

MAY/JUNE 2022 VOL. 8, NO. 3

VALUE & OUTCOMES SPOTLIGHT

A magazine for the global HEOR community.

The Societal Impact of COVID-19

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"NORMAL"
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ON HEALTHCARE
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VALUE & OUTCOMES SPOTLIGHT

MAY/JUNE 2022
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FROM THE EDITOR

Reflections on the COVID-19 Crisis

COVID-19 has significantly and pervasively affected our lives, created a “new normal” for how we live and, in many cases, rewritten our social contract. Some have suggested that this global pandemic is the worst since the influenza outbreak of 1918. Many believe that it may have caused the largest economic contraction since the Great Depression as evidenced by a 3.9% drop in the median global gross domestic product from 2019 to 2020 according to the International Monetary Fund.

The pandemic may have arguably created our current global economic crisis, but it unquestionably created a global public health one, as millions of lives were lost and even more lost their employer-sponsored healthcare. Our social fabric was stretched thin as working from home became the norm and for many had to be balanced with at-home childcare as schools transitioned to virtual instruction. Many were faced with isolation that affected their mental health and most postponed necessary, routine, and/or preventive medical care. Clearly, this pandemic has had a dramatic—and most likely permanent and irreversible—effect on individuals and our global society.

For me, traveling was a significant part of my personal and professional life. Often, I traveled to countries around the world with excitement, enthusiasm, and curiosity and without hesitation. In fact, I have set foot on every continent apart from Antarctica (which I hope to eventually do on a vacation or for an ISPOR meeting!) However, my attitude toward travel changed abruptly and dramatically at the onset of the pandemic, and as a result, I had not traveled for business or personal reasons since early 2020.

As the ISPOR 2022 conference approached, I found myself exhaustively debating whether to attend, because I was concerned about large gatherings and the risk of contracting COVID-19. My concern was not mostly for myself but for my family and friends, some of whom are elderly and immune compromised; I did not want to risk exposing them if I could avoid it. Many of my concerns were eased after learning that ISPOR required proof of vaccination or negative COVID test results for those attending the conference in person. So, I took the chance and decided to attend the ISPOR meeting; this meeting would be my first face-to-face conference since the beginning of the pandemic.

I took all the precautions: used sanitizer, washed my hands often, wore a mask, social distanced where possible, tested regularly, and was extra careful. The experience was fantastic; seeing colleagues and friends in person after such a long time, attending the plenary, podium, and poster sessions, as well as visiting the exhibit hall and attending various receptions and dinners rejuvenated me! On my way home, I reflected on my decision to attend in person and realized I had made the right one. I felt energized and realized that I desperately needed that face-to-face interaction that I sorely missed. This meeting was extra special to me personally and professionally because of that. After returning, I tested 3 days later and was negative. Only then did I resume visiting my loved ones as I felt it was the responsible thing to do.

As researchers, we also have a responsibility to do our part to conduct evidence-based research or to develop evidence to improve healthcare decisions. It is important to evaluate the COVID-19 crisis from a health economic, medical, and societal perspective—whether it is through patient experiences, clinical studies, economic models, retrospective studies, or real-world evidence. Examples include capturing the societal impacts of COVID-19 in health economic analyses, understanding how the pandemic disrupted the delivery of essential health services, looking at the overall impact of COVID-19 on healthcare decision making, and addressing changes (or lack thereof) in societal behaviors such as vaccine hesitancy among Black and other minority populations. We also need to expeditiously and thoroughly capture the necessary data to inform healthcare decisions in real time as well as to inform policies and policy setting that will impact our society. Through evidence generation and stakeholder collaboration, we can make a difference and a positive impact on patients' lives, even during a major global health crisis such as a pandemic.

As always, I welcome input from our readers.
Please feel free to email me at zeba.m.khan@hotmail.com.

Zeba M. Khan, RPh, PhD

Editor-in-Chief, Value & Outcomes Spotlight



ISPOR SPEAKS

Returning to “Normal”: Reflections on the Past Year

Isao Kamae, DrPH, MD, ISPOR President; University of Tokyo, Tokyo, Japan

While I am the third ISPOR President whose term has been virtual due to the global pandemic, I am delighted to be the President to welcome members back to an in-person meeting. We certainly missed the experiences of face-to-face networking and knowledge-sharing with colleagues. The stellar attendance at ISPOR 2022 certainly proves how ready we are to be back together.

I would like to emphasize how important it is to be resilient and to persist during challenging times like these. In my presidential theme, I noted 5 words that describe our society: **I**nvolvement, **S**cientific, **P**rofessional, **O**utstanding and **R**esilient.

ISPOR Is Involved:

Its members stay involved in the global HEOR community through the Society. Our virtual events comprise state-of-the-art international scientific programs and through member participation, we strengthen ISPOR's ability to share leading research.

ISPOR Is Scientific:

The Society drives the strategic scientific agenda in the field of HEOR through a new science strategy and the involvement of thousands of experts.

ISPOR Is Professional:

ISPOR is the leading professional society for HEOR globally. We have a strong roadmap for the future that builds on the input of many stakeholders.

ISPOR Is Outstanding:

The Society supports outstanding achievement in the field of HEOR. Our awards program, which was recently expanded to include a new award for members reflecting HEOR excellence in low- and middle-income countries, confers acknowledgement of leading work globally.

ISPOR Is Resilient:

The Society has been driving innovation in the field for more than 25 years.

And ISPOR has proven its resilience. The pandemic has impacted so much—including healthcare, the economy, research, and HEOR. HEOR has never been more important, and its influence continues to grow. The Society has taken advantage of opportunities during these challenging times to develop new virtual content and ways of connecting and learning. It has been my pleasure to work with an outstanding Board of Directors, Executive Director, and staff in continuing to achieve our mission.

I am honored to have had the opportunity to lead the Society and to be the first President from Asia. During my term, there were many important objectives that we have successfully achieved:

- Ensuring that a stable and evolving Society transitions to your incoming President, Jan Hansen. While continuing to expand its reach, ISPOR has maintained a solid financial position to serve the Society for many years to come
- Prioritizing digital strategies that continue to be important post pandemic
- Continuing global stakeholder engagement, including the introduction of new virtual communities and a new call for volunteers' section on the ISPOR website
- Participation in HTA Roundtables and Patient Roundtables where ISPOR strategically brings the voice of patients and decision makers into conversation and integrates these and other perspectives into our work
- Raising awareness of health disparities through creation of a new special interest group
- Advancing our Science Strategy

In my final month as your President, I will be hosting a global networks strategic meeting with members, focused on an update of its CHEERS 2022 report and our 2022-2023 Top 10 HEOR Trends report. The goal of this global meeting is to further my objective to be an ambassador for all members, regardless of where they live and work.

I would like to extend a very special thank you to the ISPOR Board of Directors. Your Board has been working extremely hard to support ISPOR's strategic direction, leadership role, and sustainability during a difficult time as we navigate through the pandemic and beyond.

And lastly, I would also like to recognize the ISPOR staff. The staff are the engine that makes the ISPOR organization run smoothly, and we all appreciate them.



