

Quality adjusted life years in the time of COVID-19

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Abstract. The quality adjusted life year (QALY) as a basis of valuing additional expenditure on health is widely accepted. Although early in the COVID-19 pandemic, several commentators called for a similar approach in resolving trade-offs between economic activity and reducing the burden of COVID-19, this has not occurred. The value of a QALY has not been used to deny all intervention, as the rule of rescue attests. Further, while there was no other way of managing the pandemic, there were other means available to mitigate the economic losses. Now that vaccine programs have commenced in several countries, it is interesting to consider whether economic evaluation should now be applied. However, the recognised complexities of the evaluation of vaccines, plus the challenge of measuring opportunity costs in the face of an economic recession and the severity of the consequences of an outbreak even though the probability of transmission is exceedingly low, mean its use will be restricted. COVID-19 has changed everything, even the way we should think about economic evaluation.

Keywords: Australia, COVID-19, economic evaluation, epidemiology, health economics, opportunity cost, quality adjusted life year (QALY), vaccines.

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Quality adjusted life years and resource allocation

The quality adjusted life year (QALY) is now widely accepted as a means of informing resource allocation in health care. The QALY provides a quantification of health outcomes in which years of life gained are weighted by the quality of those years, giving a composite measure of health-related benefits. The cost per QALY gained or incremental cost-effectiveness ratio (ICER) demonstrates the value, in terms of health outcomes, of the health investment. The QALY was designed to compare health outcomes and costs to guide the allocation of health resources. And notably to weigh up marginal decisions: ‘Resources need to be redeployed at the margin to procedures for which the benefits to patients are high in relation to the costs’¹. For questions about whether to invest in a new medicine, or a new diagnostic test, or a new procedure, it has now become the norm in many countries for the decision to be made based on incremental cost per QALY.

When the pandemic was at its first wave height, there were heated debates about the trade-offs between the health consequences of letting the virus spread unchecked, and the disruption caused through the economic and social shutdown. Tony Abbott, the former Australian Prime Minister, for example, claimed lockdowns were costing the Australian Government as much as A\$200 000 to give an elderly person an extra year’s life, substantially beyond what the Australian Government

would usually pay for new medicines on the Pharmaceutical Benefits Scheme.² We are familiar with cost per QALY to make decisions about medicines and new technologies but can the social value of a QALY determine the price we should pay in economic losses to save lives?

Would employing a cost per QALY analysis have helped in the early response?

The Pharmaceutical Benefits Advisory Committee approach, which does not work within a fixed budget, is based on how big a gain in health will justify additional public funding. The trade-off is an incremental gain in health vs the opportunity cost of the extra funding – for the sake of this exposition, everything else. Or in other words, a little more health vs spending on other goods and services. Under pandemic conditions, the trade-off was not around small gains; the choice was a stark loss of life and overcrowded health services (the public health gain) vs the loss of economic activity. The ‘margin’ here is not small trade-offs but extremely large.^{3,4} Even in the accepted marginal use, cost per QALY is not used to withhold any or all treatment, particularly where consequences are severe. The oft cited ‘rule of rescue’ gives priority to those with very severe disease, those for whom no other treatment is available, and those with rare diseases. This reflects ethical values which override simple utilitarianism

even though the return in QALYs is low. One can simply look at the expenditure committed to care in the last year of life to see that is the case.⁵

This was the major but not the only barrier to using cost per QALY analysis for policy making. At the beginning of the pandemic, there was an information vacuum. Much had to be learnt about the transmission and spread of the virus. Although with time more sophisticated epidemiologic models have been developed, even now the long-term consequences of infection cannot be known.

The cost in economic losses was also largely unknowable, as the fall in economic activity occurred with or without a mandated lockdown. And the speed at which restrictions could be eased without sparking a second wave, and the length and depth of the economic crisis were also unknown. A range of policies were developed to ease the losses for individuals (e.g. JobKeeper, the COVID-19 supplement to NewStart) and support the economy. Even the familiar notion of opportunity cost lost its clarity in the face of large-scale unemployment, idle resources and near zero interest rates.

With vaccines becoming available, will the value of a QALY be more useful?

Vaccination programs have already commenced in the UK and the US, without any substantial formal economic evaluation,⁶ even though that would be a usual requirement in the UK, as in Australia. The level of governments financial commitments to the development of vaccines, well before their efficacy was known, reflected the high value of expected benefits of a vaccine. That the economic evaluation of vaccines presents additional challenges to other forms of health technology has long been recognised.^{7,8} These include the complexity of robust epidemiological models that capture dynamic effects, the choice of an appropriate discount rate for long-term consequences, the spill-over effects on caregivers, and the value of risk reduction. And that was before COVID-19.

There are two further challenges particularly evident in the case of a pandemic. One, the inclusion of productivity losses in economic evaluation remains contentious, particularly where it can be argued the economy has spare capacity. In the case of COVID-19, the economic losses are evident in gross domestic product downturn and unemployment numbers, so do represent a real and large loss. Two, the high level of infectivity means that a small breakdown in public health measures can initiate a new wave of infections, as has already been seen in Australia, first in Victoria and then in South Australia and New South Wales. While the probability of that first transmission (patient zero) may be rare, the exponential spread of the virus and its consequences are widespread and severe, so the value of more stringent protective measures is poorly captured by the probability of an event times the value of the outcome.

Conclusion

The big lesson of 2020 is that COVID-19 has changed nearly everything, and that includes our approach to vaccine evaluation. Australia has yet to approve any of the COVID-19 vaccines, though a decision from the Therapeutic Goods Administration is expected in January 2021.⁹ While the vaccines will be subject to the same safety assessment, it is very unlikely they will be subjected to the same rigorous economic evaluation and cost-effectiveness thresholds as other vaccines. Simply, the stakes of not controlling the pandemic are too high. There may be some value in the use of conventional economic evaluation as new vaccines come to market, or alternative vaccination strategies are considered. Even in that context, its use may be limited. COVID-19 has extended the challenges of evaluating vaccines; particularly, more careful consideration of what is captured in a QALY, how we estimate expected outcomes when the risk of loss is enormous and the probability is low, and the true meaning of opportunity cost.

Competing interests

No competing interests declared.

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