposed by WHO to analyze health system performance, including the measurement of levels of health. Constituted in October 2001 under the chairmanship of Professor Sudhir Anand (University of Oxford), the SPRG comprised 13 members from a wide range of countries with expertise in areas related to the measurement and evaluation of health and health systems. The Group's work was preceded by and informed by ten technical consultations on major components of performance assessment, including five related to the measurement of population health. It also benefited from the reports of regional consultations in all WHO regions. An advisory group was also established to advise the Director General on the process and it included members from the Executive Board and the Advisory Committee on Health Research.

The SPRG's interim report to the Director-General was provided to the Board at its 109th session, in January 2002 (EB109/6), and its final report to the Director-General was provided at the Board's 110th session in May 2002 (EB 110/8). The final report is accessible on the WHO web site (133). The final report made numerous recommendations for revisions and improvements to methodology used for the calculation of HALE (100). It considered that the methodology for the measurement of HALE was well advanced, and made a number of technical recommendations which are being addressed for the calculations to be reported in the World Health Report 2003. In addition to the SPRG's review of the statistical methods used for the calculation of HALE, these methods and results have been published in six peer-reviewed papers (134-139) and eight peer-reviewed book chapters (78;79;140-145).

Inputs to HALE calculations

Calculation of HALE for WHO Member States requires three inputs (100). First, life expectancy at each age is calculated as described above. Second, estimates of the prevalence of various states of health at each age are calculated based on epidemiological analyses and on data from the WHO Multi-Country Survey Study (MCSS). Finally, health state valuations are used to weight time lived in different health states. The following section summarizes the methods and data used to estimate severity-weighted health state prevalences by age and sex ($_nD_x$). Sullivan's method (146) is used to calculate HALE using these $_nD_x$ within the abridged life table for each Member State.

Health state prevalence data

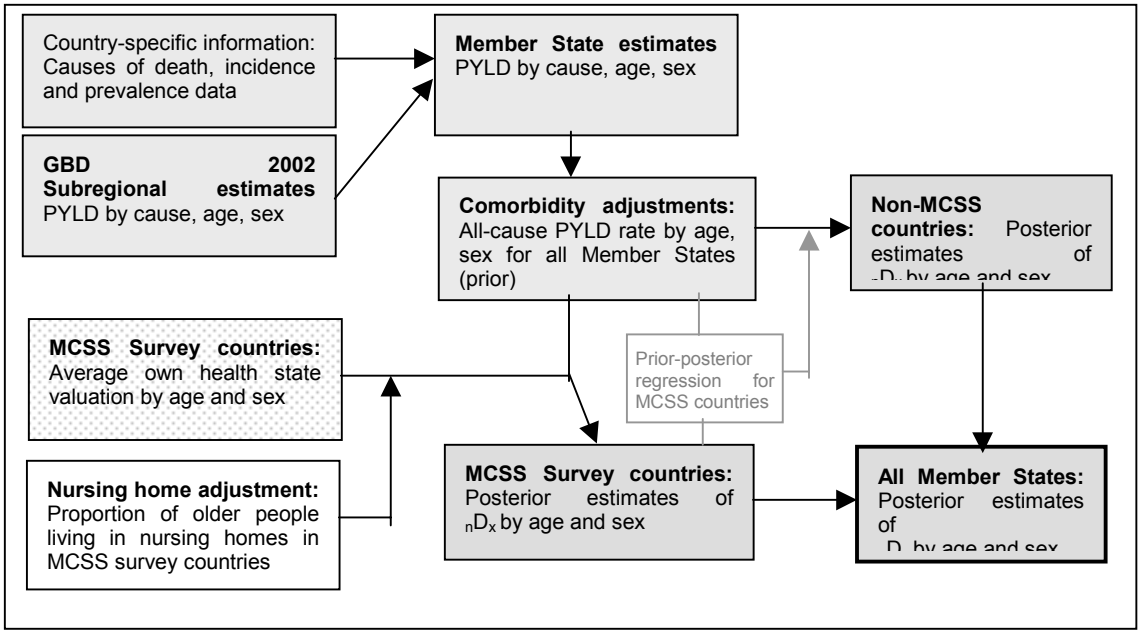
Data from the Global Burden of Disease 2000 study (GBD 2000) have been used to estimate severity-adjusted prevalences for health conditions by age and sex for all 192 WHO Member States ("prior" prevalences). Secondly, data from the MCSS (132) were used to make independent estimates of severity-adjusted prevalences by age and sex for 60 Member States. Finally, posterior prevalences ($_nD_x$) for all Member States for 2002 were calculated based on the GBD 2000-based prior prevalences and the survey prevalences. This process is summarized in Figure 11.

GBD2000-based estimates

The GBD 2000 results were used to calculate prevalence-based YLD rates as well as the standard incidence-based YLD, and adjusted for co-morbidity, giving direct estimates of the severity-weighted prevalence of health states attributable to each cause. Prevalence YLD measure the equivalent number of years of healthy life lost for prevalent cases of disease and injury and their sequelae, and are calculated as:

YLD = prev x DW

Figure 11 Estimation of severity-adjusted health state prevalences for calculation of HALE



where *prev* is the number of prevalent cases of the condition in the population and DW is the disability weight for the condition (in the range 0-1) (100).

Summation of prevalence YLD across all causes would result in overestimation of the total average severity-weighted health state prevalence because of comorbidity between conditions. For previous World Health Reports, adjustments have been made for independent comorbidity (where the probability of having two (comorbid) conditions is assumed to equal the product of the probabilities for having each of the diseases). As discussed with the Scientific Peer Review Group (133), further work has been undertaken to properly take dependent comorbidity into account. For many diseases, the probability of having a pair of diseases is greater than the product of the probabilities for each disease, reflecting common causal pathways (for example common risk factors causing both diabetes and heart disease) and also that one disease may increase the risk of another.

Data from five large national health surveys (147-152) were analysed by age and sex to estimate "dependent comorbidity" factors for pairs of conditions. These factors were defined as the ratio of the prevalence of people with both conditions to the product of the two total prevalences for each of the conditions. There was surprising consistency in these factors across the five surveys and the resulting dependent comorbidity factors shown in Table 9 were used for all Member States to adjust for dependent comorbidity in summation of prevalence YLD across all causes.

The improved estimation of dependent comorbidity resulted in reductions in total PYLD per capita ranging from a few per cent in younger adult ages to around 8% in the oldest age group (80 years and over) in developed countries and up to 15% in the oldest age group in the least developed countries.

Table 9 Dependent comorbidity factors used in the calculation of all-cause PYLD per capita

	Males								Females							
Condition pair	**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**	**0-4**	**5-14**	**15-29**	**30-44**	**45-59**	**60-69**	**70-79**	**80+**
CVD + diabetes	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
+ respiratory*	26.2	26.2	26.2	15.1	5.9	3.7	3.7	3.6	25.0	25.0	25.0	16.1	7.4	3.7	4.0	4.2
+ Musculoskeletal	10.9	10.9	10.9	9.0	3.9	2.7	2.6	2.5	9.1	9.1	9.1	7.6	4.6	2.8	3.0	3.3
+ Sight or hearing loss	5.2	5.2	5.2	4.3	2.3	1.6	1.6	1.7	5.0	5.0	5.0	3.9	2.3	1.5	1.6	1.6
+ Group1***	5.2	5.2	5.2	4.3	2.3	1.6	1.6	1.7	5.0	5.0	5.0	3.9	2.3	1.5	1.6	1.6
+ Injuries	4.9	4.9	4.9	4.2	2.6	1.7	1.8	1.9	4.8	4.8	4.8	4.0	2.4	1.6	1.7	1.9
+ Other diseases	5.2	5.2	5.2	4.3	2.3	1.6	1.6	1.7	5.0	5.0	5.0	3.9	2.3	1.5	1.6	1.6
+ Neurological	4.5	4.5	4.5	3.8	2.3	1.6	1.5	1.5	4.5	4.5	4.5	3.8	2.3	1.6	1.5	1.5
+ Mental disorders	4.1	4.1	4.1	3.9	2.2	1.4	1.5	1.6	3.9	3.9	3.9	3.5	2.2	1.5	1.5	1.5

*The first condition of each pair is the cumulative prevalence of having one or more of the conditions in preceding rows.

*** Communicable diseases, maternal and perinatal conditions and nutritional deficiencies.

Survey estimates

The Multi-Country Survey Study on Health and Responsiveness (MCSS) was carried out in 2000-2001. A total of 61 surveys were completed in 71 countries using face-to-face, postal and telephone interviewing modes. A 90 minute long version of the interview and a shorter 30-minute version were used. To overcome the problem of comparability of self-report health data, the WHO survey instrument used performance tests and anchoring vignettes to calibrate self-reported health for the 6 core health domains (mobility, self care, pain, affect, work and household activities, cognition) and vision (132). WHO has developed statistical methods for correcting biases in self-reported health using these data, based on the hierarchical ordered probit (HOPIT) model (79;153;154).

Building on the findings from this Study, WHO is now undertaking the World Health Survey in collaboration with Member States (further details available on the WHO Website at www.who.int/evidence/whs). During the first half of 2003, 73 Member States conducted the World Health Survey and results are currently being received by WHO. Analyses of the World Health Survey results will contribute to the analysis of healthy life expectancy in future years.

The WHO survey instrument included short descriptions ('vignettes') that mark fixed levels of ability (e.g. people with different levels of mobility such as a paraplegic person or an athlete who runs 4 km each day) and some measured tests for selected health domains. Anchoring vignettes allow us to adjust for individual variations in the use of response categories to describe the same health state. Following the Scientific Peer Review in 2002, a number of improvements have been made to the statistical models used for analysis of the MCSS data.

The CHOPIT model described elsewhere (King et al. 2003, Tandon et al 2003) has been used to analyze data for the 6 core health domains in the MCSS. The constant variance assumption for vignettes in the basic CHOPIT model has been relaxed to allow for the fact that some vignettes are ranked with more inconsistency by respondents.

We have included in the analysis only those surveys that have met certain explicit criteria that reflect the quality of survey implementation with specific reference to the health vignettes. The USA postal survey was also excluded because respondents were presented the vignettes

in order of severity rather than randomized as in the case of all other surveys. Sixty surveys met these criteria and were included in the model.

Health state valuations

Household surveys including a valuation module were conducted in fourteen countries: China, Colombia, Egypt, Georgia, India, Iran, Lebanon, Indonesia, Mexico, Nigeria, Singapore, Slovakia, Syria and Turkey. Data on nearly 500,000 health state valuations from over 46,000 respondents were used to develop average global health state valuations for the calculation of HALE. Health state valuations quantify departures from perfect health, *i.e.*, the reductions in health associated with particular health states. It is important to emphasize that these weights *do not* measure the quality of life of people with disabilities and *do not* measure the value of different people to society.

Health state valuations for respondent's own health state were computed for all respondents in MCSS samples and used to estimate the average health state valuation by age and sex for each survey country. The MCSS survey samples did not include older people resident in nursing homes or other health institutions. Because these people will generally have worse health than those resident in households, an adjustment was made based on the estimated proportion of the population aged 60 years and over who were resident in health institutions.

Estimation of trends in health state prevalences

Health state prevalences from the WHO Multi-country Household Survey Study were assumed to relate to calendar year 2000. Trends in prevalence YLD between 2000 and 2002 were calculated for each Member State using the GBD estimates (10). Aggregated across all causes, these trends were generally small. In calculating HALE for 2002, the 2000 survey results were adjusted for likely change over two years using these estimated trends. Any information on time trends in prevalences for specific causes listed in Attachment 3 that Member States are able to provide, can potentially be used to improve the analysis of trends in HALE.

Calculation of posterior severity-weighted prevalences

Because there is potential measurement error in severity-weighted health state prevalences derived from both sources, 'posterior' prevalences for the survey countries were calculated as weighted averages of the GBD-based prevalences and the survey prevalences (100). The relationship between the GBD-based prevalences and the posterior prevalences was estimated for the survey countries using ordinary least squares regression and the results used to adjust the GBD 2000-based prevalences for the non-survey countries. This ensured that the use of the survey data did not introduce a prevalence differential between survey and non-survey countries, and allowed the survey evidence to be indirectly taken into account in making the best possible prevalence estimates for non-survey countries.

HALE estimates for 2002

Following the Scientific Peer Review (133), significant improvements have been implemented in both data and methods used to calculate life expectancies and HALE for WHO Member States. Recent surveys and censuses have provided significantly more information on levels of child and adult mortality in Member States without relatively complete death registration. This has resulted in changes in point estimates of life expectancies and reductions in uncertainty ranges for some Member States. Apart from ongoing revisions to the GBD analyses of epidemiological information on diseases and injuries, the implementation of improved methods for dealing with comorbidity has resulted

in a reduction in estimated proportion of healthy years of life lost at older ages compared to previous years.
Additionally, improvements in methods used for the analysis of the MCSS survey data have resulted in improved estimates of the severity-adjusted prevalence of health states and a reduction in the uncertainty associated with these estimates. For these reasons, the draft HALE estimates for 2002 are not directly comparable with those for 2000 and 2001 published in the World Health Report 2002 (11). After finalization of HALE estimates for 2002, following consultation with Member States, estimates for 2000 and 2001 will also be revised to provide a consistent time series.

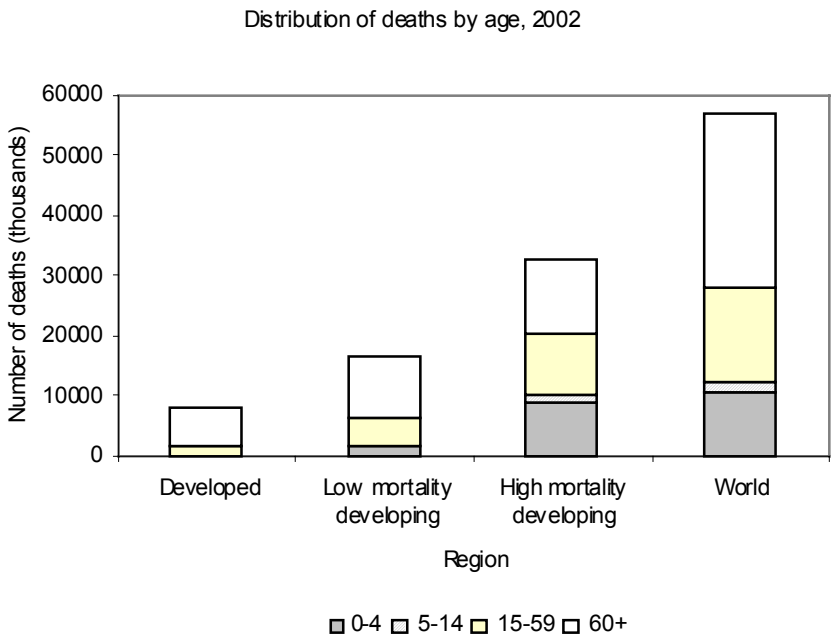
4. Version 3 results for 2002

This section gives an overview of Version 3 results for 2002. It is important to note that the results reported here and in the Annex Tables are tabulated by underlying direct cause as described above in Section 2.3. Total attributable deaths for some diseases which increase the risk of other diseases or injuries will be substantially larger.

Deaths and YLL for all causes have been estimated from the available sources of data as described above in Sections 3.1 and 3.2. An incremental approach is being taken for the revision of YLD estimates. Version 3 of the GBD 2000 includes new reviews of the epidemiological data and new or revised disease models for many causes – in some cases, these draft estimates will undergo further review and revision. For other causes which have not yet been reviewed in detail, the previous disease models have been updated to reflect trends in mortality between 1990 and 2002. Annex Table 4 gives details of the stage of revision for each cause.

A general overview of the Version 3 results for the Global Burden of Disease and of regional and global trends in life expectancy and child and adult mortality are given in Chapter 1 of the World Health Report 2003 (12), also available on the WHO website at www.who.int/evidence/whr. Detailed tabulations by region, age and sex of Version 3 results for mortality, incidence, prevalence, YLD, YLL and DALYs may be downloaded from the WHO website at www.who.int/evidence/bod.

Figure 12 Age distribution of global mortality, 2002



4.1 Version 3 estimates of deaths (all causes) for 2002

Almost 57 million people died in 2002, 10.5 million (or nearly 20%) of whom were children less than 5 years of age (see Figure 12). Of these child deaths, 98% occurred in developing countries. Over 60% of deaths in developed countries occur beyond age 70, compared to about 30% in developing countries. A key point is the comparatively high number of deaths in developing countries at young adult ages (15–59 years). Just over 30% of all deaths in developing countries occur at these ages, compared to 20% in richer regions. This vast premature adult mortality in developing countries is a major public health concern.

Developing countries themselves are a very heterogeneous group in terms of mortality (Figure 12). A contrast between low mortality developing countries such as China (with more than one-sixth of the world's population) and high mortality countries in Africa (with one-tenth of the global population) illustrates the extreme diversity in health conditions among developing regions. Less than 10% of deaths in China occur below age 5 compared with 40% in Africa. Conversely, 48% of deaths in China occur beyond age 70, whereas only 10% in Africa do.

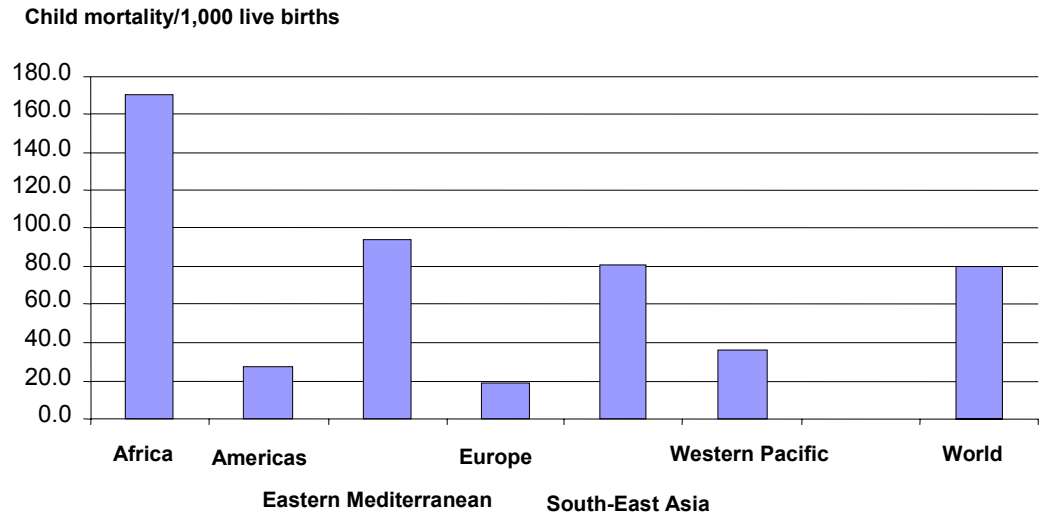
Child deaths under 5 years

Although approximately 10.5 million children under 5 years still die every year in the world, enormous strides have been made since 1970 when over 17 million child deaths occurred. These considerable reductions did not take place uniformly across time and regions but the success stories in developing countries demonstrate clearly that low mortality levels are attainable in those settings. The effects of such achievements are not to be underestimated. If the whole world came to share the current child mortality experience of Iceland (the lowest in the world at 3.1 per 1000 live births in 2002), over 10 million child deaths could be prevented each year.

Today nearly all child deaths (97%) occur in poor developing countries, and almost half of them in Africa. In one hour over 500 African mothers lose a child; had they lived in a rich European country, nearly 490 of these mothers and their children would have been spared the

ordeal. While some African countries have made considerable strides in reducing child mortality, the majority of African children live in countries where the survival gains of the past have been wiped out or even reversed, largely as a result of the HIV/AIDS epidemic.

Figure 13 Child mortality per 1000 live births in the six WHO regions, 2002

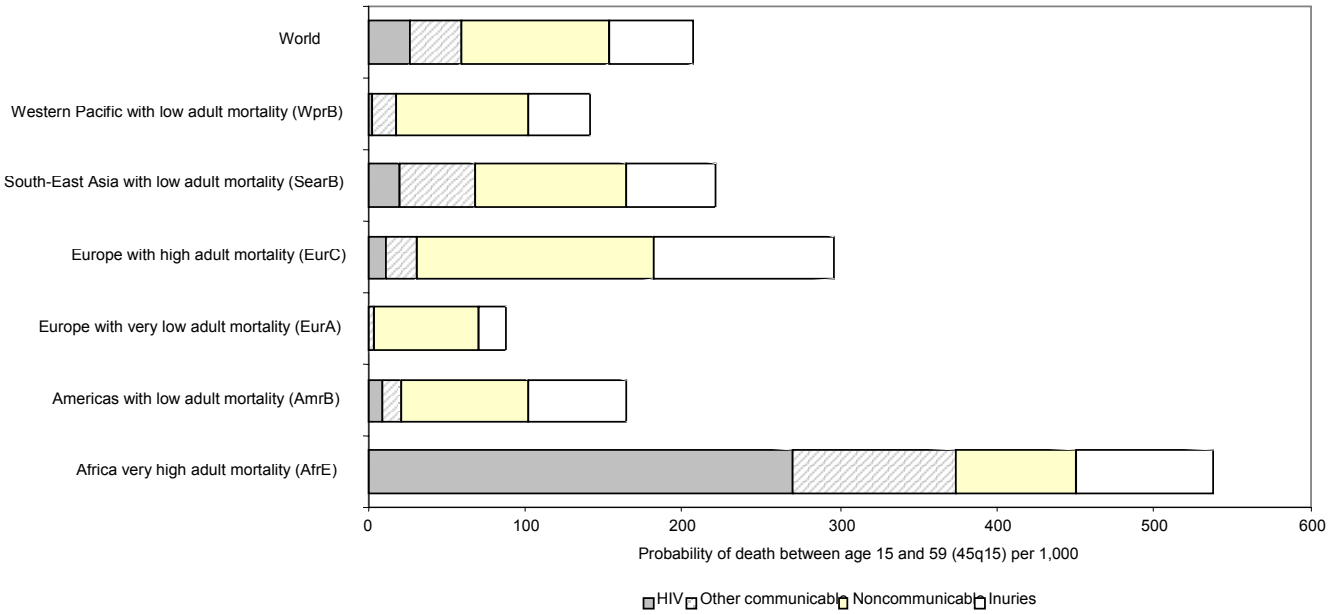


Although millions of children die every year, the last three decades have witnessed considerable gains in child survival worldwide. Global child mortality decreased from 147 per 1000 live births in 1970 to about 80 per 1000 live births in 2002. The reduction in child mortality has been particularly compelling in Latin America, South-East Asia and Middle-Eastern countries while that of African countries was more modest (12). Gains in child survival could even be seen in rich industrialized nations, where levels of mortality were already low.

Adult mortality

The probability of premature adult death varies widely between regions (Figure 14). For example, the probability of premature adult death in some parts of sub-Saharan Africa is much higher – nearly four times as high – than that observed in low mortality countries of the Western Pacific Region. Even within developed regions there are wide variations. Men in some Eastern European countries are three to four times more likely to die prematurely than men in other developed regions. Furthermore, male adult mortality in Eastern Europe is much greater than in developing regions of Americas, Asia and the Eastern Mediterranean. In all regions, male mortality is higher than female, and the discrepancy between the two sexes in mortality risk is much larger than that seen among children. The variation in proportion of women dying prematurely is much less dramatic.

Figure 14 Adult mortality: probabilities of death between age 15 and 60 by cause, selected subregions and the world, 2002



The fragile state of adult health in the face of social, economic, and political instability is also apparent in regions outside Africa. Male mortality in some countries in Eastern Europe has increased substantially and is approaching the level of adult mortality in some African countries. As a result, for the European Region as a whole, average male adult mortality risk between 15 and 59 years is 230 per 1000, which is similar to the rate observed in 1980s. Figure 14 illustrates the fact that the probability of death from injury among adults aged 15–59 years in the high mortality countries of Eastern Europe is much higher than in neighbouring Western European countries.

Table 10. Ten leading causes of death, 2002

		% of total deaths
All countries		
1	Ischaemic heart disease	12.6%
2	Cerebrovascular disease	9.6%
3	Lower respiratory infections	6.6%
4	HIV/AIDS	4.9%
5	Chronic obstructive pulmonary disease	4.8%
6	Perinatal conditions	4.3%
7	Diarrhoeal diseases	3.1%
8	Tuberculosis	2.8%
9	Trachea, bronchus, lung cancers	2.2%
10	Malaria	2.1%

Continuously declining adult mortality in low mortality regions, combined with trend reversals in high mortality areas, have resulted in widening gaps in adult mortality worldwide. The gap between the lowest and highest regional adult mortality risk between ages 15 and 60 has now increased to a level of 340 per 1000 in 2002. Regional aggregation of adult mortality also hides enormous and sobering disparities between countries. For example, within the Eastern Mediterranean Region, adult mortality risk between ages 15 and 60 among women in Djibouti is seven times higher than that of women in Kuwait in 2002. There is almost 12-fold difference between the world lowest and highest adult mortality at country level.

Table 11. Leading causes of death in males and females, global estimates for 2002

	Males	% total deaths		Females	% total deaths
1	Ischaemic heart disease	12.6%	1	Ischaemic heart disease	12.5%
2	Cerebrovascular disease	8.5%	2	Cerebrovascular disease	10.9%
3	Lower respiratory infections	6.3%	3	Lower respiratory infections	6.9%
4	HIV/AIDS	5.1%	4	Chronic obstructive pulmonary disease	4.9%
5	Chronic obstructive pulmonary disease	4.7%	5	HIV/AIDS	4.8%
6	Perinatal conditions	4.6%	6	Perinatal conditions	4.0%
7	Tuberculosis	3.5%	7	Diarrhoeal diseases	3.1%
8	Diarrhoeal diseases	3.1%	8	Malaria	2.4%
9	Trachea, bronchus, lung cancers	3.0%	9	Tuberculosis	2.0%
10	Road traffic accidents	2.9%	10	Diabetes mellitus	2.0%
11	Malaria	2.0%	11	Maternal conditions	1.9%
12	Self-inflicted injuries	1.8%	12	Hypertensive heart disease	1.8%
13	Stomach cancer	1.7%	13	Breast cancer	1.8%
14	Cirrhosis of the liver	1.7%	14	Measles	1.4%
15	Violence	1.5%	15	Trachea, bronchus, lung cancers	1.3%

4.2 Version 3 estimates of deaths by cause for 2002

The top 10 disease and injury causes of death in the year 2002 for the world are shown in Table 10. Lung cancer is the ninth leading cause of death in males, and the 14th in females (Table 11). Leading causes of death are otherwise generally similar for males and females, although breast cancer and hypertensive heart disease are higher in rank for females than males.