HEOR NEWS

1 A Comprehensive COVID-19 Response—The Need for Economic Evaluation (NEJM)

Researchers Govind Persad and Ankur Pandya say policy makers not only have to understand the benefits and burdens of various COVID-19 policy actions, they have to know how to systematically compare those benefits and burdens before including them in legislation or regulations.

[Read more.](#)

2 AI Must Be Developed Responsibly to Improve Mental Health Outcomes (Fast Company)

Many mental health startups are incorporating artificial intelligence (AI) into their offerings, but researcher Dan Adler says lessons need to be learned from the use of AI tools in other areas of healthcare because there are areas where AI-powered mental health technologies may underperform in use.

[Read more.](#)

3 14.9 Million Excess Deaths Associated With the COVID-19 Pandemic in 2020 and 2021 (World Health Organization)

The World Health Organization says the full toll of deaths associated directly (due to the disease) and indirectly (due to impact on healthcare systems) to the COVID-19 pandemic was 14.9 million, demonstrating a need for more resilient healthcare systems in every country.

[Read more.](#)

4 Evidence Hierarchy in GVDs: The Use of Non-Randomized Evidence Following NICE's Recent Methods Update (Source Health Economics)

While randomized clinical trials are still emphasized by NICE's most recent guidelines update as the top of the evidence hierarchy, the update also includes greater recognition of non-randomized evidence, which could provide complementary evidence in global value dossiers.

[Read more.](#)

5 Jayson Slotnik Weighs the Future of Value-Based Payments After the Pandemic (AJMC)

Jayson Slotnik, partner at Health Policy Strategies, Inc, talks with AJMC editors about whether patients will continue to want value-based payments rather than fee-for-service, an arrangement that was a benefit during the COVID pandemic.

[Read more.](#)

6 WHO Launches First-Ever Global Report on Infection Prevention and Control (World Health Organization)

A new report from the World Health Organization says if healthcare facilities follow good hand hygiene and other cost-effective measures, healthcare-associated infections can be cut down by 70%.

[Read more.](#)

7 A Real-World Study of Acute and Preventive Medication Use, Adherence, and Persistence in Patients Prescribed Fremanezumab in the United States (*The Journal of Headache and Pain*)

A study using real-world data from the Veradigm Health Insights database found that US patients who took the migraine medication fremanezumab for more than 6 months needed fewer acute and preventive migraine medications and for those with depression and anxiety, fewer prescriptions for depression and anti-anxiety medications.

[Read more.](#)

8 ICER to Assess Gene Therapies for Hemophilia A and B (ICER)

Next up on ICER's docket: assessing the comparative clinical effectiveness and value of CSL Behring's etranacogene dezaparvovec for hemophilia B, and updating its previous hemophilia A assessment on BioMarin's Roctavian (valoctocogene roxaparvovec). Public discussion will occur in November.

[Read more.](#)

9 India Conducts First-Ever Nationwide Epidemiological Diabetes Study (*Biospectrum Asia*)

The study found that only a third of individuals with known diabetes in India have good control of diabetes, fewer than half have good control of blood pressure and LDL (bad) cholesterol, and only 7.7% met all 3 targets.

[Read more.](#)

10 Singapore Launches Dementia Research Centre (*Biospectrum Asia*)

The goal of the center, launched by Nanyang Technological University, is to better understand how dementia develops in Asians and to advance new strategies to predict and delay the progression of the disease.

[Read more.](#)

FROM THE JOURNALS

Looking at the Overall Impact of COVID-19 on Healthcare Decision Making

Guest Contributor: Rasika Korde, MSc, PhD, Massachusetts College of Pharmacy and Health Sciences, Boston, MA, USA

Disease burden attributable to the first wave of COVID-19 in China and the effect of timing on the cost-effectiveness of movement restriction policies

Zhao J, Jin H, Li X, et al

Value Health. 2021. 24(5):615-624.

<https://doi.org/10.1016/j.jval.2020.12.009>

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), also known as coronavirus disease 2019 (COVID-19), has resulted in high morbidity and mortality worldwide. Studies have shown that movement restriction policies (MRPs) like quarantine or isolation for suspected or confirmed cases and travel restrictions for the entire population of the country are effective in delaying or possibly preventing COVID-19 transition. However, MRPs could potentially cause huge productivity losses. Thus, decision makers are unsure whether it is cost-effective to start MRPs early when there are fewer cases and deaths. Different countries have adopted different MRPs and the period between the detection of the first case and the implementation of MRPs has largely varied and the cost-effectiveness of these MRPs is unknown. Within this context, a study by Zhao et al provides insight for decision makers in determining the optimal timing of MRPs for

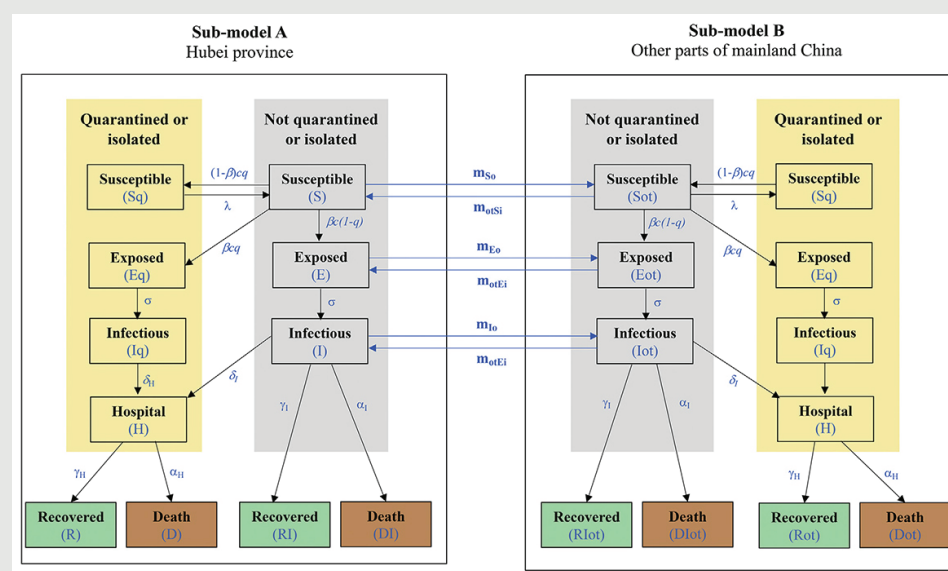
future waves of COVID-19. The study focuses on the first wave of COVID-19 outbreak in China. The authors construct a model that examines the health burden attributable to the first wave of COVID-19 in China and the cost-effectiveness of rapid versus delayed enforcement of MRPs by simulating the potential consequences of MRPs implemented at different time.

Four strategies were compared. Strategy A represents the real-world scenario in China, where the first MRP started on January 23, 2020, and ended on March 25, 2020, when there were no more newly confirmed cases identified in mainland China. Strategies B, C, and D represent a 1-week, 2-week, and 4-week delay in the imposition of MRPs, respectively. For strategies B, C, and D, MRPs end on the day when national newly confirmed cases reach zero. The authors have adopted healthcare as well as societal perspectives, and all costs are expressed in renminbi (RMB; 2019 value) and converted to US dollars using the Organization of Economic Cooperation and Development annual exchange rate for 2019.

