

VIEWPOINT

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QALYs in 2018—Advantages and Concerns

The **quality-adjusted life-year (QALY)** is a health metric some people love to hate. Concerns include that QALYs are not patient focused,¹ may be used as rationing tools by health insurers, and may be perceived as dehumanizing. The Affordable Care Act prohibits the Patient-Centered Outcomes Research Institute from using cost-per-QALY benchmarks. The use of QALYs by policy makers to inform coverage and reimbursement decisions is controversial.

However, QALYs are simply a metric to quantify health. Despite concerns, QALYs endure because they help address a difficult and unavoidable question: how to estimate and compare the benefits of what are often heterogeneous health interventions. Recently, QALYs have received increased interest in the United States from the work of the Institute for Clinical and Economic Review (ICER), a private, nonprofit organization that evaluates pharmaceuticals and other technologies and uses QALYs in its cost-effectiveness assessments. Thus, it remains important to appreciate the strengths and limitations of QALYs, why this metric is not going away, and what QALYs may portend for the future of health policy and medical practice.

Why QALYs?

QALYs represent time alive, scaled to reflect health state desirability. A year in the hypothetical state of “perfect health” is worth 1 QALY. Being deceased is worth 0 QALYs. Other health states fall between these bounds, with less desirable states closer to 0. QALYs are useful because they combine mortality and morbidity into a single metric, reflect individual preferences, and can be used as a standard measure of health gains across diverse treatments and settings.

Consider, for example, calculation of QALYs accrued by a hypothetical individual after age 70 years who develops cancer at age 74 years and who dies at age 76 years. If the health utility weight for a typical healthy individual in his or her 70s is 0.95 and the health utility weight while living with this particular cancer is 0.75, then after age 70 years, this individual accrues $(4 \text{ years} \times 0.95) + (2 \text{ years} \times 0.75) = 5.3$ QALYs. If screening leads to elimination of the cancer before symptom onset and extends the individual's life from age 76 years to age 80 years, then with screening, the individual accrues $10 \text{ years} \times 0.95 = 9.5$ QALYs.

QALYs facilitate use of cost-effectiveness analysis to compare the value of different interventions. The cost-effectiveness ratio of an intervention compared with an alternative, calculated as the additional cost of an intervention divided by its additional health benefits, can be thought of as its “price” for improving health. Low ratios are favorable because they imply that the intervention incurs a relatively small cost for each unit of health gained. Larger ratios, like higher prices, are less favorable. If ratios for multiple interventions are estimated using the same benefit metric (eg, cost per QALY gained), then intervention “prices” can be compared to help determine, at least from an efficiency perspective, which interventions are the “best buys.”

Calculation of cost-effectiveness ratios using QALYs also facilitates characterization of intervention value by making it possible to compare those ratios with common benchmarks. Typical value benchmarks in the United States have historically ranged from approximately \$50 000 to, more recently, as high as approximately \$150 000 per QALY.² Those benchmarks purport to represent the “value” of a QALY; ie, the “willingness to pay” to gain 1 QALY of health. The benchmark could also be conceived as a measure of opportunity cost in terms of the health outcomes of the marginal intervention that must be relinquished to provide resources for a new intervention.³ Interventions with lower cost-effectiveness ratios below the benchmark are said to have favorable value because they “buy” QALYs relatively inexpensively; ie, at a cost below the value indicated by the benchmark. Interventions with higher ratios “buy” QALYs expensively and hence have unfavorable value. The United Kingdom's National Institute for Health and Care Excellence, which is charged with assessing health technology value for that country's National Health Service, has used more stringent benchmarks. With a number of exceptions, favorable value has generally corresponded to cost-effectiveness ratios below £20 000 (about \$28 000) per QALY, and unfavorable value has generally corresponded to ratios exceeding £30 000 (about \$42 000) per QALY.⁴

Concerns About QALYs

A long-standing concern with cost-per-QALY rankings is that, as shown in some survey research from the United States and other countries, those rankings are not consistent with the general public's valuing of health outcomes. For example, respondents tend to favor interventions that help individuals most in need of care (eg, patients with cancer), regardless of whether these options are efficient from a QALY-optimizing standpoint.⁵ Moreover, there are concerns that cost-per-QALY ratios potentially discriminate on the basis of age and disability by favoring younger and healthier populations that have more potential QALYs to gain (although in many circumstances results from cost-per-QALY analyses favor older and disabled groups).