Causes of death in children

Infectious and parasitic diseases remain the major killers of children in the developing world, partly as a result of the HIV/AIDS epidemic. Although notable success has been achieved in certain areas (e.g. polio), communicable diseases still represent 7 out of the top 10 causes of child deaths, and cause about 60% of all child deaths. Overall, the 10 leading causes represent 87% of all child deaths (Table 12).

Many Latin American, and some Asian and Middle-Eastern countries, have partly shifted towards the cause-of-death pattern observed in developed countries. Here, conditions arising in the perinatal period, including birth asphyxia, birth trauma and low birthweight have replaced infectious diseases as the leading cause of death and are now responsible for 21–36% of deaths. Such a shift in the cause-of-death pattern has not occurred in sub-Saharan Africa,

where perinatal conditions rank in fourth place. Here, malaria, lower respiratory infections and diarrhoeal diseases continue to be the leading causes of death in children, accounting for 53% of all deaths.

About 90% of all HIV/AIDS and malaria deaths in children in developing countries occur in sub-Saharan Africa, where 23% of the world's birth and 42% of the world's child deaths are observed. The immense surge of HIV/AIDS mortality in children in recent years means that HIV/AIDS is now responsible for 332 000 child deaths in sub-Saharan Africa and nearly 8% of all child deaths in the region.

Table 12 Leading causes of death in children aged 0-14 years, 2002

Rank	Cause	Numbers	% of all deaths
1	Perinatal conditions	2,463,791	20.6%
2	Lower respiratory infections	2,018,225	16.8%
3	Diarrhoeal diseases	1,585,075	13.2%
4	Malaria	1,114,381	9.3%
5	Measles	738,417	6.2%
6	HIV/AIDS	478,966	4.0%
7	Congenital anomalies	447,079	3.7%
8	Whooping cough	301,408	2.5%
9	Tetanus	221,049	1.8%
10	Road traffic accidents	182,819	1.5%
	Other causes	2,431,917	20.3%
	Total	11,983,129	100%

Some progress has been observed in the areas of diarrhoeal diseases and measles. While incidence is thought to have remained stable, mortality from diarrhoeal diseases has fallen from 2.5 million deaths in 1990 to about 1.6 million deaths in 2002, now accounting for 13% of all child deaths under age 15. There has also been a modest decline in deaths from measles, although more than half a million children under 5 years still succumb to the disease every year. Malaria is causing over a million child deaths per year and rising to nearly 11% of all under 5 deaths.

Table 13 Leading causes of mortality among adults aged 15-59, world, 2002

Rank	Cause	Numbers	% of all deaths
1	HIV/AIDS	2,278,813	14.1%
2	Ischaemic heart disease	1,332,186	8.3%
3	Tuberculosis	1,036,379	6.4%
4	Road traffic accidents	814,299	5.1%
5	Cerebrovascular disease	783,325	4.9%
6	Self-inflicted injuries	672,919	4.2%
7	Maternal conditions	510,115	3.2%
8	Violence	473,335	2.9%

9	Cirrhosis of the liver	381,786	2.4%
10	Lower respiratory infections	351,701	2.2%
	Other causes	7,488,404	46.4%
	Total	16,123,263	100%

Causes of death in adults

Table 13 shows the leading causes of deaths and DALYs among adults aged 15–59 years worldwide for 2002. Despite global trends of declining communicable disease burden in adults, HIV/AIDS has become the leading cause of mortality and the single most important contributor to the burden of disease among adults aged 15–59.

Nearly 80% of the 2.6 million global deaths from HIV/AIDS in 2002 occurred in sub-Saharan Africa. In this region, HIV/AIDS is the leading cause of death, resulting in more than 6000 deaths every day and accounting for almost one in five deaths (all ages) and one in two deaths of adults (aged 15–59). Owing to the impact of HIV/AIDS, there has been a reversal in mortality trends among adults in this region and gains in life expectancy in past have reversed into a continuous decline in life expectancy since 1990.

Older adults

The risk of death rises rapidly with age among adults aged 60 and over in all regions. Globally, 60 year olds have a 55% chance of dying before their 70th birthday. Regional variations in risk of death at older ages are smaller, ranging from around 40% in the developed countries of Western Europe to 60% in most developing regions and 70% in Africa. Historical data from countries such as Australia and Sweden show that life expectancy at age 60 changed slowly during the first six to seven decades of the 20th century but, since around 1970, has started to increase substantially. Life expectancy at age 60 has now reached 25 years in Japan. From 1990 onwards, Eastern European countries such as Poland and Hungary have started to experience similar improvements in mortality for older people, but others, such as Russia have not, and are experiencing worsening trends.

The leading causes of mortality in older people have not changed greatly over the last decade, and are shown for 2002 in Table 14.

Table 14 Leading causes of mortality among adults aged 60+, world, 2002

Rank	Cause	Numbers	% of all deaths
1	Ischaemic heart disease	5,824,839	20.1%
2	Cerebrovascular disease	4,688,550	16.2%
3	Chronic obstructive pulmonary disease	2,398,852	8.3%
4	Lower respiratory infections	1,395,697	4.8%
5	Trachea, bronchus, lung cancers	928,001	3.2%
6	Diabetes mellitus	753,556	2.6%
7	Hypertensive heart disease	734,818	2.5%
8	Stomach cancer	605,324	2.1%
9	Tuberculosis	495,123	1.7%
10	Colon and rectum cancers	476,921	1.6%
	Other causes	10,619,211	36.7%
	Total	28,920,891	100%

Regional variations in causes of death

Total deaths by cause and for 3 broad regional groupings (developed countries, low mortality developing countries and high mortality developing countries) are given in Table 15. The leading causes of mortality are very different in developing countries. While the 3 leading causes of death in 2000 include ischaemic heart disease and cerebrovascular disease, together claiming almost one fifth of all deaths in developing countries, six of the top ten causes of death in developing countries are infectious and perinatal causes. Acute lower respiratory infections (primarily pneumonia) are the third leading cause of death (60% of these among children aged under 5). HIV/AIDS is the fifth leading cause of death for developing countries in the year 2000, accounting for 6% of all deaths or 2.5 million deaths in total. More than 80% of these deaths occurred in Africa, making HIV the leading cause of death in this region, claiming almost one in four deaths. Chronic obstructive lung disease kills more people (1.3 million) in the Western Pacific Region (primarily China) than anywhere else in the world, with 50% of global mortality from the disease occurring there.

Table 15. Leading causes of deaths for broad country groups, 2002

	Developed countries	% total deaths
1	Ischaemic heart disease	22.8%
2	Cerebrovascular disease	13.3%
3	Trachea, bronchus, lung cancers	4.5%
4	Lower respiratory infections	3.3%
5	Chronic obstructive pulmonary disease	3.2%
6	Colon and rectum cancers	2.6%
7	Diabetes mellitus	1.8%
8	Self-inflicted injuries	1.8%
9	Hypertensive heart disease	1.7%
10	Stomach cancer	1.7%

	Developing low mortality countries	% total deaths
1	Cerebrovascular disease	13.8%
2	Ischaemic heart disease	9.7%
3	Chronic obstructive pulmonary disease	9.5%
4	Lower respiratory infections	3.7%
5	Perinatal conditions	3.6%
6	Tuberculosis	3.3%
7	Stomach cancer	3.1%
8	Road traffic accidents	3.0%
9	Trachea, bronchus, lung cancers	2.8%
10	Hypertensive heart disease	2.7%

	Developing high mortality countries	% total deaths
1	Lower respiratory infections	10.0%
2	HIV/AIDS	9.6%
3	Ischaemic heart disease	9.3%
4	Perinatal conditions	6.6%
5	Diarrhoeal diseases	5.5%
6	Cerebrovascular disease	5.3%
7	Malaria	4.4%
8	Tuberculosis	3.6%
9	Chronic obstructive pulmonary disease	2.8%
10	Measles	2.5%

4.3 Version 3 estimates of YLD for 2002

The ten leading causes of YLD for the world, and for males and females are shown in Tables 16 and 17 below. The overall burden of non-fatal disabling conditions is dominated by a relatively short list of causes. In all regions, neuropsychiatric conditions are the most important causes of disability, accounting for over 37% of YLDs among adults (age 15+). The disabling burden of neuropsychiatric conditions is almost the same for males and females, but

the major contributing causes are different. While depression is the leading cause for both males and females, the burden of depression is 50% higher for females than males, and females also have higher burden from anxiety disorders, migraine and senile dementias. In contrast, the male burden for alcohol and drug use disorders is nearly six times higher than that for females, and accounts for one quarter of the male neuropsychiatric burden.

In high mortality developing regions, visual impairment, hearing loss and HIV/AIDS are the other major contributors to YLDs. In developed and low mortality developing regions, visual impairment, hearing loss, musculoskeletal disease, chronic obstructive pulmonary disease, and other noncommunicable diseases such as stroke account for the majority of adult disability.

Surprisingly, more than 80% of global non-fatal health outcomes occur in developing countries and nearly half of all YLDs are prevalent in high mortality developing countries. Although the prevalence of disabling conditions, such as dementia and musculoskeletal disease, is higher in countries with long life expectancies, this is offset by lower contributions to disability by conditions such as cardiovascular disease, chronic respiratory diseases and long-term sequelae of communicable diseases and nutritional deficiencies. In other words, people living in developing countries not only face lower life expectancies (higher risk of premature death) than those in developed countries but also live a higher proportion of their lives in poor health.

Table 16. Ten leading causes of YLD, global estimates for 2002

		% of total YLD
All countries		
1	Unipolar depressive disorders	11.8%
2	Hearing loss, adult onset	4.6%
3	Cataracts	4.5%
4	Alcohol use disorders	3.3%
5	Maternal conditions	3.3%
6	Schizophrenia	2.8%
7	Perinatal conditions	2.7%
8	Osteoarthritis	2.6%
9	Vision loss, age-related and other	2.5%
10	Bipolar affective disorder	2.5%

Table 17. Leading causes of YLD in males and females, global estimates, 2002

	Males	% total YLD		Females	% total YLD
1	Unipolar depressive disorders	9.6%	1	Unipolar depressive disorders	13.9%
2	Alcohol use disorders	5.8%	2	Maternal conditions	6.4%
3	Hearing loss, adult onset	4.8%	3	Cataracts	4.9%
4	Cataracts	4.5%	4	Hearing loss, adult onset	4.4%
5	Schizophrenia	2.8%	5	Osteoarthritis	3.1%
6	Perinatal conditions	2.8%	6	Vision disorders, age-related and other	2.7%
7	Bipolar affective disorder	2.5%	7	Schizophrenia	2.7%
8	Asthma	2.3%	8	Perinatal conditions	2.6%
9	Vision disorders, age-related and other	2.3%	9	Bipolar disorder	2.4%
10	Cerebrovascular disease	2.2%	10	Migraine	1.9%

4.4 DALYs for 2002

In terms of DALYs, 36% of total disease and injury burden for the world in 2002 was in children aged less than 15 years, and almost 50% in adults aged 15–59 years (Figure 15).

The ten leading causes of burden of disease among males and females are shown in Table 18 below. Ischaemic heart disease and stroke (cerebrovascular disease) are two of the four leading causes of burden of disease in adult males globally, following lower respiratory infections and perinatal causes. HIV/AIDS is the fourth leading cause for males and fifth for females accounting for around 5% of the global burden of disease. Unipolar depressive disorders are the sixth leading cause of burden for females, reflecting their higher prevalence in women.

Figure 15. Age distribution of burden of disease, developed and developing regions, 2002

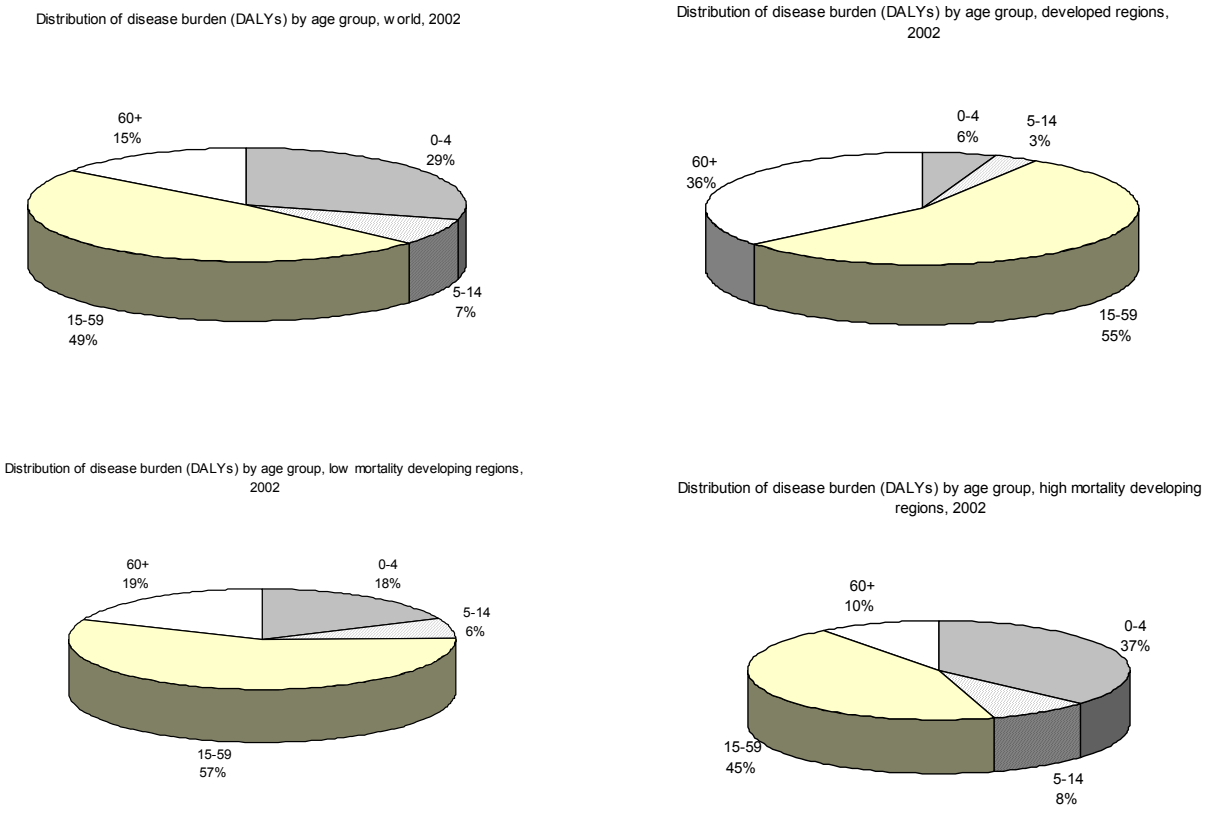


Table 18. Ten leading causes of burden of disease and injury, 2002

	% of total DALYs

All countries

1	Perinatal conditions	6.5%
2	Lower respiratory infections	5.8%
3	HIV/AIDS	5.8%
4	Unipolar depressive disorders	4.5%
5	Diarrhoeal diseases	4.1%
6	Ischaemic heart disease	3.9%
7	Cerebrovascular disease	3.3%
8	Malaria	3.0%
9	Road traffic accidents	2.6%
10	Tuberculosis	2.4%

Table 19. Leading causes of burden in males and females, Global estimates for 2002

	Males	% total DALYs		Females	% total DALYs
1	Perinatal conditions	6.9%	1	Perinatal conditions	6.2%
2	HIV/AIDS	5.8%	2	Lower respiratory infections	6.0%
3	Lower respiratory infections	5.7%	3	HIV/AIDS	5.7%
4	Ischaemic heart disease	4.4%	4	Unipolar depressive disorders	5.7%
5	Diarrhoeal diseases	4.1%	5	Maternal conditions	4.7%
6	Road traffic accidents	3.5%	6	Diarrhoeal diseases	4.1%
7	Unipolar depressive disorders	3.4%	7	Ischaemic heart disease	3.4%
8	Cerebrovascular disease	3.3%	8	Cerebrovascular disease	3.3%
9	Tuberculosis	2.9%	9	Malaria	3.2%
10	Malaria	2.8%	10	Cataracts	2.0%
11	Violence	2.3%	11	Measles	1.9%
12	Alcohol use disorders	2.2%	12	Congenital anomalies	1.9%
13	Chronic obstructive pulmonary disease	2.0%	13	Tuberculosis	1.8%
14	Congenital anomalies	1.8%	14	Hearing loss, adult onset	1.8%
15	Measles	1.7%	15	Chronic obstructive pulmonary disease	1.7%

The growing burden of noncommunicable diseases

The burden of noncommunicable diseases is increasing, accounting for nearly half of the global burden of disease (all ages), a 10% increase from estimated levels in 1990. While the proportion of burden from noncommunicable disease in developed regions remains stable at around 85% in adults aged 15 years and over, the proportion in middle-income countries has already exceeded 70%. Surprisingly, almost 50% of the adult disease burden in the high mortality regions of the world is now attributable to noncommunicable disease. Population ageing and changes in the distribution of risk factors have accelerated the epidemic of noncommunicable disease in many developing countries.

Cardiovascular diseases account for 13% of disease burden among adults (age 15+). Ischaemic heart disease and cerebrovascular disease (stroke) are the two leading causes of mortality and disease burden among older adults (age 60+). They are also among the top 10 causes of disease burden in adults aged 15–59 years. In developed countries, ischaemic heart disease and cerebrovascular disease (stroke) are together responsible for 36% of mortality, and death rates are higher for men than women. The increase in cardiovascular mortality in Eastern European countries has been offset by continuing declines in many other developed countries. In contrast, mortality and burden due to cardiovascular diseases are rapidly increasing in developing regions.

The proportion of adult burden (age 15+) attributable to cancer was 6% in developing countries and 14% in developed countries in 2002. Of the 7.1 million cancer deaths estimated to have occurred in 2002, 17% were attributable to lung cancer alone and of these, three-quarters occurred among men. There were an estimated 1.2 million lung cancer deaths in 2000, an increase of nearly 30% in the 10 years from 1990, reflecting the emergence of the tobacco epidemic in low-income and middle-income countries.

Stomach cancer, which until recently was the leading site of cancer mortality worldwide, has been declining in all parts of the world where trends can be reliably assessed and now causes 850 000 deaths each year, or about two-thirds as many as lung cancer. Liver cancer is the third

leading site, with 619 000 deaths per year, more than half of which are estimated to occur in the Western Pacific Region. Among adult females, the leading cause of cancer deaths is breast cancer. During the past decade, breast cancer survival rates have been improving, though the chance of survival varies according to factors such as coverage and access to secondary prevention. Globally, neuropsychiatric conditions account for 19% of disease burden among adults, almost all of this resulting from non-fatal health outcomes.

Injuries – a hidden epidemic among male young adults

Injuries, both unintentional and intentional, primarily affect young adults, often resulting in severe disabling sequelae. Injuries accounted for 16% of adult burden of disease in the world in 2002. In parts of the Americas, Eastern Europe, and the Eastern Mediterranean, more than 30% of the entire disease burden among male adults aged 15–44 is attributable to injuries.

Among young adult males aged 15–44, road traffic accidents, violence and self-inflicted injuries are all among the top 10 leading causes of disease burden. Globally, road traffic accidents are the third leading cause of burden in that age-sex group, preceded only by HIV/AIDS and unipolar depression. The burden of road traffic accidents is increasing, especially in the developing countries of sub-Saharan Africa, and southern Asia and South-East Asia, and particularly affects males.

Intentional injuries, a group that includes self-inflicted injuries and suicide, violence, and war, account for an increasing share of the burden, especially among economically productive young adults. In developed countries, suicides account for the largest share of intentional injury burden whereas, in developing regions, violence and war are the major sources. The former Soviet Union and other high mortality countries of Eastern Europe have rates of injury death and disability among males that are similar to those in sub-Saharan Africa.

Regional variations in burden of disease

Total DALYs by cause and broad country group are given in Table 20 below.

5. Conclusions

This discussion paper has summarised the methods, data sources and Version 3 results for the Global Burden of Disease 2000 project. Over the next 12 months, work will continue on the revision of YLD and YLL estimates with the intention of finalizing the GBD 2000 estimates for the year 2000.

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Table 20. Leading causes of burden in developed and developing countries, 2002

	Developed countries	% total DALYs
1	Ischaemic heart disease	9.1%
2	Unipolar depressive disorders	7.3%
3	Cerebrovascular disease	6.4%
4	Alcohol use disorders	3.6%
5	Hearing loss, adult onset	2.8%
6	Chronic obstructive pulmonary disease	2.6%
7	Road traffic accidents	2.5%
8	Trachea, bronchus, lung cancers	2.4%
9	Alzheimer and other dementias*	2.3%
10	Self-inflicted injuries	2.3%

	Developing high mortality countries	% total DALYs
1	HIV/AIDS	9.2%
2	Lower respiratory infections	8.5%
3	Perinatal conditions	8.0%
4	Diarrhoeal diseases	5.8%
5	Malaria	5.1%
6	Maternal conditions	3.1%
7	Unipolar depressive disorders	3.1%
8	Ischaemic heart disease	2.9%
9	Measles	2.8%
10	Tuberculosis	2.7%

	Developing low mortality countries	% total DALYs
1	Unipolar depressive disorders	6.0%
2	Perinatal conditions	5.9%
3	Cerebrovascular disease	5.0%
4	Road traffic accidents	3.7%
5	Ischaemic heart disease	3.3%
6	Chronic obstructive pulmonary disease	3.1%
7	Lower respiratory infections	2.6%
8	Tuberculosis	2.4%
9	Diarrhoeal diseases	2.4%
10	Cataracts	2.4%

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References

(1) World Bank. World Development Report 1993. Investing in health. New York: Oxford University Press for the World Bank, 1993.

(2) Murray CJL, Lopez AD. Quantifying disability: data, methods and results. *Bulletin of the World Health Organization* 1994; 72(3):481-494.

(3) Murray CJL, Lopez AD, Jamison DT. The global burden of disease in 1990: summary results, sensitivity analysis and future directions. *Bulletin of the World Health Organization* 1994; 72(3):495-509.

(4) Murray CJL, Lopez AD. The Global Burden of Disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020. 1, 211. 1996. Harvard University Press, Cambridge. Global Burden of Disease and Injury Series.

(5) Murray CJL, Lopez AD. Global Health Statistics. Cambridge: Harvard University Press, 1996.

(6) Murray CJL, Lopez AD. Evidence-based health policy -- lessons from the Global Burden of Disease Study. *Science* 1996; 274(5288):740-743.

(7) Field MJ, Gold GM. Summarizing Population Health: Directions for the Development and Application of Population Metrics. Institute of Medicine, Washington, D.C.: National Academy Press, 1998.

(8) Murray CJL, Salomon JA, Mathers CD, Lopez AD. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: WHO, 2002.

(9) Murray CJL. Rethinking DALYs. In: Murray CJL, Lopez AD, editors. The Global Burden of Disease. Cambridge: Harvard University Press, 1996: 1-98.

(10) Mathers CD, Bernard C, Iburg KM, Inoue M, Ma Fat D, Shibuya K et al. Global Burden of Disease in 2002: data sources, methods and results. GPE Discussion Paper No. 54. 2003. World Health Organization, Geneva.

(11) World Health Organization. World Health Report 2002. Reducing Risks, Promoting Healthy Life. Geneva: WHO, 2002.

(12) Ezzati M, Lopez A, Vander Hoorn S, Rodgers A, Murray CJL, Comparative Risk Assessment Collaborative Group. Selected major risk factors and global and regional burden of disease. *Lancet* 2002; 360(9343):1347-1360.

(13) Ezzati M, Lopez A, Rodgers A, Murray CJL. Comparative Quantification of Health Risks: Global and Regional Burden of Disesae Attributable to Several Major Risk Factors. Geneva: WHO, 2003.

(14) World Health Organization. World Health Report 2003: shaping the future. Geneva: WHO, 2003.

(15) World Health Organization. World Health Report 2000. Health Systems: Improving Performance. Geneva: WHO, 2000.

(16) Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death, Ninth Revision. Geneva: World Health Organization, 1977.

(17) World Health Organization. International Classification of Diseases and related health problems – Tenth Revision (ICD 10). Geneva: WHO, 1992.

(18) United Nations Population Division. World Population Prospects - the 2002 revision. 2003. United Nations, New York.

(19) Lopez AD, Ahmad O, Guillot M, Ferguson B, Salomon J, Murray C.J.L et al. World Mortality in 2000: life tables for 191 countries. Geneva: World Health Organization, 2002.

(20) Murray CJL, Ferguson BD, Lopez AD, Guillot M, Salomon J.A., Ahmad O. Modified logit life table system: principles, empirical validation and application. *Population Studies* 2003; 57(2):1-18.

(21) Lopez AD, Ahmad O, Guillot M, Inoue M, Ferguson B. Life tables for 191 countries for 2000: data, methods, results. GPE Discussion Paper No. 40. 2001. WHO, Geneva.

(22) Murray CJL, Ferguson B, Lopez AD, Guillot M, Salomon JA, Ahmad O. The modified logit lifetable system: principles, empirical validation, and application. Health Systems Performance Assessment Discussion Paper. Global Programme on Evidence for Health Policy. 2001. WHO, Geneva.

(23) Hill K. Personal communication. 2003.

(24) Salomon JA, Murray CJL, Ferguson B. Methods for life expectancy and disability-adjusted life expectancy uncertainty analysis. GPE discussion paper No. 10. 2002. WHO, Geneva.

(25) Lozano R, Murray CJL, Lopez AD, Satoh T. Miscoding and misclassification of ischaemic heart disease mortality. GPE Discussion Paper No. 12. 2001. WHO, Geneva.

(26) Boschi-Pinto C, Murray CJL, Lopez AD, Lozano R. Cancer survival by site for 14 regions of the world. GPE Discussion Paper No. 13. 2000. WHO, Geneva.

(27) Lozano R, Torres LM, Lara J, Soliz P. Impact of the implementation of ICD 10th revision on Diabetes Mellitus mortality trends in mexico. 2002. WHO,

(28) CDC. Years of healthy life -- selected states, United States, 1993-1995. *JAMA* 1998; 279(9):649.

(29) Salomon JA, Murray CJL. Compositional models for mortality by age, sex and cause. GPE Discussion Paper No. 11. 2001. WHO, Geneva.

(30) Salomon JA, Murray CJL. The epidemiologic transition revisited:compositional models for causes of death by age and sex. *Population and Development Review* 2002; 28(2):205-228.

(31) Mahapatra P. Estimating National Burden of Disease: The Burden of Disease in Andhra Pradesh, 1990's. Hyderabad: Institute of Health Systems, 2002.

(32) Gajalakshmi V, Peto R, Kanaka S, Balasubramian S. Verbal Autopsy of 48000 Adult Deaths Attributable to Medical Causes in Chennai (formerly Madras). *BioMed Central* 2002; 16(2(1):7).