The primary outcomes of the study are disability adjusted life-years (DALYs), cost, and net monetary benefit (NMB). Secondary outcomes included the accumulated number of confirmed cases, quarantined/isolated people, and deaths. To capture the initial spread of COVID 19, the model has

2 submodels (**Figure 1**). Submodel A simulates disease transmission in Hubei province, whereas submodel B simulates disease transmission in other parts of mainland China. Patients who are not quarantined can move between submodel A and B to simulate the disease transmission resulting from population movement between Hubei provinces and other parts of China. Within each submodel, there are 2 modules: one represents individuals who are quarantined or isolated, and another represents individuals who are not quarantined or isolated. On the basis of published epidemiological, disutility, and costing data, the total DALY losses and costs have been calculated for each strategy. The strategy with the highest NMB is considered the most cost-effective. Lastly, to examine the impact of uncertainty, the authors have carried out deterministic and probabilistic sensitivity analyses.

Figure 1. CEA model structure.



Susceptible = susceptible individuals who have not contracted a COVID-19 infection; Exposed = individuals who have been exposed but are currently asymptomatic; infectious; Infectious = infected individuals who have developed a symptomatic infection, infectious; Hospital = diagnosed infected individuals treated in the hospital; Recovered = infected individuals recovered from COVID-19.

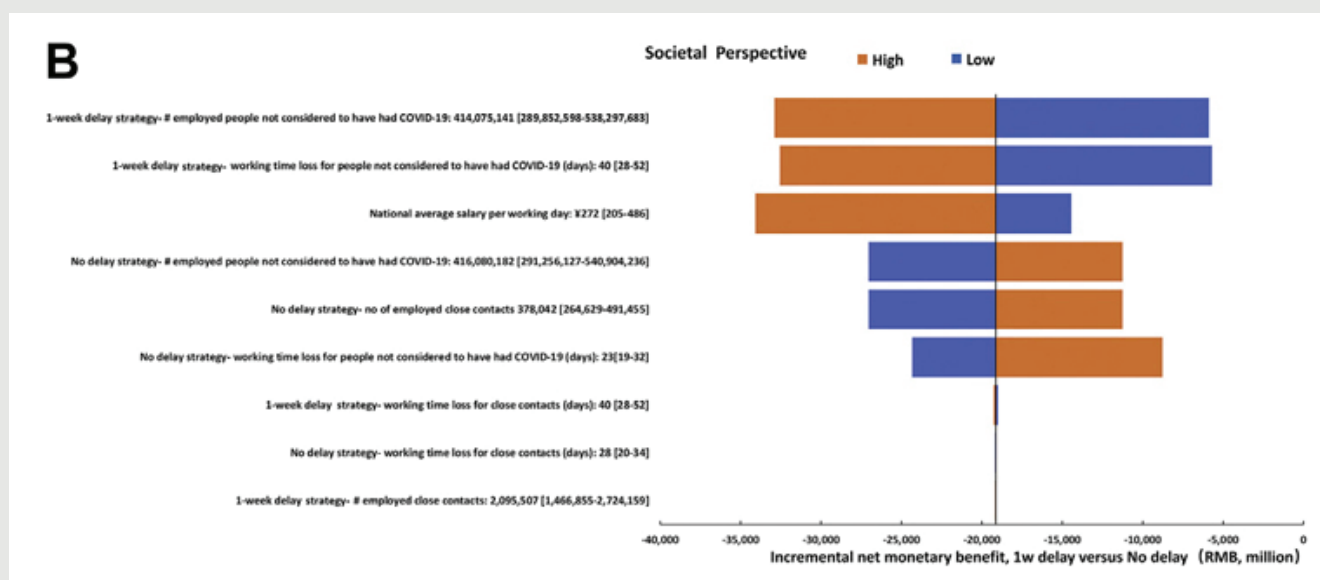
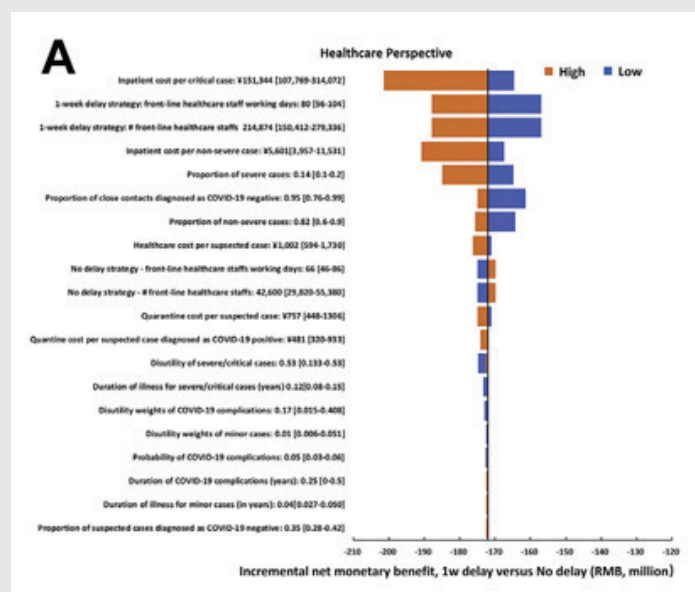
Table 1. Cost and effectiveness results for different strategies.

	Duration of Delay for Imposing MRPs			
	None	1-week	2-week	4-week
Total cost	2638 (343)	4559 (660)	6320 (915)	22,966 (3324)
Direct cost	3.6 (0.5)	28 (4.1)	204 (29.5)	4191 (606.5)
Indirect cost	2635 (381)	4531 (656)	6117 (885)	18,775 (2717)
DALY (person-year)	38,348	139,784	432,225	3,750,069
Net monetary benefit	-2636 (1381)	-4549 (-658)	-6289 (-910)	-22,699 (-3285)

All costs are expressed in billions of renminbi, followed by billions of USD in parentheses.

MRPs indicates movement restriction policies; USD, United States dollars.

Figure 2. Results of one-way sensitivity analyses.



(A) One-way sensitivity analysis results from the healthcare perspective. (B) One-way sensitivity analysis results from the societal perspective.

According to the cost-effectiveness analysis (Table 1), strategy A (no delay in MRPs) was the most cost-effective alternative at the willingness to pay of 70,892 RMB, based on healthcare as well as societal perspectives. On conducting a one-way sensitivity analysis from a healthcare perspective, results were most sensitive to inpatient cost per critical case, number of working days for front-line healthcare staff, and number of front-line healthcare staff. From a societal perspective, results were most sensitive to employed people not considered to have had COVID-19, national average salary per working day, and working time lost for people not considered to have had COVID-19 (Figure 2). Results also indicated the number of confirmed cases increased with increasing delay time for MRPs. For example, a 1-week delay in MRPs (strategy B) resulted in 0.463 million confirmed cases versus a 4-week delay (strategy D) resulted in 37.74 million confirmed cases.

