

Analyzing the Cost Effectiveness of Policy Responses for COVID-19: The Importance of Capturing Social Consequences

Medical Decision Making
 2020, Vol. 40(3) 251–253
 © The Author(s) 2020
 Article reuse guidelines:
sagepub.com/journals-permissions
 DOI: 10.1177/0272989X20922987
journals.sagepub.com/home/mdm


David Daeho Kim  and Peter J. Neumann

All signs indicate that social distancing mandates to slow the spread of COVID-19 are working, and there is broad consensus about their necessity. Still, it is critical to consider the costs and benefits of any specific policy issuance. Estimating economic impacts can shed light on the tradeoffs inherent in alternative policy options. However, such analyses can lead officials astray if underlying data and assumptions do not reasonably capture all relevant benefits and costs.

Economic analyses of policy responses to address the pandemic have already begun to appear. Their estimates are useful as early attempts to provide insights. Given the evolving crisis and the absence of consistent and reliable data, these analyses have understandably focused narrowly on the expected health benefits gained by averting COVID-19-attributable deaths.

Consider, for example, 2 analyses that have attracted notice.^{1,2} Again, although helpful as first-cut estimates, an important consideration is what may be omitted from the analyses. The analysis by Greenstone and Nigam¹ did not account for any costs; it simply estimated the benefits of social distancing. Although the analysis by Broek-Altenburg and Atherly² estimated benefits and costs, it did not explicitly consider nonhealth outcomes, such as effects on labor markets. This latter analysis also applied the cost of the recent coronavirus stimulus package as a proxy for overall economic costs, whereas such expenditures are typically largely considered transfer payments rather than economic costs. As a result, both analyses likely omit important considerations for policy makers. They also neglect to mention which sectors and specific consequences were considered and their relative contributions to results (Figure 1).

The Second Panel on Cost-Effectiveness in Health and Medicine recommended that analysts consider both a health care sector and a societal perspective to ensure that economic analyses consider all relevant consequences of interventions, including broad social consequences falling outside the health care sector.³ This

practice can highlight important differences across perspectives. As an example, the cost-effectiveness of pharmacotherapy for patients with alcohol-use disorder is more pronounced when the analysis accounts for outcomes outside the health care sector, such as improved patient productivity or reduced alcohol-related motor vehicle accidents.⁴

The Second Panel also recommended the use of an impact inventory, a structured table listing an intervention's health and nonhealth consequences, to help standardize practice and reduce confusion.³ An impact inventory can provide a good starting point for economic evaluations of interventions to address the COVID-19 pandemic.

To illustrate, we have modified the generic impact inventory to list possible health and social consequences of current mitigation strategies, including effects on health outcomes (e.g., life expectancy and quality of life), health care costs, the labor market, consumption, the legal/criminal justice system, education, and the environment (Figure 2).

We further classified these consequences into whether COVID-19 strategies may result in positive impacts (i.e., improving health outcomes or saving costs), negative impacts (i.e., worsening health outcomes or incurring additional costs), or unknown impacts because of limited evidence. For example, the effects of receiving a positive screening result or of self-quarantine and isolation policies are unclear. For the latter, one may lose quality of life because of restricted lifestyle and social connections or increased domestic violence but may also experience positive effects, such as increased physical activity.

Corresponding Author

David Daeho Kim, Tufts Medical Center—Center for the Evaluation of Value and Risk in Health, Institute for Clinical Research and Health Policy Studies, 800 Washington Street, Box 63, Boston, MA 02111-1845, USA (dkim3@tuftsmedicalcenter.org).

	Greenstone et al.[1]	Broek-Altenburg et al.[2]
Health benefits	Mortality reductions (death due to COVID-19 and hospital/intensive care unit overflow)	Quality-adjusted life-years (QALY) gained (life expectancy gained multiplied by average health-related quality of life)
Valuation of health benefit	Age-specific value of a statistical life (on average, \$11.5 million USD for an adult)	No monetization of health benefits
Non-health benefits	Excluded	Excluded
Healthcare costs associated with COVID-19	Excluded	Excluded
Non-healthcare costs associated with social interventions	Excluded	The stimulus package used as a proxy (\$1 trillion to \$4 trillion USD)
Conclusion	Mortality benefits of social distancing estimated to be \$8 trillion USD	Social distancing would cost \$75,000 to \$650,000 USD per QALY gained

Figure 1 Comparison of 2 economic analyses of social distancing for COVID-19. [1] Greenstone M, Nigam V. Does social distancing matter? 2020. Available from: <https://bfi.uchicago.edu/working-paper/2020-26/>. [2] Broek-Altenburg Evd, Atherly A. Economic cost of flattening the curve. 2020. Available from: <https://theincidentaleconomist.com/wordpress/economic-cost-of-flattening-the-curve/>.

Figure 2 also specifies who is potentially affected (e.g., patients, caregivers, payers, or society at large).

This list is not intended as an exhaustive inventory but rather as a set of key items for analysts to consider in order to capture the full health and social consequences of policy interventions. By providing such an inventory to accompany analyses, the list can signal to audiences which consequences have been included or excluded in cost-effectiveness estimates. Even if underlying data are not readily available, this modified impact inventory for the COVID-19 pandemic can help analysts and policy makers better understand the items included in analyses, their potential relative contribution to results, and perhaps whether a study's findings are likely to reflect under- or overestimates.

History will struggle to discern whether our unprecedented efforts to contain the COVID-19 pandemic were successful and whether alternative options would have been preferable. Our public officials and the research community should demand a careful examination of the tradeoffs inherent in policy choices associated with the efforts. Accounting for the broad nonhealth consequences of social interventions is essential for generating reliable and comprehensive estimates and will also be critical for economic analyses of preparedness efforts for future outbreaks and pandemics.