(33) Dye C, Scheele S, Dolin P, Pathania V, Raviglione M. Global Burden of Tuberculosis:estimated incidence, prevalence and moratlity by country. *JAMA* 2002;(282):677-686.

(34) Corbett EL, Watt CJ, Walker N. The Growing Burden of Tuberculosis: Global Trends and Interactions with the HIV Epidemic (In preparation). 2002. WHO, Geneva.

(35) World Health Organization. Global Tuberculosis Control: Surveillance, Planning and Financing. Geneva: WHO, 2003.

(36) Prescott CA, Kibel MA. Ear and hearing disorders in rural grade 2 (Sub B) schoolchildren in the western Cape. *South African Medical Journal* 1991; 79(2):90-93.

(37) Klion FM, Fabry TL, Palmer M, Schaffner F. Prediction of survival of patients with primary biliary cirrhosis. Examination of the Mayo Clinic model on a group of patients with known endpoint. *Gastroenterology* 1992; 102(1):310-313.

(38) UNAIDS Reference Group on Estimates MaP. Improved Methods and Assumptions for Estimation and Projection of HIV/AIDS Epidemics. *AIDS* 2002; 16:1-16.

(39) Stover J, Walker N, Garnett GP, Salomon JA, Stanecki KA, Ghys PD et al. Can we reverse the HIV/AIDS pandemic with an expanded response? *Lancet* 2002; 360(9326):73-77.

(40) Boschi-Pinto C, Tomaskovic L, Gouws E, Shibuya K. Diarrhoea mortality in under-fives in the developing world. 2003. World Health Organization (forthcoming), Geneva.

(41) Stein C, Birmingham M, Duclos P, Kurian M, Strebel P. The global burden of measles in the year 2000 – a model using country-specific indicators. Journal of Infectious Diseases. In press.

(42) Crowcroft N, Stein C, Duclos P, Birmingham M. How to best estimate the global burden of pertussis (submitted 2002). *Epidemiology and Infection* 2002.

(43) Crowcroft NS, Stein C, Duclos P, Birmingham M. How to best estimate the global burden of pertussis? Lancet Infectious Diseases. In press.

(44) Galazka AM, Robertson SE. Pertussis. In: Stein C, Murray CJL, Lopez AD, editors. The Global Epidemiology of Infectious Diseases (in press). World Health Organization, 2003.

(45) Stein C, Robertson M. Global Burden of Diptheria in the Year 2000. GBD Working Paper. 2002. World Health Organization, Geneva.

(46) Stein C. Global Burden of poliomyelitis in the year 2000. GBD 2000 Working Paper. 2002. World Health Organization (http://www.who.int/evidence/bod), Geneva.

(47) Williams BG, Gouws E, Boschi-Pinto C, Bryce J, Dye C. Estimates of world-wide distribution of child deaths from acute respiratory infections. *Lancet* 2002; 2:25-32.

(48) Snow RW, Craig M, Deichmann U, Marsh K. Estimating mortality, morbidity and disability due to malaria among Africa's non-pregnant population. *Bulletin of the World Health Organization* 1999; 77(8):624-640.

(49) Moncayo A, Guhl F, Stein C. The Global Burden of Chagas' Disease in the Year 2000. GBD 2000 Working Paper. GBD Working Paper. 2002. World Health Organization (http://www.who.int/evidence/bod), Geneva. GBD Discussion Paper.

(50) Abdallah MB, Zehani S. Registre des cancers Nord-Tunisie 1994. 2000. Ministere de la Sante Publique, Institut Salah Azaiz, Institut National de la Sante Publique, Tunisia.

(51) Hill K, AbouZhar C, Wardlaw T. Estimates of maternal mortality for 1995. *Bulletin of the World Health Organization* 2001; 79(3):182-193.

(52) WHO/UNICEF/UNFPA. Maternal mortality in 2000: Estimates developed by WHO, UNICEF and UNFPA. 2003. WHO (forthcoming), Geneva.

(53) Murray CJL, Lopez AD. Health dimensions of sex and reproduction. Cambridge: Harvard University Press, 1998.

(54) Mathers CD, Shibuya K, Boschi-Pinto C, Lopez AD, Murray CJ. Global and regional estimates of cancer mortality and incidence by site: I. Application of regional cancer survival model to estimate cancer mortality distribution by site. *BMC Cancer* 2002; 2(1):36.

(55) Shibuya K, Mathers CD, Boschi-Pinto C, Lopez AD, Murray CJL. Global and regional estimates of cancer mortality and incidence by site: II. Results for the Global Burden of Disease Study 2000. *BMC Cancer* 2002; 2:37.

(56) Surveillance, Epidemiology and End Results (SEER) Program Public-Use Data (1973-1999), National Cancer Institute. 2002. National Cancer Institute,

(57) Cancer Survival in Australia, 2001; Part 1:National Summary Statistics. 2001. Australian Institute of Health and Welfare (AIHW), Canberra. Cancer Survival in Australia, 2001.

(58) Annual Report of Osaka cancer Cancer Registry No 64 - Cancer incidence and medical care in Osaka in 1998 and the Survival in 1994. No. 64. 2001. Osaka Prefectural Department of Public Health and Welfare, Osaka, Japan.

(59) Berrino F, Capocaccia R, Estève J, Gatta G, Hakulinen T, Micheli A et al. Survival of cancer patients in Europe: the EUROCARE-2 study. IARC Scientific Publications No. 151. Lyon, France: International Agency for Research on Cancer, 1999.

(60) Eisenberg H, Sullivan PD, Connelly RR. Cancer in Connecticut. Survival experience. Hartford: Connecticut State Department of Health, 1968.

(61) Lag R, Eisner MP, Kosary CL. SEER Cancer Statistics Review, 1973-1999. Bethesda: National Cancer Institute, 2002.

(62) Sankaranarayanan R, Black RJ, Parkin DM. Cancer survival in developing countries. IARC Scientific Publications No. 145. Lyon, France: International Agency for Research on Cancer, 1998.

(63) Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer survival in Australia, 2001. Part 1: National summary statistics. 2001. AIHW, Canberra.

(64) Australian Institute of Health and Welfare (AIHW), Australasian Association of Cancer Registries (AACR). Cancer survival in Australia, 2001. Part 2: Statistical tables. 2001. AIHW, Canberra.

(65) Ferlay J, Bray F, Pisani P, Parkin DM. Globocan 2000: Cancer Incidence, Mortality and Prevalence Worldwide, Version 1.0. IARC CancerBase No. 5. 2001. IARCPress, Lyon.

(66) Degenhardt L, Hall W, Warner-Smith M, Lynskey M. Illicit Drugs. In: Ezzati M, Lopez A, Rodgers A, Murray CJL, editors. Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors. Geneva: WHO, 2003.

(67) European Monitoring Centre for Drugs and Drug Addiction. Annual report on the state of the drugs problem in the European Union and Norway. 2002.

(68) Single E, Robson L, Xie X, Rehm J. The costs of substance abuse in Canada. Ottawa: Canadian Centre on Substance Abuse. Ottawa: Canadian Centre on Substance Abuse, 2002.

(69) Project Ploughshares. Armed Conflict Report. 2001. Project Ploughshares, Waterloo, Canada.

(70) CRED. EM-DAT: The OFDA/CRED International Disaster Database. 2001. Université Catholique de Louvain, Belgium.

(71) Gleditsch NP, Wallensteen P, Eriksson M, Sollenberg M, Strand H. Armed Conflict 1946-2001: A New Dataset. *Journal of Peace Research* 2002; 39(5):615-637.

(72) Marshall MG, Gurr TR. Peace and Conflict 2003: A Global Survey of Armed Conflicts, Self-Determination Movements, and Democracy. College Park, Maryland: Center for International Development and Conflict Management, 2003.

(73) Murray CJ, King G, Lopez AD, Tomijima N, Krug EG. Armed conflict as a public health problem. *British Medical Journal* 2002; 324(7333):346-349.

(74) Human Rights Watch. Landmine Monitor Report:2001 Toward a Mine-Free World. 2001. Human Rights Watch, New York.

(75) Handicap International. Landmine Victim Assistance: World Report 2001. *Handicap International* 2001.

(76) Salomon JA, Mathers CD, Murray CJL, Ferguson B. Methods for life expectancy and healthy life expectancy uncertainty analysis. GPE Discussion Paper No. 10. 2001. WHO. Available on the worldwide web at http://www.who.int/evidence, Geneva.

(77) Mathers CD, Vos T, Lopez AD, Ezzati M. National Burden of Disease Studies: A Practical Guide. Edition 1.0. 2001. World Health Organization, Global Program on Evidence for Health Policy, Geneva.

(78) Sadana R, Mathers CD, Lopez AD, Murray CJL, Moesgaard-Iburg K. Comparative analysis of more than 50 household surveys of health status. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(79) Murray CJL, Tandon A, Salomon JA, Mathers CD. New approaches to enhance cross-population comparability of survey results. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(80) Salomon JA. Global Burden of Tuberculosis in the Year 2000. GBD 2000 Working Paper. 2002. WHO, Geneva. GBD 2000 Working Paper.

(81) Schwartlander B, Stanecki KA, Brown T, Way PO, Monasch R, Chin J et al. Country-specific estimates and models of HIV and AIDS: methods and limitations. *AIDS* 1999; 13(17):2445-2458.

(82) Salomon JA, Murray CJL. Modelling HIV/AIDS epidemics in sub-Saharan Africa using seroprevalence data from antenatal clinics. *Bulletin of the World Health Organization* 2001; 79(7):596-607.

(83) Salomon JA. Global Burden of HIV/AIDS in the Year 2000. GBD 2000 Working Paper. 2002. WHO, Geneva. GBD 2000 Working Paper.

(84) Bern C. Infectious diarrhoea. In: Stein C, Murray CJL, Lopez AD, editors. The Global Epidemiology of Infectious Diseases (in press). World Health Organization, 2003.

(85) Doumenge JP, Mott KE, Cheung C, Villenave D, Chapuis O, Perrin MF et al. Atlas de la répartition mondiale des schistosomiases / Atlas of the global distribution of schistosomiasis. Bordeaux: Presses Universitaires de Bordeaux, 1987.

(86) World Health Organization. Onchocerciasis and its control. Report of a WHO Expert Committee on Onchocerciasis Control. WHO Technical Report Series 852. 1995. World Health Organization, Geneva.

(87) Richards FO, Jr., Boatin B, Sauerbrey M, Seketeli A. Control of onchocerciasis today: status and challenges. *Trends in Parasitology* 2001; 17(12):558-563.

(88) Alley WS, van Oortmarssen GJ, Boatin BA, Nagelkerke NJ, Plaisier AP, Remme JH et al. Macrofilaricides and onchocerciasis control, mathematical modelling of the prospects for elimination. *BMC Public Health* 2001; 1(1):12.

(89) Shibuya K, Ezzati M. Global Burden of Onchocerciasis in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(90) Ranson MK, Evans TG. The global burden of trachomatous visual impairment: I. Assessing prevalence. *International Ophthalmology* 1995; 19(5):261-270.

(91) Frick K, Basilion E, Hanson C, Colchero A. Estimating the burden and economic impact of trachomatous visual loss. *Ophthalmic Epidemiology* 2003; 10(2):121-132.

(92) Dolin PJ, Faal H, Johnson GJ, Minassian D, Sowa S, Day S et al. Reduction of trachoma in a sub-Saharan village in absence of a disease control programme. *Lancet* 1997; 349(9064):1511-1512.

(93) Shibuya K, Mathers CD. Global Burden of Trachoma in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(94) Stein C. Global Burden of protein-energy malnutrition in the year 2000. GBD 2000 Working paper. 2002. World Health Organization, Geneva.

(95) Rastogi T, Stein C. Global Burden of Iodine Deficiency Disorders in the Year 2000. (Available soon). 2002. WHO, Geneva.

(96) Rastogi T, Stein C. Global Burden of Iron Deficiency Anaemia in the Year 2000. 2002. WHO, Geneva.

(97) Shibuya K, Mathers CD, Boschi-Pinto C, Lopez A, Murray CJL. Global and Regional Estimates of Cancer Mortality and Incidence by Site: II. Results for the Global Burden of Disease. BioMed Central, Cancer 2002. In press.

(98) Wild S, Roglic G, Sicree R, Green A, King H. Global Burden of Diabetes Mellitus in the Year 2000. GBD 2000 Working Paper. GBD 2000 Working Paper. 2002. World Health Organization (http://www.who.int/evidence.bod), Geneva.

(99) Ayuso-Mateos JL. Global Burden of Unipolar depressive disorders in the year 2000. GBD 2000 Working Paper. GBD Working Paper. 2002. World Health Organization (http://www.who.int/evidence/bod), Geneva.

(100) Mathers CD, Murray CJL, Salomon JA, Lopez AD. Estimates of healthy life expectancy for 191 countries in the year 2000: methods and results. GPE Discussion Paper No.38. 2001. WHO, Geneva.

(101) Ayuso-Mateos JL. Global Burden of Bipolar Disorder in the Year 2000. GBD 2000 Working Paper. GBD 2000 Working Paper. 2002. World Health Organization (http://www.who.int/evidence/bod), Geneva.

(102) Ayuso-Mateos JL. Global Burden of schizophrenia in the year 2000 - Version 1 Estimates. GBD 2000 Working Paper. GBD Working Paper. 2002. World Health Organization (http://www.who.int/evidence/bod), Geneva.

(103) Ayuso-Mateos JL. Global Burden of post-traumatic stress disorder in the year 2000: version 1 estimates. GBD 2000 Working Paper. GBD 2000 Working Paper. 2002. WHO (http://www.who.int/evidence/bod), Geneva.

(104) Ayuso-Mateos JL. Global Burden of Obsessive Compulsive Disorders in the Year 2000. GBD 2000 Working Paper. BD 2000 Working Paper. 2002. WHO (http//:www.who.int/evidence/bod), Geneva.

(105) Ayuso-Mateos JL. Global Burden of panic disorder in the year 2000: Version 1 Estimates. GBD 2000 Working Paper. GBD 2000 Working Paper. 2002. WHO (http://www.who.int/evidence/bod), Geneva.

(106) Mathers CD, Ayuso-Mateos JL. Global Burden of alcohol use disorders in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(107) Rehm J, Room R, Monteiro M, Gmel G, Graham K, Rehn N et al. Alcohol. In: Ezzati M, Lopez A, Rodgers A, Murray CJL, editors. Comaprative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors. Geneva: WHO, 2003.

(108) Mathers CD, Leonardi M. Global Burden of dementia in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(109) Leonardi M, Mathers CD. Global burden of migrane in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(110) Thylefors B, Negrel AD, Pararajasegaram R, Dadzie KY. Global data on blindness. *Bulletin of the World Health Organization* 1995; 73(1):115-121.

(111) Pascolini D, Mariotti S, Pokharel GP, Pararajasegaram R, Etya'ale D, Negrel AD et al. Available Data on Visual Impairment: 2002 Global Update (forthcoming). 2003.

(112) Resnikoff S, Mariotti S, Pascolini D, Pararajasegaram R, Pokharel GP, Etya'ale D. Global data on Visual Impairment in the Year 2002 (forthcoming). 2003.

(113) Shibuya K, Bernard C, Mariotti S, Pascolini D. Global Burden of vision loss and blindness in the Year 2000: summary of methods and data sources. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(114) Mathers CD, Smith A, Concha M. Global Burden of hearing loss in the year 2000. GBD 2000 Working Paper. 2003. World Health Organization, Geneva.

(115) Mathers CD, Satoh T, Begg S, Truelsent T. Global Burden of Ischaemic Heart Disease in the Year 2000. GBD 2000 Working Paper. 2002. WHO, Geneva. GBD 2000 Working Paper.

(116) Truelsent T, Begg S, Mathers CD, Satoh T. Global Burden of Cerebrovascular Disease in the Year 2000. GBD 2000 Working Paper. 2002. WHO, Geneva. GBD 2000 Working Paper.

(117) Shibuya K, Mathers CD, Lopez A. Chronic Obstructive Pulmonary Disease (COPD): consistent estimates of incidence, prevalence and mortality by WHO region. GBD 2000 Working Paper. World Health Organization, Geneva.

(118) Barendregt JJ, Baan CA, Bonneux L. An indirect estimate of the incidence of non-insulin-dependent diabetes mellitus. *Epidemiology* 2000; 11(3):274-279.

(119) The International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee. Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 1998; 12(2):315-335.

(120) The International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee. Worldwide variation in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC. *Lancet* 1998; 351(9111):1225-1232.

(121) Chinn S, Burney P, Jarvis D, Luczynska C. Variation in bronchial responsiveness in the European Community Respiratory Health Survey (ECRHS). *Eur Respir J* 1997; 10(11):2495-2501.

(122) Pearce N, Sunyer J, Cheng S, Chinn S, Bjorksten B, Burr M et al. Comparison of asthma prevalence in the ISAAC and the ECRHS. ISAAC Steering Committee and the

European Community Respiratory Health Survey. International Study of Asthma and Allergies in Childhood. *Eur Respir J* 2000; 16(3):420-426.

(123) Symmons DP, Mathers CD, Lopez AD, Pfleger B. The global burden of rhematoid arthritis in the year 2000. GBD 2000 Working Paper. GBD 2000 Working Paper. 2002. WHO, Geneva.

(124) Symmons DP, Mathers CD, Pfleger B. Blobal Burden of Osteoarthritis in the Year 2000. Global Burden of Disease 2000 Working Paper. 2002. World Health Organization, Geneva.

(125) Begg S, Tomijima N, Vos T, Mathers CD. Global Burden of Injury in the Year 2000: an Ovreview of Methods. GBD 2000 Working Paper. 2002. World Health Organization, Geneva.

(126) Ustun TB, Chatterji S, Villanueva M, Bendib L, Celik C, Sadana R et al. WHO Multi-country survey study on health and responsiveness 2000-2001. GPE discussion paper No. 37. 2000. WHO, Geneva.

(127) Salomon JA, Murray CJL. Estimating health state valuations using a multiple-method protocol. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(128) Wolfson MC. Health-adjusted life expectancy. *Health Reports* 1996; 8(1):41-46.

(129) Murray CJL, Lopez AD. Regional patterns of disability-free life expectancy and disability-adjusted life expectancy: Global Burden of Disease Study. *Lancet* 1997; 349(9062):1347-1352.

(130) Mathers CD, Vos T, Stevenson C. The burden of disease and injury in Australia. Australian Institute of Health and Welfare, Canberra: AIHW, 1999.

(131) Sen A. Health: perception versus observation. *British Medical Journal* 2002; 324:860-861.

(132) Ustun TB, Chatterji S, Villanueva M, Bendib L, Sadana R, Valentine N et al. WHO multi-country household survey study on health and responsiveness, 2000-2001. GPE Discussion Paper No. 37. 2001. WHO, Geneva.

(133) Anand S, Ammar W, Evans T, Hasegawa T, Kissimova-Skarbek K, Langer A et al. Report on the Scientific Peer Review Group on Health Systems Performance Assessment. In: Murray CJL, Evans D, editors. Health systems performance assessment: debates, methods and empricism. Geneva: World Health Organisation, 2003.

(134) Murray CJL, Salomon JA, Mathers CD. A critical examination of summary measures of population health. *Bulletin of the World Health Organization* 2000; 78(8):981-994.

(135) Mathers CD, Sadana R, Salomon JA, Murray CJL, Lopez AD. Healthy life expectancy in 191 countries, 1999. *Lancet* 2001; 357(9269):1685-1691.

(136) Mathers CD, Murray CJL, Lopez AD, Sadana R, Salomon JA. Global patterns of healthy life expectancy for older women. *Journal of Women & Aging* 2002; 14(1-2):99-117.

(137) Mathers CD, Murray CJL, Salomon JA, Sadana R, Tandon A, Lopez AD et al. Healthy life expectancy: comparison of OECD countries in 2001. *Australian and New Zealand Journal of Public Health* 2003; 27(1):5-11.

(138) Mathers CD, Salomon JA, Murray CJL. Infant mortality is not an adequate summary measure of population health. *Journal of Epidemiology and Community Health* 2003; 57(5):319-319.

(139) Ezzati M, Vander Hoorn S, Rodgers A, Lopez AD, Mathers CD, Murray CJL et al. Estimates of global and regional potential health gains from reducing multiple major risk ractors. *Lancet* 2003; 362:271-280.

(140) Murray CJL, Salomon JA, Mathers CD. The individual basis for summary measures of population health. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(141) Mathers CD. Health expectancies: an overview and critical appraisal. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(142) Mathers CD, Ezzati M, Lopez AD, Murray CJL, Rogers A. Causal decomposition of summary measures of population health. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(143) Murray CJL, Salomon JA, Mathers CD, Lopez AD. Summary measures of population health: conclusions and recommendations. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(144) Mathers CD, Murray CJL, Lopez AD, Sadana R, Salomon JA. Global patterns of healthy life expectancy for older women. In: Laditka SB, editor. Health expectations for older women: international perspectives. New York: The Halworth Press, 2002: 99-118.

(145) Mathers CD, Murray CJL, Lopez AD, Salomon JA, Sadana R. Global patterns of health expectancy in the year 2000. In: Robine JM, Jagger C, Mathers CD, Crimmins EM, Suzman RM, editors. Determining health expectancies. Chichester: John Wiley & Sons, 2003: 335-358.

(146) Sullivan DF. A single index of mortality and morbidity. HSMHA Health Reports 86, 347-354. 1971.

(147) Australian Bureau of Statistics. National Health Survey: user's guide 1995. ABS cat. no. 4363.0. 1996. ABS, Canberra.

(148) Australian Bureau of Statistics. Menatl health and wellbeing: profile of adults. ABS cat. no. 4326.0. 1998. ABS, Canberra.

(149) Australian Bureau of Statistics. National survey of mental health and wellbeing of adults: users' guide. ABS cat. no. 4327.0. 1999. ABS, Canberra.

(150) National Center for Health Statistics. Data File Documentation, National Health Interview Survey, 2000 (machine readable data file and documentation). 2002. National Center for Health Statistics, Hyattsville, Maryland.

(151) Scientific Institute of Public Health. Belgium Health Interview Survey 1997. 1997. Center for Operational Public Health Research, Department of Epidemiology, Scientific Institute of Public Health,

(152) National Institute of Public Health. Danish Health and Morbidity Survey 1994. 1994. National Institute of Public Health, Denmark.

(153) Moesgaard-Iburg K, Salomon JA, Tandon A, Murray CJL. Cross-population comparability of physician-assessed and self-reported measures of health. In: Murray CJL, Salomon JA, Mathers CD, Lopez AD, editors. Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization, 2002.

(154) Tandon A, Murray CJL, Salomon J, King G. Statistical models for enhancing cross-population comparability. GPE Discussion Paper No. 42. 2002. WHO, Geneva.

ANNEX TABLES

Annex Table 1. Regional reporting categories for Global Burden of Disease 2000 project:: WHO regions and 14 subregions.

WHO region	Mortality stratum	WHO Member States
AFRO	D	Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Sao Tome And Principe, Senegal, Seychelles, Sierra Leone, Togo
AFRO	E	Botswana, Burundi, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic Of The Congo, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
AMRO	A	Canada, United States Of America, Cuba
AMRO	B	Antigua And Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts And Nevis, Saint Lucia, Saint Vincent And The Grenadines, Suriname, Trinidad And Tobago, Uruguay, Venezuela
AMRO	D	Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru
EMRO	B	Bahrain, Iran (Islamic Republic Of), Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates
EMRO	D	Afghanistan, Djibouti, Egypt, Iraq, Morocco, Pakistan, Somalia, Sudan, Yemen
EURO	A	Andorra, Austria, Belgium, Croatia, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
EURO	B	Albania, Armenia, Azerbaijan, Bosnia And Herzegovina, Bulgaria, Georgia, Kyrgyzstan,Poland, Romania, Slovakia, Tajikistan, The Former Yugoslav Republic Of Macedonia, Turkey, Turkmenistan, Uzbekistan, Yugoslavia
EURO	C	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine
SEARO	B	Indonesia, Sri Lanka, Thailand
SEARO	D	Bangladesh, Bhutan, Democratic People's Republic Of Korea, India, Maldives, Myanmar, Nepal
WPRO	A	Australia, Japan, Brunei Darussalam, New Zealand, Singapore
WPRO	B	Cambodia, China, Lao People's Democratic Republic, Malaysia, Mongolia, Philippines, Republic Of Korea, Viet Nam
		Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States Of), Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

Annex Table 2. Regional epidemiological analysis categories for Global Burden of Disease 2000 project:: GBD regions and 17 subregions.