This study supports the findings that early MRPs are more cost-effective than delayed MRPs. This research is highly meaningful as governments have been reluctant to impose MRPs because they pose ethical dilemmas regarding the restriction of civil liberties alongside concerns about the impact on the economy. Quantifying this impact on costs and health of postponement of MRPs reduces uncertainty and supports decision making. One will need to weigh the cost of early implementation of MRPs against the cost of delay to the economy and population health.

This *Value in Health* article is very timely and useful, as COVID-19 cases in Asian countries (especially China) are on an upward trend again. Plus, as countries across the world are easing travel and social distancing restrictions, there could be a potential surge in COVID-19 cases, which may require decision makers to implement quarantine guidelines all over again. This can be a critical piece of evidence for clinicians, government authorities, and policy makers to plan future pandemic responses and even apply this model to other infectious diseases.

RESEARCH ROUNDUP

Section Editor: **Aakash Bipin Gandhi, BPharm, PhD**, Research Scientist, RWE, Sanofi, Cambridge, MA, USA

The broader societal impacts of COVID-19 and the growing importance of capturing these in health economic analyses.

Schnitzler L, Janssen LM, Evers SM, et al. *Int J Technol Assess Health Care*. 2021;37:e43.

Summary

The article by Schnitzler et al discusses the societal impact of COVID-19 on factors external to the healthcare system such as (including but not limited to) labor markets and work productivity. Further, it highlights the importance of incorporating these aspects in any analysis that assesses the economic impact (where available and appropriate) of COVID-19 to provide a comprehensive characterization of its public health consequences. Additionally, the article sheds light on how the pandemic revealed and further worsened gender, health, and socioeconomic disparities associated with contracting the virus, bearing the burden of household tasks, and access to essential healthcare services.

Relevance

Any economic analysis related to COVID-19 conducted from a single or narrow perspective may exclude key societal impacts related to the disease and associated indirect costs that constitute a major proportion of the economic impact of the disease. Further, quantifying the societal impact of COVID-19 within an economic analysis can help guide healthcare and policy decision makers with the efficient allocation of scarce healthcare resources towards managing the disease.

A comprehensive COVID-19 response—the need for economic evaluation.

Persad G, Pandya A. *N Engl J Med*. 2022 May 4. Online ahead of print. doi: 10.1056/NEJMp2202828.

Summary

The article by Persad and Pandya discusses the use of economic evaluations to study the cost and consequences of COVID-19-related health policies. Certain COVID-19 policy initiatives have been studied more comprehensively compared to others due to the easy availability of data. For example, policies supporting improvement of access to vaccines is supported by a wide array of literature highlighting its safety and cost-effectiveness. In contrast, policies supporting improving ventilation that helps decrease COVID-19 transmission has not been studied well due to the lack in the quantity and quality of associated data. Further, the article stresses the need of including societal effects within economic evaluations to aid in healthcare decision making and increasing transparency regarding the parameters inputted in the model.

Relevance

The economic evaluation of healthcare policies offers several benefits. First, in addition to quantifying the costs or benefits associated with a policy, economic evaluations can help aid the creation of dashboards to guide decision makers in interpreting disaggregated data. Second, economic evaluations can help determine the society's threshold for accepting healthcare policies that are aimed at improving population health through the equitable distribution of health outcomes. Third, uncertainty associated with healthcare policies can also be quantified through economic evaluations. For example, value of information analysis can be conducted to decide whether it is feasible to bear a certain amount of economic burden in order to gain benefits from a certain policy.

COVID-19 and resilience of healthcare systems in ten countries.

Arsenault C, Gage A, Kim MK, et al. *Nat Med*. 2022 Mar 14. Online ahead of print. doi: 10.1038/s41591-022-01750-1.

Summary

The study by Arsenault et al assessed the impact of the COVID-19 pandemic on the decline in health service use across 10 countries that were categorized as low-income (Ethiopia, Haiti), middle-income (Ghana, Lao People's Democratic Republic, Mexico, Nepal, South Africa, Thailand) and high-income (Chile, South Korea). The study found that services such as cancer screening, tuberculosis screening, and HIV testing declined by 26% to 96% during the pandemic. Additionally, total outpatient visits (9% to 40%) and visits related to maternal health (5% to 33%) also declined over the same period. The study used an interrupted time-series analysis where the interruption was identified to be 11 March 2020 (announcement by the World Health Organization declaring a global pandemic) with a 15-month baseline and 9-month follow-up period. The Routine Health Information System data, as well as data from the several national administrative health systems, were used for the analysis.

Relevance

The findings of this analysis on reduced health service use due to COVID-19 highlight the need for pandemic preparedness globally. There is a need to design healthcare systems in a way that they are more resistant to adverse consequences that may arise during future pandemics and retain the ability to function efficiently even in time of crisis.

Note from the Section Editor: Views, thoughts, and opinions expressed in this section are my own and not those of any organization, committee, group, or individual that I am affiliated with.

ISPOR Conferences and Events

Signal Series



June 21 | 11:00AM – 12:30PM EDT

The Real Experience Revolution®: Towards a New Empiricism of Health

Reserve your complimentary virtual seat and prepare to hear a radical position on the empiricism of health and its interactional creation. Join us as we explore how we can better view real experiences with health, disease, and illness, ask how and why do real experiences form, become different, and recur, and address the origin and persistence of health inequalities and disparities within social groups, places, communities, and populations.

Host:

Daniel Pesut, PhD, RN, FAAN, Emeritus Professor of Nursing, University of Minnesota, Minneapolis, Minnesota, USA

Guest Speaker:

Christopher Lawer, MPhil, Creator of Umio and the Umio Community, Global Advisor and Educator, and Author of Interactional Creation of Health: Experience Ecosystem Ontology, Task and Method, and Flow: A Short Guide to Real Experience Flow Creation® (May 2022)

The **Signal** series—ISPOR's signature program—looks beyond today's linear thinking to explore topics that will shape healthcare decision making over the next decade. **Signal** episodes are scheduled throughout the year and feature conversations with speakers who are innovative thought leaders and change makers in both healthcare and other sectors of economy, science disciplines, and areas of human inquiry that can impact healthcare.

 Learn more and register at www.ispor.org/signal-ExperienceEcosystems

 The conversation begins on Twitter [ISPORSignal](https://twitter.com/ISPORSignal)

ISPOR Conferences and Events

ISPOR Europe 2022 | 6-9 November

Austria Center Vienna, Vienna, Austria



Join global healthcare leaders as they convene in Vienna, the “City of Music,” for ISPOR Europe 2022. The 3-day conference will offer in-depth discussion and dissemination of the hottest international topics in health economics and outcomes research (HEOR).

This must-attend event provides you with dedicated opportunities to network in person and virtually with your peers, HEOR experts, and thought leaders to discuss with a global audience how we establish, incentivize, and share value sustainable for health systems, patients, and technology developers. The conference will be complete with plenary sessions, spotlights, a **Signal Series** episode, breakouts, forums, sponsored educational symposia, poster presentations, and an exhibit hall. Registration fee includes pre- and post-conference access to content on-demand!

