



# INDICATOR ANALYSIS

## DISABILITY ADJUSTED LIFE YEARS (DALY)

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How is the indicator calculated?	<p>The purpose Disability Adjusted Life Years is to offer a measure of the economic burden of mortality and disability.</p> <p>One DALY = one lost year of healthy life.</p> <p>To calculate the ‘loss of healthy life,’ the DALY combines two measures (1):  <math>DALY = YLL + YLD</math>  <math>YLL = \text{Years of healthy life lost due to premature mortality};</math>  <math>YLD = \text{Years of healthy life lost due to living with disability}.</math></p> <p><b>Years of life lost (YLLs)</b> are years lost due to premature mortality. YLLs are calculated by subtracting the age at death from the longest possible life expectancy for a person at that age. For example, if the longest life expectancy for men in a given country is 75, but a man dies of cancer at 65, this would be 10 years of life lost due to cancer.</p> <p><b>YLD</b> are years of life lost due to living with disability. This can include conditions such as influenza, which may last for only a few days, or epilepsy, which can last a lifetime. It is measured by taking the prevalence of the condition multiplied by the disability weight for that condition. Disability weights reflect the severity of different conditions and are developed through surveys of the general public.</p>
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### GLOBAL TRENDS

What are the global patterns for this indicator?	<p>“Between 1990 and 2017, age-standardized DALY rates decreased by 41.3% (38.8–43.5) for communicable diseases and by 49.8% (47.9–51.6) for neonatal disorders. For non-communicable diseases, global DALYs increased by 40.1% (36.8–43.0), although age-standardized DALY rates decreased by 18.1% (16.0–20.2)” (2).</p>
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### UTILITY

What does the indicator measure?	<p>An aggregate of years of healthy life lost to premature death and disability. The YLL is a counterfactual – or a hypothetical calculation - if a person had not died, how many years would they have been expected to live? (3) The YLD assesses the burden from ‘prevailing’ or actual diseases and conditions that cause ill-health – not a counterfactual or a hypothetical (but an assessment of the burden of disease) (3).</p>
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What does it NOT measure - what does it miss?	Given that it uses exogenous life tables and the same life expectancy for men/women, it can underestimate the burden of conditions of ill health for women and for children [3].
If and how does the indicator relate to interface/relationship among health, gender and fragility/stability;	The DALY measures the burden of ill health and mortality – it therefore should be able to demonstrate more fully the impact of fragility and conflict.

### AVAILABILITY

Sources for indicator (CRVS, DHS etc. - include links);	IHME calculates the DALY from a wide variety of data sources: administrative data including census data; demographic surveillance data; epidemiological surveillance; survey data.  Data is available from the Global Burden for Disease website: <a href="http://ghdx.healthdata.org/gbd-2017">http://ghdx.healthdata.org/gbd-2017</a>
Dates available;	1990 - 2017
Availability across geographic areas;	Estimates are available for all countries
Availability in conflict affected settings;	Yes

### GRANULARITY

*Disaggregation at national level*

Data disaggregated by sex;	Yes.
Data disaggregated by age;	Yes
Data disaggregated by identity group (race, ethnicity);	No.
Data disaggregated by income;	No.
Data disaggregated by citizenship;	No.
Data disaggregated by migration background;	No.
<i>Disaggregation at sub-national level</i>	
Data disaggregated by geographic region;	Available for some HIC locations.
Data disaggregated by age;	Available for some HIC locations.
Data disaggregated by identity group (race, ethnicity);	No.
Data disaggregated by income.	No.

<b>SOURCES OF BIAS</b>	
What bias can exist with this data?	Selection bias: the sample used (entire population) may not be a good reflection of the actual sample of interest (specific population living in specific region).

<b>VALIDITY</b>	
Clear and accepted international standards for indicator;	The IHME has a Scientific Oversight Committee which deliberates on all decisions made regarding calculations of the DALY.

<p>Validity of measurement of indicator generally accepted;</p>	<p>Several topics of controversy regarding the calculation of DALYs have put into question its validity: the measurement of the YLL (life estimate tables, male/female life expectancy); Disability weights; the assignment of a lower weight to years of life lost in the future; the assignment of a lower weight to years of life lost in the future (4).</p>
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<p style="text-align: center;"><b>RELIABILITY</b></p>	
<p>Reliability of indicator generally accepted;</p>	<p>This measurement is widely used in health-related research.</p>

<p style="text-align: center;"><b>COMPLEXITY</b></p>	
<p>Enables analysis across time and location.</p>	<p>Yes – comparability is stressed in the protocol: “Comparison is at the heart of the GBD approach. For decision-makers, health-sector leaders, researchers, and informed citizens, the GBD and affiliated projects provide an opportunity to see the big picture, to compare diseases, injuries, and risk factors, and to understand in a given place, time, and age-sex group, what are the most important contributors to health loss. To ensure a health system is adequately aligned to a population’s true health challenges, policymakers must be able to compare the effects of different conditions that kill people prematurely and cause poor health and disability" (1).</p>

<p style="text-align: center;"><b>OTHER REFLECTIONS</b></p>	
<p>Is the Indicator modelled?</p>	<p>All DALY estimates are modelled and make use of real observations based on availability and quality. Here is the flow chart for calculating the DALYs as outlined in the IHME protocol (1).</p>

## References

1. Institute for Health Metrics and Evaluation. Protocol for the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) [Internet]. Institute for Health Metrics and Evaluation; 2018. Available from: [http://www.healthdata.org/sites/default/files/files/Projects/GBD/GBD\\_Protocol.pdf](http://www.healthdata.org/sites/default/files/files/Projects/GBD/GBD_Protocol.pdf)
2. Kyu HH, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*. 2018;392(10159):1859–922.
3. Anand S, Reddy SG. The construction of the DALY: implications and anomalies. Available at SSRN 3451311. 2019;
4. Voigt K, King NB. Disability weights in the global burden of disease 2010 study: two steps forward, one step back? *Bull World Health Organ*. 2014 Jan 10;92:226–8.