GBD region	Mortality stratum	Region code	WHO Member States	Reporting subregion
AFRO	D	1	Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, Sao Tome And Principe, Senegal, Seychelles, Sierra Leone, Togo,	AFRO D
			Djibouti, Somalia, Sudan	EMRO D
AFRO	E	2	Botswana, Burundi, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic Of The Congo, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe	AFRO E
AMRO	A	3	Canada, United States Of America	AMRO A
AMRO	B	4	Antigua And Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts And Nevis, Saint Lucia, Saint Vincent And The Grenadines, Suriname, Trinidad And Tobago, Uruguay, Venezuela	AMRO B
			Cuba	AMRO A
AMRO	D	5	Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru	AMRO D
EMRO	B	6	Bahrain, Iran (Islamic Republic Of), Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates	EMRO B
			Cyprus	EURO A
EMRO	D	7	Egypt, Iraq, Morocco, Yemen	EMRO D
EURO	A	8	Andorra, Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom	EURO A
EURO	B1	9	Albania, Bosnia And Herzegovina, Bulgaria, Georgia, Poland, Romania, Slovakia, The Former Yugoslav Republic Of Macedonia, Turkey, Yugoslavia	EURO B
EURO	B2	10	Armenia, Azerbaijan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	EURO B
EURO	C	11	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine	EURO C
SEARO	B	12	Indonesia, Sri Lanka, Thailand	SEARO B
			Malaysia, Philippines	WPRO B
			Brunei Darussalam, Singapore	WPRO A
SEARO	D	13	Bangladesh, Bhutan, India, Maldives, Nepal	SEARO D
			Afghanistan, Pakistan	EMRO D
WPRO	A	14	Australia, Japan, New Zealand	WPRO A
WPRO	B1	15	China, Mongolia, Republic Of Korea	WPRO B
			DPR Korea	SEARO D
WPRO	B2	16	Cambodia, Lao People's Democratic Republic, Viet Nam	WPRO B
			Myanmar	SEARO D
WPRO	B3	17	Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia (Federated States Of), Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu	WPRO B

Annex Table 3: GBD2000 cause categories and ICD codes

Code	GBD Cause Name	ICD-9 code	ICD-10 code
U000	**All Causes**		
U001	**I. Communicable, maternal, perinatal and nutritional conditions (a)**	001-139, 243, 260-269,*279.5*, 280-281, 285.9, 320-323, 381-382,460-465, 466, 480-487, 614-616, 630-676, 760-779	A00-B99, G00-G04, N70-N73, J00-J06, J10-J18, J20-J22, H65-H66, O00-O99, P00-*P96*, E00-E02, E40-E46, E50, D50-D53, D64.9, E51-64
U002	**A. Infectious and parasitic diseases**	001-139, *279.5*, 320-323, 614-616, 771.3	A00-B99, G00, G03-G04, N70-N73
U003	1. **Tuberculosis**	010-018, 137	A15-A19, B90
U004	2. **Sexually transmitted diseases excluding HIV**	090-099, 614-616	A50-A64, N70-N73
U005	a. Syphilis	090-097	A50-A53
U006	b. Chlamydia	-	A55-A56
U007	c. Gonorrhoea	098	A54
U008	Other STDs	099, 614-616	A57-A64, N70-N73
U009	3. **HIV/AIDS**	279.5 (=042-044)	B20-B24
U010	4. **Diarrhoeal diseases**	001, 002, 004, 006-009	*A00, A01,A03, A04*, A06-A09
U011	5. **Childhood-cluster diseases**	032, 033, 037, 045, 055, 138, 771.3	A33-A37, A80, B05, B91
U012	a. Pertussis	033	A37
U013	b. Poliomyelitis	045, 138	A80,B91
U014	c. Diphtheria	032	A36
U015	d. Measles	055	B05
U016	e. Tetanus	037, 771.3	A33-A35
U017	6. **Meningitis**	036, 320-322	A39, G00, G03
U018	7. **Hepatitis B**	070.2-070.9	B16-B19 (minus B17.1, B18.2)
U019	**Hepatitis C**	-	B17.1, B18.2
U020	8. **Malaria**	084	B50-B54
U021	9. **Tropical-cluster diseases**	085, 086, 120, 125.0, 125.1, 125.3	B55-B57, B65, B73, B74.0-B74.2
U022	a. Trypanosomiasis	086.3, 086.4, 086.5,	B56
U023	b. Chagas disease	086.0, 086.1, 086.2, 086.9	B57
U024	c. Schistosomiasis	120	B65
U025	d. Leishmaniasis	085	B55
U026	e. Lymphatic filariasis	125.0, 125.1	B74.0-B74.2
U027	f. Onchocerciasis	125.3	B73
U028	10. **Leprosy**	030	A30
U029	11. **Dengue**	061	A90-A91
U030	12. **Japanese encephalitis**	062.0	A83.0
U031	13. **Trachoma**	076	A71
U032	14. **Intestinal nematode infections**	126-129	*B76-B81*
U033	a. Ascariasis	127.0	B77
U034	b. Trichuriasis	127.3	B79
U035	c. Hookworm disease (Ancylostomiasis and necatoriasis)	126	B76
U036	Other intestinal infections	127.1, 127.2, 127.4-127.9, 128, 129	B78, B80,B81

Annex Table 3 (continued): GBD2000 cause categories and ICD codes

Code	GBD Cause Name	ICD-9 code	ICD-10 code
U037	Other infectious diseases	003, 005, 020-027, 031, 034, 035, 038-041, 046-049, 050-054, 056-057, 060, 062.1-066, 070.0-070.1, 071-075, 077-079, 080-083, 087-088, 100-104, 110-118, 121-124, 125.2, 125.4, 125.5, 125.6, 125.7, 125.9, 130-136, 139, 323	A02,A05,A20-A28,A31,A32,A38,A40-A49,A65-A70,A74-A79,A81,A82,A83.1-A83.9,A84-A89,A92-A99,B00-B04,B06-B15,B25-B49,B58-B60,B64,B66-B72,B74.3-B74.9,B75,B82-B89,B92-B99, G04
U038	**B. Respiratory infections**	460-466, 480-487, 381-382	J00-J06, J10-J18, J20-J22, H65-H66
U039	1. Lower respiratory infections	466, 480-487	J10-J18, J20-J22
U040	2. Upper respiratory infections	460-465	J00-J06
U041	3. Otitis media	381-382	H65-H66
U042	**C. Maternal conditions**	630-676	O00-O99
U043	1. Maternal haemorrhage	640, 641, 666	O44-O46, O67, O72
U044	2. Maternal sepsis	670	O85-O86
U045	3. Hypertensive disorders of pregnancy	642	O10-O16
U046	4. Obstructed labour	660	O64-O66
U047	5. Abortion	630-639	O00-O07
U048	Other maternal conditions	643-659, 661-665, 667-669, 671-676	O20-O43,O47-O63,O68-O71,O73-O75,O87-O99
U049	**D. Conditions arising during the perinatal period**	760-779 minus 771.3	P00-*P96*
U050	1. Low birth weight	764-765	P05-P07
U051	2. Birth asphyxia and birth trauma	767-770	P03, P10-P15, P20-P29
U052	Other perinatal conditions	760-763, 766, 771 (minus 771.3), 772-779	P00-P02, P04, P08, P35-P96
U053	**E. Nutritional deficiencies**	243, 260-269, 280-281, 285.9	E00-E02, E40-E46, E50, D50-D53,D64.9, E51-E64
U054	1. Protein-energy malnutrition	260-263	E40-E46
U055	2. Iodine deficiency	243	E00-E02
U056	3. Vitamin A deficiency	264	E50
U057	4. Iron-deficiency anaemia	280, 285.9	D50, D64.9
U058	Other nutritional disorders	265-269, 281	D51-D53, E51-E64
U059	**II. Noncommunicable diseases (a)**	140-242, 244-259, 270-279 (minus 279.5),282-285 (minus 285.9), 286-319, 324-380, 383-459, 470-478, 490-611, 617-629, 680-759	C00-C97, D00-D48,D55-D64 (minus D 64.9) D65-D89, E03-E07, E10-E16, E20-E34, E65-E88, F01-F99, G06-G98, H00-H61, H68-H93, I00-I99, J30-J98, K00-K92, N00-N64, N75-N98, L00-L98, M00-M99, Q00-Q99
U060	**A. Malignant neoplasms**	140-208	C00-C97
U061	1. Mouth and oropharynx cancers (b)	140-149	C00-C14
U062	2. Oesophagus cancer (b)	150	C15
U063	3. Stomach cancer (b)	151	C16
U064	4. Colon and rectum cancers (b)	153, 154	C18-C21
U065	5. Liver cancer	155	C22
U066	6. Pancreas cancer	157	C25
U067	7. Trachea, bronchus and lung cancers	162	C33-C34
U068	8. Melanoma and other skin cancers (b)	172-173	C43-C44
U069	9. Breast cancer (b)	174, 175	C50
U070	10. Cervix uteri cancer (b)	180	C53

Annex Table 3 (continued): GBD2000 cause categories and ICD codes

Code	GBD Cause Name	ICD-9 code	ICD-10 code
U071	11. Corpus uteri cancer (b)	179, 182	C54-C55
U072	12. Ovary cancer (b)	183	C56
U073	13. Prostate cancer (b)	185	C61
U074	14. Bladder cancer (b)	188	C67
U075	15. Lymphomas and multiple myeloma (b)	200-203	C81-C90, C96
U076	16. Leukaemia (b)	204-208	C91-C95
U077	Other malignant neoplasms (b)	152, 156, 158-161, 163-171,181, 184, 186-187, 189-199	C17,C23,C24,C26-C32, C37-C41,C45-C49, C51,C52,C57-C60,C62-C66,C68-C80,C97
U078	**B. Other neoplasms**	210-239	D00-D48
U079	**C. Diabetes mellitus**	250	E10-E14
U080	**D. Endocrine disorders**	240-242, 244-246, 251-259, 270-279 (minus 274, 279.5),282-285 (minus 285.9), *286*-289	*D55-D64 (minus D64.9),D65-D89, E03-E07, E15-E16, E20-E34, E65-E88*
U081	**E. Neuro-psychiatric conditions**	290-319, 324-359	F01-F99, G06-G98
U082	1. Unipolar depressive disorders	296.1, 311	F32-F33
U083	2. Bipolar affective disorder	296 (minus 296.1)	F30-F31
U084	3. Schizophrenia	295	F20-F29
U085	4. Epilepsy	345	G40-G41
U086	5. Alcohol use disorders	291, 303, 305.0	F10
U087	6. Alzheimer and other dementias	290, 330, 331	F01, F03, G30-G31
U088	7. Parkinson disease	332	G20-G21
U089	8. Multiple sclerosis	340	G35
U090	9. Drug use disorders	304, 305.2-305.9	F11-F16, F18-F19
U091	10. Post-traumatic stress disorder	308-309	*F43.1*
U092	11. Obsessive-compulsive disorder	300.3	F42
U093	12. Panic disorder	300.2	F40.0, F41.0
U094	13. Insomnia (primary)	307.4	F51
U095	14. Migraine	346	G43
U096	Mental Retardation attributable to lead exposure	317-319	F70-F79
U097	Other neuropsychiatric disorders	292-294, 297-300.1, 300.4-302, 305.1, 306-307 (minus 307.4), 310, 312-316, 324-326, 333-337, 341-344, 347-349, 350-359	F04-F09,F17,F34-F39,F401-F409,F411-F419, F43(minus F43.1), F44-F50, F52-F69, F80-F99,G06-G12,G23-G25,G36,G37,G44-G98
U098	**F. Sense organ diseases**	360-380, 383-389	H00-H61, H68-H93
U099	1. Glaucoma	365	H40
U100	2. Cataracts	366	H25-H26
U101	3. Vision disorders, age-related	367.4	H524
U102	4. Hearing loss, adult onset	389	H90-H91
U103	Other sense organ disorders	360-364, 367-380 (minus 367.4), 383-388	H00-H21,H27-H35, H43-H61(minus H524),H68-H83, H92-H93
U104	**G. Cardiovascular diseases**	390-459	I00-I99
U105	1. Rheumatic heart disease	390-398	I01-I09
U106	2. Hypertensive heart disease	401-405	I10-I13
U107	3. Ischaemic heart disease (b)	410-414	I20-I25
U108	4. Cerebrovascular disease	430-438	I60-I69
U109	5. Inflammatory heart diseases	420, 421, 422, 425	I30-I33, I38, I40, I42

Annex Table 3 (continued): GBD2000 cause categories and ICD codes

Code	GBD Cause Name	ICD-9 code	ICD-10 code
U110	Other cardiovascular diseases (b)	415-417, 423-424, 426-429, 440-448, 451-459	I00, I26-I28, I34-I37, I44-I51, I70-I99
U111	**H. Respiratory diseases**	470-478, 490-519	J30-J98
U112	1. Chronic obstructive pulmonary disease	490-492, 495-496	J40-J44
U113	2. Asthma	493	J45-J46
U114	Other respiratory diseases	470-478, 494, 500-508, 510-519	J30-J39,J47-J98
U115	**I. Digestive diseases**	530-579	K20-*K92*
U116	1. Peptic ulcer disease	531-533	K25-K27
U117	2. Cirrhosis of the liver	571	K70, K74
U118	3. Appendicitis	540-543	K35-K37
U119	Other digestive diseases	530, 534-537, 550-553, 555-558, 560-570, 572-579	K20-K22,K28-K31,K38,K40-K66,K71-K73,K75-K92
U120	**J. Genito-urinary diseases**	580-611, 617-629	N00-N64, N75-N98
U121	1. Nephritis and nephrosis	580-589	N00-N19
U122	2. Benign prostatic hypertrophy	600	N40
U123	Other genitourinary system diseases	590-599, 601-611, 617-629	N20-N39, N41-N64, N75-N98
U124	**K. Skin diseases**	680-709	L00-L98
U125	**L. Musculoskeletal diseases**	710-739, 274	M00-M99
U126	1. Rheumatoid arthritis	714	M05-M06
U127	2. Osteoarthritis	715	M15-M19
U128	3. Gout	274	M10
U129	4. Low back pain	720-724 (minus 721.1, 722.0, 722.4)	M45-M48, M54 (minus M54.2)
U130	Other musculoskeletal disorders	710-713, 716-719,721.1, 722.0, 722.4, 723, 725-739	M00-M02, M08, M11-M13, M20-M43, M50-M53, M54.2, M55-M99
U131	**M. Congenital anomalies**	740-759	Q00-Q99
U132	1. Abdominal wall defect	*756.7*	*Q79.2-Q79.5*
U133	2. Anencephaly	740.0	Q00
U134	3. Anorectal atresia	751.2	Q42
U135	4. Cleft lip	749.1	Q36
U136	5. Cleft palate	749.0	Q35, Q37
U137	6. Oesophageal atresia	750.3	Q39.0-Q39.1
U138	7. Renal agenesis	753.0	Q60
U139	8. Down syndrome	758.0	Q90
U140	9. Congenital heart anomalies	745-747	Q20-Q28
U141	10. Spina bifida	741	Q05
U142	Other Congenital anomalies	740.1, 740.2, 742-744, 748, 749.2, 750.0, 750.1, 750.2, 750.4-751.1, 751.3-751.9, 752, 753.1-753.9, 754, 755, 756.0-756.6, 756.8, 756.9, 757, 758.1-758.9, 759	Q01-Q04, Q06-Q18, Q30-Q34, Q38, Q392-Q399, Q40-Q41, Q43-Q56, Q61-Q78, Q790, Q791, Q796, Q798, Q799, Q80-Q89, Q91-Q99
U143	**N. Oral conditions**	520-529	K00-K14
U144	1. Dental caries	521.0	K02
U145	2. Periodontal disease	523	K05
U146	3. Edentulism	-	-
U147	Other oral diseases	520, 521.1-521.9, 522, 524-529	K00, K01,K03,K04,K06-K14

Annex Table 3 (continued): GBD2000 cause categories and ICD codes

Code	GBD Cause Name	ICD-9 code	ICD-10 code
U148	**III. Injuries**	E800-999	V01-Y89
U149	**A. Unintentional injuries (d)**	E800-949	V01-X59, Y40-Y86, Y88, Y89
U150	1. Road traffic accidents	E810-819, E826-829, E929.0	(e)
U151	2. Poisonings	E850-869	X40-X49
U152	3. Falls	E880-888	W00-W19
U153	4. Fires	E890-899	X00-X09
U154	5. Drownings	E910	W65-W74
U155	6. Other unintentional injuries	E800-E807, E820-E848, E870-E879, E900-E909, E911-E949	*Rest of V, W20*-W64, W75-W99, X10-X39, X50-X59, Y40-Y86, Y88,Y89
U156	**B. Intentional injuries (d)**	E950-978, 990-999	X60-Y09, Y35-Y36, Y870, Y871
U157	1. Self-inflicted injuries	E950-959	X60-X84, Y870
U158	2. Violence	E960-969	X85-Y09, Y871
U159	3. War	E990-999	Y36
U160	Other intentional injuries	E970-E978	Y35

(a) Deaths coded to "Symptoms, signs and ill-defined conditions" (780-799 in ICD-9 and R00-R99 in ICD-10) are distributed proportionately to all causes within Group I and Group II.

(b) Cancer deaths coded to ICD categories for malignant neoplasm of other and unspecified sites including those whose point of origin cannot be determined, secondary and unspecified neoplasm (ICD-10 C76, C80, C97 or ICD-9 195, 199) were redistributed pro-rata across the footnoted malignant neoplasm categories within each age–sex group, so that the category 'Other malignant neoplasms' includes only malignant neoplasms of other specified sites (53).

(c) Ischaemic heart disease deaths may be miscoded to a number of so-called cardiovascular garbage codesThese include heart failure, ventricular dysrhythmias, generalized atherosclerosis and ill-defined descriptions and complications of heart disease. Proportions of deaths coded to these causes were redistributed to ischaemic heart disease as described in (23). Relevant ICD-9 codes are 427.1, 427.4, 427.5, 428, 429.0, 429.1, 429.2, 429.9, 440.9, and relevant ICD-10 codes are I47.2, I49.0, I46, I50, I51.4, I51.5, I51.6, I51.9, I70.9.

(d) Injury deaths where the intent is not determined (E980-989 of ICD-9 and Y10-Y34, Y872 in ICD-10) are distributed proportionately to all causes below the Group level for injuries.

(e) For countries with 3-digit ICD10 data, for Road traffic accidents use: V01-V04, V06, V09-V80, V87, V89, V99. For countries with 4-digit ICD10 data, for Road traffic accidents use:

V01.1-V01.9, V02.1-V02.9, V03.1-V03.9, V04.1-V04.9, V06.1-V06.9, V09.2, V09.3, V10.4-V10.9, V11.4-V11.9, V12.3-V12.9, V13.3-V13.9, V14.3-V14.9, V15.4-V15.9, V16.4-V16.9, V17.4-V17.9, V18.4-V18.9, V19.4-V19.6, V20.3-V20.9, V21.3-V21.9, V22.3-V22.9, V23.3-V23.9, V24.3-V24.9, V25.3-V25.9, V26.3-V26.9, V27.3-V27.9, V28.3-V28.9, V29.4-V29.9, V30.4.V30.9, V31.4-V31.9, V32.4-V32.9, V33.4-V33.9, V34.4-V34.9, V35.4-V35.9, V36.4-V36.9, V37.4-V37.9, V38.4-V38.9, V39.4-V39.9, V40.4-V40.9, V41.4-V41.9, V42.4-V42.9, V43.4-V43.9, V44.4-V44.9, V45.4-V45.9, V46.4-V46.9, V47.4-V47.9, V48.4-V48.9, V49.4-V49.9, V50.4-V50.9, V51.4-V51.9, V52.4-V52.9, V53.4-V53.9, V54.4-V54.9, V55.4-V55.9, V56.4-V56.9, V57.4-V57.9, V58.4-V58.9, V59.4-V59.9, V60.4-V60.9, V61.4-V61.9, V62.4-V62.9, V63.4-V63.9, V64.4-V64.9, V65.4-V65.9, V66.4-V66.9, V67.4-V67.9, V68.4-V68.9, V69.4-V69.9, V70.4-V70.9, V71.4-V71.9, V72.4-V72.9, V73.4-V73.9, V74.4-V74.9, V75.4-V75.9, V76.4-V76.9, V77.4-V77.9, V78.4-V78.9, V79.4-V79.9, V80.3-V80.5, V81.1, V82.1, V83.0-V83.3, V84.0-V84.3, V85.0-V85.3, V86.0-V86.3, V87.0-V87.8, V89.2, V89.9, V99, Y850.

Annex Table 4: GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
I. Communicable, maternal, perinatal and nutritional conditions		
A1. Tuberculosis	Cases refer to individuals with clinical tuberculosis, normally pulmonary sputum culture positives and extra-pulmonary cases.	2
HIV sero-negative cases	HIV sero-negative cases	
HIV sero-positive cases	HIV sero-positive cases	
A2a. Syphilis	Acute and chronic infection with Treponema pallidum	1
Congenital syphilis	Syphilis in the newborn due to maternal-fetal transmission in utero	
Low birth weight	Birthweight of less than 2500 g	
Primary	Initial infection in adults resulting in primary chancre at the site of inoculation	
Secondary	Disseminated disease, which appears 2-8 weeks after the primary stage and usually marked by a rash	
Tertiary – Neurologic	Late stage of the disease with varied neurological manifestations	
A2b. Chlamydia	Bacterial infection transmitted through vaginally, anally or perinatally with Chlamydia trachomatis (excludes ocular trachoma)	1
Cervicitis	Inflammation of the cervix uteri due to Chlamydia trachomatis	
Neonatal pneumonia	Pneumonia in infants due to infection with Chlamydia.	
Ophthalmia neonatorum	Purulent conjunctivitis in infants less than 30 days, which was acquired during passage through an infected birth canal	
Low birth weight	Birthweight of less than 2500 g	
Pelvic inflammatory disease	Inflammation of the adnexa of the uterus (includes endometritis)	
Ectopic pregnancy	Pregnancy located outside the uterus	
Tubo-ovarian abscess	Abscess located in the fallopian tubes or ovaries	
Chronic pelvic pain	Chronic pelvic pain following reproductive tract infection with Chlamydia	
Infertility	Total of infertility due to chlamydia-related PID and ectopic pregnancy in women and epididymitis in men.	
Symptomatic urethritis	Inflammation of the urethra causing symptoms including dysuria and/or haematuria	
Epididymitis	Inflammation of the sperm ducts	
A2c. Gonorrhoea	Bacterial infection transmitted through vaginally, anally or perinatally with Neisseria gonorrhoea	1
Ophthalmia neonatorum	Purulent conjunctivitis in infants less than 30 days, which was acquired during passage through an infected birth canal	
Low birth weight	Birthweight of less than 2500 g	
Corneal scar -- Blindness	Permanent corneal scar resulting from corneal ulceration due to infection with Neisseria gonorrhoea and leading to blindness	
Corneal scar -- Low vision	Permanent corneal scar resulting from corneal ulceration due to infection with Neisseria gonorrhoea and to low vision	
Cervicitis	Inflammation of the cervix uteri due to Neisseria gonorrhoea	
Pelvic inflammatory disease	Includes both acute and recurrent PID due to gonorrhoea.	
Ectopic pregnancy	Pregnancy located outside the uterus	
Tubo-ovarian abscess	Abscess located in the fallopian tubes or ovaries	
Chronic pelvic pain	Chronic pelvic pain following reproductive tract infection with N gonorrhoea	
Infertility	Total of infertility due to gonorrhoea -related PID and ectopic pregnancy in women and epididymitis in men.	
Symptomatic urethritis	Inflammation of the urethra causing symptoms including dysuria and/or haematuria	
Epididymitis	Inflammation of the sperm ducts	
Stricture	Narrowing of the urethra due to urethritis	
A3. HIV/AIDS		2
HIV cases	HIV sero-positive, not yet progressed to AIDS	
AIDS cases	HIV sero-positive and progressed to AIDS	
A4. Diarrhoeal diseases -- episodes	Episodes of diarrhoea including acute watery diarrhoea, persistent diarrhoea and dysentery. Deaths of children with both measles and diarrhoea or both LRI and diarrhoea are not included in the estimates of diarrhoea mortality.	1

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
A5a. Pertussis	Acute bacterial infection of the respiratory tract with Bordetella pertussis or parapertussis	2
Episodes	Acute bacterial infection of the respiratory tract with Bordetella pertussis or parapertussis, characterised by paroxysmal, violent coughs followed by high-pitched inspiratory whoop.	
Encephalopathy	Degenerative disease of the brain, which in pertussis is usually a result of hypoxia, leading to mental retardation	
A5b. Poliomyelitis – lameness	Viral infection characterised by acute flaccid paralysis and proven by isolation of polio virus from stool.	2
A5c. Diphtheria	Acute disease caused by toxin-producing *Corynebacterium diphtheriae*	2
Episodes	Acute bacterial disease involving primarily tonsils, pharynx, larynx, nose and other sites, characterised by grayish plaques or membranes with surrounding tissue inflammation.	
Neurological complications	Polyneuritis involving both cranial and peripheral nerve palsies, which are largely reversible.	
Myocarditis	Inflammation of the heart muscle leading to electrocardiographic aberrations and sometimes permanent damage with congestive heart failure, which may be fatal.	
A5d. Measles – episodes	Acute and highly contagious infection with measles virus characterised by red, blotchy rash, fever, cough, coryza and conjunctivitis	2
A5e. Tetanus – episodes	Neonatal: Infection with Clostridium tetani in infants less than 30 days with progressive difficulty and inability to feed because of trismus, generalised stiffness, spasms and opisthotonus.	2
	Non-neonatal: Infection with Clostridium tetani non-neonates with initial localised spasms lead to general rigidity, opisthotonus and "risus sardonicus".	
A6. Meningitis	Acute bacterial disease with sudden onset and fever, intense headache, nausea, vomiting, neck stiffness and – in meningococcal disease – petechial rash with pink macules. The disease must be accompanied by laboratory evidence (in cerebrospinal fluid or blood) of *Neisseria meningitidis, Strep pneumoniae* or *Haemophilus influenzae type B*.	2
Streptococcus pneumoniae – episodes	Acute bacterial disease with sudden onset and fever, intense headache, nausea, vomiting, and neck stiffness. The disease must be accompanied by laboratory evidence (in cerebrospinal fluid or blood) of *Strep pneumoniae.*	
Haemophilus influenzae – Episodes	Acute bacterial disease with sudden onset and fever, intense headache, nausea, vomiting, and neck stiffness. The disease must be accompanied by laboratory evidence (in cerebrospinal fluid or blood) of *Haemophilus influenza type B.*	
Neisseria meningitidis – Episodes	Acute bacterial disease with sudden onset and fever, intense headache, nausea, vomiting, and neck stiffness. The disease must be accompanied by laboratory evidence (in cerebrospinal fluid or blood) of *Neisseria meningitidis.*	
Meningococcaemia without meningitis -- Episodes	Invasion of the bloodstream with Neisseria meningitidis.	
Deafness	At least <u>moderate</u> impairment, where person is able to hear and repeat words using raised voice at 1 metre, RESULTING from meningitis.	
Seizure disorder	Seizures of any type that were present at least 6 months after hospitalisation, RESULTING from meningitis.	
Motor deficit	Spasticity or paresis of one or more limbs, RESULTING from meningitis	
Mental retardation	IQ of 70 or below	
A7a. Hepatitis B – episodes	Inflammation of the liver due to Hepatitis B virus	1
A7b Hepatitis C – episodes	Inflammation of the liver due to Hepatitis C virus	1
A8. Malaria	Infectious disease caused by protozoa of the genus *Plasmodium*	1
Episodes	Attacks of chills, fever, and sweating due to *Plasmodium* infection	
Anaemia	Defined using WHO criteria for mild to very severe anaemia.	
Neurological sequelae	Includes hemiplegia, aphasia, ataxia and cortical blindness.	
A9a. Trypanosomiasis – Episodes	Infection with protozoa of the genus Trypanosoma, excluding T. cruzi	1
A9b. Chagas disease	Infection with Trypanosoma cruzi	2
Infection	Episode of infection with Trypanosoma cruzi	
Cardiomyopathy without congestive heart failure	Disorder of the heart muscle resulting from infection with T. cruzi without congestive heart failure	
Cardiomyopathy with congestive heart failure	Disorder of the heart muscle resulting from infection with T. cruzi without congestive heart failure	
Megaviscera	Dilation of interior organ in the abdominal cavity, particularly of oesophagus and colon due to T. cruzi	
A9c. Schistosomiasis – Infection	Infection and associated direct mortality from schistosomiasis. Does not include estimates of mortality from bladder cancer, cirrhosis or colon cancer that may be related to schistosomiasis.	1
A9d. Leishmaniasis	Infection with flagellate protozoa of the genus Leishmania	0
Visceral	Generalised involvement of the reticulo-endothelial system due to infection with Leishmania	
Cutaneous	Presence of skin lesions (which may ulcerate) due to infection with Leishmania	