The Call for Session Abstracts closes 9 June and the Call for Research Abstracts closes 30 June. Visit our [Abstract Information page](#) for ISPOR Europe 2022 to learn more.

Interested in sponsoring or exhibiting at ISPOR Europe 2022? Contact the Sales Team at exhibit@ispor.org.

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MAKING THE MOST OF YOUR ISPOR MEMBERSHIP

Here are 5 simple ways you can maximize your involvement and expand your network within ISPOR's global HEOR community:

- 1 **SUBMIT** your research for an upcoming [ISPOR Conference](#). ISPOR's scientific conferences provide the ideal venue for you to share your new research as a podium or poster presentation, interact with attendees during a workshop, and/or debate your views on a controversial topic in an issue panel session. Submissions for abstract sessions and research abstracts are now open for ISPOR Europe 2022.
- 2 **DOWNLOAD** and read ISPOR's [HEOR Competencies Assessment Framework](#). Published in the September 2020 issue of *Value in Health*, this report is the first large scale effort to formally identify competencies from within the HEOR field. The framework is a valuable resource for HEOR professionals who are looking to develop academic curricula, fellowships, and continuing education programs, as well as assess job candidates for HEOR career opportunities.
- 3 **NOMINATE** your mentors and peers for [ISPOR Awards](#). ISPOR's scientific achievement, leadership, and research presentation and poster awards program is designed to foster and recognize research excellence, leadership, and outstanding technical achievement in HEOR.
- 4 **SET UP** job alerts on the [HEOR Career Center](#) to receive the latest updates and postings about career opportunities in the field. The ISPOR Career Center provides an easy-to-use, highly targeted resource for employment connections—whether you're looking for an organization where you can best apply your HEOR knowledge or looking for candidates who possess the unique skills needed to excel in the HEOR field. ISPOR's Career Center is your connection to the global HEOR community.
- 5 **EXPLORE** the [HEOR Solutions Center](#) to connect with leading companies in the HEOR field. Access live presentations and on-demand content through the HEOR Theater. ISPOR's HEOR Solutions Center brings the content, connections, insights, trends, and product services from experts in the HEOR industry directly to you.

ISPOR Conferences and Events

Virtual ISPOR Asia Pacific Summit 2022 | 20-21 September

The leading HEOR event for Asia Pacific, themed “Linking HEOR Research, Evidence, and Patient Needs for Decision Making in Asia Pacific,” will feature content focusing on in-depth research and discussion of the current state of HEOR in the region, and how HEOR can support health systems confronting practical issues associated to healthcare quality, access, and affordability, and finding potential solutions in the Asia Pacific region. The virtual summit will be held in Korea Standard Time (KST).

The Summit program will feature 2 thought-provoking plenary sessions titled: “Value or Volume: Are APAC Regions Transforming into Value-Based Healthcare?” and “Digital Health Innovations: Improving Patient Outcomes and Equity in the Asia Pacific Region.” In addition, topical issue panels and workshops, and educational symposia will fill the schedule.

Sponsorship opportunities are available. Contact the ISPOR Sales Team at exhibit@ispor.org.

 More at www.ispor.org/AsiaPacific2022

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ISPOR Education

ISPOR Webinars



June 7 | 11:00AM EDT

Sustainable Access to Biosimilars in the USA and Latin America: Challenges and Potential Solutions

This webinar leverages recent global research, conducted across 17 countries, to provide an overview of the challenges and solutions to ensuring biosimilar benefits are sustainably delivered to the whole society, with specific focus on issues in the United States and Latin American region.

Sponsored by: Charles River Associates

June 16 | 10:00AM EDT

Oncology Endpoints in Reimbursement Decision-Making: Are We Keeping Pace with the Science?

In this webinar, the speakers will represent differing perspectives on the solutions to achieve patient access

in the absence of mature overall survival data. Included will be an outline of how we can use alternative context-relevant endpoints to inform decision-making.

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June 23 | 11:00AM EDT

Distributional Cost-Effectiveness Analysis to Inform Healthcare Decisions

This webinar will provide an educational opportunity for ISPOR members to learn about the methods for conducting distributional cost-effectiveness analysis and the resulting equity impacts and trade-offs.

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ISPOR Education

Virtual ISPOR Short Courses



June 8-9 | 10:00AM – 12:00PM EDT

Advanced Patient-Reported Outcomes

This course will present steps for successful implementation of PROs in the drug development process that includes: PRO instrument selection, psychometric evaluation, data capture, and interpretation to navigate regulatory, reimbursement, and market access drug development hurdles. Psychometric measurement properties and interpretation of meaningful change for PRO measures will also be reviewed.

June 22-23 | 10:00AM – 12:00PM EDT

Patient Engagement in Medical-Product Research and Development

This half-day course is designed to provide participants with an introduction to patient engagement (PE) in medical-product research through defining PE and providing its historical context and significance throughout ISPOR's HEOR taxonomy. This course will also equip attendees with tools to plan and implement meaningful PE activities in their respective areas of research expertise (eg, clinical development, epidemiology, health economics, real-world evidence, etc).

June 29-30 | 10:00AM – 12:00PM EDT

Economic Model Review: Quality Control, Strategic Assessment and Reporting Standards

The aim of this course is to explain and demonstrate the steps that are involved in assessing the quality of pharmacoeconomic models, including technical checks regarding the 'wiring' of the model, the assessment of the analytical techniques used to generate model inputs and outputs, and the importance of strategic review and assessment.

July 13-14

10:00AM – 12:00PM EDT

Introduction to Use of Electronic Health Record Data for Health Technology Assessment

Electronic health records (EHRs) are increasingly available for health economics and outcomes research yet are unfamiliar to many researchers and analysts. This introductory course will focus on principles for understanding the EHR and how it may be used for research and inform Health Technology Assessments.

July 19-20 | 10:00AM – 12:00PM EDT

Multiple Imputation Methods for Addressing Missing Data in Health Economic Evaluation

This course offers an in-depth description of multiple imputation (MI) methods for addressing missing data in cost-effectiveness analyses (CEA). The course provides an overview of the basic principles of MI, as well as more advanced approaches for handling complex features, such as clustering and missing not at random. We illustrate the methods through a series of trial-based CEAs using Stata.

July 26-27 | 10:00AM – 12:00PM EDT

Introduction to Modeling Methods

This course is an introduction to basic modeling methods including decision trees, Markov models and other simulation methods used in pharmacoeconomic evaluation and outcomes research. The course will use the ISPOR-SMDM Joint Modeling Good Research Practices Task Force to explore when and how modeling should be used in economic evaluation and which are the suitable model techniques.

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The Societal Impact of COVID-19

By Ilze Abersone, MS,
Research Consultant, Vital Statistics Consulting,
Hoboken, NJ, USA

It had probably been at least a decade since I last took time off due to an illness. But then one day in early January, as Omicron was sweeping through the United States, I too received a positive PCR test result and became one of more than half a billion people worldwide who by May 2022 had gotten infected by SARS-CoV-2 virus.¹ Being generally healthy and fully vaccinated, I was back on my feet after a couple of feverish days and a few weeks of what would be considered mild illness. Many, however, have been far less fortunate and have either directly experienced severe or long-term COVID-19, suffered from an overwhelmed healthcare system, or encountered great societal and economic consequences of this public health emergency. As we move into the third year of this pandemic, it is important to look back and evaluate the shortfalls and successes that could help us manage future infectious disease outbreaks.

