

University of Groningen

COVID-19 Health Economics

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Published in:
Value in Health

DOI:
[10.1016/j.jval.2022.03.008](https://doi.org/10.1016/j.jval.2022.03.008)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2022

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Postma, M. J., & Chhatwal, J. (2022). COVID-19 Health Economics: Looking Back and Scoping the Future. *Value in Health*, 25(5), 695-696. <https://doi.org/10.1016/j.jval.2022.03.008>

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Themed Section: COVID-19

COVID-19 Health Economics: Looking Back and Scoping the Future

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As of March 2022, nearly 6 million people have died of COVID-19 globally.¹ The COVID-19 pandemic has already gone through several distinct stages during the first 2 years, with noticeable health and health economics impact at each stage. The initial emergency stage resulted in lockdowns that incurred enormous societal costs, concerning gross domestic product reductions as well as (mental) health damages. Diagnostic tests were implemented on a never-before-seen scale in many healthcare systems, without health economics justification,^{2,3} as exemplified in a systematic review in this themed section.⁴ In the second stage, vaccines were introduced in Western countries without the general health economic considerations that generally apply in evaluations of country-specific national immunization technological advisory groups.⁵ In the third stage, health economic considerations on emerging treatments remain scarce, as we previously addressed in a previous *Value in Health*-themed section on COVID-19.⁶ The recent Omicron variant—potentially associated with less severe disease—resulted in a different phase in the pandemic, with emergency actions being replaced by considerate actions inclusive of health economic considerations. This themed section aims to look back on the abovementioned issues from a health economics point of view and identify emerging topics in COVID-19 health economics.

The initial response to the pandemic was based on non-pharmaceutical interventions, including closing schools, working from home, restricting large gatherings, and closing of restaurants, bars, sports facilities, and businesses. Because of the urgency of the situation, immediate actions were taken without thoroughly evaluating the effectiveness, harms, costs, and benefits upfront of such interventions. Three articles in this themed section tried to estimate these impacts retrospectively. The article by Sun et al⁷ analyzed the data from 145 countries in the Oxford COVID-19 government response tracker, identifying that the effectiveness of interventions was higher in the early stages of outbreaks than in later stages. Closing of schools, workplaces, and public events showed the highest effectiveness, whereas closing public transport and controlling international travel were effective but to a lesser extent. The study by van Baal et al⁸ estimated COVID-19 mortality and loss in quality-adjusted life-years despite social distancing interventions in 2020. Building on previously described methods⁹ and explicitly taking into account that COVID-19 mortality may concentrate in risk groups of older adults and those with comorbidities, the study estimated that in The Netherlands, excess mortality was 16 308, corresponding to 61 032 quality-adjusted life-years lost in 2020.⁸ Notably, this would translate into increased mortality by greater than 10% when taking the

Dutch overall population numbers into account.¹⁰ The article by Peña-Longobardo et al¹¹ in this themed section quantified the broad impact of COVID-19 and related interventions on mental health. In particular, informal caregivers of patients with COVID-19 were compared with noncaregivers with regard to scorings on items such as depression, anxiety, and sleep. It was found that informal caregivers in Europe have experienced a more severe effect on mental health than noncaregivers.

In the second year of the pandemic, rapidly developed conventional and mRNA vaccines became available. Two articles in this themed section analyzed issues around vaccinations. Vadlamudi et al¹² analyzed vaccines' clinical trials for anti-severe acute respiratory syndrome-coronavirus 2 immunoglobulin G antibodies geometric mean titers after 28 days of vaccination. All 16 vaccines identified were considered to report relevant immune responses while maintaining tolerable safety levels concerning reactogenicity. It has become apparent that some safety issues—notably, thrombocytopenia and myocarditis—can only be identified after large-scale use of vaccines, requiring the intensive monitoring that occurs worldwide on COVID-19 vaccines. A specific case study for Spain analyzed the issue of autonomy in vaccine choice (ie, choosing between a heterologous or homologous boosting).¹³ In particular, the group of essential workers (eg, firefighters, teachers, and police officers) primed with a conventional vaccine could choose to be boosted with the same conventional vaccine or an alternative mRNA vaccine. The article concludes that adequately informed persons can very well weigh their options in choosing vaccines. The finding on the benefits of a certain level of autonomy in vaccine choice can be crucial for designing potential future COVID-19 booster campaigns that achieve maximum coverage.

Recently, the first oral antiviral treatment for COVID-19 PF-07321332/ritonavir was approved by the US Food and Drug Administration and the European Medicines Agency. It is now undergoing subsequent health technology assessment in various European Union countries. Off-label, multiple treatments have been used from the beginning of the pandemic. For example, corticosteroids were clinically used, obviously with only scarce evidence. This themed session includes an analysis of its use in patients with nonsevere COVID-19 based on a multicenter network in the Hubei province in China.¹⁴ The findings do not support any recommendation for its use in patients with non-severe COVID-19. Two additional articles estimated the value of remdesivir for COVID-19 treatment and they remain inconclusive.^{15,16} Given that the benefits of remdesivir on survival are highly uncertain, cost-effectiveness broadly ranges from

potentially highly cost-effective to excessively not cost-effective, fully depending on the unknown survival benefits.¹⁷ The final article in this themed section retrospectively analyzes the healthcare resource use of patients with COVID-19 based on a geographically diverse all-payer hospital administrative database in the United States.¹⁸ High levels of healthcare resource use and in-hospital mortality were found and that 1 in 3 inpatients required posthospital care services.

With the COVID-19 pandemic potentially—and hopefully—entering a new phase defined by an endemic-like situation, the role of health economics in decision making is likely going to increase. Specific analyses on resource utilization by patients with COVID-19, such as the abovementioned featured in this themed section, will support the evaluation of the cost-effectiveness of COVID-19 interventions. In summary, this COVID-19 themed section highlights several important topics, including the effect of COVID-19 on mental health, autonomous choices in vaccine boosting to optimize coverage, the cost-effectiveness of different vaccination and treatment strategies, and clinical utilities of dynamic testing approaches. Future studies could evaluate the cost-effectiveness of frequency and type of COVID-19 boosters and the value of COVID-19 testing and treatment in different settings as COVID-19 transitions from a pandemic to an endemic phase.

Article and Author Information

Accepted for Publication: March 16, 2022

Published Online: April 4, 2022

doi: <https://doi.org/10.1016/j.jval.2022.03.008>

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Author Contributions: *Concept and design:* Postma, Chhatwal
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Analysis and interpretation of data: Postma, Chhatwal
Drafting of the manuscript: Postma, Chhatwal
Critical revision of the paper for important intellectual content: Postma, Chhatwal
Supervision: Postma, Chhatwal

Conflict of Interest Disclosures: Dr Postma reported receiving a grant from Janssen Pharmaceuticals on COVID-19 modeling; reported receiving honoraria from Janssen Pharmaceuticals; and reported serving as a member of the UK Joint Committee Vaccination and Immunization. Dr Chhatwal reported being a partner with Value Analytics Labs, a healthcare

consulting company; and reported receiving personal fees from Novo Nordisk and Flatiron outside the submitted work. Drs Postma and Chhatwal are editors for *Value in Health* and had no role in the peer-review process of this article.

Funding/Support: This work was supported by a National Science Foundation award 2035361.

Role of the Funder/Sponsor: The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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