

Disability Adjusted Life Year (DALY)

What is the DALY?

- The Disability-Adjusted Life Year or DALY is a standardized measure representing the years of healthy life lost by calculating life years lost weighted by disability.
- Estimating DALYs generally factors in measures of life expectancy, age, and disability. There are three main approaches to estimating DALYs: incidence-based, prevalence-based, and hybrid.

How is the DALY different?

- While quality adjusted life years (QALYs) represent the years of healthy lives lived, DALYs attempt to quantify the years of healthy life lost due to disability.
- Simple measures of mortality rates (i.e. life years lost) provide an incomplete picture by focusing solely on deaths and not accounting for the quality-of-life impact of non-fatal health conditions. DALYs aim to overcome this limitation by gauging the combined impact of morbidity and mortality.
- The DALY framework allows for a somewhat more nuanced understanding of disease burden, considering factors like age, sex, and risk factors than mortality rates alone.
- DALYs are the sum of life years lost relative to average life expectancy and years lived with a disability or disease. The level of disability is measured on a scale from 0 to 1 with 0 equating perfect health and 1 equating death, the opposite of the QALY for which 1 is perfect health and 0 is death.

How do DALYs measure up?

- DALYs are widely recognized to discriminate against individuals with disabilities because use of the “disability weight” measures time with a disability as worth less than not having a disability. This can lead analyses using the DALY to give “less credit to (otherwise equivalent) health interventions that save the lives of disabled people.”
- The DALY fails to capture the full spectrum of patient experiences, preferences, and benefits – including improving a patient’s quality of life and non-health factors including economic or social consequences such as loss of ability to work or effects on caregivers.
- Critics also highlight concerns about the use of disability weights, which may be subjective and be based on a panel of judges (representing medical experts, health practitioners), patients, or representative population samples instead of actual patients.
 - A triathlete may weigh physical function more highly. An academic may weigh mental acuity higher. Assuming the same weights to different aspects of quality of life as a representative of all people risks being applicable to none.
- The estimation of DALYs is not an exact science as its calculations will vary based on factors including life expectancy standards, age weighting, and disability weight calculation methods.

- Critics have raised ethical concerns as the disability weights do not consider patient differences by race, comorbidities, and other factors, nor do they explicitly incorporate equity concerns related to race, ethnicity, or socioeconomic factors. DALYs also do not account for implicit bias or structural inequities within healthcare systems, disparities in access to healthcare services and treatments, or social determinants of health.

Who is using DALY?

- DALYs were developed by the World Health Organization and Harvard School of Public Health in 1996 and endorsed by World Bank and WHO to assess global burden of disease.

What is the broader community saying?

- Grosse, Lollar, et al. recommend that public health professionals refrain from using DALYs to assess the impact of disabling conditions: *“Because DALY and [years of life lost to disability] estimates do not measure limitations experienced by people, the most important medical factors underlying disability could receive less funding if DALYs were used to allocate funds across conditions than if direct measures of functioning were used.”*
- Feng, Kim, et al. recommend that more studies are needed on both the QALY and DALY to fully understand their impact especially when used in decision making: *“Although both QALYs and DALYs can produce cost effectiveness estimates that assist in healthcare decision making, further studies are warranted to better improve the methodologies and applications of these measures to address local health needs and concerns.”*
- Colin Killick, Disability Policy Consortium, concluded in his Master’s thesis that DALY’s use of survey data fails to reflect the disability experience: *“DALYs do not, in fact, directly measure the burden of any disabilities. They incorporate data about the incidence of various disabling conditions, but their disability weights are calculated based on public opinion surveys, not any actual data about the experiences of individuals with disabilities. The fact that survey data from thousands of laypeople is included, rather than just a few dozen doctors, means that the developers of the metric now incorporates the views of more people, but it does not change the fact that the results are essentially hearsay—that they reflect which conditions a predominantly non-disabled random sample of individuals felt would be worse to have, after being prompted by a brief description of the condition.”¹*

¹ Killick, Colin, “Mistaking the Map for the Territory: How Disability Adjusted Life Years Misunderstand Disability and Distort Global Healthcare,” written as Master’s in Public Policy Candidate for Harvard Kennedy School of Government, 2018.