Where the healthcare system fell short during the pandemic

In the first half of 2020, the World Health Organization declared COVID-19 a global pandemic, and personal consumption expenditures on health services in the United States dropped by more than 30%.² This was largely due to the disruption and cancellations of routine prescheduled examinations and preventive procedures. Many healthcare professionals, including Ethan Chapin, MD, an emergency medicine physician and Director of the Urgent Care and Occupational Health at Colley Dickinson Health Care in Amherst, MA, USA, are worried that consequences of this (mostly) outpatient care disruption could have a catastrophic long-term impact on the population. “If you delay screening exams or checkups for a 2-year pandemic, that’s 2 years during which a stage 1 cancer can go to stage 4. In the worst-case scenarios, this delay is between life or death.” Two years later, although improving, we still have not fully returned to the pre-pandemic levels for these preventive procedures, and the National Cancer Institute predicts that by 2030 forgone colonoscopies and mammograms may cause up to 10,000 excess colorectal and breast cancer deaths, potentially turning one public health crisis into others.³

“If you delay screening exams or checkups for a 2-year pandemic, that’s 2 years during which a stage 1 cancer can go to stage 4. In the worst-case scenarios, this delay is between life or death.”

— Ethan Chapin, MD

The COVID-19 pandemic has also exposed weaknesses in our healthcare system and emergency preparedness. “The US healthcare system is not designed to accommodate large numbers of high-acuity patients or patients with severe end-stage disease entering the system all at once,” explains Chapin.

We most noticeably saw this during the first wave of infections, but the risk of overcrowded intensive care units (ICUs) and emergency rooms still persists with the appearance of every new SARS-CoV-2 variant. However, it’s not just the patients that suffer. Chapin points out that in addition to the space constraints and shortage of equipment for critically ill patients, there was a great psychological and emotional toll imposed on healthcare workers due to the lack of personal protective equipment (PPE). “Being told that the hospital couldn’t acquire it, we had to reach out to friends and family for any N95s that they might have. My dad sent me some old masks that he had saved up for woodworking.” In fact, 93% of healthcare provider executives reported that they experienced supply chain shortages⁴ and most of these providers are now preparing for increased spending on tools that could help foresee and manage any future large-scale disease outbreaks.

Predictive modeling as a tool during an evolving public health emergency

As COVID-19 was spreading across the globe, many analysts and statisticians were rushing to create dynamic epidemiological models that could predict infection and vaccination rates, mortality, ICU capacity, as well as the effect of public health mitigation measures on the viral spread containment. Generally, these forecasts have

“Not only are you dealing with differences across individuals, but also within individuals over time. People are getting burned out in terms of mitigation measures.”

— Jessica Steier, DrPH

improved over time and can paint a fairly accurate picture of healthcare resource capacity, but Jessica Steier, DrPH, CEO of Vital Statistics Consulting and Cofounder of the Unbiased Science Institute in Amherst, MA, USA, admits that such models are only useful to an extent because “there are variables that impact how realistic they can be. We are dealing with a completely novel virus that is mutating and each variant is behaving differently in terms of infection rates and disease severity.” However, it’s not all about the virus itself. Another major barrier to creating accurate models is human behavior. We have seen throughout the pandemic that individual behavior matters—and it can greatly affect the rate at which an infection spreads. Standard SIR models, which divide populations into “Susceptible,” “Infectious,” and “Recovered,” are often used in other infectious disease (eg, influenza) evaluations, but they fall short in capturing rates that continuously change in response to both pandemic fatigue and local and federal government actions. More importantly, Steier adds that, “Not only are you dealing with differences across individuals, but also *within* individuals over

time. People are getting burned out in terms of mitigation measures.” Compliance with nonpharmaceutical interventions is challenging to predict with great accuracy using current modeling methods. Therefore, many stakeholders have been pushed to investing in more sophisticated predictive forecasting that, among other methods, utilizes machine learning for policy evaluation and decision making. While epidemiologists rightfully have been at the forefront of COVID-19, health economists too have played a major role in evaluating the impact of this pandemic. Governments around the world have been pouring an unprecedented amount of financial relief into the healthcare sector to prevent it from collapsing. For example, it is estimated that on average, a COVID-19-associated hospitalization in the United States costs anywhere from \$20,000 to \$25,000, imposing a huge economic burden on both private payers and the government. In addition, in the second half of 2021, preventable hospitalizations among the unvaccinated population alone cost nearly \$14 billion.⁵

“Often in public health we focus on health outcomes in terms of morbidity and mortality, but it’s important to look at the major economic, mental health, and employment impacts because they have real-life implications.”

— Jessica Steier, DrPH

With vaccinations widely available and various therapeutics in the pipeline, payers are turning to comparative cost-effectiveness models for intervention decision making. However, more evidence increasingly points to the fact that recovering from COVID-19 is more complex than initially thought. Lingering health effects of postacute sequelae of SARS-CoV-2 infection are common and can affect one’s productivity and wellness long-term.

Looking beyond the effect on healthcare and planning ahead

It is important to recognize that the response to the COVID-19 pandemic has involved a lot more than just the healthcare sector. In fact, there likely isn’t a single socioeconomic system that was not in one way or another affected by the extraordinary amount of mitigation measures and restrictions imposed by local and national governments. As administrations were dealing with the tradeoffs between health and economic implications, it created an immediate negative effect on labor market, education, housing, environment, and many other social sectors. It is therefore important to recognize and evaluate the broader societal impact of this pandemic. “Often in public health we focus on health outcomes in terms of morbidity and mortality, but it’s important to look at the major economic, mental health, and employment impacts because they have real-life implications,” said Steier. Losing your job or

working from home while having to oversee the schoolwork for your children is likely to create not only physical burnout, but also emotional exhaustion, substance abuse, and even domestic violence, leaving significant long-term impacts on quality of life.

While it will take a while to fully evaluate and understand both the health and economic burdens that this pandemic has imposed on our society, there are some steps that health economics can take now to plan for the future. For example, we need cross-sectional approaches that evaluate health and social factors, as well as the economic impact and burden on both the healthcare system and individuals. It is important to look at comparative cost-effectiveness of both pharmaceutical and nonpharmaceutical interventions because we have to understand the health and economic outcomes of the various vaccination programs.

Growing sentiment of distrust in the scientific establishment is a major issue that has increased vaccine hesitancy among certain populations and calls for community-based approaches. Steier recognizes that in these instances, scientific communication has to occur through grassroots local efforts, local communities, and community-based organizations in order to yield better outcomes. In fact, previous studies have shown that peer-to-peer education about vaccinations can result in higher rates of vaccine uptake. In addition to healthcare interventions and evaluations, quality-of-life studies are needed to understand the patient perspective and their expectations.

