Balancing Lives Saved with Economic Costs

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COVID-19 Actuaries Response Group – Learn. Share. Educate. Influence.

Summary

A recent paper made headlines by asserting that the economic consequences of policy responses to the COVID-19 pandemic may cost more lives than the disease itself.

It is perfectly reasonable to attempt to balance short and longer term impacts on the health and life expectancy of the population, and we support the paper in seeking to tackle these difficult questions.

However, certain issues that we have identified on review of this paper lead us to question the author's key conclusion, in particular that a substantial lockdown would have life expectancy outcomes less acceptable than the base case "do nothing" scenario.

We have reviewed the paper "J-value assessment of how best to combat Covid-19" by Philip Thomas, Professor of Risk Management in the Faculty of Engineering at Bristol University.

Summary of key aspects of the paper

This paper was given some coverage in mainstream media after its non-peer reviewed publication on 23 March. It sets out a proposed methodology for considering the costs and benefits of different strategies to deal with the pandemic of Covid-19 in the UK.

The J value concept is that there is a justified output in terms of values of lives saved compared with the values of lives lost under the hypothesis that the lockdown of the economy leads to a reduction in GDP with a causally linked subsequent reduction in life expectancy.

Section 2.1 of the paper opens the analysis by calculating "The worth of a year of life in the UK". A GDP per capita of £33,141 is applied to an average life expectancy of 42 years, with a social discount rate on future income and a grossing up factor to account for risk aversion, producing a "value of a life year in the UK as £248,209". It should be noted that this approach seeks to quantify the value a society may place on a year of life, which is fundamentally different (and significantly greater) than the economic output that may be ascribed to a year of life. The formula is highly dependent on the grossing up factor which values one extra year of life at 11 times average GDP at the margin.

The author does his own epidemiological analysis but this is not central to the paper, whose focus is on translating lives into values.

In Section 5.2 various Government options for responding to the pandemic are analysed. The author takes the distribution of predicted deaths by age, multiplies this by a normal unadjusted life expectancy for that age and then applies his "value of a life year" of £248,209 to this to produce a very large estimate of the societal value to be placed on some of the options presented.

In section 6.2, the author concludes that a reduction of 0.25 years in population life expectancy could be tolerated with the most extreme lockdown approach, and that this would be caused by a 6.4% fall in GDP.

On the basis of a prediction of a fall in GDP of twice that figure, the authors conclude that the loss of life in the population as a whole would be greater than the value of the lives saved.

Key comments on the paper

We have identified several issues with the paper.

Firstly, the author implicitly assumes that the base case, with no intervention to save lives, would have no economic impact. We find this implausible. Ignoring the economic impact of COVID-19 in the base case results in an overstatement of the marginal economic cost of the intervention scenarios.

The calculation of years of life saved may be greater than reality since it is clear from studies published to date that a majority of those who have died from Covid-19 infection had underlying health issues. No data exists on the life expectancy, in the absence the virus, of those who die, and consideration of that would be necessary to make sense of the author's arguments. This may therefore overstate the benefit of the intervention scenarios (and perhaps offset the impacts of some of our other comments). We discussed the life expectancy of COVID-19 victims in an earlier bulletin.

On the other hand, the authors ignore a major impact on health outcomes from the reduction in non-COVID health activity during the epidemic. This will have a difficult to quantify but negative impact on life expectancy of those who might otherwise have been able to receive treatment were it not for the diversion of attention to COVID-19. Without intervention this would be an enormous reduction in resources available for normal treatment in an overstretched health system. With intervention, there is still some reduction as routine and other appointments are postponed. Overall, ignoring this factor serves to understate the net benefits of intervention in maintaining the health system.

The presumption of a causal correlation between a lower GDP and lower life expectancy may need re-examining in the context of a crisis driven by a medical issue rather than a recession arising through other economic activity. It is the policy response to a recession, not a recession per se, that drives any reduction in life expectancy gains.

In addition, by asserting that life expectancy "would have been at least 3 months greater by 2017… in the absence of the recession" the author assumes that much or all of the deceleration in life expectancy gains can be attributed to economic causes. In fact a slowdown in life expectancy gains was expected for non-economic reasons, following the significant reduction in cardiovascular mortality in the 2000s. The extent of the influence of economic causes remains unclear. This and the previous issue imply that the decrease in life expectancy resulting from the economic cost of the interventions may be overstated.

In considering the merits of the interventions, the paper effectively seeks to maximise total life span across the whole population. We would argue that society cares greatly about the distribution of life spans. The prospect of 1% of the population suffering an unpleasant death in the next year motivates intervention in a way that an 1% fall in life expectancy spread evenly across society would not. The paper equates these scenarios as having the same utility. This argument would imply the societal benefits of intervention are greater than the metrics used in the paper imply.

Conclusion

While a number of our comments act in competing directions, overall our view is the paper tends to overstate the (negative) impact that the economic cost of significant intervention will have on life expectancy (relative to the base case of no intervention).

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References

Thomas, P., 2020, "J-value assessment of how best to combat Covid-19", accepted for publication in Nanotechnology Perceptions.