Annex 4B. Global and regional burden of disease 2000-2015: Methods and summary results

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1 Introduction

A consistent and comparative description of the burden of diseases and injuries, and the risk factors that cause them, is an important input to health decision-making and planning processes. Information that is available on mortality and health in populations in all regions of the world is fragmentary and sometimes inconsistent. Thus, a framework for integrating, validating, analyzing and disseminating such information is useful to assess the comparative importance of diseases and injuries in causing premature death, loss of health, and disability in different populations.

The World Bank commissioned the first Global Burden of Disease (GBD) study for its World Development Report 1993 (1) and the study was carried out in a collaboration between the Harvard School of Public Health and the World Health Organization. This study introduced a new metric – the disability-adjusted life year (DALY) – as a single measure to quantify the burden of diseases, injuries and risk factors (2). The DALY is based on years of life lost from premature death and years of life lived in less than full health; it is described in more detail in Section 2.

Drawing on extensive databases and information provided by Member States, WHO produced annually updated GBD estimates for years 2000 to 2004 (3). The GBD results for the year 2001 also provided a framework for cost-effectiveness and priority setting analyses carried out for the Disease Control Priorities Project (DCPP), a joint project of the World Bank, WHO, and the National Institutes of Health, funded by the Bill & Melinda Gates Foundation (4). The GBD results were documented in detail, with information on data sources and methods, and analyses of uncertainty and sensitivity, in a book published as part of the DCPP (5). By the time of the GBD 2004 study, 97 of the 136 disease and injury causes had been updated, including all causes of public health importance or with significant YLD contribution to DALYs.

In 2007, the Bill & Melinda Gates Foundation provided funding for a new GBD 2010 study, led by the Institute for Health Metrics and Evaluation at the University of Washington, with key collaborating institutions including WHO, Harvard University, Johns Hopkins University, and the University of Queensland. The results were published in a series of papers in the Lancet in December 2012 and welcomed by the WHO as representing an unprecedented effort to improve global and regional estimates of levels and trends in the burden of disease. In many areas, the GBD 2010 results presented in the Lancet papers were similar to WHO's recently published estimates. In others, however, the GBD 2010 study came to conclusions that differed substantially from the analysis by WHO and UN interagency groups. Pending the availability of more detailed information on the data and methods used in these areas, and the opportunity to review and assess the reasons for differences, the WHO did not endorse the GBD results.

To meet WHO's need for comprehensive global health statistics, which brings together WHO and interagency estimates for all-cause mortality and priority diseases and injuries, as well as drawing on the work of academic collaborators, including IHME, a series of Global Health Estimates (GHE) for mortality, causes of death, and disease burden, have been released. The GHE estimates of deaths by cause for the years 2000-2015 are summarized in Chapter 4 of the *Disease Control Priorities* Volume 9 (6).

To meet the need for DALY estimates consistent with the GHE for cause-specific mortality, WHO also released regional- and country-level estimates of DALYs by cause, age and sex for

years 2000 and 2015. This annex summarizes the methods and data used for these DALY estimates, and accompanying summary tables for YLL, YLD and DALYs downloadable as Excel files These tables provide a comprehensive and comparable set of DALY estimates from year 2000 onwards, consistent with and incorporating UN agency, interagency and WHO estimates for population, births, all-cause deaths and specific causes of death, as well as GBD 2010 analyses for YLDs, with some revisions and methodological differences as summarized below:

- A simpler form of DALY has been adopted (see Section 2). Age-weighting and time discounting are dropped, and the YLDs are calculated from prevalence estimates rather than incidence estimates. YLDs are also adjusted for independent comorbidity.
- The standard life table used for calculation of years of life lost for a death at a given age is based on the projected frontier life expectancy for 2050, with a life expectancy at birth of 92 years (see Section 2.2)
- The years of life lost from mortality (YLLs) are calculated using WHO estimates of deaths by region, cause, age and sex for years 2000-2015 (6).
- Estimates of YLD draw on the GBD 2015 analyses (8), with selected revisions to disability weights and prevalence estimates as noted below.
- Limited revisions have been made to disability weights for infertility, intellectual disability, vision loss, hearing loss, dementia, drug use disorders and low back pain.
- WHO estimates of vision and hearing loss prevalence by country and their cause distributions have been used to calculate YLDs for vision and hearing loss sequelae.
- The GBD did not include problem use as a sequela for alcohol use disorders as was done in the GBD 2004. YLDs for problem use of alcohol have been estimated and added to the YLDs for alcohol dependence.
- Revised severity distributions have been taken into account in estimating YLDs for migraine, back/neck pain and skin disorders.

Annex Table 1 lists the disease and injury cause categories and their definitions in terms of the codes of the International Classification of Diseases, Tenth Revision (ICD-10) (7). The cause categories are grouped into three broad cause groups: Group I (communicable, maternal, perinatal and nutritional conditions), Group II (noncommunicable diseases); and Group III (injuries). The cause list has a hierarchical structure so that different levels of aggregation are included. At each cause level, the list provides a set of mutually exclusive and collectively exhaustive categories.

2 The disability-adjusted life year

The DALY is a summary measure which combines time lost through premature death and time lived in states of less than optimal health, loosely referred to as "disability". The DALY is a generalization of the well-known Potential Years of Life Lost measure (PYLLs) to include lost good health. One DALY can be thought of as one lost year of 'healthy' life and the measured disease burden is the gap between a population's health status and that of a normative reference population. DALYs for a specific cause are calculated as the sum of the YLLs from that cause and the YLDs for people living in states of less than good health resulting from the specific cause:

$$DALY(c,s,a,t) = YLL(c,s,a,t) + YLD(c,s,a,t)$$ for given cause c, age a, sex s and year t

The YLLs for a cause are essentially calculated as the number of cause-specific deaths multiplied by a loss function specifying the years lost for deaths as a function of the age at which death occurs. The basic formula for YLLs is the following for a given cause *c*, age *a*, sex *s* and year *t*:

$$YLL(c,s,a,t) = N(c,s,a,t) \times L(s,a)$$

where:

$N(c,s,a,t)$ is the number of deaths due to the cause *c* for the given age *a* and sex *s* in year *t*

$L(s,a)$ is a standard loss function specifying years of life lost for a death at age *a* for sex *s*

The GBD 1990 study chose not to use an arbitrary age cut-off such as 70 years for the loss function used in the calculation of YLLs, but rather specified the loss function in terms of the life expectancies at various ages in standard life tables with life expectancy at birth fixed at 82.5 years for females and 80.0 years for males. These represented approximately the highest observed life expectancies for females in the mid-1990s, together with an assumed biologically-determined minimum male-female difference.

The GBD 1990 and subsequent WHO updates used an incidence perspective for the calculation of YLDs. To estimate YLDs for a particular cause in a particular time period, the number of incident cases in that period is multiplied by the average duration of the disease and a weight factor that reflects the severity of the disease on a scale from 0 (perfect health) to 1 (dead):

$$YLD(c,s,a,t) = I(c,s,a,t) \times DW(c,s,a) \times L(c,s,a,t)$$

where:

$I(c,s,a,t)$ = number of incident cases for cause *c*, age *a* and sex *s*

$DW(c,s,a)$ = disability weight for cause *c*, age *a* and sex *s*

$L(c,s,a,t)$ = average duration of the case until remission or death (years)

The 'valuation' of time lived in non-fatal health states formalizes and quantifies the loss of health for different states of health as *disability weights*.

In the standard DALYs reported by the original GBD study and in subsequent WHO updates, calculations of YLDs and YLLs used an additional 3% time discounting and non-uniform age weights that give less weight to years lost at young and older ages (2). Using discounting and age weights, a death in infancy corresponds to 33 DALYs, and deaths at ages 5–20 years to around 36 DALYs.

2.1 Simplified DALY

Following the publication of the original GBD study (1), there has been extensive debate on all the key value choices incorporated into the DALY – the years lost on death, the disability weights, age weights and time discounting (9-14). Additionally, the incidence-based perspective required substantial modelling of incidence and average durations for many diseases where the available data mainly related to prevalence. Following consultations with philosophers, ethicists, and economists, the GBD 2010 study chose to simplify the calculation of DALYs (15-16) as follows:

- Use of a new normative standard life table for the loss function used to compute YLLs;
- Calculation of YLDs simply as the prevalence of each sequela multiplied by the relevant disability weight
- Adjustment for comorbidity in the calculation of YLDs
- No discounting for time or unequal age weights

Following informal consultations with relevant WHO programs, collaborators and expert advisory groups in late 2012, WHO decided to adopt the simplified calculation methods for DALYs as described in more detail in the following sections, albeit with an updated loss function for the computation of YLLs.

2.2 Standard expected years of life lost for calculation of YLLs

The standard reference life table for the GBD 1990 was based on the highest observed life expectancy at the time, Japanese females with a life expectancy at birth close to 82.5 years. Based on the observed male-female gap in life expectancy in the best-off communities within high-income countries, the standard reference life expectancy was set to 80·0 years at birth for males. The standard reference life table is intended to represent the potential maximum life span of an individual in good health at a given age. For the GBD 2010 study, it was decided to use the same reference standard for males and females and to use a life table based on the lowest observed death rate for each age group in countries of more than 5 million in population. The new GBD 2010 reference life table has a life expectancy at birth of 86·0 years for males and females.

However, some of the experts consulted by WHO argued that it was not appropriate to set the normative loss of years of life in terms of currently observed death rates, since even for the lowest observed death rates there are a proportion of deaths which are preventable or avertable. In fact, Japanese females have already exceeded the GBD 2010 reference life expectancy at birth,

with a life expectancy at birth in 2013 of 87.1 years. Since the loss function is intended to represent the maximum life span of an individual in good health, who is not exposed to avoidable health risks, or severe injuries, and receives appropriate health services, we chose to base this on the frontier national life expectancy projected for the year 2050 by the World Population Prospects 2012 (17).

The highest projected life expectancies for the year 2050 were projected to be achieved by women in Japan and the Republic of Korea, with a life expectancy at birth of 91.9 years. While this may still not represent the ultimate achievable human life spans, it does represent a set of life spans which are thought likely to be achieved by a substantial number of people who are alive today. Table 4B.1 summarizes the loss function used for the calculation of YLLs in the WHO GHE. Annex Table 2 tabulates the full loss function by single years of age.

Figure 4B.1 compares the age distribution of global YLLs in the year 2011 calculated using the various loss functions in Table 1. Loss functions corresponding to longer life expectancies result in an increased share of YLLs by older ages. Age-weighting and time discounting used in the GBD 1990 gives less weight to younger and older ages, and more weight to young adults.

Table 4B.1. Standard Loss Functions used in Global Burden of Disease Studies and for WHO Global Health Estimates

	GBD 1990 age-weighted, discounted		GBD 1990 no age-weights or discounting		GBD 2010	WHO GHE
Age range	**Male**	**Female**	**Male**	**Female**	**Persons**	**Persons**
Neonatal	33.27	33.38	79.94	82.43	86.01	91.93
Postneonatal	34.22	34.34	78.85	81.36	85.68	91.55
1-4	35.17	35.29	77.77	80.28	83.63	89.41
5-9	37.22	37.36	72.89	75.47	78.76	84.52
10-14	37.31	37.47	67.91	70.51	73.79	79.53
15-19	36.02	36.22	62.93	65.55	68.83	74.54
20-24	33.84	34.08	57.95	60.63	63.88	69.57
25-29	31.11	31.39	52.99	55.72	58.94	64.60
30-34	28.08	28.40	48.04	50.83	54.00	59.63
35-39	24.91	25.30	43.10	45.96	49.09	54.67
40-44	21.74	22.19	38.20	41.13	44.23	49.73
45-49	18.63	19.16	33.38	36.36	39.43	44.81
50-54	15.65	16.26	28.66	31.68	34.72	39.92
55-59	12.82	13.52	24.07	27.10	30.10	35.07
60-64	10.19	10.96	19.65	22.64	25.55	30.25
65-69	7.80	8.60	15.54	18.32	21.12	25.49
70-74	5.71	6.45	11.87	14.24	16.78	20.77
75-79	4.00	4.59	8.81	10.59	12.85	16.43
80-84	2.68	3.09	6.34	7.56	9.34	12.51
85+	1.37	1.23	3.82	3.59	5.05	7.60

Figure 4B.1 Age distribution of global YLLs for the year 2011 using various loss functions

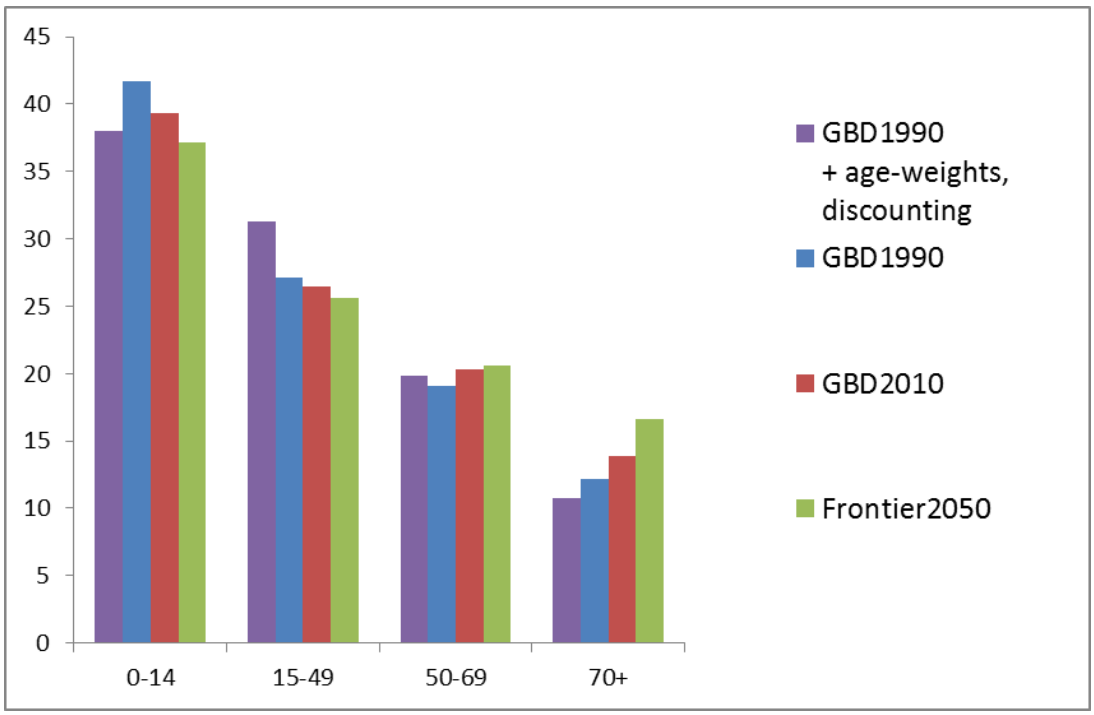


Table 4B.2 compares distributions of global YLLs by sex, major cause groups, country income groups and age for year 2011 from earlier GHE estimates for 2000-2011 (18). The WHO GHE standard gives 2 additional percentage points to noncommunicable diseases, reflecting the somewhat greater relative emphasis this standard gives to deaths at older ages. The sex distribution is largely unchanged, but the WHO GHE standard gives a slightly greater share of global YLLs to both high income and low income countries compared to the GBD 2010 standard.

Table 4B.2 Distribution of Global YLLs for the Year 2011 by Major Cause Group, Sex, Income Group, and Age

	YLL standard used			
	GBD 1990 (age weights & discounting)	**GBD 1990 (no age weights or discounting)**	**GBD 2010**	**WHO GHE**
Total YLLs (millions)	765	1567	1775	2016
By cause (%)				
Communicable, maternal, neonatal and nutritional	43	45	43	41
Noncommunicable diseases	43	42	44	46
Injuries	14	13	13	12
By sex (%)				
Male	55	54	56	56
Female	45	46	44	44
By income group (%)				
High income	7	8	8	9
Upper middle income	23	23	22	22
Lower middle income	45	46	45	44
Low income	24	24	24	25
By age (%)				
0-14	38	42	39	37
15-49	31	27	26	26
50-69	20	19	20	21
70+	11	12	14	16

2.3 Age weighting and time discounting

The GBD 1990 study and subsequent WHO updates published DALYs computed with a 3% discount rate for future lost years of healthy life and an alternative set with a 0% discount rate. The arguments for discounting future health were couched mainly in terms of avoiding various decision-making paradoxes when future costs of health interventions are discounted (11). Critics have argued that there is no intrinsic reason to value a year of health as less important simply because it is in the future (19) and the experts consulted for the GBD 2010 study also advised against discounting, particularly in the context where the DALY has been more explicitly defined as quantifying loss of health, rather than the social value of loss of health. This also avoids the inconsistency in the original DALY method, where the start time for discounting future stream of YLDs was the year of incidence, whereas that for YLLs was the year of death.

Table 4B.3 Distribution of Global DALYs for the Year 2004* with and without Age Weighting and Discounting

	YLL standard used			
	GBD 1990 (age weights & discounting)	**GBD 1990 (no age weights or discounting)**	**GBD 2010 (no age weights or discounting)**	**WHO GHE (no age weights or discounting)**
Total YLLs (millions)	765	1567	1775	2016
Total YLDs (millions)				
Total DALYs (millions)				
By age (%)				
0-14	38	42	39	37
15-49	31	27	26	26
50-69	20	19	20	21
70+	11	12	14	16

* Illustrated using WHO estimates of DALYs for year 2004 (WHO 2008).

