An overarching health indicator for the Post-2015 Development Agenda

Brief summary of some proposed candidate indicators

Background paper for Expert Consultation 11-12 December 2014

A health goal – “ensure healthy lives and promote well-being for all at all ages” - has been proposed by the Open Working Group (OWG 2014) as one of 17 goals. The OWG also proposed nine subgoals for health out of a total of 169 subgoals. Other proposals have been made by the High Level Panel of Eminent Persons, the Sustainable Development Solutions Network, and many others. The current discussions focus on developing an indicator and monitoring framework for the post 2015 SDG and the Statistical Commission is likely to play a major role in this process which should conclude in March 2016.

Most proposals appear to focus on having 100 indicators and nine or so of those would be related to the health goal. It is however unlikely that a set of 100 indicators on a very diverse set of subjects will easily be communicated and become the discourse for the SDGs. There has been little discussion on high level indicators that could be used as tracer indicators for the implementation of the SDGs. Such as discussion is however critical. An overarching health outcome indicator should be part of such a small set of high level tracer indicators that are indicative of progress of the whole post-2015 development agenda. Eventually such a small set (ideally less than 10 indicators) could also be put into an index of sustainable development including social, economic and environmental components. WHO is taking the initiative to review potential leading candidates for an overarching health outcome indicator with a view of stimulating further discussion in the health and other constituencies and providing recommendations to the UN process.

In parallel, WHO is developing a set of indicators that can directly be mapped on to the nine health subgoals and can be used in interactions with the Statistical Commission, the UN member states and other relevant bodies. This set of indicators will also be part of a common roadmap for measurement and accountability for health results in the post 2015 era which will be developed in the first quarter of 2015.

The following sections briefly summarize definitions, relevance, methods, data sources and pros and cons for four potential candidate indicators: life expectancy at birth, premature mortality (deaths below age 70), and healthy life expectancy (population survey based or burden of disease based).

An overarching health outcome indicator should meet the following criteria:

- Understandable and relevant to the health goal and development outcomes, and reasonably easy to communicate to the general public.
- Measurable for most countries using data available at national level for recent time periods
- Allows the setting of meaningful and potentially attainable targets that are motivating for policy makers and communicators.
- Universal, flexible, and allow for country adaptation.
An overarching health outcome indicator not only measures the performance of the health sector but is also closely linked to other development processes, as health is closely linked to the economic, social and environmental factors.

Better measurement of inequalities within and between countries will be more prominent in the SDG agenda than it was in the MDG era. This document assesses for each of the overarching health outcome indicators how feasible disaggregation by major stratifiers such as sex, socioeconomic status and place of residence is, but does not go into great detail on this critical dimension of the post-2015 development agenda.

1. Life Expectancy at Birth

**Brief Definition:** The average number of years that a newborn could expect to live, if he or she were to pass through life subject to the age-specific death rates of a given period.

**Relevance to Sustainable Development health goal:** Life expectancy at birth is a summary indicator of mortality conditions and, by proxy, of health conditions. It summarizes mortality risks and trends across all age groups, including older people. Measurement of life expectancy at birth also allows reporting of life expectancy at other ages to track health improvements for specific age groups in populations. Life expectancy is included as a basic indicator of health and social development in, among others, the Minimum National Social Data Set endorsed by the United Nations Statistical Commission and the OECD/DAC core indicators.

**Use for setting targets:** The Declaration of Alma Ata (1978) set a target of life expectancy greater than 60 years by the year 2000; the International Conference on Population and Development (ICPD), held in Cairo in 1994, specified that: life expectancy should be greater than 65 years by 2005 and 70 years by 2015 for countries that currently have the highest levels of mortality; and 70 years and 75 years, respectively, for the other countries (United Nations 1994).

We are not aware of any proposal to set post-2015 targets based on life expectancy at birth. Table 1 summarizes projected average life expectancies for the period 2015-2030 for countries grouped by income under various scenarios. The 40% reduction in premature deaths target proposed by Norheim et al (2014) would result in a global increase in life expectancy of 5 years, assuming mortality rates at ages 70 and over also decline as projected by WHO (WHO 2013).