Another concern is that QALYs are not “patient-centric.” Some research supports this contention; QALYs may not reflect certain goals and priorities individuals have in treatment decisions, such as their effect on family circumstances (eg, desiring a therapy because it may increase the chance of attending an upcoming family wedding).⁶ Moreover, QALYs do not inherently distinguish between a long period spent in a moderately diminished health state and a shorter period spent in a more severe health state.

Additional concerns about QALYs are directed at the idea of an authority, such as policy makers or economists, placing numbers on what people are “worth.”⁷ In addition, meaningful measurement of the utility weights

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that underlie QALY estimates poses challenges. Health condition-specific “direct elicitation” methods ask respondents to consider a health condition and (1) associate with it a value on a visual scale ranging from 0 to 1; (2) specify how much life expectancy they would be willing to sacrifice in exchange for a cure; or (3) specify how large a hypothetical risk of instant, painless death they would accept in exchange for a chance of cure. These approaches can yield different answers. Moreover, because these elicitation measures are difficult and time consuming, researchers have developed generic preference functions that convert a condition’s attributes (eg, effects on mobility, pain) to a preference weight ranging from 0 to 1. However, such generic scales do not always adequately capture a condition’s salient attributes (eg, symptoms of mental illness).

Advantages of QALYs

Because health care resources are limited, society needs a way to assess the value of health interventions. By reflecting both longevity and quality of life, QALYs provide a useful, although imperfect, measurement standard. QALYs can help guide health decisions while fostering consistency and transparency and provide a way to represent the output of health care and public health systems.³ Moreover, alternatives to QALYs have their own ethical challenges because any decision rule for allocating resources is fraught with discriminatory implications.

Individuals who dislike QALYs tend not to offer solutions beyond nebulous comments about the need to place patients at the forefront of decisions.^{1,7} However, avoiding QALYs does not remove the need to confront trade-offs; it simply masks them. It also means that resource allocation decisions are less grounded in empirical analysis and are potentially more at risk of interest group influence and political whims.

Although no single number can ever capture the complexity of preferences for health, QALYs provide a helpful point of departure for thinking about whether the price for a new drug is reasonable or whether a health program is worth the investment. Guidelines recommending cost-per-QALY analyses emphasize that they provide only one input into what are invariably multifaceted decisions.^{3,8} Decision-making bodies that use QALYs always consider other factors, such as

clinical benefit, the rarity and severity of the disease in question, ethical considerations, and the feasibility of an intervention.⁸

The Future of QALYs

QALYs will likely remain important because the need to understand comparative value will persist, a reality reflected in the increasing number of published cost-per-QALY studies. However, important conceptual issues will also remain. An example is the question of whose preferences should form the basis of the quality-of-life weights used to construct QALYs: those of patients or members of the general population. Arguments for using patient preferences emphasize that individuals directly affected by and most experienced with a health state or disease can best provide responses. Arguments in favor of community-based preferences highlight the idea that health plan enrollees and taxpayers, as the ultimate payers of private and public health care, are best positioned to inform *ex ante* decisions about covered benefits as potential patients.³ Moreover, the preferences of society should matter in health resource allocation decisions, as health systems benefit all citizens. Complicating matters is that because some people (eg, young children or older adults with Alzheimer disease) cannot respond to preference elicitation questions, proxy respondents must be used. But which proxies? In what circumstances? These and other questions will continue to be debated and will likely never be fully resolved.

However, the increased interest in QALYs by virtue of the enhanced visibility and influence of reports from the Institute for Clinical and Economic Review and others is instructive. Without QALYs, these reports would not have such a potent tool for benchmarking value or for calculating and defending a value-based price based on cost-effectiveness ratios. In such reports, limitations of QALYs can be recognized by considering factors that might not be well captured by cost-per-QALY calculations, such as the relative complexity of the treatment regimen in question, and by allowing input from patients in the review process.⁹

Without QALYs, health systems would still have difficult trade-offs. Decision makers would still confront and make difficult choices about paying for the health care that people need and desire. But they would lack a practical instrument to aid in the process.

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