The field of health economics and outcomes research has all the tools needed to assist in evidence generation either through real-world evidence, retrospective data analysis, patient voices, or some other mechanism. Applying these insights to stakeholder decisions and policy making would bring us closer to evidence-based decision making in the future.

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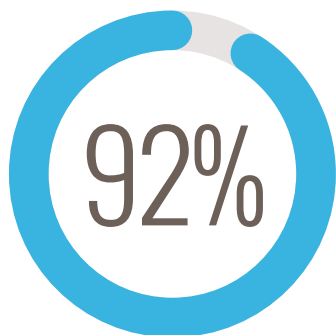
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By the Numbers: Evaluating the COVID-19 Crisis From a Health Economic, Medical, and Societal Perspective

Section Editor: The ISPOR Student Network

Contributors: Ingrid A. Cox, University of Tasmania, Hobart, Australia; Tyler D. Wagner, Virginia Commonwealth University, Richmond, USA; Jacinda Tran, University of Washington, Seattle, USA; Chintal Shah, University of Maryland, Baltimore, USA

Disruption of continuity of care by healthcare setting during the pandemic



117 of 127 countries reported some extent of disruptions in at least one essential health service



Primary care **53%**



Emergency, critical & operative care **38%**



Elective surgeries **59%**



Rehabilitative services **52%**



Community care **54%**

Disruption data reflect the percentage of countries reporting.

Percentage of countries reporting disruptions of at least 75% or more in essential health services by income group

Percentage of Countries (n = 105) and income group

45%

Low income (n=22)

30%

Lower middle income (n=33)

13%

Upper middle income (n=13)

4%

High income (n=27)

Perspectives of economic evaluations of COVID-19 policies

33.3%

Societal

8.3%

Societal and healthcare payer

58.3%

Healthcare payer

Exploring the Economic and Social Dimension of COVID-19 Vaccination Using a Budget Impact Analysis

Matthäus Traunfellner, MSc; Franz Meyer, BA; Evelyn Walter, PhD, Institute for Pharmoeconomic Research, Vienna, Austria

Nonpharmaceutical interventions, improved diagnostics, and treatment options have mitigated the burden of COVID-19, yet vaccination has proven to be the most effective tool against the spread of the disease.

Well-suited economic evaluation instruments help policy makers and payers understand the past and future value of COVID-19 vaccination to the general public.

The number of COVID-19 cases is lower in a “world with vaccination” versus a “world without vaccination.” 581,406 cases can be averted over the entire observation period.

Background

Since the outbreak of the COVID-19 pandemic in early 2020, more than 500 million infections and more than 6 million deaths have occurred globally.¹ To date, the increase in morbidity and mortality associated with COVID-19 has come with enormous financial expenditures for national healthcare systems and societies around the world. Nonpharmaceutical interventions (NPIs), improved diagnostics, and treatment options have mitigated the burden of COVID-19, yet vaccination has proven to be the most effective tool against the spread of the disease.²

However, implementing a successful vaccination campaign incurs high upfront costs for procurement, logistics, and administration of the vaccine, not to mention the intense dedication of medical resources during periods of high viral incidence. Many individuals

must be vaccinated within a limited time period to achieve the desired protective effect so that unvaccinated individuals may benefit through herd immunity.³ The emergence of new viral variants with altered immunological and epidemiological characteristics, as well as the decline in vaccine-induced immunity, also necessitate long-term participation of broad segments of the population in a COVID-19 vaccination program. Given the aforementioned efforts, well-suited economic evaluation instruments help policy makers and payers understand the past and future value of COVID-19 vaccination to the general public.

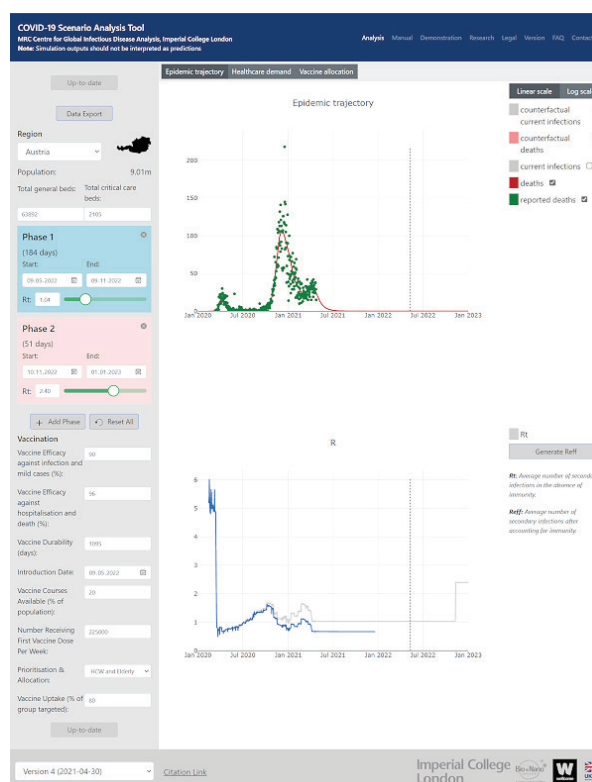
Reliable and understandable information obtained in this way can be an important contribution to convincing previously hesitant individuals of the benefits of vaccination. In addition, confidence in vaccination can be reinforced in those who have already been vaccinated,

thereby maintaining a willingness to receive booster vaccinations after vaccine-induced immunity has waned. Both effects are important to ensure the sustainable success of the vaccination campaign in the future. In this paper, we analyze the financial and public health impact of COVID-19 vaccination using the Austrian healthcare system and society as examples.

Our Approach

We performed a budget impact analysis (BIA) to quantify the expected monetary and societal impact of COVID-19 vaccination in Austria. The BIA compares a “world with vaccination” (real-world scenario) to a “world without vaccination” (counterfactual scenario). The model captures the number and costs for hospitalizations, rehabilitation, work absences, and loss of human capital for deceased adult patients in 3

Figure 1: COVID-19 Scenario Analysis Tool.*



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different age categories (18-49 years, 50-64 years, ≥ 65 years). Vaccination costs are only considered for the vaccination-eligible population in the “world with vaccination” scenario. The time horizon of the model is 2021 to 2023.

The trajectory of COVID-19 cases, hospitalizations (normal ward, intensive care unit [ICU]), and deaths for the “world with vaccination” and the “world without vaccination” scenario was performed using an online age-structured susceptible-exposed-infectious-removed (SEIR) model for COVID-19 transmission, which was adapted to capture the loss of immunity over time and to model the effects of vaccination.^{4,5} The SEIR model allows the user to provide inputs on the availability of hospital beds, the effectiveness and availability of used vaccines, the vaccination coverage rate of the adult population, as well as the time-varying reproduction rate R_t (Figure 1). The sources of clinical and cost data are provided in Table 1.

Results

The savings in direct costs, indirect costs, vaccination costs, and the total expected budget impact for the years 2021 to 2023 is shown Table 2.

Table 3 summarizes the number of prevented COVID-19 cases, prevented hospitalizations (normal ward and ICU), prevented deaths, prevented quarantines and sick leaves.