Under a scenario relating to the major specific subtargets for child, maternal, infectious disease deaths and non-communicable diseases, the global increase in life expectancy would be a little lower at 4 years. Under both of these scenarios, the gap between life expectancy for high and low income countries would narrow from 17.5 years to around 13-14 years. The proportional gain in life expectancy at birth would range from around 2% in high income countries to close to 10% in low income countries.
Table 1. Global projections of life expectancy at birth under various target scenarios

<table>
<thead>
<tr>
<th>Life expectancy at birth</th>
<th>Income category (World Bank 2012)</th>
<th>Inequality</th>
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<tbody>
<tr>
<td></td>
<td>World High Upper middle Lower middle Low</td>
<td>High-Low</td>
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<tr>
<td>2015 projected (a)</td>
<td>70.7 79.4 74.5 66.4 61.8</td>
<td>17.5</td>
</tr>
<tr>
<td>2030 projected (a)</td>
<td>72.9 81.0 77.0 69.3 64.0</td>
<td>16.9</td>
</tr>
<tr>
<td>Specific subtargets (b)</td>
<td>74.7 81.3 77.8 71.2 66.7</td>
<td>14.6</td>
</tr>
<tr>
<td>Norheim et al (c)</td>
<td>75.2 81.0 77.0 71.7 68.2</td>
<td>12.7</td>
</tr>
<tr>
<td>Norheim et al (d)</td>
<td>75.7 81.7 78.1 72.1 68.1</td>
<td>13.6</td>
</tr>
<tr>
<td>Norheim et al (e)</td>
<td>76.7 82.4 78.6 73.2 69.6</td>
<td>12.8</td>
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<table>
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<tr>
<th>LE0 gain 2015-2030</th>
<th>Prevented&lt;70</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>2030 projected (a)</td>
<td>2.1 1.6 2.6 2.8 2.2</td>
<td>25% (f)</td>
</tr>
<tr>
<td>Specific subtargets (b)</td>
<td>4.0 1.9 3.3 4.8 4.9</td>
<td>33%</td>
</tr>
<tr>
<td>Norheim et al (c)</td>
<td>4.4 1.6 2.5 5.2 6.4</td>
<td>40%</td>
</tr>
<tr>
<td>Norheim et al (d)</td>
<td>5.0 2.3 3.6 5.6 6.3</td>
<td>40%</td>
</tr>
<tr>
<td>Norheim et al (e)</td>
<td>6.0 3.0 4.1 6.8 7.8</td>
<td>40%</td>
</tr>
</tbody>
</table>

(a) Latest updated projections (BAU - business as usual, WHO 2013)
(b) 2/3 reduction for child, maternal, HIV, TB, malaria, NCD 25x25 target extended to period 2010-2030, 50% reduction for road injury, all other causes BAU projections.
(c) 2/3 reduction for child, maternal, HIV, TB, malaria, 1/3 reduction for everything else below age 70. Death rates above age 70 remain at 2010 levels.
(d) 2/3 reduction for child, maternal, HIV, TB, malaria, 1/3 reduction for everything else below age 70. BAU projections for death rates above age 70.
(e) 2/3 reduction for child, maternal, HIV, TB, malaria, 1/3 reduction for everything else below age 70. Death rates above age 70 also decline by 1/3.
(f) Per cent reduction in under 70 total deaths compared to counterfactual where 2010 death rates applied.

**Methods of calculation:** Calculation of life expectancy at birth is based on age-specific death rates for a particular calendar period and methods are well known and standardized (Preston et al 2001). The death rates are commonly tabulated for ages 0 to 1 years, 1 to 5 years, and for 5-year age groups for ages 5 and above.

Life expectancy may be calculated separately for males and females, or for both sexes combined, and can also be presented for particular ages after birth. Life expectancy inequalities can also be calculated for population groups (e.g. region of residence, or socioeconomic status as defined by individual or area-level indicators in available data source).