The original GBD 1990 study and subsequent WHO updates also incorporated age-weighting in the standard DALYs used in most publications and analyses. The standard age weights gave less weight to years of healthy life lost at young ages and older ages (2). With the clearer conceptualization of DALYs as purely a measure of population health loss rather than broader aspects of social welfare, it is difficult to justify the inclusion of age weights, and both the IHME GBD studies and WHO have dropped them. Dropping time discounting and age weighting results in a substantial increase in the absolute number of DALYs lost (Table 4B.3) and a relative increase in the share of DALYs at younger and older ages (Table 4B.2 and Figure 4B.1).

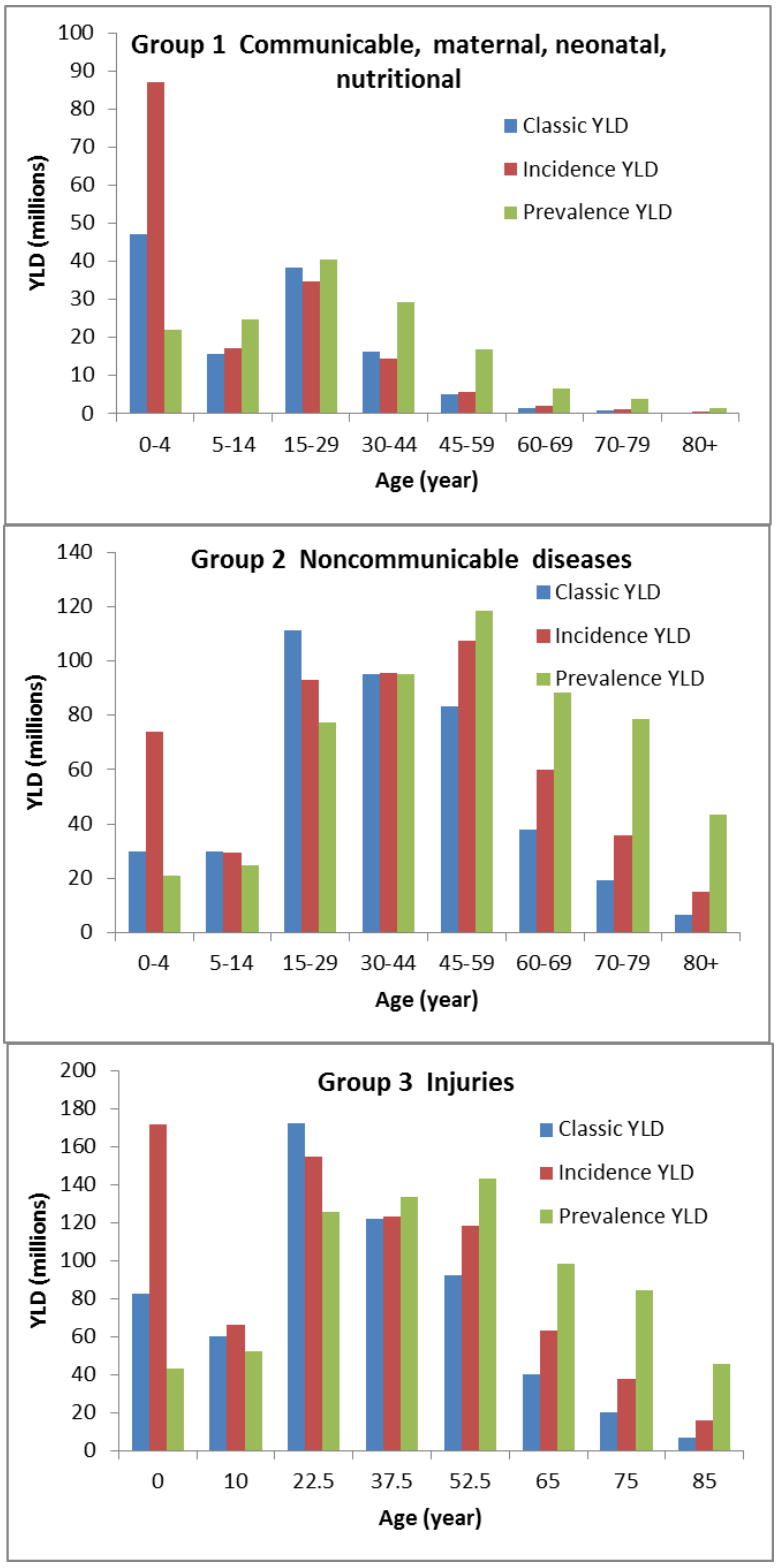
2.4 Prevalence versus incidence YLDs

DALYs were calculated in the GBD 1990 and subsequent WHO updates using an incidence perspective for YLDs. Incident YLDs were computed as the stream of future health loss associated with disease sequelae incident in the reference year. This was done to ensure consistency with the YLL calculation, which takes an inherently incidence perspective, although prevalence-based YLDs were also calculated for other purposes, such as the calculation of period healthy life expectancy.

The incidence-based YLD approach has three major disadvantages. First, it will not reflect the current prevalent burden of disabling sequelae for a condition for which incidence has been substantially reduced. Secondly, the YLD calculation requires estimates of both incidence and average duration of disease sequelae, whereas for many health conditions it is primarily prevalence data that are collected. Third, in an incidence perspective, all YLDs for a condition are assigned to the age-groups at which the condition is incident, whereas the policy-maker is often more interested in the ages at which the loss of health is experienced. Finally, incorporation of comorbidity is more straightforward in a prevalence approach than an incidence approach.

Given these advantages of a prevalence approach, both the GBD 2010 and WHO have decided to switch to a prevalence-based approach to calculation of YLDs. The major impact of this is to shift the age distribution of YLDs significantly (Figure 4B.2). Thus for example YLDs for congenital hearing loss will be spread relatively evenly across all age groups in the prevalence perspective, whereas they will all fall at age 0 in an incidence perspective.

Figure 4B.2 Age Distribution of Global YLD for the Year 2004 (3)



2.5 Comorbidity adjustment

Earlier versions of the GBD reported YLDs calculated separately for individual disease and injury causes without adjustment for comorbidity. These were added across causes to obtain total all-cause YLDs. Some limited adjustments for comorbidity were incorporated into subsequent WHO updates. For example, prevalence estimates for depression, substance use disorders and anxiety disorders were adjusted to take into account quite substantial levels of comorbidity between these conditions, so that double or triple counting did not occur for DALYs for these individuals. More comprehensive adjustments for comorbidity across all conditions was required for the calculation of healthy life expectancy. The first WHO estimates for HALE adjusted for YLD comorbidity assuming independence of conditions (the probability of having two comorbid conditions is the product of the individual probabilities of the two conditions). Later, a method for taking dependent comorbidity into account was applied (20).

Because many people have more than one disease or injury, particularly at older ages, addition of YLDs across causes may result in overestimation of the total loss of health. This is particularly important at the oldest ages, where summed YLDs may approach or exceed 100% of person-years. Following expert consultations, the GBD 2010 and subsequent revisions implemented adjustments for independent comorbidity so that summed YLDs across causes reflect the sum of the overall lost health at the individual. Individuals with the same functional health loss are then treated as like regardless of whether that functional health loss came from one or several contributing conditions.

The GBD 2010 study estimated comorbidities using the assumption of independence within age-sex groups:

$$p_{1+2} = p_1 + p_2 - p_1 \, x \, p_2 = 1 - (1 - p_1) \, x \, (1 - p_2) \qquad (1)$$

where p_{1+2} is the prevalence of the two comorbid diseases 1 and 2, p_1 is the prevalence of disease 1 and p_2 the prevalence of disease 2.

It tested this assumption using UW Medical Expenditure Panel Survey data and concluded that the error in magnitude of YLDs from using the independence assumption was minimal. The combined disability weight for individuals with multiple conditions is estimated assuming a multiplicative model as follows:

$$DW_{1+2} = 1 - (1 - DW_1) \, x \, (1 - DW_2)$$

Since prevalence YLDs are calculated for each individual cause as:

$$YLD_i = DW_i \, x \, p_i \qquad (2)$$

the two preceding equations can be combined into a single calculation resulting in:

$$YLD_{1+2} = 1 - (1\text{-}YLD_1) \, x \, (1 - YLD_2) \qquad (3)$$

Using the GBD 2004 estimates for non-age-weighted, undiscounted YLDs as an example, adjustment for independent comorbidity reduces global all-age YLDs by 6% and YLDs for ages 60 and over by 11%.

3 Disability weights for calculation of YLDs

3.1 Evolution of methods for estimation of disability weights

In order to use time as a common currency for non-fatal health states and for years of life lost due to mortality, we must define, measure and numerically value time lived in non-fatal health states. While death is not difficult to define, non-fatal health states are. They involve multiple domains of health which relate to different functions, capacities or aspects of living. In the GBD studies, the numerical valuation of time lived in non-fatal health states is through the so-called disability weights, which quantify loss of functioning on a scale where 1 represents perfect health and 0 represents a state equivalent to death. Depending on how these weights are derived and what they are attempting to quantify, they are variously referred to as disability weights, quality-adjusted life year (QALY) weights, health state valuations, utilities or health state preferences.

In the earliest version of the GBD 1990 study, the burden of disease was defined as loss of welfare/subjective well-being/quality of life (1). Murray (2) subsequently argued that the health state values should reflect societal judgements of the value of averting different diseases rather than individual judgments of the disutility of the diseases. As a result, the 1996 version of the GBD 1990 used two forms of the person-trade-off (PTO) method to assess social preferences for health states and asked small groups of health professionals in weighting exercises to make a composite judgment on the severity distribution of the condition and the social preference for time spent in each severity level (2). Dutch researchers subsequently used the same methods to estimate disability weights for the Netherlands (21, 22). The version of PTO used by the GBD study was criticized as unethical by a number of commentators (23) and rejected for the same reason by project participants in a European multi-country study following on from the Dutch study (24). Other criticism of the GBD 1990 approach to valuation of health states related to the use of judgements from health professionals rather than the general population, or those with the conditions, and to the use of universal weights rather than weights that varied with social and cultural environment.

During the period 2000-2008 in which WHO was carrying out updates of the GBD using the original disability weights, with some revisions and additions (25), the conceptual thinking behind the GBD made explicit the aspiration to quantify loss of health, rather than the social value of the loss of health, or of wellbeing (26). In this conceptualization, health state valuations formalize the intuitive notions that health levels lie on a continuum and that we may characterize an individual as being more or less healthy than another at a particular moment in time. Health state valuations quantify departures from perfect health, i.e., the reductions in health associated with particular health states. Thus in the GBD terminology, the term *disability* is used broadly to refer to departures from optimal health in any of the important domains of health and disability weights should reflect the general population judgments about the 'healthfulness' of defined

states, not any judgments of quality of life or the worth of persons or the social undesirability or stigma of health states.

3.2 Disability weights revisions for GBD 2015 and GHE 2015

The GBD 2010 study undertook a comprehensive re-estimation of disability weights through a large-scale empirical investigation with a major emphasis on surveying respondents from the general population, in which judgments about health losses associated with many causes of disease and injury were elicited through a new standardized approach. The GBD 2010 study estimated disability weights for 220 health states using a method involving discrete choice comparisons of "health" for pairs of health states described using lay descriptions consisting of a brief summary of the health state of an average or modal case in 30 words or less (see Salomon et al (27, 28) for details of lay descriptions, survey and statistical methods). Paired comparisons data were collected from 13,902 individuals in household surveys in five countries, supplemented by an open-access web-based survey of 16,328 people. This study represents the most extensive empirical effort to date to measure disability weights. It found strong evidence of highly consistent results across the samples from different cultural environments.

Salomon et al (27). noted that the new disability weights were much higher for some health states (such as heroin addiction, acute low back pain) and much lower for a larger number of health states, including infertility (0.01, previously 0.18), moderate to profound hearing loss (0.02-0.03, previously 0.12-0.33), blindness (0.20, previously 0.60) and intellectual disability (for severe intellectual disability 0.126, previously 0.82). Experts from the GBD Vision Loss Expert Group noted the surprisingly low disability weights for severe vision disorders and suggested that the cause was inadequate descriptions of the consequences of vision disorders (29).

Nord (30) argued that these problems result from the explicit framing the discrete choice comparisons of sequelae in terms of "who is healthier". Even if blindness is significantly limits functioning, blind people are – in everyday language – not 'sick' or 'ill'. Given this, many respondents may not have thought of blind people as being in poor health. Other states with which this semantic and conceptual point may have led to unreasonably low weights are for example 'deafness' (dw = 0.03), 'amputations of legs and two artificial legs' (0.05) and 'paralysed below the waist, moves about with a wheelchair' (0.05). Alternatively, it is also possible that the "lay descriptions of these health states" were inadequate in some way.

Previous WHO estimates of DALYs for years 2000-2012 made adjustments to a number of the GBD 2010 disability weights for permanent long-term disabilities as described in a previous Technical Paper (18). IHME also recognized that there were problems with these weights, and a number of others with implausible face validity, and carried out an additional valuation exercise using revised health state descriptions (31).

Salomon et al (31) carried out new web-based surveys in 2013 of 30,660 respondents in four European countries (Hungary, Italy, the Netherlands, and Sweden). These surveys included 183 health states; of which 30 were revised descriptions and 18 were for new health states. Health state descriptions were revised for most of the health states for which WHO had revised disability weights. In particular, descriptions were revised for spinal cord injury, hearing loss, and cognitive impairments. Valuations were also obtained for new health state descriptions

relating to five mild health states for alcohol and drug dependence outcomes (see Section 3.3). Table 4B.4 summarizes the GBD 2010 and GBD 2015 disability weights for those health states where the GBD 2010 disability weights were previously revised for use in the GHE DALY estimates.

The revised descriptions resulted in increased disability weights for intellectual disability and hearing loss, as well as changes in various other weights. For the health states shaded in grey in Table 4, the GHE 2012 revised disability weights have been kept for the GHE 2015 update. For other states not shaded, the GBD 2015 disability weights have been adopted.

Annex Table 3 lists the health states and health state descriptions used in the GBD 2015 study (8). Annex Table 4 tabulates the various revisions of GBD disability weights for 234 health states and lists the weights used for the GHE 2015 estimates.

Table 4B.4. Comparison of GBD2010, GBD2015 and Revised GHE Disability Weights

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Infertility: primary	0.056	0.056	0.008	0.011	0.180
Infertility: secondary	0.026	0.026	0.005	0.006	0.180
Borderline intellectual functioning	0.011	0.0034	0.011	0.0034	
Intellectual disability / mental retardation, mild	0.127	0.127	0.043	0.031	0.290
Intellectual disability / mental retardation, moderate	0.293	0.293	0.100	0.080	0.430
Intellectual disability / mental retardation, severe	0.383	0.383	0.160	0.126	0.820
Intellectual disability / mental retardation, profound	0.444	0.444	0.200	0.157	0.760
Dementia: mild	0.165	0.165	0.069	0.082	
Dementia: moderate	0.388	0.388	0.377	0.346	0.666
Dementia: severe	0.545	0.545	0.449	0.438	0.940
Hearing loss: mild	0.010	0.005	0.010	0.005	0.040
Hearing loss: moderate	0.050	0.050	0.027	0.023	0.120
Hearing loss: severe	0.167	0.167	0.158	0.031	0.333
Hearing loss: profound	0.281	0.281	0.204	0.032	0.333
Hearing loss: complete	0.281	0.281	0.215	0.033	
Distance vision: mild impairment	0.005	0.005	0.003	0.004	
Distance vision: moderate impairment	0.089	0.089	0.031	0.033	0.170
Distance vision: severe impairment	0.314	0.314	0.184	0.191	0.430
Distance vision blindness	0.338	0.338	0.187	0.195	0.600
Cannabis dependence (average disability	0.030	0.190	0.266	0.329	0.252

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
weight)					
Amphetamine dependence (average disability weight)	0.141	0.240	0.141	0.353	0.252
Cocaine dependence (average disability weight)	0.149	0.260	0.149	0.376	0.252
Heroin and other opioid dependence (average disability weight)	0.452	0.340	0.452	0.641	0.252

3.3 Alcohol problem use

The GBD 2015 included alcohol dependence (mild, moderate and severe) as sequelae for alcohol use disorders, but did not include problem use as formerly in the GBD 2004. While revising disability weights for the impairments described above, a revised disability weight of 0.111 was also estimated for alcohol problem use (18).

WHO is currently revising the estimated prevalence of alcohol dependence and problem use for a forthcoming global report. In the interim, the ratio of prevalence of problem use to dependence was assumed to be the same as that estimated for the Global Burden of Disease 2004 estimates (3).

3.4 Drug use disorders

The GBD 2010 included estimates of health loss for amphetamine, cannabis, cocaine, opioid dependence and other drug use disorders (32). The GBD 2010 disability weights for drug dependence (cannabis, amphetamines, cocaine, heroin) were substantially higher than those used in previous versions of the GBD 2010. Salomon et al (27) attributed the increase in disability weights for drug use disorders to the fact that the drug use lay descriptions attributed functional outcomes to particular causes (such as heroin use), which was deliberately avoided in most other lay descriptions. The lay description for heroin dependence was "…uses heroin daily and has difficulty controlling the habit. When the effects wear off, the person feels severe nausea, agitation, vomiting and fever. The person has a lot of difficulty in daily activities." Explicit reference to use of or addiction to illicit drugs as the cause of the functional outcomes described could have biased disability weights upwards by introducing wellbeing considerations beyond "loss or health", or reflecting moral or social disapproval.