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
A9e. Lymphatic filariasis	Infection with filariae (Wucheria bancrofti and Brugia malayi)	0
Hydrocele > 15cm	Circumscribed collection of fluid in testicle or along the spermatic cord due to filariasis	
Bancroftian lymphoedema	Swelling of subcutaneous tissues due to the prescence of excessive lymph fluid as a result of infection with Wucheria bancrofti	
Brugian lymphoedema	Swelling of subcutaneous tissues due to the prescence of excessive lymph fluid as a result of infection with Brugia malayi	
A9f. Onchocerciasis	Infection with worms of the genus Onchocerca	2
Blindness	Inability to distinguish the fingers of a hand at the distance of 3 metres, or less than 5% of remaining vision as compared to a normally sighted individual as a result of infection with Onchocerca volvulus	
Itching	Itchy dermatitis as a result of infection with Onchocerca volvulus	
Low vision	Corrected visual acuity in the better eye of less than 6/18 but better than or equal to 3/60 due to infection with Onchocerca volvulus	
A10. Leprosy	Chronic disease resulting from infection with Mycobacterium leprae	2
Cases	WHO case definition: Person showing clinical signs of leprosy, with or without bacteriological confirmation of the diagnosis, and requiring chemotherapy	
Disabling leprosy	Grade 1 and 2 of World Health Organization grades of disability for leprosy	
A11. Dengue	Mosquito-born disease caused by viruses of the family Flaviviridae	0
Dengue haemorrhagic fever	Severe manifestation of dengue infection characterised by multiple haemorrhages, and potentially followed by circulatory failure, neurological manifestations and shock.	
A12. Japanese encephalitis	Mosquito-born encephalitis caused by JE virus	0
Episodes	Episode of Japanese encephalitis infection	
Cognitive impairment	Reduced cognitive function resulting from encephalitis due to JE virus	
Neurological sequelae	Neurological deficits resulting from encephalitis due to JE virus	
A13. Trachoma	Cases of follicular or inflammatory trachoma.	2
Blindness	Corrected visual acuity in the better eye of less than 3/60.	
Low vision	Corrected visual acuity in the better eye of less than 6/18 but better than or equal to 3/60.	
A14a. Ascariasis	Infection with worms of the genus Ascaris	1
High intensity infection	Infection resulting in at least 20-40 worms per stool load	
Contemporaneous cognitive deficit	Reduction in cognitive ability in school-age children, which occur only while infection persists. – Provisional definition	
Cognitive impairment	Delayed psychomotor development, impaired performance on language skills, motor skills and co-ordination that is equivalent to a 5-10 point deficit in IQ.	
Intestinal obstruction	Blockage of the intestines due to worm mass	
A14b. Trichuriasis		1
High intensity infection	Infection resulting in at least 250-500 worms per stool load	
Contemporaneous cognitive deficit	Reduction in cognitive ability in school-age children, which occur only while infection persists. – Provisional definition	
Massive dysentery syndrome	Rectal prolapse and/or tenesmus and/or bloody mucoid stools due to carpeting of intestinal mucosa by worms.	
Cognitive impairment	Delayed psychomotor development, impaired performance on language skills, motor skills and co-ordination that is equivalent to a 5-10 point deficit in IQ.	
A14c. Hookworm disease	Ancylostomiasis and necatoriasis	1
High intensity infection	Infection resulting in at least 80-160 worms per stool load	
Anaemia	Anaemia (as under E.4) due to hookworm infection	
Cognitive impairment	Delayed psychomotor development, impaired performance on language skills, motor skills and co-ordination that is equivalent to a 5-10 point deficit in IQ.	
B1. Lower respiratory infections	ICD-10: J12-22	2
Episodes	Episode of lower respiratory infection	
Chronic sequelae	Includes bronchiectasis and impaired lung function as measured by a decrease in FEV.	
B2. Upper respiratory infections	ICD-10: J00-06	2
Episodes	Episode of upper respiratory infection	
Pharyngitis	Inflammation of the pharynx	
B3. Otitis media	Inflammation of the middle ear	0
Episodes	Episodes of acute otitis media.	
Deafness	At least moderate impairment, where person is able to hear and repeat words using raised voice at 1 metre, RESULTING from otitis media.	

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
C1. Maternal haemorrhage		2
Episodes	All episodes of antepartum and postpartum haemorrhage	
Severe anaemia	Blood haemoglobin level < 10mg/dl following postpartum haemorrhage	
C2. Maternal sepsis		2
Episodes	Major puerperal infection, excluding infection following abortion, minor genital tract infection following delivery and urinary tract infections following deliver	
Infertility	Failure to conceive again after a previous conception (secondary infertility), caused by maternal sepsis	
C3. Hypertensive disorders of pregnancy		2
Episodes	Includes pre-eclampsia and eclampsia.	
C4. Obstructed labour		2
Episodes	Labour with no advance of the presenting part of the fetus despite strong uterine contractions	
Caesarean section for OL	Cases of OL for which CS has been performed	
Stress incontinence	Cases with leaking of urine during coughing or sneezing	
Rectovaginal fistula	Cases with a communication between the vaginal wall and the bladder/the rectum resulting from obstructed labour	
C5. Abortion		2
Episodes	Episodes of unsafe abortion (termination of an unwanted pregnancy either by persons lacking the necessary skills or in an environment lacking the necessary standards or both)	
Infertility	Failure to conceive following unsafe abortion	
Reproductive tract infection	Cases of reproductive tract infection resulting from unsafe abortion	
D1. Low birth weight – All sequelae	Birthweight below 2500g. Includes small-for-gestational-age infants and premature infants. All developmental sequelae due to low birth weight have been clustered into one outcome, which includes cerebral palsy, mental retardation, epilepsy, hearing loss and visual loss.	1
D2. Birth asphyxia and birth trauma All sequelae	All the developmental sequelae due to birth asphyxia and birth trauma have been clustered into one outcome which includes cerebral palsy, mental retardation, epilepsy, hearing loss and visual loss.	1
E1. Protein-energy malnutrition		2
Wasting	Observed weight for height at least 2 standard deviations below the mean for 0-5 year old children.	
Stunting	Observed height for age at least 2 standard deviations below the mean for 0-5 year old children.	
Developmental disability	Limited physical and mental ability to perform most activities in <u>all</u> of the following areas: recreation, education, procreation or occupation	
E2. Iodine deficiency		1
Total goitre rate (G1 + G2)	TGR (total goitre rate) combining both G1 (a mass in the neck consistent with an enlarged thyroid – grade 1 = palpable but not visible) and G2 (a mass in the neck consistent with an enlarged thyroid – grade 2 = palpable and visible in neutral neck position)	
Mild developmental disability	Any of the following due to iodine deficiency:	
	Bilateral hearing loss, delay of walking ability, mild intellectual impairment	
Cretinoidism	Hypothyroid cretinism: Hypothyroidism and stunting as a RESULT of iodine deficiency	
	Neurological cretinism: Mental deficiency (IQ below 70), deaf-mutism, and spastic paralysis as a RESULT of iodine deficiency	
Cretinism	Some but not all features of full cretinism as a RESULT of iodine deficiency	
E3. Vitamin A deficiency		2
Xerophthalmia	All ocular manifestations of vitamin A deficiency: night blindness, Bitot's spots, corneal xerosis, corneal ulceration and corneal scarring.	
Corneal scar	Permanent corneal scar resulting from corneal ulceration due to Vitamin A deficiency and potentially leading to blindness	
E4. Iron-deficiency anaemia		1
Mild	Haemoglobin of 100-109 g/l in pregnant women, 110-119 g/l in children and adult women and 120-129 g/l in adult men.	
Moderate	Haemoglobin of 70-99 g/l in pregnant women, 80-109 g/l in children and adult women and 90-119 g/l in adult men.	
Severe	Haemoglobin of 40-69 g/l in pregnant women, 50-79 g/l in children and adult women and 60-89 g/l in adult men.	
Cognitive impairment	Delayed psychomotor development, impaired performance on language skills, motor skills and co-ordination that is equivalent to a 5-10 point deficit in IQ.	

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
II. Noncommunicable diseases		
A. Malignant neoplasms sequelae		2
Diagnosis and primary therapy	Chemotherapy, radiotherapy, surgery	
Control	Clinical observation during control/remission phase	
Preterminal (metastasis)	Metastatic dissemination of the disease	
Terminal	Terminal stage prior to death	
Mastectomy	Mastectomy in 5 year breast cancer survivor	
Infertility	Infertility in 5 year survivor of cervix, uterus or ovary cancer	
Incontinence or impotence	Incontinence or impotence in 5 year survivor of prostate cancer	
Stoma	Stoma in 5 year survivor of digestive system cancer	
C. Diabetes mellitus		2
Cases	Venous plasma concentration of μ 11.1 mmol/l 2 h after a 75g oral glucose challenge	
Diabetic foot	Chronic or recurring diabetic foot ulcers	
Neuropathy	Loss of reflexes and of vibration; damage and dysfunction of sensory, motor or autonomic nerves attributable to diabetes	
Retinopathy – blindness	Retinopathy: Microaneurysms or worse lesions in at least one eye; progressive damage of the small blood vessels of the retina	
	Blindness: Unable to distinguish the fingers of a hand at the distance of 3 meters, or, has less than 5% of remaining vision as compared to a normally sighted individual; visual acuity of less than 3/60, or corresponding visual field loss in the better eye with best possible correction	
Amputation	Surgical elimination of the lower extremity or part of it because of gangrene	
E1. Unipolar depressive disorders		1
Mild episode	Mild major depressive episode (F 32.0 and F 33.0)	
Moderate episode	Moderate major depressive episode (F 32.1 and F 33.1)	
Severe episode	Severe major depressive episode (F 32.2 , F 32.3, F 33.2 and F 33.3)	
Dysthymia	Dysthymia case with no concurrent major depressive episode	
E2. Bipolar affective disorder – cases	Cases that meet ICD 10 criteria	2
E3. Schizophrenia – cases	Cases that meet ICD 10 criteria	2
E4. Epilepsy – cases	Cases meeting ILAE definition.	1
	Cases meeting ICD 10 criteria for alcohol dependence and harmful use (F10.1 and F 10.2), excluding cases with comorbid depressive episode.	
E6. Alzheimer and other dementias – cases	Mild, moderate and severe Alzheimer disease, senile and other dementias.	1
E7. Parkinson disease – cases	Cases meeting clinical criteria for Parkinson disease	1
E8. Multiple sclerosis – cases	Cases of chronic or intermittent relapsing multiple sclerosis.	1
E9. Drug use disorders	Cases meeting ICD 10 criteria for opioid dependence and harmful use (F 11.1 F 11. 2) or cocaine dependence and harmful use (F 14.1 and F 14.2), excluding cases with comorbid depressive episode.	2
E10. Post-traumatic stress disorder – cases	Cases meeting DSM IV criteria for PTSD, excluding cases with comorbid depressive episode or alcohol and drug use(harmful and/or dependence).	2
E11. Obsessive-compulsive disorder – cases	Cases meeting ICD 10 criteria (F 42), excluding cases with comorbid depressive episode.	2
E12. Panic disorder – cases	Cases meeting ICD 10 criteria for panic disorder (F 41.0) or agoraphobia with panic disorder (F 40.01), excluding cases with comorbid depressive episode.	2
E13. Insomnia (primary)	Cases meeting DSM IV criteria for primary insomnia (307.42) where the insomnia causes problems with usual activities. Cases with comorbid depressive episode or alcohol and drug use(harmful and/or dependence) are excluded.	2
E14. Migraine	Cases meeting IHS definition for migraine.	1
E15. Mild mental retardation attributable to lead Exposure	IQ in the range 50-69 attributable to childhood lead exposure.	2
F1. Glaucoma	Cases of primary angle closure glaucoma and primary open angle glaucoma.	2
Low vision	Corrected visual acuity in the better eye of less than 6/18 but better than or equal to 3/60.	
Blindness	Corrected visual acuity in the better eye of less than 3/60.	
F2. Cataracts	Cases of senile cataract causing progressive visual impairment.	2
Low vision	Corrected visual acuity in the better eye of less than 6/18 but better than or equal to 3/60.	
Blindness	Corrected visual acuity in the better eye of less than 3/60.	
F3. Vision disorders, age-related	Low vision or blindness due to macular degeneration, refractive errors or other age-related causes. Excludes sight loss due to congenital causes, other diseases or injury.	2
Low vision	Corrected visual acuity in the better eye of less than 6/18 but better than or equal to 3/60.	
Blindness	Corrected visual acuity in the better eye of less than 3/60.	

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae		Case definition	Version[a]
F4.	Hearing loss, adult onset	Cases of adult onset hearing loss due to ageing or noise exposure. Excludes hearing loss due to congenital causes, infectious diseases, other diseases or injury.	2
	Moderate hearing loss, no aids	Hearing threshold level in the better ear is 41-60 dBHTL (averaged over 0.5, 1, 2, 4kHz). (some difficulty understanding or actively participating in a conversation with one person, great difficulty with more than one person). Person does not use a hearing aid	
	Severe hearing loss, no aids	Hearing threshold level in the better ear is 61 dBHTL or more (averaged over 0.5, 1, 2, 4kHz). (great difficulty or unable to understand or participate in a conversation with one other person). Person does not use a hearing aid	
	Moderate hearing loss, uses aids	Hearing threshold level in the better ear is 41-60 dBHTL (averaged over 0.5, 1, 2, 4kHz). (some difficulty understanding or actively participating in a conversation with one person, great difficulty with more than one person). Person uses a hearing aid	
	Severe hearing loss, uses aids	Hearing threshold level in the better ear is 61 dBHTL or more (averaged over 0.5, 1, 2, 4kHz). (great difficulty or unable to understand or participate in a conversation with one other person). Person uses a hearing aid	
G1.	Rheumatic heart disease	Symptomatic cases of congestive heart failure due to rheumatic heart disease.	0
G2.	Hypertensive heart disease	Symptomatic cases of congestive heart failure due to hypertensive heart disease.	0
G3.	Ischaemic heart disease		2
	Acute myocardial infarction	Definite and possible episodes of acute myocardial infarction according to MONICA study criteria	
	Angina pectoris	Cases of clinically diagnosed angina pectoris or definite angina pectoris according to Rose questionnaire	
	Congestive heart failure	Mild and greater (Killip scale k2-k4)	
G4.	Cerebrovascular disease		2
	First-ever stroke cases	First-ever stroke according to WHO definition (includes subarachnoid haemorrhage but excludes transient ischaemic attacks, subdural haematoma, and haemorrhage or infarction due to infection or tumour).	
	Long-term stroke survivors	Persons who survive more than 28 days after first-ever stroke.	
G5.	Inflammatory heart diseases		0
	Myocarditis	Symptomatic cases of congestive heart failure due to myocarditis.	
	Pericarditis	Symptomatic cases of congestive heart failure due to pericarditis.	
	Endocarditis	Symptomatic cases of congestive heart failure due to endocarditis	
	Cardiomyopathy	Symptomatic cases of congestive heart failure due to cardiomyopathy	
H1.	Chronic obstructive pulmonary disease – Symptomatic cases	Chronic (stable) airways obstruction with FEV1< 1 litre (corresponding to symptomatic disability)	2
H2.	Asthma -- Cases	Reported wheeze in the last 12 months plus current bronchial hyperresponsiveness, defined as a 20% fall in FEV1 with a provoking concentration of histamine (PC20) at 8 mg/ml or less.	1
I1.	Peptic ulcer disease	Individuals with peptic ulcers, most of whom have recurrent intermittent symptoms.	0
	Cases with antibiotic treatment	Active gastric or peptic duodenal ulcer receiving appropriate antibiotic treatment	
	Cases not treated with antibiotic	Other active gastric or peptic duodenal ulcer. Includes untreated cases and cases receiving symptomatic treatment.	
I2.	Cirrhosis of the liver – Symptomatic cases	Individuals with symptomatic cirrhosis.	0
I3.	Appendicitis -- episodes	Episodes of acute appendicitis (treated or untreated).	0
J1.	Nephritis and nephrosis		0
	Acute glomerulonephritis	Acute episode of glomerulonephritis	
	End-stage renal disease	End-stage renal failure with or without dialysis, excluding diabetic nephropathy and nephropathy due to cancers, congenital conditions and injury	
J2.	Benign prostatic hypertrophy – Symptomatic cases	Individuals with some albeit intermittent symptoms from benign prostatic hypertrophy.	0
L1.	Rheumatoid arthritis -- cases	Definite or classical RA by 1958 ARA or 1987 ACR criteria	2
L2.	Osteoarthritis		2
	Hip	Symptomatic osteoarthritis of the hip, radiologically confirmed as Kellgren-Lawrence grade 2-4.	
	Knee	Symptomatic osteoarthritis of the knee, radiologically confirmed as Kellgren-Lawrence grade 2-4.	
L3.	Gout	Cases of gout (ARA 1977 survey criteria; at least 6 of 11 symptoms) (ref)	1

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	Version[a]
L4. Low back pain		1
Episode of limiting low back pain	Acute episode of low back pain resulting in moderate or greater limitations to mobility and usual activities. Excludes low back pain due to intervertebral disc displacement or herniation, and low back pain that does not result in some limitations to mobility and usual activities.	
Episode of intervertebral disc displacement or herniation	Episode of intervertebral disc displacement or herniation.	
Chronic intervertebral disc	Disorder of intervertebral disc resulting in pain and disability that does not resolve within 6 weeks following treatment (medical or surgical).	
M1. Abdominal wall defect – cases	Liveborn cases with exomphalos or gastroschisis	*0*
M2. Anencephaly – cases	Liveborn cases with anencephaly	0
M3. Anorectal atresia – cases	Liveborn cases with anorectal atresia	0
M4. Cleft lip – cases	Liveborn cases, includes individuals who have had surgical correction.	0
M5. Cleft palate – cases	Liveborn cases, includes individuals who have had surgical correction.	0
M6. Oesophageal atresia – cases	Liveborn cases with oesophageal atresia	0
M7. Renal agenesis – cases	Liveborn cases with renal agenesis	0
M8. Down syndrome – cases	Liveborn cases with Down syndrome	0
M9. Congenital heart anomalies – cases	Liveborn cases with major congenital malformations	0
M10. Spina bifida -- cases	Liveborn cases with spina bifida aperta (low, medium or high level)	0
N1. Dental caries – episodes	Incidence rates and prevalence are per person, not per tooth, quadrant or sextant.	0
N2. Periodontal disease – cases	Pockets greater than 6 mm deep	0
N3. Edentulism -- cases	Cases of treated and untreated edentulism (absence of all teeth)	0
III. **Injuries – external cause (refer to Annex Table 3 for ICD 9 and ICD 10 definitions)**		
A1. Road traffic accidents	Includes crashes and pedestrian injuries due to motor vehicles.	2
A2. Poisonings	Only one outcome is included for poisonings.	2
A3. Falls	Includes falls resulting from osteoporotic fractures.	2
A4. Fires	Most of the sequelae of fires are due to burns. Some individuals, however, jump from buildings or are otherwise injured due to fires.	2
A5. Drownings	Other than drowning and near-drowning rates, the only other major disabling sequelae from near-drowning included is quadriplegia.	2
A6. Other unintentional injuries	This is not a residual category, but includes injuries due to environmental factors, machinery and electrical equipment, cutting and piercing implements, and various other external causes of unintentional injury.	2
B1. Self-inflicted injuries	Suicide attempts, whether or not resulting in death.	2
B2. Violence	Interpersonal violence, including assault and homicide.	2
B3. War	Injuries and deaths directly attributable to war in combatants and non-combatants. For example, the estimates of mortality include deaths to children and adults from landmines.	1
III. **Injuries - type of injury sequelae**	Injury severe enough to warrant medical attention or that leads immediately to death. In other words, injuries that are severe enough that if an individual had access to a medical facility he or she would seek attention.	
	ICD 9 Code	*ICD 10 Code*
1. Fractures		
Skull—short-term[1]	800 to 801	S02.0/1/7/9, T90.2
Skull—long- term[1]	800 to 801	S02.0/1/7/9, T90.2
Face bones[1]	802	S02.2/6/8
Vertebral column	805	S12, S22.0/1, S32.0/7, T91.1
Rib or sternum[2]	807	S22.2-9
Pelvis[2]	808	S32.1-5/8, T91.2
Clavicle, scapula or humerus[3]	810-812	S42, S49.7
Radius or ulna[3]	813	S52, S59.7, T10, T92.1
Hand bones[3]	814-817	S62, S69.7, T92.2
Femur—short-term[4]	820-821	S72, S79.7
Femur—long-term[4]	820-821	S72, S79.7
Patella, tibia or fibula[4]	822-823	S82.0-4, S82.7/9, S89.7, T12
Ankle[4]	824	S82.5-6/8
Foot bones[4]	825-826	S92, S99.7
2. Injured spinal cord	806 and 952	S14, S24, S34, T06.0/1, T08, T91.3
3. Dislocations		
Shoulder, elbow or hip	831, 832, 835	S43, S73
Other dislocation	830, 833-834, 836-839	S03.0-3, S13, S23, S33, S53, S63.0/1, S83.1-3, S93.1-3, T03, T11.2, T13.2, T14.3, T92.3, T93.3

Annex Table 4 (continued): GBD2000 cause categories, sequelae and case definitions

GBD Cause/Sequelae	Case definition	
III. **Injuries - type of injury sequelae (continued)**	*ICD 9 Code*	*ICD 10 Code*
4. Sprains	840-848	S03.4/5, S16, S29.0, S39.0, S46, S56, S63.5-7, S66, S76, S83.4/7, S86, S93.4/6, S96, T06.4, T11.5, T13.5, T14.6, T92.5, T93.5
5. Intracranial injuries		
Short-term	850-854	S06, T90.5
Long-term	850-854	S06, T90.5
6. Internal injuries	860-869	S25-S27, S35-S37, S39.6, T06.4, T91.4/5
7. Open wound	870, 872-884, 890-894	S01, S08, S11, S15, S21, S31, S41, S45, S51, S55, S61, S65, S71, S75, S81, S85, S91, S95, T01, T11.1/4, T13.5, T14.6, T90.1, T92.5, T93.5
8. Injury to eyes		
Short-term	871, 950	S05, T90.4
Long-term	871, 950	S05, T90.4
9. Amputations		
Thumb	885	S68.0
Finger	886	S68.1/2
Arm	887	S48, S58, S68.3-9, T05.0/2, T11.6
Toe[5]	895	S98.1/2
Foot[5]	896, 897.0-1	S98.0/3/4, T05.3
Leg[5]	897.2-3	S78, S88, T05.4/6, T13.6
10. Crushing	925-929	S07, S17, S28, S38, S47, S57, S67, S77, S87, S97, T04, T14.7, T92.6, T93.6
11. Burns		
Less than 20%—short-term[6]	940-947, 948.0-1	T31.0/1
Less than 20%—long- term[6]	940-947, 948.0-1	T31.0/1
20 to 60%—short-term[6]	948.2-5	T331.2/5
20 to 60%—long-term[6]	948.2-5	T331.2/5
Greater than 60%—short-term[6]	948.6-9	T31.6/9
Greater than 60%—long- term[6]	948.6-9	T31.6/9
12. Injured nerves		
Short-term	951, 953-957	S04, S44, S54, S64, S74, S84, S94, T06.2, T11.3, T13.3, T14.4
Long-term	951, 953-957	S04, S44, S54, S64, S74, S84, S94, T06.2, T11.3, T13.3, T14.4
13. Poisoning	960-979, 980-989	T36-T65, T96-T97

a Version 0 estimates for YLD are based on epidemiological reviews and disease models from the GBD 1990, adjusted for time trends and internal consistency with the 2000 population estimates, and cause-specific and background mortality for the year 2000.
Version 1 estimates for YLD are provisional revised estimates based on new epidemiological reviews and disease models for the year 2000. These estimates may change with further revisions.
Version 2 estimates for YLD are close-to-final estimates based on new epidemiological reviews and disease models for the year 2000.
YLL for all causes based on complete analysis of mortality data for the year 2000.

1 The N-codes 803 and 804 were assigned to fractured skull following the distribution of N-codes 801 and 802.

2 The N-code 809 was assigned to fractured rib, sternum, and pelvis following the distribution of N-codes 807 and 808.

3 The N-codes 818 and 819 were assigned to fractured clavicle, scapula, humerus, radius, ulna and hand bones following the distribution of N-codes 810-817.

4 The N-codes 827 and 828 were assigned to Fractured patella, tibia, fibula, ankle and foot bones following the distribution of N-codes 822-826.

5 The N-codes 897.4 to 897.7 were assigned to Amputated toe, foot and leg following the distribution of N-codes 895, 896 and 897.0-897.3.

6 The N-code 949 was assigned to Bums following the N-codes 940-948. In ICD-10, burns are classified by site (T20–T30) and/or proportion of body surface affected (T31). If there is no information given on the proportion of body surface affected, a decision will have to be made how to map the T20–T30 codes across.