**Assessment of data availability:** These rates are derived directly from registered deaths and population counts, where data on deaths by age are of good quality, or adjustments for age misstatement and incompleteness can be made. For other countries, available census and survey information is evaluated and used to the extent possible, together with model life table systems. A considerable amount of survey information is available for child mortality under 5, usually based on collection of direct or indirect birth histories from female respondents (IGME 2014). Adult mortality levels can be estimated from census and survey data on deaths in households, orphanhood and sibling survival. There are considerable problems in assessing the completeness of reporting and biases in such data, and availability of consistent data sources over time is an issue for many countries.
WHO’s life expectancy estimates for year 2012, published in early 2014, were based directly on civil registration data for year 2012 for 28 countries and on projected death rates based on civil registration data, adjusted for completeness where necessary, for an additional 67 countries. For the other 99 countries, available census and survey data on child and adult mortality were used together with model life table systems. In 43 of these countries, UNAIDS estimates for HIV age-specific mortality trends were also taken into consideration (WHO 2014).

Available comprehensive estimates: Past, current and projected estimates of life expectancy at birth are prepared for all countries by the Population Division, UNDESA and appear in the United Nations publication, World Population Prospects: The 2012 Revision (UN DESA 2013). These estimates are currently available for five year periods (e.g. 2005-2010, 2010-2015) but not for specific calendar years, and are revised and published on a two year cycle. The next revision WPP 2015, is expected to be released in June 2015.

WHO publishes life expectancies for WHO Member States for years 1990 and latest year in its annual publication World Health Statistics, released in May each year. The WHS 2014 includes estimates for life expectancies in years 1990 and 2012. WHO has moved to a two year revision cycle aligned with the WPP revision cycle, and towards increasing use of the WPP life tables, interpolated to annual life tables with additional inputs from WHO and UNAIDS.

The Institute for Health Metrics and Evaluation (IHME), based at University of Washington, has in recent years also published annual life table series for most countries as part of the Global Burden of Disease study funded by the Bill and Melinda Gates Foundation. IHME uses a different model life table system to the UN WPP, and also different approaches to assessing the impact of the HIV epidemic on mortality rates and the levels of adult mortality assessed from survey data on sibling survival (Wang et al. 2012).

Advantages and disadvantages as an high-level indicator for the SDG health goal:

Advantages: Calculation methods are well defined and non-controversial. The indicator is well understood, widely used and reported. Regularly updated national data is available for almost half of countries, and there is now substantial global momentum to improve civil registration and vital statistics, including death registration data, in countries without reasonable national coverage at present. There are reasonably acceptable methods to estimate child mortality and adult mortality from other sources, though regularity of data availability and time delays remain a problem, as does the problems of assessing levels of under-reporting.

Disadvantages: Does not directly address non-fatal health outcomes, disability etc except through the proxy of mortality risks. For many countries with relatively high life expectancies at present, plausible targets will not involve large increases in life expectancy. Aiming for a four year increase in life expectancy at birth may not excite policy makers as much as reducing a death rate by 75%.

2. Premature mortality

Brief Definition: The total number of deaths that occur before age 70 years.

Relevance to Sustainable Development health goal: Targeting overall mortality before age 70 ignores no modifiable cause of death, nor causes of disability that also cause substantial numbers
of deaths. 40% fewer premature deaths would be important in all countries, but implies very different priorities in different populations.

**Use for setting targets:** Norheim et al (2014) recently proposed an overarching health target for the health SDG that would reduce premature mortality in the year 2030 by at least 40% compared to the under-70 deaths that would be seen in the 2030 population at 2010 death rates. Associated with this overarching target, they also proposed four global subtargets for 2030: avoid two-thirds of child and maternal deaths; two-thirds of tuberculosis, HIV,, and malaria deaths; a third of premature deaths from non-communicable diseases; and a third of those from other causes.

**Methods of calculation:** Calculation of premature mortality requires only age-specific death rates and population numbers for broad age groups for a particular calendar period and the method is extremely simple. Premature mortality requires less detailed data for its calculation than does life expectancy at birth

Premature mortality may be calculated separately for males and females, or for both sexes combined, and can also be disaggregated for broad age groups (eg. under 5, under 50, 50-69). Premature mortality inequalities can also be calculated for population groups (eg. region of residence, or socioeconomic status as defined by individual or area-level indicators in available data source).