Since the YLDs are intended to quantify functional losses in a comparable way across sequelae, and to exclude non-health aspects, we previously used a set of disability weights for the drug dependence sequelae derived from lay descriptions in which the drug name is masked by being described as "use of medication" (18, 33). The GBD 2013 and 2015 studies addressed this issue by introducing a set of mild health states for drug and alcohol dependence and estimating severity distributions for alcohol and drug dependence (8). Table 4 summarizes the average disability weights (across all severity categories) for the drug dependence categories. The GHE 2015 uses the same disability weights as GBD 2015, rather than the previous "masked" weights.

3.5 Migraine and non-migraine headache

The GBD 2010 pooled information on frequency and duration of headache episodes to derive estimates of the proportion of time spent in episodes (5.3% for migraine and 2.4% for tension-type headaches) (34). The global all-age prevalence of migraine was estimated at 14.7% and tension-type headache at 20.8%. The disability weight estimated for migraine episodes was 0.433, for tension-type headache it was much lower at 0.04. As a result, the YLD burden of migraine was much higher than tension-type headache.

Previous burden estimates for migraine produced by WHO assumed there was a distribution of migraine severity (23% mild, 52% moderate and 25% severe) and frequency, and that the average duration of migraine was lower in developed countries where effective treatment was available to a proportion of sufferers. As a result, the GBD 2000 estimates of per cent of time symptomatic ranged from 2.3% in developed countries to 9.2% in low income countries.

The GBD 2010 lay description for migraine described a severe migraine episode and was applied to all migraine episodes. Pending publication of the detailed severity information used in the GBD studies, and further review, we assume that 50% of migraine episodes are severe and 50% moderate severity. For moderate severity migraine episodes, we use the disability weight of 0.267 calculated for moderate headache in the WHO revision of disability weights (18). The resulting average disability weight for migraine episodes is 0.35.

3.6 Skin diseases

The GBD 2010 estimated the YLD burden for 15 categories of skin disease, resulting in an estimate of 33.7 million YLD for 2010, 4.3% of total YLD for all causes. Estimated global all age prevalence for some skin conditions were extremely high (see Table 4B.5). To date, only summary information on the data and assumptions for the skin conditions have been published (35). Available information is summarized in Table 5, including average disability weights calculated using information from the Medical Expenditure Panel Survey (MEPS), 2000-2009, USA to assess per cent of time symptomatic and severity distributions.

Table 4B.5. Global YLD, Prevalence and Disability Weight Assumptions for Migraine and Tension-Type Headache

	GBD 2010 YLD	Global prevalence (%)	GBD 2010 average disability weight	GHE average disability weight
Eczema	8,896,814	3.3	0.0391	0.0042
Psoriasis	1,058,733	1.5	0.0100	0.0100
Cellulitis	375,868	0.2	0.0371	0.0371
Impetigo	417,615	2.0	0.0054	0.0054
Abscess and other bacterial skin infections	904,509	1.2	0.0029	0.0029
Scabies	1,579,681	1.5	0.0133	0.0133
Fungal skin diseases	2,302,797	14.5	0.0024	0.0024
Viral warts	2,460,967	13.0	0.0296	0.0069
Molluscum contagiosum	269,813	1.8	0.0022	0.0022
Acne vulgaris	4,001,776	9.4	0.0063	-
Alopecia areata	1,352,473	0.1	0.0038	-
Pruritus	2,086,451	4.0	0.0079	0.0079
Urticaria	2,599,599	1.0	0.0321	0.0321
Decubitus ulcer	476,012	0.1	0.1215	0.1215
Other skin diseases	4,960,696	11.7	0.0062	0.0030
All skin diseases	33,743,804			

Pending availability of more detailed information on the case definitions, prevalence estimates, severity distributions and per cent of time symptomatic, allowing review of the GBD 2010 estimates, we excluded acne and alopecia areata from the WHO Global Health Estimates and revised other YLD estimates using the provisional disability weights shown in the final column of Table 4B.5. The revised total for skin disease is slightly more than halved to 15.1 million YLD.

4. YLD estimates for diseases and injuries

4.1 General approach

For most disease and injury causes, we have drawn on GBD 2015 estimates by country for the years 2000- 2015 (8). The GBD 2015 study computed YLD as the prevalence of a sequela multiplied by the disability weight for that sequela without age weighting or discounting. The YLDs arising from a disease or injury are the sum of the YLDs for each of the sequelae associated with that disease. The GBD 2015 study estimated YLDs by country, age, sex for 2619 sequelae of 310 diseases and injuries. In the GBD 1990, 483 disease sequelae were identified and 632 in the GBD 2004.

For most sequelae, the GBD 2015 study used a Bayesian meta-regression method, DisMod-MR 2.1, designed to address key limitations in descriptive epidemiological data, including missing data, inconsistency, and large methodological variation between data sources. For some disorders, natural history models, back calculation from mortality rates, or other methods were used. YLDs by cause at age, sex, country, and year levels were adjusted for comorbidity with simulation methods.

For selected impairments, WHO and other collaborators have estimated the overall prevalence of the impairment (18). These "envelope" prevalence constrained the estimates for sequelae related to that impairment to sum to estimates of the overall impairment prevalence. For example, nine disorders have blindness as a sequela. The prevalence of all blindness sequelae was constrained to sum to blindness prevalence. The GBD 2015 estimated impairment prevalence envelopes for anaemia, blindness, low vision, hearing impairment, infertility, heart failure, epilepsy, and intellectual disability.

The WHO GHE draws on the GBD 2015 analyses for YLDs with some caveats. Selected disability weights are revised as described in Section 3 above. Other revisions for prevalence estimates, cause distributions and severity distributions were carried out for vision loss, hearing loss, intellectual disability, infertility, anaemia, back and neck pain, migraine and headache, alcohol problem use, and skin diseases. These are further described in the following Sections. In 2007, WHO established the Foodborne Disease Burden Epidemiology Reference Group (FERG) to estimate global and regional burdens of foodborne disease. Included among the parasitic foodborne diseases analyzed were cysticercosis, echinococcis, and food-borne trematodosis. In 2015, the FERG published regional and global estimates of deaths and DALYs for these diseases for the year 2010 (36, 37). The GBD2015 time series estimates of YLD for these three diseases were scaled to match the underlying FERG estimates of deaths for 14 WHO sub-regions in 2010.

4.2 Vision loss

WHO and the GBD 2010 Vision Loss Expert Group carried out a systematic review of medical literature which identified indexed articles containing data on incidence, prevalence and causes of blindness and vision impairment (38). Only cross-sectional population-based representative studies were selected from which to extract data for a database of age- and sex-specific data of prevalence of 4 distance and one near visual acuity sequelae (presenting and best-corrected).

Unpublished data and data from studies using 'rapid assessment' methodology were later added. Despite extensive data seeking, data were not available for many countries and years, were reported using incomparable definitions of vision impairment, or were representative of a subnational or community area only.

Statistical methods were used to generate estimates of the prevalence and causes of blindness and moderate and severe vision impairment (MSVI) for each country and year, 1990-2010, in 190 countries nested in 21 Global Burden of Disease (GBD) subregions (39, 40). Vision loss YLD were recalculated using WHO prevalence estimates by cause of vision loss. In addition, onchocerciasis YLD were adjusted upwards by a factor of 1.15 (taking into account the vision loss contribution to overall YLD for onchocerciasis) and YLD for vitamin A deficiency by a factor 1.63. The resulting YLD were adjusted for comorbidity with other causes as in Section 4.2.

WHO prevalences for vision loss are somewhat lower than those estimated by the GBD 2010, resulting 18.0 million YLD globally in 2011 compared to 19.9 reported by GBD 2010, using GBD 2010 disability weights. After revision of disability weights, the global total YLD for vision loss rose to 31.4 million (Table 4B.6).

Table 4B.6. YLD for Vision-Related Causes 2011

		Unadjusted for comorbidity		Adjusted for comorbidity	
Cause	**YLD (GBD 2010)**	**WHO YLD (GBD 2010 DW)**	**WHO YLD (GHE DW)**	**WHO YLD (GBD 2010 DW)**	**WHO YLD (GHE DW)**
Trachoma	350,238	167,651	317,287	162,377	307,503
Diabetic retinopathy*	351,994*	402,390	780,576	351,994	683,815
Glaucoma	974,736	696,319	1,297,900	648,783	1,210,451
Cataracts	4,739,218	4,316,405	8,189,777	3,682,253	7,000,164
Refractive errors	5,710,345	7,487,474	15,200,000	6,582,117	13,400,000
Macular degeneration	1,387,769	809,665	1,528,619	727,464	1,374,981
Other vision loss	6,359,209	4,142,317	8,086,520	3,797,546	7,423,050
Total	19,873,509	18,022,221	35,400,679	15,952,535	31,399,964

*Published GBD 2010 YLD are summed across vision loss and other sequelae. WHO YLD for vision sequelae only (GBD 2010 weights, adjusted for comorbidity) are shown for GBD 2010 YLD.
Note: The first column shows YLD imputed from GBD 2010. The following columns show YLD derived from WHO prevalence estimates, using GBD 2010 and revised GHE weights, unadjusted and adjusted for comorbidity.

4.3 Hearing loss

Hearing loss data from epidemiological studies together with data on the prevalence of hearing aid use were used to estimate prevalence of hearing loss by region (18, 41, 42). The six severity thresholds used in this analysis are defined in Table 4B.7. Note that the labeling of the severity-specific sequelae in this table and in the IHME YLD paper differ from the labels used in the GBD 2010 disability weights study – however the definitions and lay descriptions match. Note also that these severity levels are more detailed than those used by WHO previously.

We then modeled the following causes as fractions of total hearing loss: meningitis, otitis media, and congenital. For meningitis and congenital hearing loss, we accessed cross-sectional studies of the etiology of hearing impairment in school-aged children (42). For congenital hearing loss, we fit a logistic regression with percent of hearing impairment with a congenital origin as the independent variable, and log GDP per capita as the independent variable. For meningitis, we fit a similar regression for developing countries. For high-income countries, we fit a logistic regression with percent of hearing impairment caused by meningitis as the independent variable and year as the dependent variable.

Finally, for otitis media, we used all cross-sectional data in which the percent of hearing impairment caused by otitis media was reported. We fit a logistic regression with percent of hearing impairment caused by otitis media as the dependent variable, and year and a restricted cubic spline of age as the independent variables. When the sum of meningitis, otitis media, and congenital exceeded the total estimated number of people with hearing loss, we rescaled the sub-causes proportionally so that their sum was equal to the total cases of hearing loss. When the sum of meningitis, otitis media, and congenital was lower than the total estimated number of people with hearing loss, we attributed the difference to hearing loss from other causes. The "other hearing loss" category includes hearing loss due to old age, occupational hazards, injury, and other causes. We did not have data to generate separate estimates for each of these causes.

There are separate hearing states for hearing loss with tinnitus (ringing in the ears). The prevalence of tinnitus at each hearing loss threshold was estimated from 3 studies (see Table 4B.8). The resulting average weights for all hearing loss are shown in Table 4B.4 by hearing loss threshold. We assumed the same distribution of tinnitus across all causes of hearing loss.

Table 4B.7 Hearing Loss Sequelae: Definitions and Lay Descriptions

Sequela	Definition	Lay descriptions
Hearing loss, mild	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 20-34 dB. Measured with hearing aid if one is normally used.	This person has occasional difficulty following a conversation in a noisy environment but no other hearing problems.
Hearing loss, moderate	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 35-49 dB. Measured with hearing aid if one is normally used.	has difficulty following a conversation in a noisy environment but no other hearing problems.
Hearing loss, moderately severe	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 50-64 dB. Measured with hearing aid if one is normally used.	has difficulty hearing a normal voice and great difficulty following a conversation in a noisy environment.
Hearing loss, severe	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 65-79 dB. Measured with hearing aid if one is normally used.	has great difficulty hearing in any situation or in using a phone.
Hearing loss, profound	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 80-94 dB. Measured with hearing aid if one is normally used.	has great difficulty hearing in any situation and is not able to use a phone.
Hearing loss, complete	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 95 dB or greater. Measured with hearing aid if one is normally used.	cannot hear at all, even loud sounds.
Hearing loss, moderate, with ringing	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 35-49 dB. Measured with hearing aid if one is normally used.	This person has difficulty following a conversation in a noisy environment, and has ringing in the ears for more than 5 minutes, almost every day.
Hearing loss, moderately severe, with ringing	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 50-64 dB. Measured with hearing aid if one is normally used.	This person has difficulty hearing a normal voice, has great difficulty following a conversation in a noisy environment, and has ringing in the ears for more than 5 minutes, almost every day.
Hearing loss, severe, with ringing	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 65-79 dB. Measured with hearing aid if one is normally used.	This person has great difficulty hearing in any situation, and has ringing in the ears for more than 5 minutes, almost every day.
Hearing loss, profound, with ringing	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 80-94 dB. Measured with hearing aid if one is normally used.	This person always has great difficulty hearing in any situation, cannot use a phone, and has ringing in the ears for more than 5 minutes, almost every day.
Hearing loss, complete, with ringing	Audiometric hearing threshold level (averaged over 0.5, 1, 2, 4kHz in the better ear) of 95 dB or greater. Measured with hearing aid if one is normally used.	This person has difficulty following a conversation in a noisy environment, and has ringing in the ears for more than 5 minutes, almost every day.

Table4B. 8 Estimated Proportion Experiencing Tinnitus Daily / at Least 5 Minutes per Day

	Unilateral HL	Mild	Moderate	Moderate–severe	Severe	Profound	Almost total
		20 to 34.9	35 to 49.9	50 to 64.9	65 to 79.9	80 to 94.5	95+
Sample size	164	1373	439	169	55	30	11
Number with tinnitus	51	287	133	55	35	19	6
Central estimate	0.309	0.209	0.302	0.325	0.638	0.641	0.545
Lower CL	0.241	0.188	0.260	0.256	0.496	0.439	0.234
Upper CL	0.388	0.232	0.348	0.402	0.762	0.801	0.833

Sources: NHANES 1999-2004 (CDC & NCHS) reanalysis by Howard Hoffman (NIDCD/NIH), Davis(43)-reanalysis by author, Davis et al (44) . reanalysis by author.

Table 4B.9 YLD for Hearing-Related Causes 2011

		Unadjusted for comorbidity		Adjusted for comorbidity	
Cause	YLD (GBD 2010)	WHO YLD (GBD 2010 DW)	WHO YLD (GHE DW)	WHO YLD (GBD 2010 DW)	WHO YLD (GHE DW)
Meningitis	202,024*	202,024	287,127	198,165	281,623
Otitis media	1,625,232*	1,625,232	2,110,541	1,579,540	2,049,389
Other hearing loss	15,900,000	13,300,000	25,000,000	11,500,000	21,400,000
Other congenital anomalies	812,986	1,159,973	1,859,817	1,151,055	1,845,486
Total	18,540,242	16,287,229	29,257,485	14,428,760	25,576,498

*Published GBD 2010 YLD are summed across hearing loss and other sequelae. WHO YLD for hearing sequelae only (GBD 2010 weights, adjusted for comorbidity) are shown for GBD 2010 YLD.

Note: The first column shows YLD imputed from GBD 2010. The following columns show YLD derived from WHO prevalence estimates, using GBD 2010 and revised GHE weights, unadjusted and adjusted for comorbidity.

Hearing loss YLD were recalculated using WHO prevalence estimates for the causes listed in Table 4B.9. The resulting YLD were adjusted for comorbidity with other causes as described in Section 2.5. Table 4B.9 compares the unadjusted and adjusted YLD calculated using the GBD 2010 disability weights and the revised GHE disability weights. WHO prevalences for hearing loss are lower than those estimated by the GBD 2010, resulting 16.3 million YLD globally in 2011 compared to approximately 18.5 based on the GBD 2010, using GBD 2010 disability

weights. After revision of disability weights, the global total YLD for hearing loss rises to 25.6 million (Table 4B.9).

4.4 Intellectual disability

Intellectual disability was not included as a health condition or cause in the GBD 1990 study. The WHO revisions carried out from 2000 to 2008 included mental retardation attributable to lead exposure, and intellectual or developmental disability as sequelae for a number of causes

During 2009-2010, WHO established an informal expert advisory group to advise on the analysis of population data on intellectual disability. This group also contributed substantially to the identification of relevant published and unpublished data, including a number of population-based registers. Following advice from the group, five sequelae were defined for intellectual disability as summarized in Table 4B.10.

Table 4B.10 Sequelae for Intellectual Disability: Severity Levels, Definitions and Lay Descriptions

Severity level	Definition	Lay description
Borderline	ICD-10 definition, IQ range 70-84	This person does not do well in school, has some difficulty doing complex or unfamiliar tasks, has trouble concentrating. The person may also have behavioral problems.
Mild	ICD-10 definition, IQ range 50-69	This person has low intelligence and is slow in learning at school. As an adult, the person can work at simple supervised jobs and live independently, but often needs help to raise children.
Moderate	ICD-10 definition, IQ range 35-49	This person has low intelligence and is slow in learning to speak and do simple tasks. As an adult, the person requires a lot of support to work productively, live independently, and raise children.
Severe	ICD-10 definition, IQ range 20-34	This person has low intelligence and cannot speak more than a few words, needs help with most basic daily activities, and can do only simple tasks under close supervision.
Profound	ICD-10 definition, IQ range <20	This person has low intelligence, cannot understand basic requests or instructions, and requires constant assistance for nearly all activities.