ORCID iD

David Daeho Kim  <https://orcid.org/0000-0002-3383-8972>

Tufts Medical Center—Center for the Evaluation of Value and Risk in Health, Institute for Clinical Research and Health Policy Studies, Boston, MA, USA (DDK, PJN); and Tufts University School of Medicine, Boston, MA, USA (DDK, PJN). The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. Support was provided by the PhRMA Foundation Center of Excellence in Value Assessment Award to the Center for Enhanced Value Assessment (CEVA) at the Center for the Evaluation for Value and Risk in Health (CEVR), Tufts Medical Center. The authors are also supported by grants from the Bill and Melinda Gates Foundation, Arnold Ventures, and a variety of other grants from government, private foundation, and pharmaceutical industry sources.

Sector	Category	Type of Impact by Sector, Direction, and Audience
Healthcare Sector Perspective		
HEALTHCARE SECTOR	Health Outcomes	<u>Positive Impact</u> <ul style="list-style-type: none"> Life-years gained due to averted COVID-19 cases (<i>COVID-19 patient</i>) Health-related quality of life (HrQOL) improvement due to averted COVID-19 cases (<i>COVID-19 patient and caregiver</i>)
		<u>Negative Impact</u> <ul style="list-style-type: none"> Adverse consequences on life-years and HrQOL among non-COVID-19 patients due to not receiving timely and appropriate treatment (<i>non-COVID-19 patient and caregiver</i>)
		<u>Unknown Impact</u> <ul style="list-style-type: none"> HrQOL impact of receiving a "positive" screening results (e.g., psychological burden and stress even with mild symptoms and worry about infecting others, or peace of mind that one will get necessary treatment if needed) (<i>COVID-19 patients</i>) HrQOL impact due to self-quarantine and isolation (e.g., loss of quality of life due to restricted lifestyle and social connection as well as increased home violence, but also positive impacts such as increased physical activity) (<i>all individuals</i>)
	Healthcare Cost	<u>Positive Impact</u> <ul style="list-style-type: none"> Costs saved due to limited inpatient and outpatient services (e.g., reductions in non-COVID-19 related visits and elective surgeries) (<i>patient and payer</i>)
		<u>Negative Impact</u> <ul style="list-style-type: none"> Healthcare costs of screening and diagnosis for identifying COVID-19 patients (<i>patient and payer</i>) Healthcare costs of treating COVID-19 patients (<i>patient and payer</i>) Increased costs associated with telehealth (<i>patient and payer</i>)
		<u>Unknown Impact</u> <ul style="list-style-type: none"> Prescription costs for non-COVID-19 patients (<i>patient and payer</i>)
Societal Perspective		
LABOR MARKET	<u>Positive Impact</u> <ul style="list-style-type: none"> Increased employment in selected sectors (e.g., healthcare, online market, delivery services) (<i>individuals and society</i>) 	
	<u>Negative Impact</u> <ul style="list-style-type: none"> Widespread unemployment due to business closure (<i>individuals and society</i>) 	
	<u>Unknown Impact</u> <ul style="list-style-type: none"> Impact on productivity due to working from home (e.g., presenteeism) (<i>individuals and society</i>) 	
CONSUMPTION	<u>Negative Impact</u> <ul style="list-style-type: none"> Reduced non-health consumption due to the fear of contagion (e.g., restaurant, sporting events, entertainment) (<i>individuals and society</i>) 	
LEGAL/CRIMINAL JUSTICE	<u>Positive Impact</u> <ul style="list-style-type: none"> Impact on motor-vehicle accident due to reduced road traffic (<i>society</i>) 	
	<u>Unknown Impact</u> <ul style="list-style-type: none"> Impact on crime rates due to the restricted social engagement (<i>society</i>) 	
EDUCATION	<u>Unknown Impact</u> <ul style="list-style-type: none"> Impact on student education attainment through online learning (<i>individuals and society</i>) 	
ENVIRONMENT	<u>Positive Impact</u> <ul style="list-style-type: none"> Reduced air pollution due to reduced road traffic (<i>society</i>) 	

Figure 2 Modified generic impact inventory³ for the COVID-19 pandemic. [3] Sanders GD, Neumann PJ, Basu A, et al. Recommendations for conduct, methodological practices, and reporting of cost-effectiveness analyses: Second Panel on Cost-Effectiveness in Health and Medicine. *JAMA*. 2016;316(10):1093–103.

References

- Greenstone M, Nigam V. Does social distancing matter? 2020. Available from: <https://bfi.uchicago.edu/working-paper/2020-26/>
- Broek-Altenburg Evd, Atherly A. Economic cost of flattening the curve. 2020. Available from: <https://theincidentaleconomist.com/wordpress/economic-cost-of-flattening-the-curve/>
- Sanders GD, Neumann PJ, Basu A, et al. Recommendations for conduct, methodological practices, and reporting of cost-effectiveness analyses: Second Panel on Cost-Effectiveness in Health and Medicine. *JAMA*. 2016;316(10): 1093–103.
- Kim DD, Basu A, Duffy SQ, Zarkin GA. Worked example 1: the cost-effectiveness of treatment for individuals with alcohol use disorders: a reference case analysis. In: Neumann PJ, Sanders GD, Russell LB, Siegel JE, Ganiats TG, eds. *Cost-Effectiveness in Health and Medicine*. New York: Oxford University Press; 2017. p. 385–430.