**Assessment of data availability:** Premature mortality is available directly from registered deaths, where data on deaths by age are of good quality, or adjustments for age misstatement and incompleteness can be made. For other countries, available census and survey information is evaluated and used to the extent possible, together with model life table systems, to estimate age-specific death rates. A considerable amount of survey information is available for child mortality under 5, usually based on collection of direct or indirect birth histories from female respondents. Adult mortality levels can be estimated from census and survey data on deaths in households, orphanhood and sibling survival. There are considerable problems in assessing the completeness of reporting and biases in such data, and availability of consistent data sources over time is an issue for many countries.

WHO’s age-sex-specific mortality estimates for year 2012, published in early 2014, were based directly on civil registration data for year 2012 for 28 countries and on projected death rates based on civil registration data, adjusted for completeness where necessary, for an additional 67 countries. For the other 99 countries, available census and survey data on child and adult mortality were used together with model life table systems. In 43 of these countries, UNAIDS estimates for HIV age-specific mortality trends were also taken into consideration (WHO 2014).

**Available comprehensive estimates:** Past, current and projected estimates of numbers and rates of deaths by 5-year age group are prepared for all countries by the Population Division, UNDESA and appear in the United Nations publication, *World Population Prospects: The 2012 Revision* (UN DESA 2013). These estimates are currently available for five year periods (eg. 2005-2010, 2010-2015) but not for specific calendar years, and are revised and published on a two year cycle. The next revision WPP 2015, is expected to be released in June 2015.

WHO publishes age-sex-specific death numbers and rates for WHO Member States for years 1990 and latest year in its annual publication World Health Statistics, released in May each year. The WHS 2014 includes estimates for life expectancies in years 1990 and 2012. WHO has
moved to a two year revision cycle aligned with the WPP revision cycle, and towards increasing use of the WPP life tables, used to interpolate annual age-sex-specific mortality rates with additional inputs from WHO and UNAIDS.

The Institute for Health Metrics and Evaluation (IHME), based at University of Washington, has in recent years also published annual all-cause mortality estimates for most countries as part of the Global Burden of Disease study funded by the Bill and Melinda Gates Foundation. IHME uses a different model life table system to the UN WPP, and also different approaches to assessing the impact of the HIV epidemic on mortality rates and the levels of adult mortality assessed from survey data on sibling survival (Wang et al. 2012).

**Advantages and disadvantages as an high-level indicator for the SDG health goal:**

**Advantage:** simple to calculate and understand, allows nesting of specific subtargets for priority areas of health, and for country-specific priority setting.

This indicator would facilitate quantification of the target-setting process, based on analysis of mortality trends by age as well as by disease category. The proposed targets focus on premature mortality and avoid more complex metrics that are much harder to measure and track over time. Norheim et al stress the importance of countries adapting the targets to their own circumstances. According to the authors' detailed analyses, achieving these targets would result in a halving of deaths under age 50 years, avoiding a third of the NCD deaths in people aged 50—69 years, and, overall, result in avoidance of 40% of deaths under age 70 years by 2030.

Disadvantage: the indicator appears to exclude older people, and as for life expectancy measures, does not include non-fatal health/disability. In reality, concerted action to reduce non-communicable disease deaths in the ages 30-69 years will inevitably also help to reduce NCD death rates for people aged 70 years and over; however communication around this issue would require special attention.

### 3. Healthy life expectancy at birth (HLE)

**Brief Definition:** The average equivalent number of years of full health that a newborn could expect to live, if he or she were to pass through life subject to the age-specific death rates and average age-specific levels of health states for a given period.

**Relevance to Sustainable Development health goal:** Healthy life expectancy (HLE) provides a summary of overall health conditions for a population, which are in turn an integral part of development. While communicable diseases such as HIV/AIDS, tuberculosis and malaria continue to cause substantial loss of health and mortality in developing countries, particularly African countries, non-communicable diseases and injuries are responsible for more than half of all lost years of healthy life in developing as well as developed countries. HLE thus provides a more complete picture of the impact of morbidity and mortality on populations, than simple life expectancy alone.