WHO carried out a systematic review of published studies on the population prevalence of intellectual disability and also collected data from unpublished studies and population-based registers (45). After inclusion of additional summary data from a number of population-based registers, the final dataset included 481 data points from 74 studies, of which 75% related to developed countries and 60% were from population-based registers. Most of these studies were relatively old, with 57% of the data points from the 1980s, 25% from the 1990s and 17% from the 2000s.

For studies which used non-standard IQ thresholds for reported prevalences, prevalences at standard thresholds were interpolated from the log cumulative prevalence distribution across thresholds. Maulik et al (45) carried out a meta-analysis of this data using random effects to account for heterogeneity. Sub-group analyses were also done. The prevalence of intellectual disability across 52 studies included in the meta-analysis was 1.04% (95%CI 0.96-1.12). The rates varied according to the income group of the country ranging from 0.92% (95%CI 0.85-1.00) in high income countries up to 1.64 (95%CI 1.11-2.17) in low income countries. Overall, the rates form low- and middle-income countries were almost twice that in high income countries. Studies based on identification of cases by using psychological assessments or scales showed higher prevalence compared to those using standard diagnostic systems and disability instruments. Prevalence was higher among studies based on children/adolescents, compared to those on adults.

Challenges for the assessment of prevalence of intellectual disability according to region, age and severity level include the increasing heterogeneity of measurement types and measurement errors with decreasing severity threshold, and in particular, considerable issues of under-ascertainment for borderline intellectual disability. For high income countries, the study data on prevalence of severe or profound intellectual disability (IQ<35) were broadly consistent, with a prevalence of around 0.3 to 0.4%.

Apart from the predominance of older studies, estimation issues were compounded by the limited numbers of surveys in developing countries that used instruments that identified intellectual disability in terms of IQ, and the fact that most of the studies were for younger children. Completeness of ascertainment tends to rise to around age 10, and many cases of intellectual disability are not identified until children have been in school for some years.

In almost 50% of cases of intellectual disability, the cause is not identified. An identifiable etiology is present in up to 70% of children with severe mental retardation but in only 24% of children with mild mental retardation. The causes could be environmental or genetic. For example, Down syndrome is a common genetic cause of intellectual disability. The common environmental causes include birth asphyxia and trauma, intrauterine growth retardation, maternal infection, malnutrition, iodine deficiency, and lead exposure.

Estimation of the prevalence of intellectual disability by severity threshold was carried out for the GBD 2010 study using the DISMOD-MR meta-analysis tool as described by Vos et al (46). Inclusion of a health system access index as a fixed effect allowed for inference from older data points when estimating more current prevalences. The overall prevalence of intellectual disability globally in 2005 was 1.3% and the high income countries prevalence of 0.7% was around half than for the low- and middle-income countries. These results are broadly consistent with the results of the meta-analysis by Maulik et al (45), whose results were a little higher as they were not adjusted for time trends.

The GBD 2010 study estimated aetiology-specific intellectual disability prevalences for autism, preterm birth, neonatal encephalopathy, Down's syndrome, unbalanced chromosomal rearrangements, Klinefelter syndrome, other congenital disorders, meningitis, cretinism, and fetal alcohol syndrome. These prevalences were subtracted from the overall prevalence of intellectual disability to estimate the prevalence of idiopathic intellectual disability as described by Vos et al. (46). WHO estimates of YLD sequelae associated with intellectual disability were calculated using the revised disability weights shown in Table 4B.4.

4.5 Infertility

The burden of infertility was carried out in 5 steps: (1) application of a consistent definition of infertility to survey data; (2) adjustment of extracted data for known biases as needed; (3) application of a statistical model to estimate infertility prevalence and exposure proportion trends by country and age of the female partner; and (4) estimation of the proportion of infertility attributable to the male partner vs. to the female partner; and (5) estimation of the disease causes of infertility. Data from 227 household surveys were analyzed (47), and used to calculate infertility prevalences for 5-year age groups for women aged 20–44 years, excluding infertility during the beginning (15–19 years) and end (45–49 years) of the reproductive period, when fewer couples are seeking a child and estimates of prevalence are less stable.

DisMod-MR was used with the survey analysis described above, to estimate all four parameters for every country, for 1990, 2005 and 2010 for the GBD 2010 study (46). Estimates for primary and secondary infertility at the population level (i.e., among all women) were calculated by multiplying the estimates of prevalence of infertility among exposed women by the prevalence of exposure to infertility.

To obtain data on the sex and cause breakdown for infertility, Vos et al. (46) carried out a systematic literature search. In total, 15 studies were included in their analysis for the sex breakdown among infertile couples. Because infertility in some couples is attributable to both partners rather than just one, the sum of the proportion of couples' prevalence due to male factor infertility and due to female factor infertility is greater than 1. As before, only estimates for ages 20-44 years were used in subsequent stages of the analysis.

Published literature was also used to determine the proportion of female infertility due to sexually transmitted diseases, polycystic ovarian syndrome, and endometriosis. The remaining proportion of female infertility was assigned to "other female infertility". Sexually transmitted diseases were further divided into sexually transmitted chlamydial diseases, gonococcal infection, and other sexually transmitted diseases in a 30:20:50 ratio, based on the approximate ratio of prevalent cases due to each type of disease. Male infertility was not divided according to cause.

YLD were estimated using the revised disability weights for primary and secondary infertility (Table 4B.4) resulting in an overall 4.7 fold increase in YLD for infertility compared to the GBD 2010 estimates.

4.6 Anaemia

Trends in the distributions of blood haemoglobin and in the prevalences of anaemia and severe anaemia for children 6-59 months of age, non-pregnant women, and pregnant women for the period 1995-2011 have been estimated by the Nutrition Impact Model Study (48, 49), based on 257 population-representative data sources on haemoglobin and/or anaemia for children and women of childbearing age from 107 countries in every world region. Total anaemia was defined based on WHO thresholds of haemoglobin < 110 g/L for children under 5 years of age and pregnant women, and < 120 g/L for non-pregnant women. Severe anaemia was defined as blood haemoglobin < 70 g/L for children under 5 years and pregnant women, and < 80 g/L for non-pregnant women.

IHME used a subset of these data to inform the global anaemia prevalence envelope calculations for the GBD 2010 study (46). Predicted hemoglobin levels were used to calculate the total hemoglobin shift from "normal" and predict the prevalence of mild, moderate, and severe

anemia in each setting. Then, estimated shifts of mean hemoglobin due to the following diseases were assessed: malaria, hookworm, schistosomiasis, maternal hemorrhage, chronic kidney disease, thalassemias, sickle cell disorders, G6PD deficiency, gastritis and duodenitis, and peptic ulcer disease. For each cause, the mean shift was multiplied by prevalence. All ten shift prevalence figures were then added together and compared to the total hemoglobin shift predicted above.

4.7 Back pain

The GBD 2010 estimated disability weights for the symptomatic state for back and neck pain headache using health states and lay descriptions listed in Annex Table 3. While there are disability weights for mild and severe neck pain, all the lay descriptions for low back pain describe "severe" or "constant" back pain followed by listing of considerable difficulties in daily living and problems with sleep and affect. The prevalence of low back pain assessed by the GBD 2010 is quite high: the global all-age prevalence for 2010 is 9.2% (Table 11). The average disability weights are also quite high, similar in level to the GBD weights for a fractured backbone or amputation of one arm. As a result, low back pain is the leading cause of YLD globally and the first or second ranked cause of YLD in 17 of the 21 GBD 2010 regions.

Table 4B.11. GBD 2010 Global Prevalence and YLD Estimates for Back and Neck Pain, 2010

	YLD (millions)	Point prevalence (millions)	Prevalence(%) 2010	Implied average disability weight
Low back pain	83.06	632	9.2	0.131
Neck pain	33.64	332	4.8	0.101

We carried out an analysis of the severity of self-reported back pain in the last month using data for 58 countries from the WHO World Health Survey (51) and for six countries from the WHO SAGE surveys carried out in 2011-2013 in China, Ghana, India, Mexico, Russia and South Africa (52). Disability weights for mild (0.023), moderate (0.072) and severe (0.269) back pain were used together with the global average severity distribution based on the World Health Surveys and SAGE surveys to derive an average disability weight for all back pain of 0.061, slightly less than half of the average GBD 2010 disability weight of 0.131 for low back pain.

4.8 Uncertainty in YLD estimates

The GBD 2015 study estimated 95% uncertainty ranges for YLD estimates. Global uncertainty ranges for each cause category are summarized in the following Table, in terms of average relative uncertainty (all ages, both sexes) calculated as 0.5*(upper bound – lower bound)/median value.

Table 4B.12 Average Global Relative Uncertainty (%) for YLD by Cause

Cause 2015	Cause name	Av. uncertainty (±%)	Cause 2015	Cause name	Av. uncertainty (±%)
0	All Causes	25.9	820	Mentaldisorders	26.7
10	Group I	36.4	830	Depression	32.4
20	Infectious	40.5	831	Major depression	34.1
30	TB	35.2	832	Dysthymia	37.0
40	STDs	47.7	840	Bipolar disorder	41.7
50	Syphilis	34.5	850	Schizophrenia	26.7
60	Chlamydia	52.0	860	Alcohol abuse	38.1
70	Gonorrhoea	48.4	870	Drug abuse	30.6
80	Trichomoniasis	85.0	871	Opioid abuse	30.0
85	Genital herpes	101.5	872	Cocaine abuse	38.8
90	Other STDs	37.6	873	Amphetamine abuse	45.0
100	HIV/AIDS	28.8	874	Cannabis abuse	38.5
110	Diarrhoeal	35.1	875	Other drug abuse	41.4
120	Childhood-cluster	48.9	880	Anxiety disorders	34.0
130	Pertussis	46.0	890	Eating disorders	35.1
140	Diphtheria	76.2	900	Autism	36.5
150	Measles	91.3	910	Child behavioural	47.3
160	Tetanus	30.1	911	ADD	46.6
170	Meningitis	30.0	912	Conduct disorder	47.4
180	Encephalitis	29.3	920	ID	66.2
185	Hepatitis	39.5	930	Other mental	32.8
186	Acute hepatitis A	40.0	940	Neurological	33.9
190	Acute hepatitis B	42.4	950	Dementias	30.4
200	Acute hepatitis C	70.8	960	Parkinson disease	32.1
205	Acute hepatitis E	42.0	970	Epilepsy	31.7
210	Parasitic	45.2	980	Multiple sclerosis	28.7
220	Malaria	33.8	990	Migraine	43.9
230	Trypanosomiasis	65.5	1000	Other headache	43.5
240	Chagas disease	38.6	1010	Other neurological	29.6
250	Schistosomiasis	64.0	1020	Sense organ	33.3
260	Leishmaniasis	69.8	1030	Glaucoma	34.9
270	lymphatic filariasis	52.4	1040	Cataracts	30.8
280	Onchocerciasis	66.1	1050	Refractive errors	45.3
285	Cysticercosis	34.6	1060	Macular degen	33.0
295	Echinococcosis	34.6	1070	Other vision loss	33.3
300	Dengue	88.5	1080	Other hearing loss	34.1
310	Trachoma	36.4	1090	Other sense	41.0
315	Yellow fever	124.5	1100	CVD	30.8

320	Rabies	39.6	1110	RHD	44.1
330	Worms	50.0	1120	HHD	33.6
340	Ascariasis	58.4	1130	IHD	33.6
350	Trichuriasis	60.2	1140	Stroke	31.5
360	Hookworm disease	47.2	1141	Ischameic stroke	31.1
362	Trematodes	66.0	1142	Haem stroke	32.1
365	Leprosy	36.6	1150	Inflammatory HD	34.9
370	Other infectious	72.7	1160	Other circulatory	34.4
380	Resp infections	48.1	1170	Chronic resp	25.0
390	LRI	36.6	1180	COPD	16.7
400	URI	57.4	1190	Asthma	37.5
410	Otitis media	42.4	1200	Other resp	16.7
420	Maternal	31.0	1210	Digestive diseases	35.4
490	Neonata	26.8	1220	Peptic ulcer disease	37.0
500	Preterm	26.5	1230	Cirrhosis	33.0
510	Birth asphyxia	43.4	1231	Cirrhosis hep B	34.5
520	Neonatal sepsis	61.6	1232	Cirrhosis heps C	33.4
530	Other neonatal	31.8	1233	Cirrhosis alcohol	34.6
540	Nutritional	37.3	1234	Other cirrhosis	33.9
550	PEM	39.3	1240	Appendicitis	34.0
560	Iodine deficiency	43.8	1241	Gastritis	37.8
570	Vit A deficiency	43.5	1242	Intestinal obstruction	34.9
580	ID anaemia	37.8	1244	Inflam. bowel	33.3
590	Other nutritional	45.7	1246	Gallbladder disease	34.7
600	Group II	26.6	1248	Pancreatitis	33.9
610	Cancers	27.3	1250	Other digestive	35.9
620	Oral cancers	30.2	1260	GU diseases	33.9
621	Lip and oral cavity	29.0	1270	Kidney diseases	23.8
622	Nasopharynx	34.8	1271	Acute glom.	43.5
623	Other pharynx	29.2	1272	CKD diabetes	28.0
630	Oesophagus ca	29.4	1273	Other CKD	26.1
640	Stomach cancer	26.7	1280	Prostatic hyperplasia	39.5
650	Colorectaql cancers	27.2	1290	Urolithiasis	34.4
660	Liver cancer	30.6	1300	Other urinary	39.3
661	Liver cancer hep B	33.5	1310	Infertility	88.9
662	Liver cancer hep C	29.0	1320	Gynecological	36.0
663	Liver cancer alc	30.6	1330	Skin diseases	42.2
664	Other liver cancer	32.6	1340	Musculoskeletal diseases	26.7
670	Pancreas cancer	29.5	1350	Rheumatoid arthritis	32.8
680	Lung cancers	26.4	1360	Osteoarthritis	34.6

690	Skin cancers	35.0	1370	Gout	34.2
691	Melanoma	37.9	1380	Back and neck pain	32.6
692	NMSC	31.4	1390	Other musc.	35.9
700	Breast cancer	30.6	1400	Congenital	44.2
710	Cervix cancer	29.3	1410	Neural tube defects	53.9
720	Uterus cancer	33.7	1420	CL/CP	65.0
730	Ovary cancer	27.1	1430	Down syndrome	54.3
740	Prostate cancer	33.1	1440	Congenital heart	71.8
742	Testicular cancer	35.5	1450	Other chromosomal	68.1
745	Kidney cancer	30.8	1460	Other congenital	50.0
750	Bladder cancer	29.2	1470	Oral conditions	47.1
751	Brain cancers	29.5	1480	Dental caries	74.2
752	Gallbladder cancer	30.2	1490	Periodontal disease	84.3
753	Larynx cancer	30.1	1500	Edentulism	38.8
754	Thyroid cancer	33.3	1502	Other oral disorders	44.9
755	Mesothelioma	29.0	1505	SIDS	0.0
760	Lymphomas MM	30.7	1510	Group III	31.7
761	Hodgkin lymphoma	33.1	1520	Unintentional	32.3
762	Non-H lymphoma	30.8	1530	Road injury	33.3
763	Multiple myeloma	29.4	1540	Poisonings	38.5
770	Leukaemia	28.0	1550	Falls	32.1
780	Other cancers	31.4	1560	Fire	32.6
790	Other neoplasms	29.5	1570	Drowning	32.8
800	Diabetes mellitus	34.8	1575	Mechanical	33.3
810	Endocrine blood	39.2	1580	Disasters	35.0
811	Thalassaemias	39.7	1590	Other unintentional	35.3
812	Sickle cell	37.6	1600	Intentional	29.0
813	Other haemo	39.6	1610	Suicide	32.2
814	Other endocrine	38.1	1620	Homicide	32.1
			1630	Conflict	40.0

Source: GBD 2015

5. Results

Three downloadable Excel files are available containing summary tabulations of YLL, YLD and DALYs by cause, age, and sex for the world and for country income groups for 2000 and 2015. These DALY results are consistent with the cause of death estimates documented in Chapter 4 of Volume 9 of *Disease Control Priorities, Third Edition* (6). A more detailed cause list is used in these tables, to include significant non-fatal causes as well as causes of death. A downloadable Excel file is also available for deaths tabulated according to the same more detailed cause list.