Annex Table 5a: GBD 2000 disability weights

GBD cause	Sequelae	R01 Afr D	R02 Afr E	R03 Amr A	R04 Amr B	R05 Amr D	R06 Emr B	R07 Emr D	R08 Eur A	R09 Eur B1	R10 Eur B2	R11 Eur C	R12 Sear B	R13 Sear D	R14 Wpr A	R15 Wpr B1	R16 Wpr B2	R17 Wpr B3	W	W M	W F	Variation
Tuberculosis	Cases	0.271	0.272	0.270	0.273	0.273	0.271	0.274	0.271	0.269	0.269	0.269	0.270	0.271	0.272	0.270	0.270	0.270	0.271	0.270	0.272	0.005
Syphilis	Congenital syphilis	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.315	0.000
	Primary	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.000
	Secondary	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.048	0.000
	Tertiary – Neurologic	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.000
Chlamydia	Cervicitis	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	-	0.049	0.000
	Neonatal pneumonia	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.280	0.000
	Ophthalmia neonatorum	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.000
	Pelvic inflammatory disease	0.382	0.382	0.194	0.269	0.269	0.295	0.295	0.194	0.219	0.295	0.219	0.332	0.370	0.194	0.295	0.332	0.332	0.327	-	0.327	0.188
	Ectopic pregnancy	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	-	0.549	0.000
	Tubo-ovarian abscess	0.548	0.548	0.547	0.548	0.548	0.548	0.548	0.546	0.547	0.548	0.546	0.548	0.548	0.546	0.548	0.548	0.548	0.548	-	0.548	0.002
	Chronic pelvic pain	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	-	0.122	0.000
	Infertility	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.000
	Symptomatic urethritis	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	-	0.000
	Epididymitis	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	-	0.000
Gonorrhoea	Cervicitis	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	-	0.049	0.000
	Corneal scar -- Blindness	0.600	0.600	-	0.600	0.600	0.600	0.600	-	-	0.600	-	0.600	0.600	-	-	0.600	0.600	0.600	0.600	0.600	0.000
	Ophthalmia neonatorum	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.000
	Pelvic inflammatory disease	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	0.169	-	0.169	0.000
	Ectopic pregnancy	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	-	0.549	0.000
	Tubo-ovarian abscess	0.548	0.548	0.547	0.548	0.548	0.548	0.548	0.546	0.547	0.548	0.546	0.548	0.548	0.546	0.548	0.548	0.548	0.548	-	0.548	0.002
	Chronic pelvic pain	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	-	0.122	0.000
	Infertility	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.000
	Symptomatic urethritis	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	0.067	-	0.000
	Epididymitis	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	0.167	-	0.000
	Corneal scar -- Low vision	0.233	0.233	-	0.233	0.233	0.233	0.233	-	0.233	0.233	0.233	0.233	0.233	-	-	0.233	0.233	0.233	0.233	0.233	0.000
	Stricture	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	0.151	-	0.000
HIV/AIDS	HIV cases	0.135	0.135	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.136	0.135	0.135	0.135	0.135	0.001
	AIDS cases	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.000
Diarrhoeal diseases	Episodes	0.110	0.110	0.106	0.104	0.106	0.109	0.110	0.103	0.108	0.109	0.105	0.109	0.109	0.103	0.094	0.109	0.111	0.105	0.105	0.105	0.016
Pertussis	Episodes	0.158	0.158	0.017	0.087	0.087	0.104	0.105	0.018	0.052	0.104	0.052	0.141	0.140	0.018	0.139	0.139	0.141	0.129	0.129	0.129	0.141
	Encephalopathy	0.461	0.461	0.402	0.432	0.432	0.439	0.439	0.402	0.417	0.439	0.417	0.454	0.454	0.402	0.454	0.454	0.454	0.450	0.450	0.450	0.059
Poliomyelitis	Cases - lameness	0.369	0.369	-	0.369	0.369	0.369	0.369	-	-	0.369	-	0.369	0.369	-	0.369	0.369	0.369	0.369	0.369	0.369	0.000
Diphtheria	Episodes	0.231	0.231	-	0.231	0.231	0.231	0.231	-	0.230	0.230	0.230	0.231	0.231	-	0.231	0.231	-	0.231	0.231	0.231	0.000
	Neurological complications	0.078	0.078	0.078	0.078	0.078	0.078	0.078	0.106	0.078	0.078	0.078	0.078	0.078	0.106	0.078	0.078	0.078	0.078	0.078	0.078	0.028
	Myocarditis	0.323	0.323	-	0.323	0.323	0.323	0.323	-	0.323	0.323	0.323	0.323	0.323	-	0.323	0.323	-	0.323	0.323	0.323	0.000
Measles	Episodes	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.000
Tetanus	Episodes	0.634	0.634	0.612	0.636	0.636	0.637	0.637	-	0.637	0.637	-	0.630	0.632	-	0.634	0.630	0.630	0.633	0.633	0.633	0.026
Meningitis	Streptococcus pneumoniae – Episodes	0.615	0.615	0.614	0.615	0.615	0.615	0.615	0.614	0.615	0.615	0.614	0.615	0.615	0.614	0.615	0.615	0.615	0.615	0.615	0.615	0.001
	Haemophilus influenzae – Episodes	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.616	0.000
	Neisseria meningitidis – Episodes	0.615	0.615	0.615	0.615	0.616	0.616	0.616	0.615	0.615	0.616	0.615	0.615	0.616	0.615	0.615	0.615	0.616	0.615	0.615	0.615	0.001

Annex Table 5a (continued): GBD 2000 disability weights

GBD cause	Sequelae	R01 Afr D	R02 Afr E	R03 Amr A	R04 Amr B	R05 Amr D	R06 Emr B	R07 Emr D	R08 Eur A	R09 Eur B1	R10 Eur B2	R11 Eur C	R12 Sear B	R13 Sear D	R14 Wpr A	R15 Wpr B1	R16 Wpr B2	R17 Wpr B3	W	W M	W F	Variation
Meningitis (continued)	Meningococcaemia without meningitis -- Episodes	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.000
	Deafness	0.230	0.230	0.226	0.228	0.229	0.229	0.229	0.224	0.226	0.229	0.224	0.228	0.229	0.224	0.227	0.229	0.230	0.229	0.229	0.229	0.007
	Mental retardation	0.465	0.465	0.427	0.443	0.440	0.448	0.447	0.433	0.436	0.448	0.442	0.461	0.460	0.433	0.463	0.461	0.460	0.456	0.456	0.456	0.038
	Motor deficit	0.385	0.385	0.349	0.366	0.364	0.370	0.369	0.353	0.359	0.371	0.363	0.382	0.381	0.353	0.385	0.382	0.380	0.380	0.379	0.380	0.036
	Seizure disorder	0.105	0.105	0.060	0.084	0.081	0.089	0.088	0.062	0.073	0.089	0.077	0.104	0.102	0.062	0.108	0.104	0.101	0.097	0.096	0.097	0.048
Hepatitis B	Episodes	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.000
Hepatitis C	Episodes	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.000
Malaria	Episodes	0.192	0.191	-	0.177	0.178	0.180	0.183	-	-	0.180	-	0.181	0.182	-	0.179	0.181	0.183	0.191	0.191	0.190	0.016
	Neurological sequelae	0.471	0.471	-	0.455	0.455	0.458	0.458	-	-	0.458	-	0.462	0.462	-	0.462	0.462	0.462	0.471	0.471	0.471	0.017
	Anaemia	0.012	0.012	-	0.012	0.012	0.012	0.012	-	-	0.012	-	0.012	0.012	-	0.012	0.012	0.012	0.012	0.012	0.012	0.000
Trypanosomiasis	Episodes	0.350	0.350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.350	0.350	0.350	0.000
Chagas disease	Infection	-	-	-	0.000	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.000	0.000	0.000	0.000
	Cardiomyopathy with congestive heart failure	-	-	-	0.062	0.062	-	-	-	-	-	-	-	-	-	-	-	-	0.062	0.062	0.062	0.000
	Cardiomyopathy without congestive heart failure	-	-	-	0.270	0.270	-	-	-	-	-	-	-	-	-	-	-	-	0.270	0.270	0.270	0.000
	Megaviscera	-	-	-	0.240	0.240	-	-	-	-	-	-	-	-	-	-	-	-	0.240	0.240	0.240	0.000
Schistosomiasis	Infection	0.006	0.005	-	0.006	-	0.006	0.006	-	-	-	-	0.006	-	-	0.006	0.006	-	0.006	0.006	0.006	0.000
Leishmaniasis	Visceral	0.243	0.243	-	0.243	0.243	0.243	0.243	-	-	0.243	-	0.243	0.243	-	0.243	0.243	0.243	0.243	0.243	0.243	0.000
	Cutaneous	0.023	0.023	-	0.023	0.023	0.023	0.023	-	-	0.023	-	-	-	-	-	-	-	0.023	0.023	0.023	0.000
Lymphatic filariasis	Hydrocele > 15cm	0.073	0.073	-	0.073	0.073	0.073	0.075	-	-	-	-	0.073	0.073	-	0.074	0.073	0.073	0.073	0.073	-	0.002
	Bancroftian lymphoedema	0.107	0.107	-	0.111	0.109	0.107	0.115	-	-	-	-	0.107	0.105	-	0.107	0.106	0.105	0.106	0.108	0.105	0.010
	Brugian lymphoedema	-	-	-	-	-	-	-	-	-	-	-	0.120	0.116	-	-	0.119	0.119	0.116	0.115	0.117	0.004
Onchocerciasis	Blindness	0.600	0.600	-	0.600	0.600	-	-	-	-	-	-	-	-	-	-	-	-	0.600	0.600	0.600	0.000
	Itching	0.068	0.068	-	0.068	0.068	-	0.068	-	-	-	-	-	-	-	-	-	-	0.068	0.068	0.068	0.000
	Low vision	0.260	0.260	-	0.260	0.260	-	-	-	-	-	-	-	-	-	-	-	-	0.260	0.260	0.260	0.000
Leprosy	Cases	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Disabling leprosy	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.152	0.000
Dengue	Dengue haemorrhagic fever	0.075	0.075	-	-	-	-	0.075	-	-	-	-	0.075	0.075	-	0.075	0.075	0.075	0.075	0.075	0.075	0.000
Japanese Encephalitis	Episodes	-	-	-	-	-	-	-	-	-	-	-	0.616	0.616	-	0.616	0.616	0.616	0.616	0.616	0.616	0.000
	Cognitive impairment	-	-	-	-	-	-	-	-	-	-	-	0.468	0.467	-	0.468	0.468	0.466	0.468	0.467	0.468	0.001
	Neurological sequelae	-	-	-	-	-	-	-	-	-	-	-	0.380	0.379	-	0.380	0.380	0.379	0.380	0.379	0.380	0.001
Trachoma	Blindness	0.600	0.600	-	0.600	0.600	0.600	0.600	-	-	-	-	-	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.000
	Low vision	0.282	0.282	-	0.270	0.271	0.274	0.274	-	-	-	-	-	0.274	0.255	0.271	0.275	0.274	0.278	0.278	0.278	0.026
Ascariasis	High intensity infection	0.000	0.000	-	0.000	0.000	0.000	0.000	-	-	0.000	-	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Contemporaneous cognitive deficit	0.006	0.006	-	0.006	0.006	0.006	0.006	-	-	0.006	-	0.006	0.006	-	0.006	0.006	0.006	0.006	0.006	0.006	0.000
	Cognitive impairment	0.463	0.463	-	0.463	0.463	0.463	0.463	-	-	0.463	-	0.463	0.463	-	0.463	0.463	0.463	0.463	0.463	0.463	0.000
	Intestinal obstruction	0.024	0.024	-	0.024	0.024	0.024	0.024	-	-	0.024	-	0.024	0.024	-	0.024	0.024	0.024	0.024	0.024	0.024	0.000
Trichuriasis	High intensity infection	0.000	0.000	-	0.000	0.000	-	0.000	-	-	-	-	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Contemporaneous cognitive deficit	0.006	0.006	-	0.006	0.006	-	0.006	-	-	-	-	0.006	0.006	-	0.006	0.006	0.006	0.006	0.006	0.006	0.000
	Massive dysentery syndrome	0.116	0.116	-	0.116	0.116	-	-	-	-	-	-	0.116	0.116	-	0.116	0.116	0.116	0.116	0.116	0.116	0.000
	Cognitive impairment	0.024	0.024	-	0.024	0.024	-	0.024	-	-	-	-	0.024	0.024	-	0.024	0.024	0.024	0.024	0.024	0.024	0.000

Annex Table 5a (continued): GBD 2000 disability weights

GBD cause	Sequelae	R01 AfrD	R02 AfrE	R03 AmrA	R04 AmrB	R05 AmrD	R06 EmrB	R07 EmrD	R08 EurA	R09 EurB1	R10 EurB2	R11 EurC	R12 SearB	R13 SearD	R14 WprA	R15 WprB1	R16 WprB2	R17 WprB3	W	W M	W F	Variation
Hookworm disease ancylostomiasis and necatoriasis)	High intensity infection	0.000	0.000	-	0.000	0.000	0.000	0.000	-	-	0.000	-	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Anaemia	0.024	0.024	-	0.024	0.024	0.024	0.024	-	-	0.024	-	0.024	0.024	-	0.024	0.024	0.024	0.024	0.024	0.024	0.000
	Cognitive impairment	0.024	0.024	-	0.024	0.024	0.024	0.024	-	-	0.024	-	0.024	0.024	-	0.024	0.024	0.024	0.024	0.024	0.024	0.000
Lower respiratory infections	Episodes	0.279	0.279	0.278	0.279	0.279	0.279	0.279	0.278	0.279	0.279	0.279	0.279	0.279	0.278	0.279	0.279	0.279	0.279	0.279	0.279	0.002
	Chronic sequelae	0.099	0.099	-	0.099	0.099	0.099	0.099	-	-	0.099	-	0.099	0.099	-	0.099	0.099	0.099	0.099	0.099	0.099	0.000
Upper respiratory infections	Episodes	0.271	0.271	0.241	0.253	0.253	0.257	0.257	0.241	0.245	0.257	0.245	0.263	0.269	0.241	0.257	0.263	0.263	-	-	-	0.031
	Pharyngitis	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.070	0.000
Otitis media	Episodes	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.000
	Deafness	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.228	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.229	0.001
Maternal haemorrhage	Episodes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	0.000	0.000
	Severe anaemia	0.093	0.093	-	0.093	0.093	0.093	0.093	-	-	0.093	-	0.093	0.093	-	0.093	0.093	0.093	0.093	-	0.093	0.000
Maternal sepsis	Episodes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	0.000	0.000
	Infertility	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	-	0.180	0.000
Hypertensive disorders of pregnancy	Episodes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	0.000	0.000
Obstructed labour	Episodes	0.000	0.000	-	0.000	0.000	0.000	0.000	-	-	-	-	0.000	0.000	-	0.000	0.000	0.000	0.000	-	0.000	0.000
	Caesarean section for OL	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	0.349	-	0.349	0.000
	Stress incontinence	0.025	0.025	-	0.025	0.025	0.025	0.025	-	-	-	-	0.025	0.025	-	0.025	0.025	0.025	0.025	-	0.025	0.000
	Rectovaginal fistula	0.430	0.430	-	0.430	0.430	0.430	0.430	-	-	-	-	0.430	0.430	-	0.430	0.430	0.430	0.430	-	0.430	0.000
Abortion	Episodes	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-	0.000	0.000	0.000	-	0.000	0.000
	Infertility	0.180	0.180	-	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	-	-	0.180	0.180	0.180	-	0.180	0.000
	Reproductive tract infection	0.067	0.067	-	0.067	0.067	0.067	0.067	-	0.067	0.067	0.067	0.067	0.067	-	-	0.067	0.067	0.067	-	0.067	0.000
Low birth weight	All sequelae	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.000
Birth asphyxia and birth trauma	All sequelae	0.379	0.379	0.343	0.364	0.364	0.367	0.367	0.343	0.353	0.367	0.353	0.374	0.374	0.343	0.372	0.374	0.374	0.372	0.372	0.372	0.035
Protein-energy malnutrition	Wasting	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.000
	Stunting	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.000
	Developmental disability	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.000
Iodine deficiency	Total goitre rate (G1 + G2)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Mild developmental disability	0.006	0.006	0.000	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.000	0.000	0.006	0.006	0.006	0.006	0.006	0.006
	Cretinoidism	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.000
	Cretinism	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.804	0.000
Vitamin A deficiency	Xerophthalmia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Corneal scar	0.276	0.277	-	-	0.274	-	0.276	-	-	0.277	-	0.278	0.276	-	0.277	0.278	0.277	0.276	0.276	0.277	0.004
Iron-deficiency anaemia	Mild	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Moderate	0.011	0.011	0.012	0.011	0.011	0.011	0.011	0.012	0.012	0.011	0.011	0.011	0.011	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.000
	Severe	0.090	0.090	0.090	0.090	0.092	0.090	0.091	0.090	0.091	0.091	0.090	0.089	0.091	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.003
	Cognitive impairment	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.024	0.000
Malignant neoplasms[a]																						
Other neoplasms	Cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000
Diabetes mellitus	Cases	0.012	0.012	0.018	0.015	0.015	0.014	0.014	0.018	0.016	0.014	0.016	0.013	0.013	0.018	0.014	0.013	0.013	0.015	0.014	0.015	0.006
	Diabetic foot	0.136	0.136	0.130	0.134	0.134	0.134	0.134	0.130	0.131	0.134	0.131	0.135	0.135	0.130	0.134	0.135	0.135	0.133	0.133	0.133	0.005
	Neuropathy	0.076	0.076	0.066	0.072	0.072	0.073	0.073	0.066	0.068	0.073	0.068	0.074	0.075	0.066	0.073	0.074	0.074	0.072	0.072	0.071	0.009
	Retinopathy – blindness	0.594	0.594	0.511	0.544	0.544	0.555	0.555	0.511	0.527	0.555	0.527	0.567	0.567	0.511	0.567	0.567	0.567	0.550	0.550	0.550	0.084

Amputation	0.151	0.151	0.086	0.112	0.112	0.120	0.120	0.086	0.099	0.120	0.099	0.129	0.129	0.086	0.129	0.129	0.129	0.102	0.103	0.101	0.065

Annex Table 5a (continued): GBD 2000 disability weights

GBD cause	Sequelae	R01 Afr D	R02 Afr E	R03 Amr A	R04 Amr B	R05 Amr D	R06 Emr B	R07 Emr D	R08 Eur A	R09 Eur B1	R10 Eur B2	R11 Eur C	R12 Sear B	R13 Sear D	R14 Wpr A	R15 Wpr B1	R16 Wpr B2	R17 Wpr B3	W	W M	W F	Variation
Endocrine disorders	All sequelae	0.139	0.139	0.083	0.105	0.105	0.113	0.113	0.083	0.090	0.113	0.090	0.124	0.135	0.083	0.113	0.124	0.124	0.106	0.107	0.105	0.056
Unipolar depressive disorders	Episodes	0.298	0.298	0.410	0.425	0.425	0.298	0.298	0.410	0.395	0.395	0.410	0.458	0.458	0.384	0.361	0.361	0.361	0.398	0.396	0.399	0.160
	Dysthymia	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.000
Bipolar affective disorder	Cases	0.387	0.387	0.309	0.361	0.361	0.374	0.374	0.309	0.335	0.374	0.335	0.374	0.374	0.309	0.387	0.374	0.374	0.367	0.367	0.367	0.078
Schizophrenia	Cases	0.572	0.572	0.406	0.475	0.475	0.503	0.503	0.406	0.434	0.503	0.434	0.558	0.572	0.406	0.544	0.558	0.558	0.528	0.527	0.529	0.166
Epilepsy	Cases	0.131	0.133	0.079	0.112	0.111	0.115	0.114	0.081	0.088	0.114	0.089	0.119	0.127	0.079	0.104	0.119	0.117	0.113	0.113	0.112	0.055
Alcohol use disorders	Cases	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.000
Alzheimer and other dementias	Cases	0.665	0.665	0.667	0.666	0.666	0.665	0.665	0.667	0.666	0.666	0.667	0.666	0.666	0.667	0.666	0.666	0.665	0.666	0.666	0.666	0.002
Parkinson disease	Cases	0.388	0.387	0.337	0.356	0.353	0.362	0.362	0.338	0.346	0.363	0.342	0.367	0.385	0.337	0.365	0.373	0.373	0.351	0.351	0.352	0.052
Multiple sclerosis	Cases	0.410	0.412	0.413	0.411	0.411	0.411	0.410	0.413	0.412	0.411	0.416	0.411	0.411	0.411	0.411	0.411	0.411	0.411	0.411	0.412	0.006
Drug use disorders	Cases	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.252	0.000
Post-traumatic stress disorder	Cases	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.000
Obsessive-compulsive disorder	Cases	0.129	0.129	0.122	0.124	0.124	0.128	0.128	0.122	0.127	0.128	0.127	0.129	0.129	0.122	0.129	0.129	0.129	0.127	0.127	0.127	0.007
Panic disorder	Cases	0.171	0.171	0.153	0.157	0.157	0.161	0.161	0.153	0.161	0.161	0.161	0.169	0.169	0.153	0.169	0.169	0.169	0.165	0.165	0.165	0.018
Insomnia (primary)	Cases	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.000
Migraine	Cases	0.030	0.030	0.025	0.030	0.030	0.030	0.030	0.025	0.029	0.030	0.029	0.030	0.030	0.025	0.030	0.030	0.030	0.029	0.029	0.029	0.004
Mild mental retardation attributable to lead exposure	Cases	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.361	0.000
Glaucoma	Low vision	0.282	0.282	0.167	0.244	0.243	0.257	0.255	0.162	0.187	0.258	0.187	0.257	0.256	0.166	0.243	0.258	0.258	0.247	0.248	0.247	0.120
	Blindness	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.000
Cataracts	Low vision	0.279	0.279	0.255	0.262	0.259	0.265	0.263	0.251	0.261	0.268	0.262	0.270	0.268	0.253	0.271	0.272	0.271	0.271	0.271	0.271	0.028
	Blindness	0.594	0.594	0.511	0.544	0.544	0.555	0.555	0.511	0.527	0.555	0.527	0.567	0.567	0.511	0.567	0.567	0.567	0.568	0.568	0.568	0.084
Vision disorders, age-related and other	Low vision	0.282	0.282	0.244	0.270	0.269	0.274	0.272	0.245	0.257	0.275	0.258	0.274	0.273	0.249	0.269	0.275	0.274	0.268	0.268	0.268	0.038
	Blindness	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.600	0.000
Hearing loss, adult onset	Moderate or severe hearing loss	0.191	0.193	0.132	0.161	0.161	0.178	0.178	0.132	0.133	0.169	0.157	0.156	0.159	0.121	0.192	0.168	0.162	0.159	0.156	0.163	0.072
Rheumatic heart disease	Cases	0.300	0.300	0.186	0.232	0.232	0.247	0.247	0.186	0.201	0.247	0.201	0.270	0.292	0.186	0.247	0.270	0.270	0.253	0.256	0.251	0.114
Hypertensive heart disease	Cases	0.300	0.300	0.201	0.232	0.232	0.262	0.262	0.201	0.201	0.262	0.201	0.270	0.293	0.201	0.247	0.270	0.270	0.243	0.247	0.240	0.099
Ischaemic heart disease	Acute myocardial infarction	0.477	0.477	0.405	0.434	0.434	0.443	0.443	0.405	0.415	0.443	0.415	0.458	0.472	0.405	0.443	0.458	0.458	0.437	0.437	0.437	0.072
	Angina pectoris	0.207	0.207	0.108	0.148	0.148	0.161	0.161	0.108	0.122	0.161	0.122	0.181	0.201	0.108	0.161	0.181	0.181	0.137	0.135	0.141	0.099
	Congestive heart failure	0.300	0.300	0.186	0.232	0.232	0.247	0.247	0.186	0.201	0.247	0.201	0.270	0.292	0.186	0.247	0.270	0.270	0.234	0.235	0.234	0.114
Cerebrovascular disease	First-ever stroke cases	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.000
	Long-term stroke survivors	0.272	0.283	0.255	0.265	0.264	0.271	0.271	0.259	0.260	0.273	0.261	0.277	0.285	0.257	0.272	0.279	0.276	0.270	0.269	0.271	0.030
Inflammatory heart disease	All sequelae	0.300	0.300	0.201	0.232	0.232	0.262	0.262	0.201	0.201	0.262	0.201	0.270	0.293	0.201	0.247	0.270	0.270	0.252	0.249	0.256	0.099
Chronic obstructive pulmonary disease	Symptomatic cases	0.174	0.173	0.260	0.215	0.160	0.221	0.195	0.266	0.282	0.315	0.321	0.260	0.240	0.221	0.271	0.272	0.270	0.255	0.252	0.259	0.161
Asthma	Cases	0.050	0.050	0.036	0.041	0.041	0.043	0.043	0.036	0.039	0.043	0.039	0.046	0.046	0.036	0.043	0.046	0.046	0.043	0.043	0.043	0.014
Peptic ulcer disease	Cases with antibiotic treatment	-	-	0.003	-	-	-	-	0.003	-	-	-	-	-	0.003	-	-	-	0.003	0.003	0.003	0.000
	Cases not treated with antibiotic	0.092	0.092	0.024	0.031	0.031	0.037	0.037	0.024	0.030	0.037	0.030	0.042	0.042	0.024	0.037	0.042	0.042	0.039	0.039	0.038	0.069
Cirrhosis of the liver	Symptomatic cases	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.330	0.000
Appendicitis	Episodes	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.463	0.000
Nephritis and nephrosis	Acute glomerulonephritis	0.086	0.086	0.098	0.095	0.093	0.089	0.089	0.099	0.098	0.090	0.099	0.093	0.087	0.100	0.097	0.093	0.091	0.091	0.091	0.090	0.014
	End-stage renal disease	0.092	0.092	0.098	0.099	0.099	0.098	0.098	0.098	0.102	0.099	0.101	0.099	0.099	0.098	0.101	0.099	0.098	0.098	0.098	0.098	0.010
Benign prostatic hypertrophy	Symptomatic cases	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	-	0.000

Annex Table 5a (continued): GBD 2000 disability weights

GBD cause	Sequelae	R01 AfrD	R02 AfrE	R03 AmrA	R04 AmrB	R05 AmrD	R06 EmrB	R07 EmrD	R08 EurA	R09 EurB1	R10 EurB2	R11 EurC	R12 SearB	R13 SearD	R14 WprA	R15 WprB1	R16 WprB2	R17 WprB3	W	W M	W F	Variation
Skin diseases	Cases	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.000
Rheumatoid arthritis	Cases	0.221	0.221	0.185	0.194	0.194	0.200	0.200	0.185	0.191	0.200	0.191	0.206	0.209	0.185	0.203	0.206	0.206	0.199	0.199	0.198	0.035
Osteoarthritis	Hip	0.147	0.147	0.118	0.125	0.125	0.130	0.130	0.118	0.123	0.130	0.123	0.135	0.137	0.118	0.132	0.135	0.135	0.126	0.129	0.124	0.029
	Knee	0.147	0.147	0.118	0.125	0.125	0.130	0.130	0.118	0.123	0.130	0.123	0.135	0.137	0.118	0.132	0.135	0.135	0.129	0.129	0.129	0.029
Gout	Cases	0.189	0.189	0.061	0.103	0.103	0.129	0.129	0.061	0.095	0.129	0.095	0.172	0.172	0.061	0.172	0.172	0.172	0.132	0.133	0.123	0.128
Low back pain	Episode of limiting low back pain	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.000
	Episode of intervertebral disc displacement or herniation	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.061	0.000
	Chronic intervertebral disc	0.125	0.125	0.103	0.115	0.115	0.125	0.125	0.103	0.115	0.125	0.115	0.125	0.125	0.103	0.125	0.125	0.125	0.121	0.121	0.121	0.023
bdominal wall defect	Cases	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.000
Anencephaly	Cases	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.000
Anorectal atresia	Cases	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.000
Cleft lip	Cases	0.082	0.082	0.024	0.041	0.041	0.049	0.049	0.024	0.028	0.049	0.028	0.065	0.057	0.024	0.041	0.065	0.065	0.049	0.049	0.049	0.057
Cleft palate	Cases	0.187	0.187	0.036	0.079	0.079	0.101	0.101	0.036	0.047	0.101	0.047	0.144	0.123	0.036	0.079	0.144	0.144	0.101	0.101	0.100	0.151
Oesophageal atresia	Cases	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.000
Renal agenesis	Cases	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.850	0.000
Down syndrome	Cases	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.000
Congenital heart anomalies	Cases	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.323	0.000
Spina bifida	Cases	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.000
Dental caries	Episodes	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.000
Periodontal disease	Cases	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
Edentulism	Cases	0.052	0.052	0.007	0.025	0.031	0.031	0.037	0.007	0.007	0.016	0.007	0.043	0.049	0.007	0.037	0.043	0.043	0.020	0.020	0.019	0.045
Injuries[b]																						

a Please see tables 5b and 5c.

b Please see table 5d.