**Use for setting targets:** The European Union has set a target to increase the average healthy lifespan by two years by 2020 (European Innovation Partnership on Active and Healthy Ageing 2014). Its preferred measure is Healthy Life Years (HLY), the average remaining years spent free of activity limitation. This indicator is a disability-free life expectancy indicator calculated using self-reported disability data from the EU-SILC surveys for 27 countries. Apart from
general aspirational statements, HLE has not been specifically used in other international conventions or agreements to date.

**Methods of calculation:** Sullivan’s method is generally used to combine life table data with estimates of proportion of years lived in each life table age range which are “healthy years”. There are three main classes of method/data used:

(a) Dichotomous classification into healthy/non-healthy, based usually on self-report of disability and functioning limitations, either in a module of questions or in response to a single global question such as “How is your health? Excellent/Good/Fair/Poor/Bad”

(b) Use of survey data on functioning in a set of health domains together with a health state valuation function which enables summation across health states into a single “equivalent healthy years”. Examples of survey modules of this type include SF-36, EQ-5D, HUI and the WHODAS and SAGE instruments. Examples of health state valuation functions include the EQ-5D values, the HUI valuation function and the WHO World Health Surveys valuation function.

(c) Use of Global Burden of Disease analyses estimating YLD for a comprehensive set of diseases and injuries to prepare age-sex-specific average YLD per capita, interpreted as the equivalent healthy proportion of years lived at that age group.

The remainder of this section addresses calculation methods using population survey data on the prevalence of health states to calculate healthy life expectancy (HLE). The GBD-based indicator is described further in Section 4.

Health expectancy estimates based on self-reported health status information are generally not comparable across countries due to differences in survey instruments and cultural differences in reporting of health (Romieu and Robine 1994). Comparability problems with self-report health status data relate not only to differences in survey design and methods, but more fundamentally to unmeasured differences in expectations and norms for health (King et al. 2003). Even when reliability and within population validity have reached acceptable levels, the meaning that different populations attach to the labels used for each of the response categories, such as mild, moderate or severe, in self-reported questions can vary greatly.

The first method based on self-reported global health questions with a dichotomous threshold also involves a level of arbitrariness in the choice of threshold for definition of poor health or disability. Additionally, such indicators are insensitive to differences in severity distribution of health or disability beyond the threshold. However, they require less detailed data and analysis for their calculation than does HLE, and are reported by a number of international organizations including EUROSTAT and OECD.

The second method requires the additional step of applying health state weights, or a health state valuation function, to the prevalences of health states derived from survey data. Examples of such health state valuation functions include the Canadian HUI index (Horsman et al 2003) and the Euroqol 5D (Craig et al 2009). Such valuation function may be based on econometric methods or on psychometric methods. Although development of such functions may be complex and require separate survey programs, it might also be possible to define standard weights using other approaches.

**Assessment of data availability:** Mortality data as required for calculation of period life expectancy together with comprehensive prevalence estimates for health states in the population
and a health state valuation function to enable computation of equivalent years of full health lived at each age.

At present, there is no generally accepted standard survey instrument and methodology to operationalize measurement of health state distributions in populations (see Annex A for a more detailed summary). There have been three main approaches for survey measurement of self-reported health. The first approach is to ask a single global question on overall health (with five response categories ranging from excellent to bad or very bad) or on long-term activity limitations (the so-called GALI question with three responses not limited/moderately limited/severely limited). This approach while attractive often produces results that seem to lack face validity in terms of comparisons across countries or while comparing trends over time even within the same country from different data sources. The second strategy is to collect data on more severe forms of disability and assess functional independence by asking about activities of daily living (ADLs) and instrumental activities of daily living (IADLs). This is often done by asking single questions for each significant domain of functioning with dichotomous (or multiple categorical) response option(s) or asking for a count of these limitations due to an underlying chronic health condition.