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Annex Table 1. GHE Cause Categories and ICD-10 Codes

GHE code	GHE cause name	ICD-10 codes
10	**I. Communicable, maternal, perinatal and nutritional conditions**[a]	A00-B99, D50-D53, D64.9, E00-E02, E40-E46, E50-E64, G00-G04, G14, H65-H66, J00-J22, N70-N73, O00-O99, P00-P96, U04
20	**A. Infectious and parasitic diseases**	A00-B99, G00-G04, G14, N70-N73, P37.3, P37.4
30	1. Tuberculosis	A15-A19, B90
40	2. STDs excluding HIV	A50-A64, N70-N73
50	a. Syphilis	A50-A53
60	b. Chlamydia	A55-A56
70	c. Gonorrhoea	A54
80	d. Trichomoniasis	A59
85	e. Genital herpes	A60
90	f. Other STDs	A57-A58, A61-A64, N70-N73
100	3. HIV/AIDS	B20-B24
101	a. HIV resulting in TB	B20.0
102	b. HIV resulting in other diseases	B20-B24 (minus B20.0)
110	4. Diarrhoeal diseases[b]	A00, A01, A03, A04, A06-A09
120	5. Childhood-cluster diseases	A33-A37, B05
130	a. Whooping cough	A37
140	b. Diphtheria	A36
150	c. Measles	B05
160	d. Tetanus	A33-A35
170	6. Meningitis[b]	A39, G00, G03
180	7. Encephalitis[b]	A83-A86, B94.1, G04
185	8. Hepatitis	B15-B19 (minus B17.8)
186	a. Acute hepatitis A	B15
190	b. Acute hepatitis B	B16-B19 (minus B17.1, B17.2, B18.2, B18.8)
200	c. Acute hepatitis C	B17.1, B18.2
205	d. Acute hepatitis E	B17.2, B18.8
210	9. Parasitic and vector diseases	A71, A82, A90-A91, A95, B50-B57, B65, B67, B69, B73, B74.0-B74.2, P37.3-P37.4
220	a. Malaria	B50-B54, P37.3, P37.4
230	b. Trypanosomiasis	B56
240	c. Chagas disease	B57
250	d. Schistosomiasis	B65
260	e. Leishmaniasis	B55
270	f. Lymphatic filariasis	B74.0-B74.2
280	g. Onchocerciasis	B73
285	h. Cysticercosis	B69
295	i. Echinococcosis	B67
300	j. Dengue	A90-A91
310	k. Trachoma	A71
315	l. Yellow fever	A95

320			m. Rabies	A82
330		10.	Intestinal nematode infections	B76-B81
340			a. Ascariasis	B77
350			b. Trichuriasis	B79
360			c. Hookworm disease	B76
362			d. Food-bourne trematodes	B78, B80, B81
365		11.	Leprosy	A30
370		12.	Other infectious diseases	A02, A05, A20-A28, A31, A32, A38, A40-A49, A65-A70, A74-A79, A80-A81, A87-A89, A92-A99, B00-B04, B06-B09, B17.8, B25-B49, B58-B60, B64, B66, B68, B70-B72, B74.3-B74.9, B75, B82-B89, B91-B99 (minus B94.1), G14
380	**B.**	**Respiratory infectious**[b]		H65-H66, J00-J22, P23, U04
390		1.	Lower respiratory infections	J09-J22, P23, U04
400		2.	Upper respiratory infections	J00-J06
410		3.	Otitis media	H65-H66
420	**C.**	**Maternal conditions**		O00-O99
490	**D.**	**Neonatal conditions**		P00-P96 (minus P23, P37.3, P37.4)
500		1.	Preterm birth complications[b]	P05, P07, P22, P27-P28
510		2.	Birth asphyxia and birth trauma[b]	P03, P10-P15, P20-P21, P24-P26, P29
520		3.	Neonatal sepsis and infections	P35-P39 (minus P37.3, P37.4)
530		4.	Other neonatal conditions	P00-P02, P04, P08, P50-P96
540	**E.**	**Nutritional deficiencies**		D50-D53, D64.9, E00-E02, E40-E46, E50-E64
550		1.	Protein-energy malnutrition	E40-E46
560		2.	Iodine deficiency	E00-E02
570		3.	Vitamin A deficiency	E50
580		4.	Iron-deficiency anaemia	D50, D64.9
590		5.	Other nutritional deficiencies	D51-D53, E51-E64
600	**II.**	**Noncommunicable diseases**[a]		C00-C97, D00-D48, D55-D64 (minus D 64.9), D65-D89, E03-E07, E10-E34, E65-E88, F01-F99, G06-G98 (minus G14), H00-H61, H68-H93, I00-I99, J30-J98, K00-K92, L00-L98, M00-M99, N00-N64, N75-N98, Q00-Q99, X41-X42, X44, X45, R95
610	**A.**	Malignant neoplasms		C00-C97
620		1.	Mouth and oropharynx cancers	C00-C14
621			a. Lip and oral cavity	C00-C08
622			b. Nasopharynx	C11
623			c. Other pharynx	C09-C10, C12-C14
630		2.	Oesophagus cancer	C15
640		3.	Stomach cancer	C16
650		4.	Colon and rectum cancers	C18-C21
660		5.	Liver cancer[c]	C22
670		6.	Pancreas cancer	C25
680		7.	Trachea, bronchus, lung cancers	C33-C34
690		8.	Melanoma and other skin cancers	C43-C44

691		a. Malignant skin melanoma	C43
692		b. Non-melanoma skin cancer	C44
700	9.	Breast cancer	C50
710	10.	Cervix uteri cancer	C53
720	11.	Corpus uteri cancer	C54-C55
730	12.	Ovary cancer	C56
740	13.	Prostate cancer	C61
742	14.	Testicular cancer	C62
745	15.	Kidney, renal pelvis and ureter cancer	C64-C66
750	16.	Bladder cancer	C67
751	17.	Brain and nervous system cancers	C70-C72
752	18.	Gallbladder and biliary tract cancer	C23-C24
753	19.	Larynx cancer	C32
754	20.	Thyroid cancer	C73
755	21.	Mesothelioma	C45
760	22.	Lymphomas, multiple myeloma	C81-C90, C96
761		a. Hodgkin lymphoma	C81
762		b. Non-Hodgkin lymphoma	C82-C86, C96
763		c. Multiple myeloma	C88, C90
770	23.	Leukaemia	C91-C95
780	24.	Other malignant neoplasms[d]	C17, C26-C31, C37-C41, C46-C49, C51, C52, C57-C60, C63, C68, C69, C74-C80, C97
790	**B.**	**Other neoplasms**	D00-D48
800	**C.**	**Diabetes mellitus**	E10-E14 (minus E10.2-E10.29, E11.2-E11.29, E12.2, E13.2-E13.29, E14.2)
810	**D.**	**Endocrine, blood, immune disorders**	D55-D64 (minus D64.9), D65-D89, E03-E07, E15-E34, E65-E88
811	1.	Thalassaemias	D56
812	2.	Sickle cell disorders and trait	D57
813	3.	Other haemoglobinopathies and haemolytic anaemias	D55, D58-D59
814	4.	Other endocrine, blood and immune disorders	D60-D64 (minus D64.9), D65-D89, E03-E07, E15-E34, E65-E88
820	**E.**	**Mental and substance use disorders**	F04-F99, G72.1, Q86.0, X41-X42, X44, X45
830	1.	Depressive disorders	F32-F33, F34.1
831		a. Major depressive disorder	F32-F33
832		b. Dysthymia	F34.1
840	2.	Bipolar disorder	F30-F31
850	3.	Schizophrenia	F20-F29
860	4.	Alcohol use disorders	F10, G72.1, Q86.0, X45
870	5.	Drug use disorders[e]	F11-F16, F18-F19[e], X41-X42, X44[e]
871		a. Opioid use disorders	F11, X42, X44[e]
872		b. Cocaine use disorders	F14
873		c. Amphetamine use disorders	F15
874		d. Cannabis use disorders	F12

875		e. Other drug use disorders	F13, F16, F18, F19[e], X41
880		6. Anxiety disorders	F40-F44
890		7. Eating disorders	F50
900		8. Autism and Asperger syndrome	F84
910		9. Childhood behavioural disorders	F90-F92
911		a. Attention deficit/hyperactivity syndrome	F90
912		b. Conduct disorder	F91-F92
920		10. Idiopathic intellectual disability	F70-F79
930		11. Other mental and behavioural disorders	F04-F09, F17, F34-F39 (minus F34.1), F45-F48, F51-F69, F80-F83, F88-F89, F93-F99
940	**F.**	**Neurological conditions**	F01-F03, G06-G98 (minus G14, G72.1)
950		1. Alzheimer disease and other dementias	F01-F03, G30-G31
960		2. Parkinson disease	G20-G21
970		3. Epilepsy	G40-G41
980		4. Multiple sclerosis	G35
990		5. Migraine	G43
1000		6. Non-migraine headache	G44
1010		7. Other neurological conditions	G06-G12, G23-G25, G36-G37, G45-G98 (minus G72.1)
1020	**G.**	**Sense organ diseases**	H00-H61, H68-H93
1030		1. Glaucoma	H40
1040		2. Cataracts	H25-H26
1050		3. Uncorrected refractive errors	H49-H52
1060		4. Macular degeneration	H35.3
1070		5. Other vision loss	H30-H35 (minus H35.3), H53-H54
1080		6. Other hearing loss	H90-H91
1090		7. Other sense organ disorders	H00-H21, H27, H43-H47, H55-H61, H68-H83, H92-H93
1100	**H.**	**Cardiovascular diseases**	I00-I99
1110		1. Rheumatic heart disease	I01-I09
1120		2. Hypertensive heart disease	I10-I15
1130		3. Ischaemic heart disease[f]	I20-I25
1140		4. Stroke[g]	I60-I69
1150		5. Cardiomyopathy, myocarditis, endocarditis	I30-I33, I38, I40, I42
1160		6. Other circulatory diseases	I00, I26-I28, I34-I37, I44-I51, I70-I99
1170	**I.**	**Respiratory diseases**	J30-J98
1180		1. Chronic obstructive pulmonary disease	J40-J44
1190		2. Asthma	J45-J46
1200		3. Other respiratory diseases	J30-J39, J47-J98
1210	**J.**	**Digestive diseases**	K20-K92
1220		1. Peptic ulcer disease	K25-K27

1230		2.	Cirrhosis of the liver[h]	K70, K74
1240		3.	Appendicitis	K35-K37
1241		4.	Gastritis and duodenitis	K29
1242		5.	Paralytic ileus and intestinal obstruction	K56
1244		6.	Inflammatory bowel disease	K50-K52, K58.0
1246		7.	Gallbladder and biliary diseases	K80-K83
1248		8.	Pancreatitis	K85-K86
1250		9.	Other digestive diseases	K20-K22, K28, K30-K31, K38, K40-K46, K55, K57, K58.9, K59-K66, K71-K73, K75-K76, K90-K92
1260	**K.**	**Genitourinary diseases**		E10.2-E10.29,E11.2-E11.29,E12.2,E13.2-E13.29,E14.2, N00-N64, N75-N76, N80-N98
1270		1.	Kidney diseases	N00-N19, E10.2-E10.29,E11.2-E11.29,E12.2,E13.2-E13.29,E14.2
1271			a. Acute glomerulonephritis	N00-N01
1272			b. Chronic kidney disease due to diabetes	E10.2-E10.29, E11.2-E11.29, E12.2, E13.2-E13.29, E14.2
1273			c. Other chronic kidney disease	N02-N19
1280		2.	Benign prostatic hyperplasia	N40
1290		3.	Urolithiasis	N20-N23
1300		4.	Other urinary diseases	N25-N39, N41-N45, N47-N51
1310		5.	Infertility	N46, N97
1320		6.	Gynecological diseases	N60-N64, N75-N76, N80-N96, N98
1330	**L.**	**Skin diseases**		L00-L98
1340	**M.**	**Musculoskeletal diseases**		M00-M99
1350		1.	Rheumatoid arthritis	M05-M06
1360		2.	Osteoarthritis	M15-M19
1370		3.	Gout	M10
1380		4.	Back and neck pain	M45-M48, M50-M54
1390		5.	Other musculoskeletal disorders	M00, M02, M08, M11-M13, M20-M43, M60-M99
1400	**N.**	**Congenital anomalies**		Q00-Q99 (minus Q86.0)
1410		1.	Neural tube defects	Q00, Q05
1420		2.	Cleft lip and cleft palate	Q35-Q37
1430		3.	Down syndrome	Q90
1440		4.	Congenital heart anomalies	Q20-Q28
1450		5.	Other chromosomal anomalies	Q91-Q99
1460		6.	Other congenital anomalies	Q01-Q04, Q06-Q18, Q30-Q34, Q38-Q89 (excluding Q86.0)
1470	**O.**	**Oral conditions**		K00-K14
1480		1.	Dental caries	K02
1490		2.	Periodontal disease	K05
1500		3.	Edentulism	-
1502		4.	Other oral disorders	K00, K01, K03, K04, K06-K14

1505		**P.**	**Sudden infant death syndrome**	R95
1510	**III.**	**Injuries**[i]		V01-Y89 (minus X41-X42, X44, X45)
1520		**A.**	**Unintentional injuries**	V01-X40, X43, X46-59, Y40-Y86, Y88, Y89
1530			1. Road injury[j]	V01-V04, V06, V09-V80, V87, V89, V99
1540			2. Poisonings[e]	X40, X43, X46-X48, X49[e]
1550			3. Falls	W00-W19
1560			4. Fire, heat and hot substances	X00-X19
1570			5. Drowning	W65-W74
1575			6. Exposure to mechanical forces	W20-W38, W40-W43, W45, W46, W49-W52, W75, W76
1580			7. Natural disasters	X30-X39
1590			8. Other unintentional injuries	Rest of V, W39, W44, W53-W64, W77-W99, X20-X29, X50-X59, Y40-Y86, Y88, Y89
1600		**B.**	**Intentional injuries**	X60-Y09, Y35-Y36, Y870, Y871
1610			1. Self-harm	X60-X84, Y870
1620			2. Interpersonal violence	X85-Y09, Y871
1630			3. Collective violence and legal intervention	Y35-Y36

Notes: —, not available;

[a] Deaths coded to "Symptoms, signs and ill-defined conditions" (R00-R94. R96-R99) are distributed proportionately to all causes within Group I and Group II.

[b] For deaths under age 5, refer to classification in Annex 4A, Table 5.

[c] For liver cancer secondary to hepatitis B, hepatitis C, and alcohol use, proportions derived from GBD2015 analyses.

[d] Cancer deaths coded to ICD categories for malignant neoplasms of other and unspecified sites including those whose point of origin cannot be determined, and secondary and unspecified neoplasms (C76, C80, C97) were redistributed pro-rata across malignant neoplasm categories within each age–sex group, so that the category "Other malignant neoplasms" includes only malignant neoplasms of other specified sites.

[e] Deaths coded to F19 (Multiple and other drug use) and X44 (Accidental poisoning by other and unspecified drugs and medicines) have been redistributed to the GHE drug categories as described in Section 8.14. Deaths coded to X49 (Accidental poisoning by other and unspecified chemicals) have been redistributed to GHE accidental poisoning and GHE opioid use disorders categories as described in Annex 4A.

[f] Ischaemic heart disease deaths may be miscoded to a number of so-called cardiovascular "garbage" codes. These 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 Annex 4A.

[g] For ischaemic stroke and haemorrhagic stroke, proportions derived from GBD2015 analyses.

[h] For cirrhosis due to hepatitis B, hepatitis C, and alcohol use, proportions derived from GBD2015 analyses.

[i] Injury deaths where the intent is not determined (Y10-Y34, Y872) are distributed proportionately to all causes below the group level for injuries.

[j] For countries with 3-digit ICD10 data, for "Road injury" use: V01-V04, V06, V09-V80, V87, V89 and V99. For countries with 4-digit ICD10 data, for "Road injury" 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, V10.3-V10.9, V11.3-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-V19.9, 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, V82.8-V82.9, V83.0-V83.3, V84.0-V84.3, V85.0-V85.3, V86.0-V86.3, V87.0-V87.9, V89.2-V89.3, V89.9, V99 and Y850.

Annex Table 2. WHO Standard Life Table for Years of Life Lost (YLL)

Age	SEYLL*	Age	SEYLL	Age	SEYLL
0	91.94	35	57.15	70	23.15
1	91.00	36	56.16	71	22.23
2	90.01	37	55.17	72	21.31
3	89.01	38	54.18	73	20.40
4	88.02	39	53.19	74	19.51
5	87.02	40	52.20	75	18.62
6	86.02	41	51.21	76	17.75
7	85.02	42	50.22	77	16.89
8	84.02	43	49.24	78	16.05
9	83.03	44	48.25	79	15.22
10	82.03	45	47.27	80	14.41
11	81.03	46	46.28	81	13.63
12	80.03	47	45.30	82	12.86
13	79.03	48	44.32	83	12.11
14	78.04	49	43.34	84	11.39
15	77.04	50	42.36	85	10.70
16	76.04	51	41.38	86	10.03
17	75.04	52	40.41	87	9.38
18	74.05	53	39.43	88	8.76
19	73.05	54	38.46	89	8.16
20	72.06	55	37.49	90	7.60
21	71.06	56	36.52	91	7.06
22	70.07	57	35.55	92	6.55
23	69.07	58	34.58	93	6.07
24	68.08	59	33.62	94	5.60
25	67.08	60	32.65	95	5.13
26	66.09	61	31.69	96	4.65
27	65.09	62	30.73	97	4.18
28	64.10	63	29.77	98	3.70
29	63.11	64	28.82	99	3.24
30	62.11	65	27.86	100	2.79
31	61.12	66	26.91	101	2.36
32	60.13	67	25.96	102	1.94
33	59.13	68	25.02	103	1.59
34	58.14	69	24.08	104	1.28
				105	1.02

*SEYLL: standard expected years of life lost. Based on projected frontier period life expectancy and life table for year 2050 (see Section 2).