Table 5b: Disability weights for malignant neoplasms

Site	Diagnosis/therapy	Waiting	Metastasis	Terminal
Mouth and oropharynx cancers	0.09	0.09	0.75	0.81
Oesophagus cancer	0.20	0.20	0.75	0.81
Stomach cancer	0.20	0.20	0.75	0.81
Colon and rectum cancers	0.20	0.20	0.75	0.81
Liver cancer	0.20	0.20	0.75	0.81
Pancreas cancer	0.20	0.20	0.75	0.81
Trachea, bronchus and lung cancers	0.15	0.15	0.75	0.81
Melanoma and other skin cancers	0.05	0.05	0.75	0.81
Breast cancer	0.09	0.09	0.75	0.81
Cervix uteri cancer	0.08	0.08	0.75	0.81
Corpus uteri cancer	0.10	0.10	0.75	0.81
Ovary cancer	0.10	0.10	0.75	0.81
Prostate cancer	0.13	0.13	0.75	0.81
Bladder cancer	0.09	0.09	0.75	0.81
Non-Hodgkin lymphoma	0.06	0.06	0.75	0.81
Hodgkin	0.06	0.06	0.75	0.81
Lymphoma	0.09	0.09	0.75	0.81
Leukaemia	0.09	0.09	0.75	0.81
Others		0.09	0.75	0.81

Table 5c: Disability weights for long-term sequelae of malignant neoplasms

A regions		**M**										**F**									
	Site	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*
Stoma	Colon and rectum cancers	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Mastectomy	Breast cancer	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Infertility and incontenence	Cervix uteri cancer	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Infertility and incontenence	Corpus uteri cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Infertility and incontenence	Ovary cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Radical prostatectomt-incontenece and impotence	Prostate cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Incontenece and impotence	Bladder cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
B regions																					
	Site	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*
Stoma	Colon and rectum cancers	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Mastectomy	Breast cancer	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Infertility and incontenence	Cervix uteri cancer	0.11	0.11	0.11	0.11	0.11	0.11	0.06	0.06	0.06	0.06	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Infertility and incontenence	Corpus uteri cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Infertility and incontenence	Ovary cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Radical prostatectomt-incontenece and impotence	Prostate cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Incontenece and impotence	Bladder cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
C regions																					
	Site	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*
Stoma	Colon and rectum cancers	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Mastectomy	Breast cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Infertility and incontenence	Cervix uteri cancer	0.13	0.13	0.13	0.13	0.13	0.13	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Infertility and incontenence	Corpus uteri cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Infertility and incontenence	Ovary cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Radical prostatectomt-incontenece and impotence	Prostate cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Incontenece and impotence	Bladder cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
D and E regions																					
	Site	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*	*0-4*	*5-14*	*15-29*	*30-44*	*45-54*	*55-59*	*60-64*	*65-69*	*70-79*	*80+*
Stoma	Colon and rectum cancers	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Mastectomy	Breast cancer	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Infertility and incontenence	Cervix uteri cancer	0.17	0.17	0.17	0.17	0.17	0.17	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Infertility and incontenence	Corpus uteri cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Infertility and incontenence	Ovary cancer	0.18	0.18	0.18	0.18	0.18	0.18	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Radical prostatectomt-incontenece and impotence	Prostate cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Incontenece and impotence	Bladder cancer	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Table 5d: Disability weights for injuries

Short-term disability weights	**Treated**					**Untreated**				
Injury category	*0-4*	*5-14*	*15-44*	*45-59*	*60+*	*0-4*	*5-14*	*15-44*	*45-59*	*60+*
Fractured skull	0.431	0.431	0.431	0.431	0.431	0.431	0.431	0.431	0.431	0.431
Fractured face bones	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223
Fractured vertebral column	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266
Fractured rib or sternum	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199
Fractured pelvis	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247	0.247
Fractured clavicle, scapula or humerous	0.153	0.153	0.136	0.136	0.136	0.153	0.153	0.136	0.136	0.136
Fractured ulna or radius	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180
Fractured hand bones	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Fractured femur	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372	0.372
Fractured patella, tibia or fibula	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271
Factured ankle	0.196	0.196	0.196	0.196	0.196	0.196	0.196	0.196	0.196	0.196
Fractured foot bones	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077	0.077
Other dislocation	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
Dislocation of sholder, elbow or hip	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
Sprains	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064
Intracranial injuries	0.359	0.359	0.359	0.359	0.359	0.359	0.359	0.359	0.359	0.359
Internal injuries	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208	0.208
Open wound	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108
Injury to eyes	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108
Crushing	0.218	0.218	0.218	0.218	0.218	0.218	0.218	0.218	0.218	0.218
Burns <20%	0.158	0.158	0.158	0.158	0.158	0.156	0.156	0.156	0.156	0.156
Burns >20% and <60%	0.441	0.441	0.441	0.441	0.441	0.469	0.469	0.469	0.469	0.469
Burns >60%	0.441	0.441	0.441	0.441	0.441	0.469	0.469	0.469	0.469	0.469
Injured nerves	0.064	0.064	0.064	0.064	0.064	0.078	0.078	0.078	0.078	0.078
Poisoning	0.611	0.611	0.608	0.608	0.608	0.611	0.611	0.608	0.608	0.608

Longt-term disability weights	**Treated**					**Untreated**				
Injury category	*0-4*	*5-14*	*15-44*	*45-59*	*60+*	*0-4*	*5-14*	*15-44*	*45-59*	*60+*
Fractured skull	0.350	0.350	0.350	0.350	0.404	0.410	0.410	0.410	0.419	0.471
Injured spinal cord	0.725	0.725	0.725	0.725	0.725	0.725	0.725	0.725	0.725	0.725
Fractured femur	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272
Intracranial injuries	0.350	0.350	0.350	0.350	0.404	0.410	0.410	0.410	0.419	0.471
Injury to eyes	0.301	0.300	0.298	0.298	0.298	0.354	0.354	0.354	0.354	0.354
Amputated thumb	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165
Amputated finger	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Amputated arm	0.257	0.257	0.257	0.257	0.257	0.308	0.308	0.308	0.308	0.308
Amputated toe	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102	0.102
Amputated foot	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Amputated leg	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300	0.300
Burns <20%	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Burns >20% and <60%	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255
Burns >60%	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255
Injured nerves	0.064	0.064	0.064	0.064	0.064	0.078	0.078	0.078	0.078	0.078

Annex table 6: Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Afghanistan	q5q15		Census 79 (sample); National Demographic and Family Guidance Survey 73; Mulptiple Indicator Cluster Survey 2000 (East rural areas only)
Albania	project vital registration with adjustment	1950, 1955, 1957-1964, 1980, 1984-2000	Multiple Indicator Cluster Survey 2000
Algeria	q5q15	1950-1956, 1964-1965, 1980-1982, 1985-1986, 1998, 2000	Enquête Démographique 70; Enquête sur la Fécondité 70; Enquête Nationale sur la Fécondité 86; Maternal and Child Health Survey 92; Mulptiple Indicator Cluster Survey 95; Mulptiple Indicator Cluster Survey 2000
Andorra	region	1950-1954, 1992, 1994-1998, 2000	
Angola	q5q15	1956-1973	Instituto Nacional de estatistica, Familias e aldeias do sul de Angola boletim #12; Mulptiple Indicator Cluster Survey 96; Mulptiple Indicator Cluster Survey 2000
Antigua and Barbuda	q5q15	1950-1966, 1969-1978, 1983, 1986-1987, 1990-1999	
Argentina	project good vital registration	1950-1970, 1977-2001	
Armenia	project vital registration with adjustment	1981-2001	Demographic and Health Survey 2000
Australia	project good vital registration	1950-2001	
Austria	project good vital registration	1950-2001	
Azerbaijan	project vital registration with adjustment	1981-2001	Multiple Indicator Cluster Survey 2000
Bahamas	projection adjusted	1965, 1967-1969, 1971-1998	
Bahrain	project good vital registration	1980-1982,1984-2001	Child Health Survey 89; Gulf Family Health Survey 95
Bangladesh	q5q15	1996-1997	Contraceptive Prevalence Survey 79; Contraceptive Prevalence Survey 81; Contraceptive Prevalence Survey 83; Contraceptive Prevalence Survey 85; Demographic and Health Survey 93; Demographic and Health Survey 97; Demographic and Health Survey 2000; Maternal Mortality Survey 2001 - preliminary; Matlab 91-98; Population Growth Estimation Experiment 62; Retrospective Survey of Fertility and Mortality 74; World Fertility Survey 75; World Fertility Survey 88
Barbados	projection adjusted	1950-2001	
Belarus	project vital registration with adjustment	1981-2001	
Belgium	project good vital registration	1950-2001	
Belize	q5q15	1950-1998	
Benin	q5q15		Census 92; Demographic and Health Survey 96;Demographic and Health Survey 2000; World Fertility Survey 82
Bhutan	q5q15		Demographic Sample Survey 84; National Health Survey 94; National Health Survey 2000

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Bolivia	q5q15	1951-1958, 1965-1966, 1976-1977	Census 76; Census 92; Demographic and Health Survey 89; Demographic and Health Survey 89; Demographic and Health Survey 93; Demographic and Health Survey 98; Encuesta Demografica Nacional 75; National Demographic Survey 80; Encuesta Nacional de Poblacion y Vivienda 88; Multiple Indicator Cluster Survey 2000
Bosnia and Herzegovina	q5q15	1989-1990, 1991, 1999	
Botswana	q5q15	1995-1998	Census 71; Census 81; Census 91; Botswana Family Health Survey I (CPS) 84; Demographic and Health Survey 88; Botswana Family Health Survey III 96; Multiple Indicator Cluster Survey 2000
Brazil	project vital registration with adjustment	1974-2000	Census 70; Census 80; Demographic and Health Survey 86; Demographic and Health Survey 96; Pesquisa Nacional por Amostra de Domicilios 72; Pesquisa Nacional por Amostra de Domicilios 73; Pesquisa Nacional por Amostra de Domicilios 76; Pesquisa Nacional por Amostra de Domicilios 77; Pesquisa Nacional por Amostra de Domicilios 78; Pesquisa Nacional por Amostra de Domicilios 84; Pesquisa Nacional por Amostra de Domicilios 86
Brunei Darussalam	projection adjusted	1950-1959, 1964-1978, 1981-2000	
Bulgaria	project good vital registration	1950-2001	
Burkina Faso	q5q15		Census 85; Demographic and Health Survey 92; Demographic and Health Survey 98/9; Enquête Démographique 91; Indepth Survey (Oubritenga, Nouna) 94-98; Post-enumeration Survey 76
Burundi	q5q15		Census 90; Annuaire statistique de Burundi 92; Demographic and Health Survey 87; Enquête Démographique 70; Enquête Post-censitaire 79; Multiple Indicator Cluster Survey 2000
Cambodia	q5q15		National Health Survey 98; Demographic and Health Survey 2000
Cameroon	q5q15		Census 87; Demographic and Health Survey 91; Demographic and Health Survey 98; World Fertility Survey 78; Multiple Indicator Cluster Survey 2000
Canada	project good vital registration	1950-2000	
Cape Verde	q5q15	1955-1957, 1959-1960, 1966-1975, 1980, 1983-1985, 1990-1991, 1998	Inquérito demográfico e de saúde reprodutiva 98
Central African Republic	q5q15		Census 75; Census 88; Demographic and Health Survey 95; Multiple Indicator Cluster Survey 2000 - preliminary
Chad	q5q15		Census 93; Demographic and Health Survey 97; Multiple Indicator Cluster Survey 2000
Chile	project good vital registration	1950-2000	

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
China	q5q15	1987-2000 (Sample Vital Registration)	Census 90; Census 2000; Disease Surveillance Points 91-99; Fertility Sampling Survey 92; National Survey on Fertility and Birth Control 88; Female Fertility in China: a 1 0/00 Population Survey 82; China 1 0/00 Population Sample Survey 87, 90-94, 96-98; China 1 0/0 Population Sample Survey 95; Child and Maternal Surveillance System 91-98
Colombia	project vital registration with adjustment	1950-1979, 1982-2001	Census 73; Census 85; Encuesta Nacional de Prevalencia de Uso de Anticoncepion 78; Demographic and Health Survey 86; Demographic and Health Survey 90; Demographic and Health Survey 95; Demographic and Health Survey 2000; Encuesta Nacional de Hogares 78; Encuesta Nacional de Hogares 80; World Fertility Survey 76
Comoros	q5q15		Demographic and Health Survey 96; Multiple Indicator Cluster Survey 2000
Congo	q5q15		Census 74
Cook Islands	projection	1951-1960, 1965, 1968, 1971-1973, 1975-1977, 1979-2001	
Costa Rica	2002 with adjustment	1950-2002	Census 73; Encuesta Nacional de Fecundidad 76; Encuesta de Prevalencia Anticonceptiva 78; Encuesta de Prevalencia Anticonceptiva 81; Census 84; Encuesta de Fecundidad y Salud 86
Côte d'Ivoire	q5q15		Census 88; Census 98; Demographic and Health Survey 95; Demographic and Health Survey 98; Enquête Démographique à Passages Répétés 78; World Fertility Survey 80
Croatia	project good vital registration	1982-2001	
Cuba	project good vital registration	1959-1965, 1968-2001	
Cyprus	project vital registration with adjustment	1950-1961, 1972-2001	
Czech Republic	project good vital registration	1980-2001	
Democratic People's Republic of Korea	q5q15		Census 93
Democratic Republic of the Congo	q5q15		Census 84; Enquête Nationale sur la Situation des Enfants et des Femmes au Zaire 95; Multiple Indicator Cluster Survey 96; Multiple Indicator Cluster Survey 2000
Democratic Republic of Timor-Leste	q5q15		
Denmark	2002	1950-2002	
Djibouti	q5q15		Enquête Démographique Intercensitaire 91
Dominica	projection adjusted	1950-1963, 1966-1998	
Dominican Republic	project vital registration with adjustment	1950-1988, 1990-1992, 1994-1999	Census 70; Census 81; Encuesta Nacional de Prevalenceia del Uso de Anticonceptivos 83; Demographic and Health Survey 86; Demographic and Health Survey 91; Demographic and Health Survey 96; Demographic and Health Survey 2002 - preliminary; World Fertility Survey 75; World Fertility Survey 80

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Ecuador	project vital registration with adjustment	1954-1998, 2000	Census 74; Census 82; Census 90; Demographic and Health Survey 87; Encuesta Demografica y de Salud Materna e infantil 94; Encuesta Demografica y de Salud Materna e infantil 99; Encuesta National de Salud Materno Infantil y Variables Demograficas 82; Encuesta National de Salud Materno Infantil y Variables Demograficas 89; World Fertility Survey 79
Egypt	project vital registration with adjustment	1950-1981, 1983-2000	Census 76; Census 86; Contraceptive Prevalence Survey 84; Demographic and Health Survey 88; Demographic and Health Survey 92; Demographic and Health Survey 95; Demographic and Health Survey 2000; Fertility Survey 77; Maternal and Child Health Survey 91; World Fertility Survey 80
El Salvador	project vital registration with adjustment	1950-1993, 1995-1999	Census 71; Census 92; Demographic and Health Survey 85; FESAL 88; FESAL 93; FESAL 98; Encuesta de Hogares de Propositos Multiples 92; National Fertility Survey 73
Equatorial Guinea	q5q15	1954-1959	Census 83
Eritrea	q5q15	1998-1999	Demographic and Health Survey 95
Estonia	2002	1981-2001	
Ethiopia	q5q15		Census 84; Census 94; Demographic and Health Survey 2000; Demographic Survey 81; Indepth Survey (Butajira) 95-96; National Family and Fertility Survey 90
Fiji	q5q15	1950-1987, 1992-2000	
Finland	project good vital registration	1950-2001	
France	project good vital registration	1950-2000	
Gabon	q5q15		Demographic and Health Survey 2000
Gambia	q5q15		Census 73; Census 83; Census 93; Gambian Contraceptive Prevalence and Fertility Determinants Survey 90; Indepth Survey (Farafenni) 95-99; Mulptiple Indicator Cluster Survey 2000
Georgia	project vital registration with adjustment	1981-1992, 1994-2000	
Germany	project good vital registration	1969-1978, 1980-2000	
Ghana	q5q15	1958, 1960, 1967-1971, 1999	Census 71; Census 84; Demographic and Health Survey 88; Demographic and Health Survey 93; Demographic and Health Survey 98; Indepth Survey (Navrongo) 95-99; World Fertility Survey 79
Greece	project good vital registration	1951-2001	
Grenada	q5q15	1950-1969, 1974-1978, 1984, 1988, 1994-1996	
Guatemala	project vital registration with adjustment	1950-1981, 1983-1988, 1991-1993, 1995-1998	Census 73; Census 81; Demographic and Health Survey 87; Demographic and Health Survey 95; Demographic and Health Survey 99; Encuesta Nacional de Fecundidad, Planificacion Familiar y Comunicacion 77; Encuesta Nacional Socio-Demografica 86; Encuesta Nacional Socio-Demografica 89
Guinea	q5q15		Demographic and Health Survey 99; Enquête Démographique et de Santé 92
Guinea-Bissau	q5q15	1966, 1969-1970	Multiple Indicator Cluster Survey 2000

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Guyana	q5q15	1950-1961, 1969-1971, 1974-1977, 1979, 1984-1985, 1993-1996	
Haiti	q5q15	1950-1981, 1983, 1997, 1999	Census 71; Census 82; Contraceptive Prevalence Survey 83; Demographic and Health Survey 94; Demographic and Health Survey 2000; Enquête sur la Mortalité, Morbidité et Utilisation des Services 87; World Fertility Survey 77
Honduras	q5q15	1950-1983	Census 74; Census 88; Encuesta Nacional de Epidemiologia y Salud Familiar 87; Encuesta Nacional de Epidemiologia y Salud Familiar 91-2; Encuesta Nacional de Epidemiologia y Salud Familiar 96; Encuesta Nacional de Epidemiologia y Salud Familiar 2001; Encuesta Nacional de Salud Materno Infantil 84; Encuesta Demografica Nacional 70; Encuesta Demografica Nacional 84; Encuesta Demografica Nacional Retrospectiva 72
Hungary	project good vital registration	1950-2001	
Iceland	projection adjusted	1950-2001	
India	project vital registration with adjustment	1990-1999 (Sample Registration System)	Census 81; National Family Planning Survey 70; Second All-India Family Planning Survey 80; Survey on Infant and Child Mortality 79; National Family Health Survey 92; National Family Health Survey 2000
Indonesia	q5q15		Census 71; Census 80; Census 90; Contraceptive Prevalence Survey 87; Demographic and Health Survey 97; Demographic and Health Survey 91; Demographic and Health Survey 94; National Contraceptive Prevalence Survey 87; Susenas 97-2000; World Fertility Survey 76
Iran (Islamic Republic of)	q5q15		
Iraq	q5q15	1955, 1958-1969, 1976-1977, 1987-1989	Census 87; Fertility Survey 74; Child and Maternal Mortality Survey 1999 (south/centre) Preliminary report 99; Immunization, Diarrhoeal Disease, Maternal and Child Mortality Survey 90; International Study Team 1991
Ireland	project good vital registration	1950-2001	
Israel	2002	1953-2000	
Italy	project good vital registration	1950-1999	
Jamaica	q5q15	1950-1965, 1967-1971, 1975, 1977, 1980-1985, 1989-1991, 1996-1999	Census 82; Contraceptive Prevalence Survey 89; Multiple Indicator Cluster Survey 2000; World Fertility Survey 75; Annual Fertility Survey 99
Japan	2002	1950-2001	
Jordan	q5q15	1953-1957, 1959-1974, 1976-1980, 1992	Census 79; Population and Housing Census Survey 94; Demographic and Health Survey 90; Demographic and Health Survey 97; Demographic and Health Survey 2002; Epi/CDD and Child Mortality Survey 88; Epi/CDD and Child Mortality Survey 90; Jordan Demographic Survey 81; National Fertility Survey 72; Verbal Autopsy Study 95-96; World Fertility Survey 76

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Kazakhstan	project vital registration with adjustment	1981-2001	Demographic and Health Survey 95; Demographic and Health Survey 99
Kenya	q5q15	1960-1963, 1968-1973	Census 69; Census 79; Census89; Demographic and Health Survey 88; Demographic and Health Survey 93; Demographic and Health Survey 98; National Demographic Survey 77; National Demographic Survey 83; World Fertility Survey 77; Welfare Monitoring Survey II 1994
Kiribati	projection	1991-2001	Census 78; Census 2000
Kuwait	project good vital registration	1962-1989, 1991-2001	Census 75; Census 80; Child Health Survey 87
Kyrgyzstan	project vital registration with adjustment	1981-2001	Demographic and Health Survey 97
Lao People's Democratic Republic	q5q15		Census 95; Fertility and Birth Spacing Survey 94; Laos Social Indicator Survey 93; Reproductive Health Survey 2000
Latvia	2002	1980-2001	
Lebanon	q5q15	1997-1999	National Fertility and Family Planning Survey; Maternal and Child Health Survey 96; Mulptiple Indicator Cluster Survey 2000 - preliminary report
Lesotho	q5q15		Census 76; Census 86; Census 96; Rural Household Consumption and Expenditure Survey 68; Rural Household Consumption and Expenditure Survey 71; World Fertility Survey 77
Liberia	q5q15	1970	Census 74; Demographic and Health Survey 86; Population Growth Survey 69; Population Growth Survey 70
Libyan Arab Jamahiriya	q5q15	1972-1976, 1981	Census 73; Maternal and Child Health Survey 95
Lithuania	2002	1981-2001	
Luxembourg	projection adjusted	1950-2001	
Madagascar	q5q15	1955, 1957-1961, 1964-1968, 1971-1972	Demographic and Health Survey 92; Demographic and Health Survey 97; National Demographic Survey 66; Multiple Indicator Cluster Survey 2000
Malawi	q5q15	1971, 1977	Census 77; Census 87; Census 98; Demographic and Health Survey 92; Demographic and Health Survey 2000; Family Formation Survey 84; National Demographic Survey 82; Population Change Survey 70
Malaysia	project vital registration with adjustment	1986,1990-1998	Census 70; Fertility and Family Survey 74
Maldives	2002 with adjustment	1978-1993, 1995-1998	
Mali	q5q15	1976, 1987	Census 76; Demographic and Health Survey 87; Demographic and Health Survey 95
Malta	projection adjusted	1950-2001	
Marshall Islands	q5q15	1986-1997	Census 99
Mauritania	q5q15	1988	Census 88; World Fertility Survey 81; Maternal and Child Health Survey 1990; Multiple Indicator Cluster Survey 96; Demographic and Health Survey 2000
Mauritius	project good vital registration	1957-2001	

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Mexico	project vital registration with adjustment	1950-2001	
Micronesia (Fed. States of)	q5q15		
Monaco	region	1950-1953, 1959, 1963, 1966, 1970, 1981-1983, 1986-1987	
Mongolia	2002 with adjustment	1987-1989, 1991-2001	National Demographic Survey 94; Reproductive Health Survey 98
Morocco	q5q15	1991-93, 1995-1998	Census 82; Contraceptive Prevalence Survey 83; Demographic and Health Survey 87; Demographic and Health Survey 92; Demographic and Health Survey 95; World Fertility Survey 80; Maternal and Child Health Survey 97
Mozambique	q5q15	1961-1969, 1971-1973, 1997	Census 70; Census 80; Demographic and Health Survey 97; Indepth Survey (Manhica) 99-98; National Demographic Survey 1991
Myanmar	q5q15	1977-1978, 1987-2000 (urban)	Census 83; Population Changes and Fertility Survey 91; National Mortality Survey 99
Namibia	q5q15		Demographic and Health Survey 92
Nauru	q5q15	1965-1968, 1978, 1993-1995	Census 92
Nepal	q5q15	1977, 1981, 1987, 1991	Census 71; Census 81; Census 91; Contraceptive Prevalence Survey 81; Demographic and Health Survey 95; Demographic and Health Survey 2001; Fertility and Family Planning Survey 85; Fertility, Family Planning and Health Survey 91; World Fertility Survey 76
Netherlands	project good vital registration	1950-2001	
New Zealand	project good vital registration	1950-2001	
Nicaragua	project vital registration with adjustment	1950-1965, 1968-1969, 1973-1978, 1987-1994, 1997-2000	Census 71; Demographic and Health Survey 92; Demographic and Health Survey 98; Demographic and Health Survey 2001; Encuesta Retrospectiva Demografica Nacional 77; Encuesta Socio-Demografica 85
Niger	q5q15		Census 88; Demographic and Health Survey 92; Demographic and Health Survey 98; Multiple Indicator Cluster Survey 2000
Nigeria	q5q15		Demographic and Health Survey 90; Demographic and Health Survey 99; Multiple Indicator Cluster Survey 2000; World Fertility Survey 81
Niue	projection	1950-1961, 1966-1969, 1973, 1975, 1980-2000	
Norway	project good vital registration	1950-2001	
Oman	q5q15		Child Health Survey 92; Family Health Survey 95
Pakistan	q5q15	1968, 1976-1979, 1984-1993	Census 81; Labour Force and Migration Survey 80; Living Standard Measurement Survey 91; Population Growth Survey II 76; World Fertility Survey 75; Demographic Survey 84; Contraceptive Prevalence Survey 85; Demographic Survey 88; Demographic and Health Survey 90; Demographic Survey 97