The final strategy is to ask multiple questions across a parsimonious set of domains of functioning that is believed to capture most of the variance in health states across population groups. For the purposes of measurement these domains of health need to be reduced to a parsimonious set that captures most of the variation and approximates the intuitive notion of health that respondents have when they are asked questions in surveys. The measurement across these different domains must then be combined into a single metric of functioning that ranges from good functioning (health) to difficulties in functioning (disability or poor health) that can then be compared across populations and over time.

To date, the field continues to suffer from the lack of a single, “gold standard” approach to creating a single metric of health. Approaches have either used the valuation of different health states by individuals and used this valuation function to create a cardinal scale of health or, alternatively, used psychometric approaches such as Item Response Theory to combine the information from the different domains. Attempts have also been made to address problems of comparability surrounding self-reported health in surveys by using anchoring vignettes to detect and correct for systematic biases in reporting. Correction for reporting biases can also be made using some performance tests such as those for vision, cognition or mobility.

There remain substantially larger variations in reporting of health status across countries than is plausible. Self-reported data contains systematic reporting biases since people understand questions differently and pick categories on an ordered scale based on their experiences and expectations. Attempts at ensuring adequate conceptual translations and uniform understanding of questions and responses do not totally eliminate these problems. Further research and testing, as well as consensus building among international organizations, national statistical and health agencies, and research groups is needed in order to reach agreement on a short survey module recommended for widespread use for the measurement of levels of functioning of populations (see Annex A).

Available comprehensive estimates: Healthy life expectancy estimates based on dichotomous survey measures are reported by EUROSTAT for EU countries and by OECD for OECD countries (OECD Health at a Glance 2014).
Advantages and disadvantages as an high-level indicator for the SDG health goal:

Advantage: It captures mortality risk and health states in a way that clearly covers both. Apart from life tables (see Section 1), the other inputs are derived directly from population-representative surveys using straightforward and relatively simple methods (though methods for deriving prevalences of health states from survey questions may vary greatly in complexity).

Disadvantage: Self-report data generally will have issues of comparability across countries, particularly if extended from high income to developing countries. There is some controversy around the use of health state valuations to summarize across various states of health. The monitoring of such an indicator at international level will require repeated population surveys, using a common survey instrument.

4. Health-adjusted life expectancy at birth (HALE)

Brief Definition: The average equivalent number of years of full health that a newborn could expect to live, if he or she were to pass through life subject to the age-specific death rates and average age-specific levels of health states for a given period.

Relevance to Sustainable Development health goal: Health-adjusted life expectancy (HALE) provides a summary of overall health conditions for a population, which are in turn an integral part of development. While communicable diseases such as HIV/AIDS, tuberculosis and malaria continue to cause substantial loss of health and mortality in developing countries, particularly African countries, non-communicable diseases and injuries are responsible for more than half of all lost years of healthy life in developing as well as developed countries. HALE thus provides a more complete picture of the impact of morbidity and mortality on populations, than simple life expectancy alone.

Use for setting targets: Apart from general aspirational statements, HALE has not been specifically used in international conventions or agreements to date.

Methods of calculation: Sullivan’s method is generally used to combine life table data with estimates of proportion of years lived in each life table age range which are “healthy years”. This section describes HALE indicators based on use of Global Burden of Disease analyses which estimate YLD for a comprehensive set of diseases and injuries to prepare age-sex-specific average YLD per capita, interpreted as the equivalent healthy proportion of years lived at that age group.

Alternate methods using population survey data to directly estimate prevalence of health states were described above in Section 3 (Healthy Life Expectancy).

Methods have been developed drawing on estimated cause-specific health state prevalences from burden of disease analysis using the Disability Adjusted Life Year (or DALY) (Salomon et al. 2012). This approach requires relatively complex analyses and is data-demanding. A number of issues remain to be resolved around methods for dealing with comorbidity in the DALY-based approach (Mathers et al. 2006, Salomon et al. 2012).