Annex Table 3. Health States and Lay Descriptions used in the GBD 2015 Study

Health state	Lay description
Infectious disease	
Infectious disease, acute episode, mild	has a low fever and mild discomfort , but no difficulty with daily activities.
Infectious disease, acute episode, moderate	has a fever and aches, and feels weak, which causes some difficulty with daily activities.
Infectious disease, acute episode, severe	has a high fever and pain, and feels very weak, which causes great difficulty with daily activities.
Infectious disease, post-acute consequences (fatigue, emotional lability, insomnia)	is always tired and easily upset. The person feels pain all over the body and is depressed.
Diarrhea, mild	has diarrhea three or more times a day with occasional discomfort in the belly.
Diarrhea, moderate	has diarrhea three or more times a day, with painful cramps in the belly and feeling thirsty
Diarrhea, severe	has diarrhea three or more times a day with severe belly cramps. The person is very thirsty and feels nauseous and tired.
Epididymo-orchitis	has swelling and tenderness in the testicles and pain during urination.
Herpes zoster	has a blistering skin rash that causes pain, with some burning and itching.
HIV cases, symptomatic, pre-AIDS	has weight loss, fatigue, and frequent infections.
HIV/AIDS cases, receiving ARV treatment	has occasional fevers and infections. The person takes daily medication that sometimes causes diarrhea.
AIDS cases, not receiving ARV treatment	has severe weight loss, weakness, fatigue, cough and fever, and frequent infections, skin rashes and diarrhea.
Intestinal nematode infections, symptomatic	has cramping pain and a bloated feeling in the belly.
Lymphatic filariasis, symptomatic	has swollen legs with hard and thick skin, which causes difficulty in moving around.
Ear pain	has an ear-ache that causes some difficulty with daily activities.
Tuberculosis, not HIV infected	has a persistent cough and fever, is short of breath, feels weak, and has lost a lot of weight.
Tuberculosis, HIV infected	has a persistent cough and fever, shortness of breath, night sweats, weakness and fatigue and severe weight loss.
Cancer	
Cancer, diagnosis and primary therapy	has pain, nausea, fatigue, weight loss and high anxiety.
Cancer, metastatic	has severe pain, extreme fatigue, weight loss and high anxiety.
Mastectomy	had one of her breasts removed and sometimes has pain or swelling in the arms.
Stoma	has a pouch attached to an opening in the belly to collect and empty stools.

Health state	Lay description
Terminal phase, with medication (for cancers, end-stage kidney/liver disease)	has lost a lot of weight and regularly uses strong medication to avoid constant pain. The person has no appetite, feels nauseous, and needs to spend most of the day in bed.
Terminal phase, without medication (for cancers, end-stage kidney/liver disease)	has lost a lot of weight and has constant pain. The person has no appetite, feels nauseous, and needs to spend most of the day in bed.
Cardiovascular and circulatory disease	
Acute myocardial infarction, days 1-2	has severe chest pain that becomes worse with any physical activity,. The person feels nauseous, short of breath, and very anxious.
Acute myocardial infarction, days 3-28	gets short of breath after heavy physical activity, and tires easily, but has no problems when at rest. The person has to take medication every day and has some anxiety.
Angina pectoris, mild	has chest pain that occurs with strenuous physical activity, such as running or lifting heavy objects. After a brief rest, the pain goes away.
Angina pectoris, moderate	has chest pain that occurs with moderate physical activity, such as walking uphill or more than half a kilometer (around a quarter-mile) on level ground. After a brief rest, the pain goes away.
Angina pectoris, severe	has chest pain that occurs with minimal physical activity, such as walking only a short distance. After a brief rest, the pain goes away. The person avoids most physical activities because of the pain.
Cardiac conduction disorders and cardiac dysrhythmias	has periods of rapid and irregular heartbeats and occasional fainting.
Claudication	has cramping pains in the legs after walking a medium distance. The pain goes away after a short rest.
Heart failure, mild	is short of breath and easily tires with moderate physical activity, such as walking uphill or more than a quarter-mile on level ground. The person feels comfortable at rest or during activities requiring less effort.
Heart failure, moderate	is short of breath and easily tires with minimal physical activity, such as walking only a short distance. The person feels comfortable at rest but avoids moderate activity.
Heart failure, severe	is short of breath and feels tired when at rest. The person avoids any physical activity, for fear of worsening the breathing problems.
Stroke, long-term consequences, mild	has some difficulty in moving around and some weakness in one hand, but is able to walk without help.
Stroke, long-term consequences, moderate	has some difficulty in moving around, and in using the hands for lifting and holding things, dressing and grooming.
Stroke, long-term consequences, moderate plus cognition problems	has some difficulty in moving around, in using the hands for lifting and holding things, dressing and grooming, and in speaking. The person is often forgetful and confused.
Stroke, long-term consequences, severe	is confined to bed or a wheelchair, has difficulty speaking and depends on others for feeding, toileting and dressing.
Stroke, long-term consequences, severe plus cognition problems	is confined to bed or a wheelchair, depends on others for feeding, toileting and dressing, and has difficulty speaking, thinking clearly and remembering things.

Health state	Lay description
Diabetes, digestive and genitourinary disease	
Diabetic neuropathy	has pain, tingling and numbness in the arms, legs, hands and feet. The person sometimes gets cramps and muscle weakness.
Chronic kidney disease (stage IV)	tires easily, has nausea, reduced appetite and difficulty sleeping.
End-stage renal disease, with kidney transplant	sometimes feels tired and down, and has some difficulty with daily activities.
End-stage renal disease, on dialysis	is tired and has itching, cramps, headache, joint pains and shortness of breath. The person needs intensive medical care every other day lasting about half a day.
Decompensated cirrhosis of the liver	has a swollen belly and swollen legs. The person feels weakness, fatigue and loss of appetite.
Gastric bleeding	vomits blood and feels nauseous.
Crohn disease or ulcerative colitis	has cramping abdominal pain, has diarrhea several times a day, and feels very tired for two months every year. When the person does not have symptoms, there is anxiety about them returning.
Benign prostatic hypertrophy, symptomatic cases	feels the urge to urinate frequently, but when passing urine it comes out slowly and sometimes is painful.
Impotence	has difficulty in obtaining or maintaining an erection.
Stress incontinence	loses small amounts of urine without meaning to when coughing, sneezing, laughing or during physical exercise.
Urinary incontinence	cannot control urinating.
Infertility, primary	wants to have a child and has a fertile partner, but the couple cannot conceive.
Infertility, secondary	has at least one child, and wants to have more children. The person has a fertile partner, but the couple cannot conceive.
Chronic respiratory diseases	
Asthma, controlled	has wheezing and cough once a month, which does not cause difficulty with daily activities.
Asthma, partially controlled	has wheezing and cough once a week, which causes some difficulty with daily activities.
Asthma, uncontrolled	has wheezing, cough and shortness of breath more than twice a week, which causes difficulty with daily activities and sometimes wakes the person at night.
COPD and other chronic respiratory problems, mild	has cough and shortness of breath after heavy physical activity, but is able to walk long distances and climb stairs.
COPD and other chronic respiratory problems, moderate	has cough, wheezing and shortness of breath, even after light physical activity. The person feels tired and can walk only short distances or climb only a few stairs.
COPD and other chronic respiratory problems, severe	has cough, wheezing and shortness of breath all the time. The person has great difficulty walking even short distances or climbing any stairs, feels tired when at rest, and is anxious.
Neurological conditions	
Dementia, mild	has some trouble remembering recent events, and finds it hard to concentrate and make decisions and plans.

Health state	Lay description
Dementia, moderate	has memory problems and confusion, feels disoriented, at times hears voices that are not real, and needs help with some daily activities.
Dementia, severe	has complete memory loss; no longer recognizes close family members; and requires help with all daily activities.
Headache, migraine	has severe, throbbing head pain and nausea that cause great difficulty in daily activities and sometimes confine the person to bed. Moving around, light, and noise make it worse.
Back pain, severe, without leg pain	has severe back pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly and feels worried.
Headache, tension-type	has a moderate headache that also affects the neck, which causes difficulty in daily activities.
Headache, medication overuse	has daily headaches, felt as dull pain and often lasting all day, with poor sleep, nausea and fatigue. The person takes medicine for the headaches, which provides little relief but is needed to avoid having worse symptoms.
Multiple sclerosis, mild	has mild loss of feeling in one hand, is a little unsteady while walking, has slight loss of vision in one eye, and often needs to urinate urgently.
Multiple sclerosis, moderate	needs help walking, has difficulty with writing and arm coordination, has loss of vision in one eye and cannot control urinating.
Multiple sclerosis, severe	has slurred speech and difficulty swallowing. The person has weak arms and hands, very limited and stiff leg movement, has loss of vision in both eyes and cannot control urinating.
Epilepsy, less severe (seizures < once per month)	has sudden seizures two to five times a year, with violent muscle contractions and stiffness, loss of consciousness, and loss of urine or bowel control.
Epilepsy, severe (seizures >= once per month)	has sudden seizures one or more times each month, with violent muscle contractions and stiffness, loss of consciousness, and loss of urine or bowel control. Between seizures the person has memory loss and difficulty concentrating.
Parkinson disease, mild	has mild tremors and moves a little slowly, but is able to walk and do daily activities without assistance.
Parkinson disease, moderate	has moderate tremors and moves slowly, which causes some difficulty in walking and daily activities. The person has some trouble swallowing, talking, sleeping, and remembering things.
Parkinson disease, severe	has severe tremors and moves very slowly, which causes great difficulty in walking and daily activities. The person falls easily and has a lot of difficulty talking, swallowing, sleeping, and remembering things.
Mental, behavioral and substance use disorders	
Alcohol use disorder, very mild	drinks alcohol daily and has difficulty controlling the urge to drink. When sober, the person functions normally.
Alcohol use disorder, mild	drinks a lot of alcohol and sometimes has difficulty controlling the urge to drink. While intoxicated, the person has difficulty performing daily activities.

Health state	Lay description
Alcohol use disorder, moderate	drinks a lot, gets drunk almost every week and has great difficulty controlling the urge to drink. Drinking and recovering cause great difficulty in daily activities, sleep loss, and fatigue.
Alcohol use disorder, severe	gets drunk almost every day and is unable to control the urge to drink. Drinking and recovering replace most daily activities. The person has difficulty thinking, remembering and communicating, and feels constant pain and fatigue.
Fetal alcohol syndrome, mild	is a little slow in developing physically and mentally, which causes some difficulty in learning but no other difficulties in daily activities.
Fetal alcohol syndrome, moderate	is slow in developing physically and mentally, which causes some difficulty in daily activities.
Fetal alcohol syndrome, severe	is very slow in developing physically and mentally, which causes great difficulty in daily activities.
Cannabis dependence	uses marijuana daily and has difficulty controlling the habit. The person sometimes has mood swings, anxiety and hallucinations, and has some difficulty in daily activities.
Cannabis dependence, mild	uses marijuana at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Amphetamine dependence	uses stimulants (drugs) and has difficulty controlling the habit. The person sometimes has depression, hallucinations and mood swings, and has difficulty in daily activities.
Amphetamine dependence, mild	uses stimulants (drugs) at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Cocaine dependence	uses cocaine and has difficulty controlling the habit. The person sometimes has mood swings, anxiety, paranoia, hallucinations and sleep problems, and has some difficulty in daily activities.
Cocaine dependence, mild	uses cocaine at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Heroin and other opioid dependence	uses heroin daily and has difficulty controlling the habit. When the effects wear off, the person feels severe nausea, agitation, vomiting and fever. The person has a lot of difficulty in daily activities.
Heroin and other opioid dependence, mild	uses heroin (or methadone) daily and has difficulty controlling the habit. When not using, the person functions normally.
Anxiety disorders, mild	feels mildly anxious and worried, which makes it slightly difficult to concentrate, remember things, and sleep. The person tires easily but is able to perform daily activities.
Anxiety disorders, moderate	feels anxious and worried, which makes it difficult to concentrate, remember things, and sleep. The person tires easily and finds it difficult to perform daily activities.
Anxiety disorders, severe	constantly feels very anxious and worried, which makes it difficult to concentrate, remember things and sleep. The person has lost pleasure in life and thinks about suicide.
Major depressive disorder, mild episode	feels persistent sadness and has lost interest in usual activities. The person sometimes sleeps badly, feels tired, or has trouble concentrating but still manages to function in daily life with extra effort.

Health state	Lay description
Major depressive disorder, moderate episode	has constant sadness and has lost interest in usual activities. The person has some difficulty in daily life, sleeps badly, has trouble concentrating, and sometimes thinks about harming himself (or herself).
Major depressive disorder, severe episode	has overwhelming, constant sadness and cannot function in daily life. The person sometimes loses touch with reality and wants to harm or kill himself (or herself).
Bipolar disorder, manic episode	is hyperactive, hears and believes things that are not real, and engages in impulsive and aggressive behavior that endanger the person and others.
Bipolar disorder, residual state	has mild mood swings, irritability and some difficulty with daily activities.
Schizophrenia, acute state	hears and sees things that are not real and is afraid, confused, and sometimes violent. The person has great difficulty with communication and daily activities, and sometimes wants to harm or kill himself (or herself).
Anorexia nervosa	feels an overwhelming need to starve and exercises excessively to lose weight. The person is very thin, weak and anxious.
Bulimia nervosa	has uncontrolled overeating followed by guilt, starving, and vomiting to lose weight.
Attention deficit hyperactivity disorder	is hyperactive and has difficulty concentrating, remembering things, and completing tasks.
Conduct disorder	has frequent behavior problems, which are sometimes violent. The person often has difficulty interacting with other people and feels irritable.
Asperger syndrome	has difficulty interacting with other people, and is slow to understand or respond to questions. The person is often preoccupied with one thing and has some difficulty with basic daily activities.
Autism	has severe problems interacting with others and difficulty understanding simple questions or directions. The person has great difficulty with basic daily activities and becomes distressed by any change in routine.
Borderline intellectual functioning	is slow in learning at school. As an adult, the person has some difficulty doing complex or unfamiliar tasks but otherwise functions independently.
Intellectual disability / mental retardation, mild	has low intelligence and is slow in learning at school. As an adult, the person can live independently, but often needs help to raise children and can only work at simple supervised jobs.
Intellectual disability / mental retardation, moderate	has low intelligence, and is slow in learning to speak and to do even simple tasks. As an adult, the person requires a lot of support to live independently and raise children. The person can only work at the simplest supervised jobs.
Intellectual disability / mental retardation, severe	has very low intelligence and cannot speak more than a few words, needs constant supervision and help with most daily activities, and can do only the simplest tasks.

Health state	Lay description
Intellectual disability / mental retardation, profound	has very low intelligence, has almost no language, and does not understand even the most basic requests or instructions. The person requires constant supervision and help for all activities.
Hearing and vision loss	
Hearing loss, mild	has great difficulty hearing and understanding another person talking in a noisy place (for example, on an urban street).
Hearing loss, moderate	is unable to hear and understand another person talking in a noisy place (for example, on an urban street), and has difficulty hearing another person talking even in a quiet place or on the phone.
Hearing loss, severe	is unable to hear and understand another person talking, even in a quiet place, and unable to take part in a phone conversation. Difficulties with communicating and relating to others cause emotional impact at times (for example worry or depression).
Hearing loss, profound	is unable to hear and understand another person talking, even in a quiet place, is unable to take part in a phone conversation, and has great difficulty hearing anything in any other situation. Difficulties with communicating and relating to others often cause worry, depression or loneliness.
Hearing loss, complete	cannot hear at all in any situation, including even the loudest sounds, and cannot communicate verbally or use a phone. Difficulties with communicating and relating to others often cause worry, depression or loneliness.
Hearing loss, mild, with ringing	has great difficulty hearing and understanding another person talking in a noisy place (for example, on an urban street), and sometimes has annoying ringing in the ears.
Hearing loss, moderate, with ringing	is unable to hear and understand another person talking in a noisy place (for example, on an urban street), has difficulty hearing another person talking even in a quiet place or on the phone, and has annoying ringing in the ears for 5 minutes at a time, almost every day.
Hearing loss, severe, with ringing	is unable to hear and understand another person talking, even in a quiet place, is unable to take part in a phone conversation, and has annoying ringing in the ears for more than 5 minutes at a time, almost every day. Difficulties with communicating and relating to others cause emotional impact at times (for example worry or depression).
Hearing loss, profound, with ringing	is unable to hear and understand another person talking, even in a quiet place, is unable to take part in a phone conversation, has great difficulty hearing anything in any other situation, and has annoying ringing in the ears for more than 5 minutes at a time, several times a day. Difficulties with communicating and relating to others often cause worry, depression, or loneliness.
Hearing loss, complete, with ringing	cannot hear at all in any situation, including even the loudest sounds, and cannot communicate verbally or use a phone, and has very annoying ringing in the ears for more than half of the day. Difficulties with communicating and relating to others often cause worry, depression or loneliness.
Distance vision, monocular	is blind in one eye and has difficulty judging distances

Health state	Lay description
Distance vision, mild impairment	has some difficulty with distance vision, for example reading signs, but no other problems with eyesight.
Distance vision, moderate impairment	has vision problems that make it difficult to recognize faces or objects across a room.
Distance vision, severe impairment	has severe vision loss, which causes difficulty in daily activities, some emotional impact (for example worry), and some difficulty going outside the home without assistance.
Distance vision blindness	is completely blind, which causes great difficulty in some daily activities, worry and anxiety, and great difficulty going outside the home without assistance.
Presbyopia	has difficulty seeing things that are nearer than 3 feet, but has no difficulty with seeing things at a distance.
Musculoskeletal disorders	
Low back pain, mild	has mild back pain, which causes some difficulty dressing, standing, and lifting things.
Low back pain, moderate	has moderate back pain, which causes difficulty dressing, sitting, standing, walking, and lifting things.
Back pain, severe, with leg pain	has severe back and leg pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly and feels worried.
Neck pain, mild	has neck pain, and has difficulty turning the head and lifting things.
Back pain, most severe, with leg pain	has constant back and leg pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly, is worried, and has lost some enjoyment in life.
Neck pain, moderate	has constant neck pain, and has difficulty turning the head, holding arms up, and lifting things
Neck pain, severe	has severe neck pain, and difficulty turning the head and lifting things. The person gets headaches and arm pain, sleeps poorly, and feels tired and worried.
Neck pain, most severe	has constant neck pain and arm pain, and difficulty turning the head, holding arms up, and lifting things. The person gets headaches, sleeps poorly, and feels tired and worried.
Musculoskeletal problems, lower limbs, mild	has pain in the leg, which causes some difficulty running, walking long distances, and getting up and down.
Musculoskeletal problems, lower limbs, moderate	has moderate pain in the leg, which makes the person limp, and causes some difficulty walking, standing, lifting and carrying heavy things, getting up and down and sleeping.
Musculoskeletal problems, lower limbs, severe	has severe pain in the leg, which makes the person limp and causes a lot of difficulty walking, standing, lifting and carrying heavy things, getting up and down, and sleeping.
Musculoskeletal problems, upper limbs, mild	has mild pain and stiffness in the arms and hands. The person has some difficulty lifting, carrying and holding things.
Musculoskeletal problems, upper limbs, moderate	has moderate pain and stiffness in the arms and hands, which causes difficulty lifting, carrying, and holding things, and trouble sleeping because of the pain.

