

Health Metrics and/as Theories of Health Value

Weissglass, D.E., Greig, E.E., Guo, Q. & Mamo, M.A.

Duke Kunshan University

When we **define** health metrics , we **create a theory of health and its value**. When these **theories are implausible**, this **motivates reexamining the metric**. On this poster, we lay out some of implications of QALYs and DALYs that cast doubt on the corresponding **theories of health value**. The nature of a poster presentation restricts us to offering only pieces of the argument, but you can contact us with questions and/or comments – see the bottom bar for more information.

Measuring Health is Defining Health

Measurement and Definition

When we develop a way to measure a concept like ‘health’ we end up defining it as well. This implicit definition is impacted by a wide range of factors ranging from the way that data are collected to the calculations that define the metric itself.

Health Adjusted Life Years

The most common way to measure health is through health adjusted life years (HALYs). HALYs share a common core commitment to measuring health as a function of the quality of health states and their duration. Intuitively, the idea is we are healthier when in higher quality health states, and when we live longer. There are two major versions of HALYs: quality-adjusted life years (QALYs), and disability-adjusted life years (DALYs).

QALYs

QALYs are a measure of good health, so the higher the number the better. The QALYs associated with a given health state are the simple product of the quality of that health state and its duration:

$QALYs = Quality * Duration$

DALYs

DALYs are a measure of poor health, so the lower the number the better. DALYs associated with a given condition are the sum of years lost to disability (YLD) and years of life lost (YLL). YLD, much like QALYs, is a product of a measure of health quality – disability weight (DW) and duration. YLL is a measure of life span shortfall from a defined threshold value, usually the median life expectancy of a people of a given sex in the nation where that is the highest.

$DALYs = YLD + YLL$

$YLD = DW * Duration$

$YLL = Threshold - Actual Life Span$

Health Quality

Inconsistent Measures

Some health surveys ask participants to assess quality of a health state directly (e.g., by placing a health state on a range from worst imaginable to best imaginable health), others ask how preferable that state is compared to other outcomes (e.g., by comparing some number of years in a given health state with time in perfect health). While used interchangeably, the subjective quality of a state is not the same as its preferability. Critically, this connects to a long rivalry in utilitarian moral theory – which imbues methodology with moral significance.

Inconsistent Bounds

The upper bound might be variously described as ‘perfect health’, ‘absence of disability’, ‘best health imaginable’, etc.; the lower bound as ‘like death’, ‘total disability’, ‘the worst health imaginable’, etc. These are not equivalent concepts, and using them as such risks misrepresenting health values.

Incomprehensibility of Perfect Health

The upper bound of health is typically defined as ‘perfect health’, but it isn’t clear what that means. It could mean: the absence of illness or injury, the best health of which my genetics are capable, the best health of which humans are capable, etc.

Incommensurability of Death

The lower bound of health quality is typically defines as ‘like death’. However, death is not a health state and is likely not comparable to one. There is nothing it is like to be dead, which makes calling a state ‘like death’ potentially nonsensical.

States Worse than Death

Neither QALYs or DALYs allow for states worse than death in their conventional forms. However, that patients might opt for euthanasia suggests that death is preferable to some states. While some efforts have been made to accommodate this, it raises challenges for data collection methods.

Duration

Order and Trend Insensitivity

The total quality of any period of time is a product of the quality of all states occurring within that time and their duration. This makes health over any period – including the lifespan – insensitive to the order of health states or the trends in health that creates. It is just as good/bad to be healthy/unhealthy when old as it is when young.

QALY: Life is always worth it

A feature of QALY’s, given that the minimum quality for any period of time is ‘like death’, is that we should always choose to live longer. Even if we are currently in the worst possible health state, a nonzero chance of any improvement makes choosing to live worth it. This would make euthanasia always a reduction in health – and raises questions about it as a medical practice.

DALY: To the threshold, and no longer

DALYs have even stranger consequences. Below the lifespan threshold, it is always better to live longer – the DALY increase due to disability over a time will never overcome those lost by living longer. Above the threshold, the opposite is true – there are no DALYs lost by living longer, and even minor illness will result in a net increase in DALYs.

Quality is Duration Insensitive

While both QALYs and DALYs respond to duration, their measures of quality do not. That is, being in a given health state should feel of the same quality throughout. However, we might tolerate a health state for a short while much more easily than for a long time. Consider maximum endurable duration, a tendency for poor health states to be preferred over death for a short time, but not indefinitely. This suggests that health quality might vary with duration, which aligns with more general experience - some things (e.g., sitting alone in a quiet room) are lovely for a moment, and torture over a longer period.

Corresponding Author:
Daniel E. Weissglass
Email me at
dew34@duke.edu

Or, just scan the QR code to
find me on various services!

Email



Academia.edu



Researchgate



LinkedIn



Homepage