Assessment of data availability: Mortality data as required for calculation of period life expectancy together with comprehensive prevalence estimates for disease and injury sequelae in the population and a health state valuation function to enable computation of equivalent years of full health lived at each age. When HALE is calculated from DALY estimates for burden of
disease by cause, age and sex, a prevalence-based analysis is required for the calculation of prevalence YLD and a method for dealing with comorbidity. The GBD 2010 estimates of HALE were based on modelled prevalence estimates by age and sex for 1,160 disease and injury sequelae for 187 countries (Salomon et al. 2012).


The Institute for Health Metrics and Evaluation (IHME), based at University of Washington, has in recent years also published annual HALE estimates for years 1990 and 2010 for most countries as part of the Global Burden of Disease study funded by the Bill and Melinda Gates Foundation (Salomon et al 2012). IHME will likely publish updated HALE estimates for 2013 soon as part of its Global Burden of Disease 2013 update.

**Advantages and disadvantages as an high-level indicator for the SDG health goal:**

**Advantage:** It captures mortality risk and health states in a way that clearly reflects all major health outcomes. The calculation methods of the GBD approach ensure reasonable cross-country comparability.

**Disadvantage:** It requires information on the prevalence of over 1000 health states. Since these data are not regularly collected for most countries, it can only be calculated by imputing prevalences based on relatively sparse population-representative studies. To date, empirical data required for comorbidity adjustments is not available and it is likely that simplifying assumptions will need to continue to be made for the foreseeable future.
References


5. Websites:

http://esa.un.org/wpp/


http://apps.who.int/gho/data/node.main.3?lang=en

Annex A. Measuring health status in population surveys

One of the major issues in trying to understand levels and trends in the health of populations is the lack of a common operationalization of the definition of health, and an understanding of its constructs, and the subsequent measurement of health in a way that is comparable over time and across populations. A self-reported health state has been traditionally measured in the older population using three main strategies. The first approach is to ask a global question on overall health whereby respondents are asked to rate their overall health using a 5-point rating scale that ranges from very good to very bad (or from excellent to poor). Though this overall rating of health has been shown to be correlated with future mortality in cohort studies it is unclear what dimensions of health this question captures and produces inconsistent patterns in population level studies across all ages. This approach while attractive often produces results that seem to lack face validity in terms of comparisons across countries or while comparing trends over time even within the same country from different data sources. Additionally, this single question leads often to respondents using standards of reporting that are not consistent across age, sex or other characteristics thereby leading to erroneous conclusions. The second strategy is to collect data on more severe forms of disability and assess functional independence by asking about activities of daily living (ADLs) and instrumental activities of daily living (IADLs) often by asking a single question on such significant functional limitations with dichotomous (or multiple categorical) response option(s) or asking for a count of these limitations due to an underlying chronic health condition. The final strategy is to ask multiple questions across a parsimonious set of domains of functioning that is believed to capture most of the variance in health states across population groups.

WHO describes a health state as a multi-dimensional attribute of an individual that reflects his or her levels on the various components or domains of health at a given point in time and differs from pathology, risk factors or etiology, and from health service encounters or interventions. Intuitively all societies have a notion of being ‘in a good state of health’ that allows us to make statements such as an individual ‘A’ is in a better state of health than another individual ‘B’. These non-fatal aspects of an individual’s health state have been the focus of an extensive literature that has grown steadily in the last three decades and have been incorporated into national and international health statistics such as the regular reporting by the WHO of Disability-Adjusted Life Years (DALYs) and healthy life expectancy (HALE) which are essentially individual health states aggregated to population levels. Comparable measurement of health states is essential in order to examine relationships between current levels of health to other aspects such as future non-fatal health outcomes, risk factor profiles, and causes of death.