Health state	Lay description
Musculoskeletal problems, generalized, moderate	has pain and deformity in most joints, causing difficulty moving around, getting up and down, and using the hands for lifting and carrying. The person often feels fatigue.
Musculoskeletal problems, generalized, severe	has severe, constant pain and deformity in most joints, causing difficulty moving around, getting up and down, eating, dressing, lifting, carrying and using the hands. The person often feels sadness, anxiety and extreme fatigue.
Gout, acute	has severe pain and swelling in the leg, making it very difficult to get up and down, stand, walk, lift, and carry heavy things. The person has trouble sleeping because of the pain.
Injuries	
Amputation of finger(s), excluding thumb (long term, with treatment)	has lost part of the fingers of one hand, causing difficulties in using the hand, pain, and tingling in the stumps.
Amputation of thumb (long term)	has lost one thumb, causing some difficulty in using the hand, pain, and tingling in the stump.
Amputation of one upper limb (long term, with or without treatment)	has lost one hand and part of the arm, leaving pain and tingling in the stump and flashbacks from the injury. The person requires help lifting objects and in daily activities such as cooking.
Amputation of both upper limbs (long term, with treatment)	has lost part of both arms, leaving pain and tingling in the stumps and flashbacks from the injury. The person has comfortable artificial arms and is mostly independent.
Amputation of both upper limbs (long term, without treatment)	has lost part of both arms, leaving pain and tingling in the stumps and flashbacks from the injury. The person needs help with basic daily activities such as eating and using the toilet.
Amputation of toe	has lost one toe, leaving occasional pain and tingling in the stump.
Amputation of one lower limb (long term, with treatment)	has lost part of one leg, leaving pain and tingling in the stump. The person has a comfortable artificial leg and only slight difficulties moving around.
Amputation of one lower limb (long term, without treatment)	has lost part of one leg, leaving pain and tingling in the stump. The person does not have an artificial leg, has frequent sores, and uses crutches.
Amputation of both lower limbs (long term, with treatment)	has lost part of both legs, leaving pain and tingling in the stumps. The person has two comfortable artificial legs, which allow for movement.
Amputation of both lower limbs (long term, without treatment)	has lost part of both legs, leaving pain, tingling, and frequent sores in the stumps. The person has great difficulty moving around and has episodes of depression, anxiety and flashbacks to the injury.
Burns, <20% total burned surface area without lower airway burns (short term, with or without treatment)	has a burn on part of the body. Parts of the burned area are painful, and other parts have lost feeling.
Burns, <20% total burned surface area or <10% total burned surface area if head/neck or hands/wrist involved (long term, with or without treatment)	has scars caused by a burn. The scars are sometimes painful and itchy.

Health state	Lay description
Burns, ≥20% total burned surface area (short term, with or without treatment)	has a painful burn over a large part of the body. Parts of the burned area have lost feeling, and the person feels anxious and unwell.
Burns, ≥20% total burned surface area or ≥10% total burned surface area if head/neck or hands/wrist involved (long term, with treatment)	has scars caused by burns over a large part of the body. The scars are frequently painful and itchy, and the person is often sad.
Burns, ≥20% total burned surface area or ≥10% total burned surface area if head/neck or hands/wrist involved (long term, without treatment)	has severe, disfiguring and itchy scars caused by burns over a large part of the body. The person cannot move some joints, feels sad, and has great difficulty with self-care such as dressing and toileting.
Lower airway burns (with or without treatment)	has a burn in the throat and lungs, which causes great difficulty breathing and a lot of anxiety.
Crush injury (short or long term, with or without treatment)	had part of the body crushed, leaving pain, swelling, tingling and limited feeling in the affected area.
Dislocation of hip (long term, with or without treatment)	walks with a limp and feels discomfort when walking.
Dislocation of knee (long term, with or without treatment)	has a knee out of joint, causing pain and difficulty moving the knee, which sometimes gives way. The person needs crutches for walking and help with self-care such as dressing.
Dislocation of shoulder (long term, with or without treatment)	has a shoulder that is out of joint, causing pain and difficulty moving. The person has difficulty with daily activities such as dressing and cooking.
Other injuries of muscle and tendon (includes sprains, strains and dislocations other than shoulder, knee, hip)	has a strained muscle that causes pain and swelling.
Drowning and nonfatal submersion (short or long term, with or without treatment)	has breathlessness, anxiety, cough, and vomiting.
Fracture of clavicle, scapula or humerus (short or long term, with or without treatment)	has a broken shoulder bone, which is painful and swollen. The person cannot use the affected arm and has difficulty with getting dressed.
Fracture of face bone (short or long term, with or without treatment)	has a broken cheek bone, broken nose, and chipped teeth, with swelling and severe pain.
Fracture of foot bones (short term, with or without treatment)	has a broken foot bone, which causes pain, swelling, and difficulty walking.
Fracture of foot bones (long term, without treatment)	had a broken foot in the past that did not heal properly. The person now has pain in the foot and has some difficulty walking.
Fracture of hand (short term, with or without treatment)	has a broken hand, causing pain and swelling.
Fracture of hand (long term, without treatment)	has stiffness in the hand and a weak grip.
Fracture of neck of femur (short term, with or without treatment)	has broken a hip and is in pain. The person cannot stand or walk, and needs help washing, dressing, and going to the toilet.

Health state	Lay description
Fracture of neck of femur (long term, with treatment)	had a broken hip in the past, which was fixed with treatment. The person can only walk short distances, has discomfort when moving around, and has some difficulty in daily activities.
Fracture of neck of femur (long term, without treatment)	had a broken hip bone in the past, which was never treated and did not heal properly. The person cannot get out of bed and needs help washing and going to the toilet.
Fracture, other than femoral neck (short term, with or without treatment)	has a broken thigh bone. The person has severe pain and swelling and cannot walk.
Fracture, other than femoral neck (long term, without treatment)	had a broken thigh bone in the past, which was never treated and did not heal properly. The person now has a limp and discomfort when walking.
Fracture of patella, tibia or fibula or ankle (short term, with or without treatment)	has a broken shin bone, which causes severe pain, swelling, and difficulty walking.
Fracture of patella, tibia or fibula or ankle (long term, with or without treatment)	had a broken shin bone in the past that did not heal properly. The person has pain in the knee and ankle, and has difficulty walking.
Fracture of pelvis (short term)	has a broken pelvis bone, with swelling and bruising. The person has severe pain, and cannot walk or do daily activities.
Fracture of pelvis (long term)	had a broken pelvis in the past and now walks with a limp. There is often pain in the back and groin, and when urinating and sitting for a long time.
Fracture of radius or ulna (short term, with or without treatment)	has a broken forearm, which causes severe pain, swelling, and limited movement.
Fracture of radius or ulna (long term, without treatment)	had a broken forearm in the past that did not heal properly, causing some pain and limited movement in the elbow and wrist. The person has difficulty with daily activities such as dressing.
Fracture of skull (short or long term, with or without treatment)	has a broken skull, but does not have brain damage. The broken area is painful and swollen.
Fracture of sternum and/or fracture of one or two ribs (short term, with or without treatment)	has a broken rib that causes severe pain in the chest, especially when breathing in. The person has difficulty with daily activities such as dressing.
Fracture of vertebral column (short or long term, with or without treatment)	has broken back bones and is in pain, but still has full use of arms and legs.
Fractures, treated (long term)	has slight pain in a bone that was broken in the past.
Injured nerves (short term)	has a nerve injury, which causes difficulty moving and some loss of feeling in the affected area.
Injured nerves (long term)	had a nerve injury in the past, which continues to cause some difficulty moving. The person often injures the affected part because it is numb.
Injury to eyes (short term)	has an injury to one eye, which causes pain and difficulty seeing.
Severe traumatic brain injury, short term (with or without treatment)	cannot concentrate and has headaches, memory problems, dizziness, and feels angry.
Concussion	has headaches, dizziness, nausea and difficulty concentrating.

Health state	Lay description
Traumatic brain injury, long-term consequences, minor (with or without treatment)	has episodes of headaches, memory problems, and difficulty concentrating.
Traumatic brain injury, long-term consequences, moderate (with or without treatment)	has frequent headaches, memory problems, difficulty concentrating, and dizziness. The person is often anxious and moody.
Traumatic brain injury, long-term consequences, severe (with or without treatment)	cannot think clearly and has frequent headaches, memory problems, difficulty concentrating and dizziness. The person is often anxious and moody, and depends on others for feeding, toileting, dressing and walking.
Open wound (short term, with or without treatment)	has a cut in the skin, which causes pain and numbness around the cut.
Poisoning (short term with or without treatment)	has drowsiness, stomach pain and vomiting.
Severe chest injury (long term, with or without treatment)	had a severe chest injury in the past that has now healed. The person still gets breathless when walking and feels discomfort in the chest.
Severe chest injury (short term, with or without treatment)	has a serious chest injury, which causes severe pain, shortness of breath and anxiety.
Spinal cord lesion below neck level (treated)	is paralyzed from the waist down, cannot feel or move the legs and has difficulties with urine and bowel control. The person uses a wheelchair to move around.
Spinal cord lesion below neck level (untreated)	is paralyzed from the waist down and cannot feel or move the legs. Legs are in fixed, bent positions, and the person gets frequent infections and pressure sores.
Spinal cord lesion at neck level (treated)	is paralyzed from the neck down and cannot feel or move the arms and legs.
Spinal cord lesion at neck level (untreated)	is paralyzed from the neck down and cannot feel or move the arms and legs. Arms and legs are in fixed, bent positions, and the person gets frequent infections and pressure sores.
Other	
Abdominopelvic problem, mild	has some pain in the belly that causes nausea but does not interfere with daily activities.
Abdominopelvic problem, moderate	has pain in the belly and feels nauseous. The person has difficulties with daily activities.
Abdominopelvic problem, severe	has severe pain in the belly and feels nauseous. The person is anxious and unable to carry out daily activities.
Anemia, mild	feels slightly tired and weak at times, but this does not interfere with normal daily activities.
Anemia, moderate	feels moderate fatigue, weakness, and shortness of breath after exercise, making daily activities more difficult.
Anemia, severe	feels very weak, tired and short of breath, and has problems with activities that require physical effort or deep concentration.
Thrombocytopenic purpura	easily bruises and sometimes bleeds from the gums and nose; feels weak and has some difficulty with daily activities.
Periodontitis	has minor bleeding of the gums from time to time, with mild discomfort.

Health state	Lay description
Dental caries, symptomatic	has a toothache, which causes some difficulty in eating.
Severe tooth loss	has lost more than 20 teeth including front and back, and has great difficulty in eating meat, fruits, and vegetables.
Disfigurement, level 1	has a slight, visible physical deformity that others notice, which causes some worry and discomfort.
Disfigurement, level 2	has a visible physical deformity that causes others to stare and comment. As a result, the person is worried and has trouble sleeping and concentrating.
Disfigurement, level 3	has an obvious physical deformity that makes others uncomfortable, which causes the person to avoid social contact, feel worried, sleep poorly, and think about suicide.
Disfigurement, level 1 with itch/pain	has a slight, visible physical deformity that is sometimes sore or itchy. Others notice the deformity, which causes some worry and discomfort.
Disfigurement, level 2, with itch/pain	has a visible physical deformity that is sore and itchy. Other people stare and comment, which causes the person to worry. The person has trouble sleeping and concentrating.
Disfigurement, level 3, with itch/pain	has an obvious physical deformity that is very painful and itchy. The physical deformity makes others uncomfortable, which causes the person to avoid social contact, feel worried, sleep poorly, and think about suicide.
Generic uncomplicated disease: worry and daily medication	has a chronic disease that requires medication every day and causes some worry but minimal interference with daily activities.
Generic uncomplicated disease: anxiety about diagnosis	has a disease diagnosis that causes some worry but minimal interference with daily activities.
Hyperthyroidism	feels nervous, has palpitations, sweats a lot and has difficulty sleeping.
Hypothyroidism	has low energy and feels cold.
Iodine-deficiency goiter	has a large mass in the front of the neck. The person sometimes has weakness and fatigue, constipation and weight gain.
Kwashiorkor	is very tired and irritable and has diarrhea.
Severe wasting	is extremely skinny and has no energy.
Speech problems	has difficulty speaking, and others find it difficult to understand.
Motor impairment, mild	has some difficulty in moving around but is able to walk without help.
Motor impairment, moderate	has some difficulty in moving around, and difficulty in lifting and holding objects, dressing and sitting upright, but is able to walk without help.
Motor impairment, severe	is unable to move around without help, and is not able to lift or hold objects, get dressed or sit upright.
Motor plus cognitive impairments, mild	has some difficulty in moving around but is able to walk without help. The person is slow in learning at school. As an adult, the person has some difficulty doing complex or unfamiliar tasks but otherwise functions independently.
Motor plus cognitive impairments, moderate	has some difficulty in moving around, holding objects, dressing and sitting upright, but can walk without help. The person has low intelligence and is slow in learning to speak and to do simple tasks.

Health state	Lay description
Motor plus cognitive impairments, severe	cannot move around without help, and cannot lift or hold objects, get dressed or sit upright. The person also has very low intelligence, speaks few words, and needs constant supervision and help with all daily activities.
Rectovaginal fistula	has an abnormal opening between her vagina and rectum causing flatulence and feces to escape through the vagina. The person gets infections in her vagina, and has pain when urinating.
Vesicovaginal fistula	has an abnormal opening between the bladder and the vagina, which makes her unable to control urinating. The woman is anxious and depressed.