Palau	projection	1985, 1987-1999

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Panama	project vital registration with adjustment	1950-2000	Census 80; Census 90; Encuesta Demografica Nacional 76; Encuesta Demografica Nacional Retrospectiva 76; World Fertility Survey 75
Papua New Guinea	q5q15	1977, 1980, 1987-1998	Census 71; Census 80; Demographic and Health Survey 91; Demographic and Health Survey 96
Paraguay	project vital registration with adjustment	1950-1962, 1964-1971, 1974-1987, 1992, 1994-2000	Census 72; Census 82; Census 92; Demographic and Health Survey 90; Encuesta Demografica Nacional 77; World Fertility Survey 79
Peru	project vital registration with adjustment	1950-1992, 1994-2000	Census 72; Census 81; Census 93; Contraceptive Prevalence Survey 81; Demographic and Health Survey 86; Demographic and Health Survey 91; Demographic and Health Survey 96; Demographic and Health Survey 2000; Encuesta Demografica Nacionals 74; Encuesta Demografica Nacional Retrospectiva 76; World Fertility Survey 77
Philippines	project vital registration with adjustment	1950-1953, 1956-1998	Census 70; Census 80; Demographic and Health Survey 93; Demographic and Health Survey 98; National Demographic Survey 88; World Fertility Survey 78
Poland	project good vital registration	1950-2001	
Portugal	project good vital registration	1950-2001	
Qatar	projection	1981-1983, 1985-1998, 2000-2001	Child Health Survey 91
Republic of Korea	project vital registration with adjustment	1957, 1960, 1962-1967, 1977-1980, 1982-2001	Census 70; Census 75; Census 80; Census 85; World Fertility Survey 74
Republic of Moldova	project vital registration with adjustment	1981-2001	Multiple Indicator Cluster Survey 2000
Romania	project good vital registration	1956-2001	
Russian Federation	project good vital registration	1980-2001	
Rwanda	q5q15		Census 78; Census91; Demographic and Health Survey 92; Demographic and Health Survey 2000; Enquête Démographique 70; National Fertility Survey 83; Socio-demographic Survey 96
Saint Kitts and Nevis	projection adjusted	1950-2000	
Saint Lucia	projection adjusted	1950-1961, 1963, 1968-2001	
Saint Vincent and the Grenadines	projection	1950-1956, 1960-1964, 1970-1972, 1974, 1977-1999	
Samoa	q5q15	1955-1970, 1973-1976, 1978, 1980, 1992-1993, 2000, 2002	SPC Demograqphic and Health Survey 1999; Demographic and vital statistics survey 2000
San Marino	projection	1962, 1964-1978, 1980-2001	
Sao Tome and Principe	q5q15	1955-1958, 1962-1971, 1977-1979, 1984-1985, 1987	Multiple Indicator Cluster Survey 2000
Saudi Arabia	q5q15		Child Health Survey 91; Gulf Family Health Survey 1996

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Senegal	q5q15		Demographic and Health Survey 86; Demographic and Health Survey 92; Demographic and Health Survey 97; Demographic and Health Survey 99; Indepth Survey (Bandafassi, Mlomp) 95-99; Multiple Indicator Cluster Survey 2000; World Fertility Survey78
Serbia and Montenegro	project vital registration with adjustment	1982-1998, 2000	
Seychelles	projection adjusted	1952-1959, 1961-2000	
Sierra Leone	q5q15		Pilot Census 73; Census 74; Census 85; Multiple Indicator Cluster Survey 2000
Singapore	project good vital registration	1950-2001	
Slovakia	project good vital registration	1982-2001	
Slovenia	project good vital registration	1982-2001	
Solomon Islands	q5q15	1990-1991, 1999 (incomplete)	Census 86; Census 99
Somalia	q5q15		Multiple Indicator Cluster Survey 2000
South Africa	q5q15	1968-1979, 1993-1999	Demographic and Health Survey 98; Indepth Survey (Agincourt) 95-99
Spain	project good vital registration	1950-2000	
Sri Lanka	q5q15	1950-1968, 1975-1989, 1991-1996	Census 71; Demographic and Health Survey 87; Demographic and Health Survey 93; World Fertility Survey 75
Sudan	q5q15		Census 73; Census 83; Demographic and Health Survey 89-90; Maternal and Child Health Survey 93; Safe Motherhood Survey 99
Suriname	q5q15	1950-1957, 1961-1966, 1971-1973, 1975-1982, 1984-1997	Multiple Indicator Cluster Survey 2000
Swaziland	q5q15		Census 66; Census 76; Census 86; Multiple Indicator Cluster Survey 2000
Sweden	project good vital registration	1950-2001	
Switzerland	project good vital registration	1950-2001	
Syrian Arab Republic	q5q15	1983-1984, 1998, 2000-2001	Census 70; Sample census 76; Census 81; Fertility Survey 78; EPI/CDD and Child Mortality Survey 90; Maternal and Child Health Survey 93; Family Health Survey 2002
Tajikistan	project vital registration with adjustment	1981-1982, 1985-1996, 1999	Multiple Indicator Cluster Survey 2000
Thailand	project vital registration with adjustment	1950-2000	Census 70; Census 80; Census 90; Contraceptive Prevalence Survey 81; Contraceptive Prevalence Survey 84; Demographic and Health Survey 87; Survey of Population Change 74; Survey of Population Change 85; Survey of Population Change 89; Survey of Population Change 95; World Fertility Survey 75

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
The Former Yugoslav Republic of Macedonia	project vital registration with adjustment	1982-2000	
Togo	q5q15	1961	Demographic and Health Survey 88; Demographic and Health Survey 98; Enquête Démographique 71
Tonga	q5q15	1957-1964, 1966, 1993-1998	
Trinidad and Tobago	project vital registration with adjustment	1950-1998	
Tunisia	q5q15	1960, 1968-1974, 1976-1980, 1987-2000	Census 75; Census 84; Contraceptive Prevalence Survey 83; Demographic and Health Survey 88; Enquête Nationale Démographique 68; World Fertility Survey 78; Maternal and Child Health Survey 95; Family Health Survey 2002
Turkey	q5q15	1967, 1990-2000 (partial)	Census 70; Census 75; Census 80; Census 85; Census 90; Demographic and Health Survey 93; Demographic and Health Survey 98; National Demographic Survey 66; Population and Health Survey 83; Population and Health Survey 88; World Fertility Survey 78
Turkmenistan	project vital registration with adjustment	1981-1982, 1985-1998	Demographic and Health Survey 2000
Tuvalu	projection	1991-2000	
Uganda	q5q15		Census 69; Census 91; Demographic and Health Survey 88; Demographic and Health Survey 95; Demographic and Health Survey 2000-1; National Integrated Household Survey 92
Ukraine	project vital registration with adjustment	1981-2000	
United Arab Emirates	q5q15	2001	Census 75; Census 80; Family Health Survey 95; Child Health Survey 91; Ministry of Planing estimate
United Kingdom	project good vital registration	1950-2001	
United Republic of Tanzania	q5q15		Census 67; Census 78; Census 88; AMMP data (Hai, Dar es Salaam, Morogoro) 92-99; Demographic and Health Survey 91; Demographic and Health Survey 94; Demographic and Health Survey 96; Demographic and Health Survey 99; National Demographic Survey 73
United States of America	project good vital registration	1950-2001	
Uruguay	project good vital registration	1950-1993, 1995-2000	
Uzbekistan	project vital registration with adjustment	1981-2000	Multiple Indicator Cluster Survey 2000; Demographic and Health Survey 96
Vanuatu	q5q15		Census79; Census 89; Census 99; hospital data 93-2002
Venezuela	project vital registration with adjustment		

Annex table 6 (continued): Data sources and methods for estimates of all cause mortality by age and sex

Member State	Method for 2002	Vital registration years	Other sources
Viet Nam	q5q15		Census 89; Census 99 (3% sample); Demographic and Health Survey 88; Demographic and Health Survey 97; Intercensal Demographic Survey 94
Yemen	q5q15		Demographic and Health Survey 91; Demographic and Health Survey 97; Maternal and Child Health Survey 94
Zambia	q5q15	1999-2000	Census 69; Census 80; Census 90; Demographic and Health Survey 92; Demographic and Health Survey 96; Demographic and Health Survey 2002; Sample Census of Population 74
Zimbabwe	q5q15	1950, 1952, 1957-1962, 1965-1967, 1969, 1982, 1986, 1990, 1992-1993, 1995	Census 69; Census 82; Census 92; Demographic and Health Survey 88; Demographic and Health Survey 94; Demographic and Health Survey 99; Intercensal Demographic Survey 87; Reproductive Health Survey 84; Intercensal Demographic Survey 97

Annex Table 7: Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Afghanistan				a	CODMOD	Egypt 2000 - Iran 2001
Albania	1987-1989, 1992-2000	2000	74.9	a	CODMOD	2000
Algeria				a	CODMOD	South Africa 1996
Andorra				b	Based on 2000 data from Aragon, Navarra and Cataluna, provinces of Spain	
Angola				a	CODMOD	South Africa 1996
Antigua and Barbuda	1961-1964, 1966, 1969-1978, 1983, 1985-1995	1993-1995	84.4	c	Vital registration	Vital registration
Argentina	1966-1970, 1977-2001	2001	102.8	b	Vital registration	Vital registration
Armenia	1981-1982, 1985-2001	2001	91.4	a	CODMOD	2001
Australia	1950-2000	2000	103.8	b	Vital registration	Vital registration
Austria	1955-2001	2001	106.2	b	Vital registration	Vital registration
Azerbaijan	1981-1982, 1985-2001	2001	70.5	a	CODMOD	2001
Bahamas	1969, 1971-1972, 1974-1977, 1979-1981, 1983-1985, 1987, 1993-1998	1996-1998	92.6	c	Vital registration	Vital registration
Bahrain	1985, 1987-1988,1997-2001	2000-2001	89.8	b	Vital registration	Vital registration
Bangladesh				a	CODMOD	India and Philippines
Barbados	1955-1995	1993-1995	108.2	Preliminary vital registration data for year 2000, c	Vital registration	Vital registration
Belarus	1981-1982, 1985-2001	2001	97.6	c	Vital registration	Vital registration
Belgium	1954-1997	1997	101.9	b	Vital registration	Vital registration
Belize	1964-1984, 1986-1987, 1989-1991, 1993-1998	1997-1998	99.3	c	Vital registration	Vital registration
Benin				a	CODMOD	South Africa 1996
Bhutan				a	CODMOD	India
Bolivia				a	CODMOD	Peru 2000
Bosnia and Herzegovina	1985-1991, 1999	1999	88.0	c	Vital registration	Vital registration
Botswana	1995-1998			a	CODMOD	South Africa 1996
Brazil	1977-2000	2000	79.3	a	CODMOD	2000
Brunei Darussalam	1996-2000	1998-2000	100.1	b	Vital registration	Vital registration
Bulgaria	1964-2001	2001	103.4	c	Vital registration	Vital registration
Burkina Faso				a	CODMOD	South Africa 1996
Burundi				a	CODMOD	South Africa 1996

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Cambodia				a	CODMOD	Philippines, Thailand
Cameroon				a	CODMOD	South Africa 1996
Canada	1950-2000	2000	99.7	b	Vital registration	Vital registration
Cape Verde	1980			a	CODMOD	South Africa 1996
Central African Republic				a	CODMOD	South Africa 1996
Chad				a	CODMOD	South Africa 1996
Chile	1954-1999	1999	102.8	Preliminary vital registration data for year 2000, b	Vital registration	Vital registration
China	1987-2000	2000		DSP, a	Vital registration and DSP	Vital registration and DSP
Colombia	1953-1970, 1972, 1974-1977, 1979,1981, 1984-1999	1999	79.3	a	CODMOD	1999
Comoros				a	CODMOD	South Africa 1996
Congo				a	CODMOD	South Africa 1996
Cook Islands	1995-2001	1999-2001	104.2	a	Vital registration	Vital registration
Costa Rica	1956-2002	2002	79.3	b	Vital registration	Vital registration
Côte d' Ivoire				Abidjan, Côte dIvoire, 1973-1992 Deaths assessed by medical personnel in city hospitals. Source: M. Benjamin Zanou, ENSEA, Abidjan, a	CODMOD	South Africa 1996
Croatia	1985-2001	2001	98.1	b	Vital registration	Vital registration
Cuba	1959, 1964-1965, 1968-2001	2001	103.8	b	Vital registration	Vital registration
Cyprus	1996-1999	1997-1999	69.9	a	CODMOD	1997-1999
Czech Republic	1985-2001	2001	104.2	b	Vital registration	Vital registration
Democratic People's Republic of Korea				a	CODMOD	Philippines, India
Democratic Republic of the Congo				a	CODMOD	South Africa 1996
Democratic Republic of Timor-Leste				a	CODMOD	India, Philippines
Denmark	1951-1999	1999	103.2	b	Vital registration	Vital registration
Djibouti				a	CODMOD	Egypt2000 - Iran 2000
Dominica	1961-1962, 1967-1994	1992-1994	109.9	c	Vital registration	Vital registration
Dominican Republic	1956-1963, 1965-1992, 1994-1998	1998	48.4	a	CODMOD	1998
Ecuador	1961, 1963-1975, 1977-2000	2000	75.5	a	CODMOD	2000

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Egypt	1954-1967,1970-1980,1987, 1991-1992, 1996-2000	2000	80.3	a	CODMOD	2000
El Salvador	1950-1974, 1981-1984, 1990-1993, 1995-1999	1999	73.1	a	CODMOD	1999
Equatorial Guinea				a	CODMOD	South Africa 1996
Eritrea	1998-1999			a	CODMOD	South Africa 1996
Estonia	1981-1982, 1985-2001	2001	99.6	b	Vital registration	Vital registration
Ethiopia				a	CODMOD	South Africa 1996
Fiji	1978, 1992-1997, 1999-2000	2000	115.5	a	Vital registration	Vital registration
Finland	1952-2001	2001	99.9	b	Vital registration	Vital registration
France	1950-1999	1999	107.9	b	Vital registration	Vital registration
Gabon				a	CODMOD	South Africa 1996
Gambia				a	CODMOD	South Africa 1996
Georgia	1981-1982, 1985-1992, 1994-2000	2000	66.2	a	CODMOD	2000
Germany	1969-2000	2000	103.0	b	Vital registration	Vital registration
Ghana				Hospital mortality data for Eastern Region, 1990-2000, a	CODMOD	South Africa 1996
Greece	1956-1999	1999	87.9	b	Vital registration	Vital registration
Grenada	1974-1978, 1984, 1988, 1994-1996	1994-1996	85.7	c	Vital registration	Vital registration
Guatemala	1958-1971, 1974-1981, 1984	1996	98.0	Preliminary vital registration data for 1996, a	CODMOD	1996
Guinea				a	CODMOD	South Africa 1996
Guinea-Bissau				a	CODMOD	South Africa 1996
Guyana	1975-1977, 1979, 1984, 1988, 1990, 1993-1996	1994-1996	73.6	c	Vital registration	Vital registration
Haiti	1980-1981, 1983, 1997, 1999	1999	6.9	a	CODMOD	1999
Honduras	1966, 1968-1983			a	CODMOD	Nicaragua, El Salvador, Guatemala
Hungary	1955-2001	2001	107.8	b	Vital registration	Vital registration
Iceland	1951-1999	1997-1999	101.2	b	Vital registration	Vital registration
India	1996 - 1998 (Survey of Cause of Death (rural))	1996-1998		Urban Medical certification of Cause of Death System - 1995, a	Proportionate mortality for urban and rural summed up to national estimate	1996 - 1998 (Survey of Cause of Death (rural)), Urban Medical certification of Cause of Death System - 1995

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Indonesia				a	CODMOD	Singapore, India, Thailand and Philippines
Iran (Islamic Republic of)	1999-2001	2001	38.6	a	CODMOD	2001 (18 provinces mortality data)
Iraq				a	CODMOD	Egypt 2000 - Iran 2001
Ireland	1950-2000	2000	102.9	c	Vital registration	Vital registration
Israel	1975-1998	1998	108.2	b	Vital registration	Vital registration
Italy	1951-1999	1999	99.4	b	Vital registration	Vital registration
Jamaica	1960-1961, 1964-1965, 1967-1971, 1975, 1977, 1980-1991	1991	< 75	a	CODMOD	1991
Japan	1950-2000	2000	97.0	b	Vital registration	Vital registration
Jordan	1959-1960,1962-1966, 1968, 1970-1975, 1978-1979			Mortality and causes of death in Jordan 1995-1996: assessment by verbal autopsy. Source: S.A. Khoury, D. Massad, & T. Fardous, Bulletin of the World Health Organization, 1999, 77 (8), a	Verbal autopsy data	Verbal autopsy data
Kazakhstan	1981-1982, 1985-2001	2001	79.8	a	CODMOD	2001
Kenya				Hospital data, Ministry of Health, 1996, 1998-2000, a	CODMOD	South Africa 1996
Kiribati	1999-2002	2000-2002	75.8	Kiribati, Third National Health Family Planning & Social Welfare Plan 1992-1995, Dec 1991, Ministry of Health Family Planning & Social Welfare, Kiribati, a	Vital registration	2000-2002
Kuwait	1972, 1975-1987, 1993-2001	1999-2001	95.9	b	Vital registration	Vital registration
Kyrgyzstan	1981-1982, 1985-2001	2001	73.2	a	CODMOD	2001
Lao People's Democratic Republic				a	CODMOD	Philippines, Thailand
Latvia	1980-2001	2001	99.7	b	Vital registration	Vital registration
Lebanon	1997-1999		18.9	a	CODMOD	Egypt 2000 - Iran 2001
Lesotho				a	CODMOD	South Africa 1996
Liberia				a	CODMOD	South Africa 1996
Libyan Arab Jamahiriya				a	CODMOD	Egypt 2000 - Iran 2001
Lithuania	1981-1982, 1985-2001	2001	96.9	b	Vital registration	Vital registration
Luxembourg	1955-1962, 1965-2001	1999-2001	109.4	b	Vital registration	Vital registration
Madagascar				Antananarivo, Madagascar, 1976-1995 Deaths certified by medical personnel. Source:M Dominique Waltisperger et al., CEPED, Paris, a	CODMOD	South Africa 1996
Malawi				a	CODMOD	South Africa 1996
Malaysia	1986, 1990-1998		40.0	a	CODMOD	Singapore, China and Thailand

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Maldives				a	CODMOD	India and Philippines
Mali				a	CODMOD	South Africa 1996
Malta	1955-2001	1999-2001	95.4	b	Vital registration	Vital registration
Marshall Islands				a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Mauritania				a	CODMOD	South Africa 1996
Mauritius	1957-2000	1998-2000	101.6	c	Vital registration	Vital registration
Mexico	1955-2001	2001	96.0	b	Vital registration	Vital registration
Micronesia (Federated States of)				1999 FSM Statistical Yearbook, a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Monaco				b	Based on 1998 data from Provence Alpes Cote dAzur, Department of France	Based on 1998 data from Provence Alpes Cote dAzur, Department of France
Mongolia	1990-2000	2000	76.4	a	CODMOD	2000
Morocco	1990-1997		33.7	a	CODMOD	Egypt 2000 - Iran 2001
Mozambique				a	CODMOD	Zimbabwe 1995 and South Africa 1996
Myanmar	1977-1978, 1998-2000			a	CODMOD	Philippines, India
Namibia				a	CODMOD	South Africa 1996
Nauru	1994-1996	1994-1996	46.0	Mortality decline in Nauru. Source: Richard Taylor & Kiki Thoma, unpublished 1998, a	Vital registration	1994-1996
Nepal				a	CODMOD	Philippines, India
Netherlands	1950-2000	2000	101.9	b	Vital registration	Vital registration
New Zealand	1950-1999	1999	105.9	b	Vital registration	Vital registration
Nicaragua	1959, 1961-1965, 1968-1969, 1973-1978, 1988-1994, 1996-2000	2000	55.0	a	CODMOD	2000
Niger				a	CODMOD	South Africa 1996
Nigeria				a	CODMOD	South Africa 1996
Niue	1995-2000	1998-2000	100.0	a	Vital registration	Vital registration
Norway	1951-2000	2000	98.3	b	Vital registration	Vital registration
Oman	1997, 2000-2001			a	CODMOD	Bahrain & Kuwait, 1997-2001
Pakistan				a	CODMOD	India

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Palau				a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Panama	1954-1989, 1996-2000	2000	86.3	a	CODMOD	2000
Papua New Guinea	1977, 1980			a	CODMOD	Philippines, India
Paraguay	1961-1963, 1965-1991, 1994, 1996-2000	2000	73.8	a	CODMOD	2000
Peru	1966-1973, 1977-1978, 1980-1983, 1986-1992, 1994-2000	2000	50.2	a	CODMOD	2000
Philippines	1963-1978, 1981, 1992-1998	1998	85.0	a	CODMOD	1998
Poland	1959-2001	2001	103.1	b	Vital registration	Vital registration
Portugal	1955-2000	2000	112.6	b	Vital registration	Vital registration
Qatar	1995, 2000-2001	2001	82.8	a	CODMOD	2001
Republic of Korea	1985-2001	2001	88.1	b	Vital registration	Vital registration
Republic of Moldova	1981-1982, 1985-2001	2001	83.0	b	Vital registration	Vital registration
Romania	1959-2001	2001	100.1	b	Vital registration	Vital registration
Russian Federation	1980-2001	2001	96.6	c	Vital registration	Vital registration
Rwanda				a	CODMOD	South Africa 1996
Saint Kitts and Nevis	1961-1963, 1965-1967, 1969-1995	1993-1995	108.2	c	Vital registration	Vital registration
Saint Lucia	1968-1981, 1983, 1986-1995	1993-1995	113.0	c	Vital registration	Vital registration
Saint Vincent and the Grenadines	1970-1972, 1974, 1977, 1979, 1982-1987, 1995-1999	1997-1999	99.1	c	Vital registration	Vital registration
Samoa				Demographic and Health Survey, 1999 and 2000, Department of Statistics, Samoa, a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
San Marino	1995-2000	1998-2000	76.3	b	Vital registration	Vital registration
Sao Tome and Principe	1984-1985, 1987			a	CODMOD	South Africa 1996
Saudi Arabia				a	CODMOD	Bahrain & Kuwait, 1997-2001

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
Senegal				NIAKHAR, Senegal 1983-1990 Deaths assessed by verbal autopsy. Source: M. Michel Garenne, CEPED, Paris, a	CODMOD	South Africa 1996
Serbia and Montenegro	2000	2000	97.4	b	Vital registration	Vital registration
Seychelles	1981-1982, 1985-1987, 1997-2000	1998-2000	106.9	b	Vital registration	Vital registration
Sierra Leone				a	CODMOD	South Africa 1996
Singapore	1955-2001	2001	81.4	c	Vital registration	Vital registration
Slovakia	1992-2001	2001	104.3	b	Vital registration	Vital registration
Slovenia	1985-2001	2001	101.6	b	Vital registration	Vital registration
Solomon Islands				a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Somalia				a	CODMOD	Egypt 2000 and South Africa 1996
South Africa	1993-1996	1996	47.2	a) National Injury Mortality Surveillance System: Summary Report 2000, South Africa b) Causes of death in a rural area of South Africa: an international perspective, Journal of Tropical Pediatrics, vol 46, 6/2000, Kahn K, Tollman SM, Garenne M, Gear JS c) Rapid assessment of trauma facilities at state hospitals in South Africa, Violence and Injury Surveillance System, MRC, May 2000, a	CODMOD	South Africa 1996
Spain	1951-2000	2000	101.9	b	Vital registration	Vital registration
Sri Lanka	1950-1968, 1977, 1980-1989, 1991-1992, 1995-1996	1996	74.4	a	CODMOD	1996
Sudan				a	CODMOD	Egypt 2000 and South Africa 1996
Suriname	1963-1966, 1971-1973, 1975-1982, 1984-1992	1990-1992	66.1	a	Vital registration	Vital registration
Swaziland				a	CODMOD	South Africa 1996
Sweden	1951-2000	2000	102.8	b	Vital registration	Vital registration
Switzerland	1951-1999	1999	102.6	b	Vital registration	Vital registration
Syrian Arab Republic	1973-1978, 1980-1981, 1984-1985, 2000-2001	2001	113.5	a	CODMOD	2001
Tajikistan	1981-1982, 1985-1995, 1999	1999	48.1	a	CODMOD	1999
Thailand	1955-1987, 1990-2000	2000	89.2	Ministry of Health - Verbal autopsy study, a	Vital registration corrected by verbal autopsy study	

Annex Table 7 (continued): Data sources and methods for estimation of mortality by cause, age and sex

Country	Vital registration data	Year used	Estimated coverage (%)	Other sources of information	Method	Cause of death distribution pattern used
The former Yugoslav Republic of Macedonia	1991-2000	2000	91.9	c	Vital registration	Vital registration
Timor-Leste				a	CODMOD	India and Philippines
Togo				a	CODMOD	South Africa 1996
Tonga	1998	1998	70.3	Report of the Minister of Health for the year 1994, Government of Tonga, a	Vital registration	Vital registration
Trinidad and Tobago	1951-1998	1996-1998	92.8	b	Vital registration	Vital registration
Tunisia				a	CODMOD	Egypt 2000 - Iran 2001
Turkey	1987-1998	1998	42.6	a	CODMOD	1998
Turkmenistan	1981-1982, 1985-1998	1998	76.0	a	CODMOD	1998
Tuvalu				a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Uganda				a	CODMOD	South Africa 1996
Ukraine	1981-1982, 1985-2000	2000	94.9	c	Vital registration	Vital registration
United Arab Emirates				a	CODMOD	Bahrain & Kuwait, 1997-2001
United Kingdom	1950-2000	2000	102.2	b	Vital registration	Vital registration
United Republic of Tanzania				a	CODMOD	Zimbabwe 1995 and South Africa 1996
United States of America	1950-2000	2000	101.4	b	Vital registration	Vital registration
Uruguay	1955-1960, 1963-1978, 1980-1991, 1993-2000	2000	101.2	b	Vital registration	Vital registration
Uzbekistan	1981-1982, 1985-2000	2000	81.7	a	CODMOD	2000
Vanuatu				Hospital data, Ministry of Health, 2001, a		Cook Islands, Marshall Islands, Niue, Samoa, Tonga, Tuvalu, Vanuatu, Kiribati, Nauru and Fiji
Venezuela (Bolivarian Republic of)	1955-1983, 1985-1990, 1992-2000	2000	97.2	b	Vital registration	Vital registration
Viet Nam				a	CODMOD	China, India and Thailand
Yemen				a	CODMOD	Egypt 2000 - Iran 2001
Zambia	1999-2000			a	CODMOD	South Africa 1996
Zimbabwe	1990, 1994-1995			a	CODMOD	Zimbabwe 1995 and South Africa 1996

a Epidemiological estimates obtained from studies, WHO technical Programmes and UNAids for the following conditions: AIDS, tuberculosis, measles, pertussis, poliomyelitis, tetanus, acute lower respiratory infections, Chagas, maternal conditions, perinatal conditions, cancers, drug use disorders, rhumathoid arthritis and war

b Epidemiological estimates obtained from studies, WHO technical Programmes and UNAids for the following conditions: drug use disorders and war

c Epidemiological estimates obtained from studies, WHO technical Programmes and UNAids for the following conditions: AIDS, drug use disorders and war