An individual’s health state is understood as a vector of capacities to function in a set of domains that range from hearing and seeing to moving around to cognition and affect. An individual’s capacity to function in a domain of health is, thus, an individual’s intrinsic ability. This notion of capacity corresponds with the common-sense interpretation of health since health is an attribute of the person and not the environment though the latter will have a substantial effect on the way the health state plays out in the individual’s actual environment. For the purposes of measurement these domains of health need to be reduced to a parsimonious set that captures most of the variation and approximates the intuitive notion of health and that respondents have when they are asked questions in surveys. The measurement across these different domains must then be combined into a single metric of functioning that ranges from good functioning (health) to difficulties in functioning (disability or poor health) that can then be compared across populations and over time.
This conceptualisation preserves the spirit of the WHO Constitution definition of health. It does not equate health with diseases or diagnostic categories, it recognizes a causal chain through which risk factors and environmental factors are determinants of diseases, and diseases and environmental factors in turn are determinants of health states. Using a parsimonious but comprehensive set of domains as the basis for descriptions of health states allows detailed data collection on key components of individual health and provides a basis for describing and measuring health states, and for carrying out causal analysis of determinants of those states, including risk factors and environmental factors. The differing choice of domains in studies means that comparisons are often possible across studies only for specific areas of functioning such as cognition or mobility or for a small subset of items such as activities of daily living (ADLs) or instrumental activities of daily living (IADLs).

To date, the field continues to suffer from the lack of a single, “gold standard” approach to creating a single metric of health. Different strategies have been used to create a single metric of health combining the capacities in the different domain. Approaches have either used the valuation of different health states by individuals and used this valuation function to create a cardinal scale of health or, alternatively, used psychometric approaches to combine the information from the different domains using either classical test approaches such as factor analysis or modern psychometric techniques based on Item Response Theory (IRT). Attempts have also been made to address problems of comparability surrounding self-reported health in surveys by using anchoring vignettes to detect and correct for systematic biases in reporting. Correction for reporting biases can also be made using some performance tests such as those for vision, cognition or mobility.

Disability- or impairment-related measures of morbidity, including functional limitation, discomfort and/or activity restriction, have been used extensively. Using the self-reported prevalence of diseases from population surveys to track the health of the population often leads to the conclusion that populations are continuing to live longer but in worse health and this evidence also is not consistent across countries.

While survival with cardiovascular disease and cancers may have improved there is no evidence that their prevalence is actually on the decline. Musculoskeletal conditions and arthritis have been increasing. Studies suggest that disabilities may be increasing in newer cohorts. The traditional approach to measure health in populations ignores the fact that the impact of health conditions, i.e., the health decrement associated with diseases, is highly variable. This is best understood as a composite of several salient decrements in capacities in functioning associated with a health condition in a range of domains that, together and in different combinations, account for the overall health impact of the health condition. This approach is the one also taken in the Global Burden of Disease (GBD) study where disability is understood as a decrement in health while estimating disease burden and healthy life expectancies in populations. Taking on the challenge of working with a continuous dimension of functioning rather than a dichotomous notion of impairment requires more detailed data generation efforts and sophisticated and analyses, but the results reflect the reality of the true levels and distributions of population health. Rather than using an a priori dichotomous threshold continuously distributed health states provide far more detailed and accurate information on the health status of populations and are also more likely to be sensitive to change over time or with interventions.

Secondly, the multi-dimensional approach integrates fairness considerations directly into policy decisions that have resource allocation consequences. The impairment counting approach obscures the true impact of health conditions that may not produce any single severe impairment
and may thereby ignore the profound burden of some highly prevalent low mortality health conditions, most notably mental health conditions such as depression.

The multi-dimensional approach is amenable to a significant modification of health and social policy that, on the most obvious economic level, is far more cost-effective. Individuals and populations can be assessed with this method in a continuous and granular fashion, rather than dichotomously. It makes it possible to determine ‘degrees of health decrement’. Such an approach also lends itself to assigning each individual a degree of health decrement (ranging from 0 – 1) that can be derived from a survey based metric and summed across the population groups to provide a more accurate estimate of the population distributions of health.

There remain substantially larger variations in reporting of health status across countries than is plausible. As noted earlier, self-reported data contains systematic reporting biases since people understand questions differently and pick categories on an ordered scale based on their experiences and expectations. Attempts at ensuring adequate conceptual translations and uniform understanding of questions and responses do not totally eliminate these problems. Innovative approaches are being explored to address these problems including actual measurements of capacities during health examinations in surveys. However, while these methods demonstrate the existence of biases in self-reported functioning, they have so far not been found to adequately correct for it. These methods will continue to be refined to provide more comparable estimates of population health across populations and over time.