Note: Reproduced from Vos et al (53)

Annex Table 4. Health State Weights used in WHO Global Health Estimates

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Infectious disease					
Infectious disease: acute episode, mild	0.006	0.005	0.006	0.005	0.005
Infectious disease: acute episode, moderate	0.051	0.053	0.051	0.053	0.137
Infectious disease: acute episode, severe	0.133	0.210	0.133	0.210	0.615
Infectious disease: post-acute consequences (fatigue, emotional lability, insomnia)	0.219	0.254	0.219	0.254	
Diarrhoea: mild	0.074	0.061	0.074	0.061	
Diarrhoea: moderate	0.188	0.202	0.188	0.202	0.105
Diarrhoea: severe	0.247	0.281	0.247	0.281	
Epididymo-orchitis	0.128	0.097	0.128	0.097	0.167
Herpes zoster	0.058	0.061	0.058	0.061	
HIV: symptomatic, pre-AIDS	0.274	0.221	0.274	0.221	0.167
HIV/AIDS cases, receiving ARV treatment	0.078	0.053	0.078	0.053	0.135
AIDS cases, not receiving ARV treatment	0.582	0.547	0.582	0.547	0.505
Intestinal nematode infections: symptomatic	0.027	0.030	0.027	0.030	0.024
Lymphatic filariasis: symptomatic	0.109	0.110	0.109	0.110	0.106
Ear pain	0.013	0.018	0.013	0.018	0.023
Tuberculosis, not HIV infected	0.333	0.331	0.333	0.331	0.271
Tuberculosis, HIV infected	0.408	0.399	0.408	0.399	0.505
Cancer					
Cancer: diagnosis and primary therapy	0.288	0.294	0.288	0.294	0.095
Cancer: metastatic	0.451	0.484	0.451	0.484	0.750
Mastectomy	0.036	0.038	0.036	0.038	0.055
Stoma	0.095	0.086	0.095	0.086	0.075
Terminal phase: with medication (for cancers, end-stage kidney or liver disease)	0.540	0.508	0.540	0.508	0.810
Terminal phase: without medication (for cancers, end-stage kidney or liver disease)	0.569	0.519	0.569	0.519	0.810
Cardiovascular diseases					
Acute myocardial infarction: days 1-2	0.432	0.422	0.432	0.422	
Acute myocardial infarction: days 3-28	0.074	0.056	0.074	0.056	0.439
Angina pectoris: mild	0.033	0.037	0.033	0.037	
Angina pectoris: moderate	0.080	0.066	0.080	0.066	0.095
Angina pectoris: severe	0.167	0.167	0.167	0.167	0.227
Cardiac conduction disorders and cardiac dysrhythmias	0.224	0.145	0.224	0.145	0.193
Claudication	0.014	0.016	0.014	0.016	
Heart failure: mild	0.041	0.037	0.041	0.037	0.006
Heart failure: moderate	0.072	0.070	0.072	0.070	0.171
Heart failure: severe	0.179	0.186	0.179	0.186	0.323
Stroke: long-term consequences, mild	0.019	0.021	0.019	0.021	
Stroke: long-term consequences, moderate	0.070	0.076	0.070	0.076	
Stroke: long-term consequences, moderate plus cognition problems	0.316	0.312	0.316	0.312	0.266
Stroke: long-term consequences, severe	0.552	0.539	0.552	0.539	

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Stroke: long-term consequences, severe plus cognition problems	0.588	0.567	0.588	0.567	0.920
Diabetes, digestive, and genitourinary disease					
Diabetic neuropathy	0.133	0.099	0.133	0.099	0.072
Chronic kidney disease (stage IV)	0.104	0.105	0.104	0.105	0.104
End-stage renal disease: with kidney transplant	0.024	0.027	0.024	0.027	
End-stage renal disease: on dialysis	0.571	0.573	0.571	0.573	0.101
Decompensated cirrhosis of the liver	0.178	0.194	0.178	0.194	0.330
Gastric bleeding	0.325	0.323	0.325	0.323	
Crohn's disease or ulcerative colitis	0.231	0.225	0.231	0.225	0.042
Benign prostatic hypertrophy: symptomatic	0.067	0.070	0.067	0.070	0.038
Impotence	0.017	0.019	0.017	0.019	0.060
Stress incontinence	0.020		0.020		
Urinary incontinence	0.139	0.142	0.139	0.142	0.060
Infertility: primary	0.056	0.056	0.008	0.011	0.180
Infertility: secondary	0.026	0.026	0.005	0.006	0.180
Chronic respiratory diseases					
Asthma: controlled	0.015	0.009	0.015	0.009	
Asthma: partially controlled	0.036	0.027	0.036	0.027	0.043
Asthma: uncontrolled	0.133	0.132	0.133	0.132	
COPD and other chronic respiratory problems, mild	0.019	0.015	0.019	0.015	0.170
COPD and other chronic respiratory problems, moderate	0.225	0.192	0.225	0.192	0.170
COPD and other chronic respiratory problems, severe	0.408	0.383	0.408	0.383	0.530
Neurological disorders					
Dementia: mild	0.165	0.165	0.069	0.082	
Dementia: moderate	0.388	0.388	0.377	0.346	0.666
Dementia: severe	0.545	0.545	0.449	0.438	0.940
Headache: migraine	0.441	0.433	0.441	0.433	0.288
Migraine headache: moderate	0.267	0.267	0.267		
Headache: tension-type	0.037	0.040	0.037	0.040	
Headache, medication overuse	0.217		0.217		
Multiple sclerosis: mild	0.183	0.198	0.183	0.198	
Multiple sclerosis: moderate	0.463	0.445	0.463	0.445	0.411
Multiple sclerosis: severe	0.719	0.707	0.719	0.707	0.670
Epilepsy: treated, seizure free		0.072		0.072	0.065
Epilepsy: treated, with recent seizures		0.319		0.319	
Epilepsy: severe		0.657		0.657	
Epilepsy: untreated		0.420		0.420	0.150
Epilepsy, less severe (seizures < once per month)	0.263		0.263		
Epilepsy, severe (seizures >= once per month)	0.552		0.552		
Parkinson's disease: mild	0.010	0.011	0.010	0.011	
Parkinson's disease: moderate	0.267	0.263	0.267	0.263	0.316
Parkinson's disease: severe	0.575	0.549	0.575	0.549	0.392

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Mental, behavioural, and substance use disorders					
Alcohol problem use	0.115	0.115	0.115		0.134
Alcohol use disorder, very mild	0.123		0.123		
Alcohol use disorder: mild	0.235	0.259	0.235	0.259	0.134
Alcohol use disorder: moderate	0.373	0.388	0.373	0.388	0.180
Alcohol use disorder: severe	0.570	0.549	0.570	0.549	
Fetal alcohol syndrome: mild	0.016	0.017	0.016	0.017	
Fetal alcohol syndrome: moderate	0.056	0.057	0.056	0.057	
Fetal alcohol syndrome: severe	0.179	0.177	0.179	0.177	
Cannabis dependence	0.266	0.190	0.266	0.329	0.252
Cannabis dependence, mild	0.039		0.039		
Amphetamine dependence	0.486	0.240	0.486	0.353	0.252
Amphetamine dependence, mild	0.079		0.079		
Cocaine dependence	0.479	0.260	0.479	0.376	0.252
Cocaine dependence, mild	0.116		0.116		
Heroin and other opioid dependence	0.697	0.340	0.697	0.641	0.252
Heroin and other opioid dependence, mild	0.335		0.335		
Anxiety disorders: mild	0.030	0.030	0.030	0.030	0.091
Anxiety disorders: moderate	0.133	0.149	0.133	0.149	0.173
Anxiety disorders: severe	0.523	0.523	0.523	0.523	0.560
Major depressive disorder: mild episode	0.145	0.159	0.145	0.159	0.140
Major depressive disorder: moderate episode	0.396	0.406	0.396	0.406	0.350
Major depressive disorder: severe episode	0.658	0.655	0.658	0.655	0.760
Bipolar disorder: manic episode	0.492	0.480	0.492	0.480	0.400
Bipolar disorder: residual state	0.032	0.035	0.032	0.035	0.140
Schizophrenia: acute state	0.778	0.756	0.778	0.756	0.627
Schizophrenia: residual state	0.588	0.576	0.588	0.576	0.351
Anorexia nervosa	0.224	0.223	0.224	0.223	0.280
Bulimia nervosa	0.223	0.223	0.223	0.223	0.280
Attention-deficit hyperactivity disorder	0.045	0.049	0.045	0.049	0.020
Conduct disorder	0.241	0.236	0.241	0.236	0.150
Asperger's syndrome	0.104	0.110	0.104	0.110	
Autism	0.262	0.259	0.262	0.259	0.550
Borderline intellectual functioning	0.011	0.0034	0.011	0.0034	
Intellectual disability / mental retardation, mild	0.127	0.127	0.043	0.031	0.290
Intellectual disability / mental retardation, moderate	0.293	0.293	0.100	0.080	0.430
Intellectual disability / mental retardation, severe	0.383	0.383	0.160	0.126	0.820
Intellectual disability / mental retardation, profound	0.444	0.444	0.200	0.157	0.760
Hearing and vision loss					
Hearing loss: mild	0.010	0.005	0.010	0.005	0.040
Hearing loss: moderate	0.050	0.050	0.027	0.023	0.120
Hearing loss: severe	0.167	0.167	0.158	0.031	0.333
Hearing loss: profound	0.281	0.281	0.204	0.032	0.333
Hearing loss: complete	0.281	0.281	0.215	0.033	

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Hearing loss: mild, with ringing	0.038	0.038	0.021	0.038	
Hearing loss: moderate, with ringing	0.095	0.095	0.074	0.058	
Hearing loss: severe, with ringing	0.220	0.220	0.261	0.065	
Hearing loss: profound, with ringing	0.320	0.320	0.277	0.092	
Hearing loss: complete, with ringing	0.327	0.327	0.316	0.088	
Distance vision, monocular			0.017		
Distance vision: mild impairment	0.005	0.005	0.003	0.004	
Distance vision: moderate impairment	0.089	0.089	0.031	0.033	0.170
Distance vision: severe impairment	0.314	0.314	0.184	0.191	0.430
Distance vision blindness	0.338	0.338	0.187	0.195	0.600
Musculoskeletal disorders					
Back pain, most severe, without leg pain	0.372	0.269	0.372	0.269	0.061
Back pain, most severe, with leg pain	0.384	0.322	0.384	0.322	0.061
Back pain, severe, without leg pain	0.272	0.366	0.272	0.366	
Back pain, severe, with leg pain	0.325	0.374	0.325	0.374	0.125
Low back pain, moderate	0.054	0.072	0.054		
Low back pain, mild	0.020	0.023	0.020		
Neck pain: acute, mild		0.040		0.040	
Neck pain: acute, severe		0.221		0.221	
Neck pain: chronic, mild		0.101		0.101	
Neck pain: chronic, severe		0.286		0.286	
Neck pain, mild	0.053		0.053		
Neck pain, moderate	0.114		0.114		
Neck pain, severe	0.229		0.229		
Neck pain, most severe	0.304		0.304		
Musculoskeletal problems, lower limbs, mild	0.023	0.023	0.023	0.023	
Musculoskeletal problems, lower limbs, moderate	0.079	0.079	0.079	0.079	0.108
Musculoskeletal problems, lower limbs, severe	0.165	0.171	0.165	0.171	0.156
Musculoskeletal problems, upper limbs, mild	0.028	0.024	0.028	0.024	
Musculoskeletal problems, upper limbs, moderate	0.117	0.114	0.117	0.114	0.174
Musculoskeletal problems, generalized, moderate	0.317	0.292	0.317	0.292	0.233
Musculoskeletal problems, generalized, severe	0.581	0.606	0.581	0.606	
Gout: acute	0.295	0.293	0.295	0.293	0.132
Injuries					
Amputation of finger(s), excluding thumb: long term, with treatment	0.005	0.030	0.005	0.030	0.102
Amputation of thumb: long term	0.011	0.013	0.011	0.013	0.165
Amputation of one arm: long term, with or without treatment	0.118	0.130	0.118	0.130	0.102
Amputation of both arms: long term, with treatment	0.123	0.044	0.123	0.044	
Amputation of both arms: long term, without treatment	0.383	0.359	0.383	0.359	
Amputation of toe	0.006	0.008	0.006	0.008	0.064
Amputation of one leg: long term, with treatment	0.039	0.021	0.039	0.021	0.300

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Amputation of one leg: long term, without treatment	0.173	0.164	0.173	0.164	0.300
Amputation of both legs: long term, with treatment	0.088	0.051	0.088	0.051	
Amputation of both legs: long term, without treatment	0.443	0.494	0.443	0.494	
Burns of <20% total surface area without lower airway burns: short term, with or without treatment	0.141	0.096	0.141	0.096	0.157
Burns of <20% total surface area or <10% total surface area if head or neck, or hands or wrist involved: long term, with or without treatment	0.016	0.018	0.016	0.018	0.002
Burns of ≥20% total surface area: short term, with or without treatment	0.314	0.333	0.314	0.333	0.455
Burns of ≥20% total surface area or ≥10% total surface area if head or neck, or hands or wrist involved: long term, with treatment	0.135	0.127	0.135	0.127	0.255
Burns of ≥20% total surface area or ≥10% total surface area if head or neck, or hands or wrist involved: long term, without treatment	0.455	0.438	0.455	0.438	0.255
Lower airway burns: with or without treatment	0.376	0.373	0.376	0.373	
Crush injury: short or long term, with or without treatment	0.132	0.145	0.132	0.145	0.218
Dislocation of hip: long term, with or without treatment	0.016	0.017	0.016	0.017	
Dislocation of knee: long term, with or without treatment	0.113	0.129	0.113	0.129	0.074
Dislocation of shoulder: long term, with or without treatment	0.062	0.080	0.062	0.080	0.074
Other injuries of muscle and tendon (includes sprains, strains, and dislocations other than shoulder, knee, or hip)	0.008	0.009	0.008	0.009	
Drowning and non-fatal submersion: short or long term, with or without treatment	0.247	0.288	0.247	0.288	
Fracture of clavicle, scapula, or humerus: short or long term, with or without treatment	0.035	0.053	0.035	0.053	0.153
Fracture of face bone: short or long term, with or without treatment	0.067	0.173	0.067	0.173	0.223
Fracture of foot bones: short term, with or without treatment	0.026	0.033	0.026	0.033	0.077
Fracture of foot bones: long term, without treatment	0.026	0.033	0.026	0.033	
Fracture of hand: short term, with or without treatment	0.010	0.025	0.010	0.025	0.100
Fracture of hand: long term, without treatment	0.014	0.016	0.014	0.016	

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Fracture of neck of femur: short term, with or without treatment	0.258	0.308	0.258	0.308	0.372
Fracture of neck of femur: long term, with treatment	0.058	0.072	0.058	0.072	0.272
Fracture of neck of femur: long term, without treatment	0.402	0.388	0.402	0.388	0.272
Fracture other than neck of femur: short term, with or without treatment	0.111	0.192	0.111	0.192	
Fracture other than neck of femur: long term, without treatment	0.042	0.053	0.042	0.053	
Fracture of patella, tibia or fibula, or ankle: short term,with or without treatment	0.050	0.087	0.050	0.087	0.271
Fracture of patella, tibia or fibula, or ankle: long term, with or without treatment	0.055	0.070	0.055	0.070	
Fracture of pelvis: short term	0.279	0.390	0.279	0.390	0.247
Fracture of pelvis: long term	0.182	0.194	0.182	0.194	
Fracture of radius or ulna: short term, with or without treatment	0.028	0.065	0.028	0.065	0.180
Fracture of radius or ulna: long term, without treatment	0.043	0.050	0.043	0.050	
Fracture of skull: short or long term, with or without treatment	0.071	0.073	0.071	0.073	0.431
Fracture of sternum or fracture of one or two ribs: short term, with or without treatment	0.103	0.150	0.103	0.150	0.199
Fracture of vertebral column: short or long term, with or without treatment	0.111	0.132	0.111	0.132	0.266
Fractures: treated, long term	0.005	0.003	0.005	0.003	
Injured nerves: short term	0.100	0.065	0.100	0.065	0.071
Injured nerves: long term	0.113	0.136	0.113	0.136	0.071
Injury to eyes: short term	0.054	0.079	0.054	0.079	0.108
Severe traumatic brain injury: short term, with or without treatment	0.110	0.235	0.110	0.235	0.359
Concussion	0.214		0.214		
Traumatic brain injury: long-term consequences, minor, with or without treatment	0.094	0.106	0.094	0.106	0.370
Traumatic brain injury: long-term consequences, moderate, with or without treatment	0.231	0.224	0.231	0.224	0.396
Traumatic brain injury: long-term consequences, severe,with or without treatment	0.637	0.625	0.637	0.625	0.730
Open wound: short term, with or without treatment	0.006	0.005	0.006	0.005	0.105
Poisoning: short term, with or without treatment	0.163	0.171	0.163	0.171	0.608
Severe chest injury: long term, with or without treatment	0.047	0.056	0.047	0.056	
Severe chest injury: short term, with or without treatment	0.369	0.352	0.369	0.352	

Health state	GHE2015	GHE2012	GBD 2015	GBD 2010	GBD 2004
Spinal cord lesion below neck: treated	0.296	0.047	0.296	0.047	0.570
Spinal cord lesion below neck: untreated	0.623	0.440	0.623	0.440	0.672
Spinal cord lesion at neck: treated	0.589	0.369	0.589	0.369	
Spinal cord lesion at neck: untreated	0.732	0.673	0.732	0.673	0.725
Other					
Abdominopelvic problem: mild	0.011	0.012	0.011	0.012	0.000
Abdominopelvic problem: moderate	0.114	0.123	0.114	0.123	0.122
Abdominopelvic problem: severe	0.324	0.326	0.324	0.326	0.463
Anaemia: mild	0.004	0.005	0.004	0.005	0.000
Anaemia: moderate	0.052	0.058	0.052	0.058	0.011
Anaemia: severe	0.149	0.164	0.149	0.164	0.090
Thrombocytopenic purpura	0.159		0.159		
Periodontitis	0.007	0.008	0.007	0.008	0.001
Dental caries:symptomatic	0.010	0.012	0.010	0.012	0.081
Severe toothloss	0.067	0.072	0.067	0.072	0.061
Disfigurement: level 1	0.011	0.013	0.011	0.013	0.023
Disfigurement: level 2	0.067	0.072	0.067	0.072	0.056
Disfigurement: level 3	0.405	0.398	0.405	0.398	0.074
Disfigurement: level 1 with itch or pain	0.027	0.029	0.027	0.029	
Disfigurement: level 2, with itch or pain	0.188	0.187	0.188	0.187	0.068
Disfigurement: level 3, with itch or pain	0.576	0.562	0.576	0.562	
Generic uncomplicated disease: worry and daily medication	0.049	0.031	0.049	0.031	0.033
Generic uncomplicated disease: anxiety about diagnosis	0.012	0.054	0.012	0.054	
Hyperthyroidism	0.145		0.145		
Hypothyroidism	0.019		0.019		
Iodine-deficiency goitre	0.199	0.200	0.199	0.200	0.025
Kwashiorkor	0.051	0.055	0.051	0.055	
Severe wasting	0.128	0.127	0.128	0.127	0.053
Speech problems	0.051	0.054	0.051	0.054	
Motor impairment: mild	0.010	0.012	0.010	0.012	0.010
Motor impairment: moderate	0.061	0.076	0.061	0.076	0.381
Motor impairment: severe	0.402	0.377	0.402	0.377	
Motor plus cognitive impairments: mild	0.031	0.054	0.031	0.054	0.024
Motor plus cognitive impairments: moderate	0.203	0.221	0.203	0.221	0.283
Motor plus cognitive impairments: severe	0.542	0.425	0.542	0.425	0.804
Rectovaginal fistula	0.501	0.492	0.501	0.492	0.430
Vesicovaginal fistula	0.342	0.338	0.342	0.338	