Table 2: Total budget impact of vaccination in Austria.

	Cost Difference			
	Direct cost	Indirect cost	Vaccination cost	Budget impact
2021	-505,089,924	-989,817,587	566,911,242	-927,916,268
2022	-461,631,312	-798,751,585	222,600,729	-1,037,782,168
2023	-436,687,020	-797,188,513	0	-1,233,875,533
2021-2023	-1,403,408,256	-2,585,757,685	789,591,971	-3,199,573,969

All costs provided in Euros.

As shown in Table 2, annual savings in a “world with vaccination” versus a “world without vaccination” range from €927.9 million in 2021 to €1.2 billion in 2023 [total: €3.2 billion]. For direct costs, savings range from €436.7 million in 2023 to €505.1 million in 2021 [total: €1.4 billion]. There are also savings for society. Indirect cost savings range from €797.2 million in 2023 to €989.8 million in 2021 [total: €2.6 billion]. The national health system incurs additional costs for vaccinations ranging from €0 in 2023 to €567.0 million in 2021 [total: €789.6 million].

The number of COVID-19 cases is lower in a “world with vaccination” versus a “world without vaccination.” 581,406 cases can be averted over the entire observation period. Additionally, 105,348 hospitalizations in the normal ward, 20,610 ICU admissions, 28,611 rehabilitations and 28,611 deaths can be prevented. Finally, 455,448 quarantines and 125,958 sick leaves can be avoided

by vaccinating the Austrian population during 2021 to 2023 (Table 3).

Limitations

The present study is associated with certain limitations that must be considered when interpreting the results and applying them to decision-making processes. The model assumes a constant vaccination rate in the adult Austrian population with respect to the first vaccination series and an additional booster vaccination. This assumption is confirmed at the time of the data cut (November 2021) by real-world and representative survey data.⁶ Lower vaccination rates with booster vaccinations would have a correspondingly lower impact on costs and public health, so future compliance in the population to be vaccinated must be considered. The extent of the long-term consequences of COVID-19 or “long COVID” was difficult to estimate at the time the BIA was drafted; short-term treatment costs for rehabilitation were considered. It is conceivable that additional costs for long-term treatment of patients with long COVID will be incurred in subsequent years. The model does not account for the emergence of new viral variants with altered characteristics of transmission, morbidity, mortality, and vaccine resistance because robust data on the emergence of new viral variants were not available at the time the model was created. In particular, since the emergence of the omicron variant, the incidence, morbidity, and mortality of COVID-19 infections in Austria and worldwide has changed dramatically. Newly developed SEIR models that predict the impact of vaccination in respect of increased vaccine resistance, waning of naturally acquired and vaccine-induced immunity, as well as population exposure to previous virus variants, are now available.⁷ Revised

Table 1: Prevented quarantines and sick leaves.

Clinical Data	
Vaccine effectiveness data	EMA published documents
Vaccination coverage rate	Austrian Corona Panel Project (ACPP)
Age-specific probabilities for symptomatic infections, hospitalizations, LOS, CFR	Austrian Agency for Health and Food Safety (AGES), literature
Percentage of patients requiring rehabilitation	Literature
Employment rate by age group	Statistics Austria 2021
Recommended vaccination schedule by age group	Austrian National Immunization Panel (NIG)
Costs	
Hospitalization	Austrian DRG catalogue 2021
Rehabilitation	Austrian social insurance institutions
Median income by age group	Statistics Austria 2021
Vaccine acquisition and administration	UNICEF, Austrian law on the implementation of vaccination against SARS-CoV-2 in the office-based sector

CFR indicates case fatality rate, LOS the average length of stay and DRG diagnosis-related group

BIAs incorporating these relevant factors for budget and public health impact of COVID-19 vaccination are areas for further research.

Closing thoughts

Vaccines represent the most important intervention to reduce the likelihood and consequences of COVID-19 infection. Downstream effects of COVID-19 infection such as work absenteeism, hospitalization, rehabilitation, and death can therefore be largely reduced. However, the implementation of successful vaccination campaigns involves high upfront costs for payers and depends on high vaccination coverage in the eligible population. National, regional, and global decision makers, therefore, need transparent and comprehensive tools that are easily adaptable to the dynamic evolution of the pandemic to justify spending on vaccines and to communicate the importance of widespread vaccination programs to the public. Economic evaluation methods such as budget impact analyses are useful tools to accurately assess the value of vaccination to the healthcare system and society as a whole.⁸

Vaccines represent the most important intervention to reduce the likelihood and consequences of COVID-19 infection.

Our results show that the vaccination campaign in Austria has the potential to significantly reduce costs for the healthcare system and society in the period from 2021 to 2023. Savings of €1.4 billion in the healthcare system and €2.6 billion in society are offset by expenditures of €789.6 million for the procurement and administration of vaccines. In addition, 581,406 infections and 28,611 deaths can be prevented between 2021 and 2023.

Although this study is based on an Austrian perspective, we assume that our results are generalizable to European countries with similar healthcare systems, population structure, and vaccination strategy.

Table 3: Prevented COVID-19 cases, hospitalizations, rehabilitations, deaths, quarantines, and sick leaves in Austria due to vaccination.

Disease Burden				
	2021	2022	2023	2021-2023
COVID-19 cases	-281,300	-150,576	-149,530	-581,406
Hospitalization, normal ward	-39,165	-33,902	-32,281	-105,348
Hospitalization, ICU	-6,821	-7,382	-6,406	-20,610
Rehabilitation	-10,291	-9,160	-9,160	-28,611
Deaths	-10,291	-9,160	-9,160	-28,611

Work Absences				
	2021	2022	2023	2021-2023
Quarantine (n)	-235,313	-109,292	-110,843	-455,448
Quarantine (d)	-1,882,508	-874,334	-886,742	-3,643,584
Sick leaves (n)	-45,987	-41,284	-38,687	-125,958
Sick leaves (d)	-541,725	-501,421	-463,748	-1,506,894

All costs provided in Euros.

d indicates days; ICU, intensive care unit; n, number.

However, Austrian peculiarities include the exceptionally high testing rate and the relatively low vaccination compliance of the population, especially for booster vaccinations. When transferring our methodology to other country contexts, it is important to use appropriate and recent data on the aforementioned factors. In addition to the Imperial College London model used (no longer

Medicine,⁹ which have implemented regularly updated country-specific data from low-, middle-, and high-income countries. In addition to the effect of vaccination, these models can also be used to simulate the impact of policy decisions such as travel restrictions, isolation of vulnerable groups, and various testing strategies on pandemic outcomes. Economic models such as budget impact models built on the results of these models then allow the economic and public health impacts of these interventions to be determined. The simplicity and adaptability of the analyses enable continuous adjustment of estimates to dynamic changes in the epidemiologic situation. This is necessary, among other things, when the spread of new COVID-19 variants with altered transmission, morbidity, and mortality parameters; improved pharmacological treatment; or the introduction of new variant-adapted vaccines change the epidemiological situation.

In summary, economic evaluations such as the BIA, which are based on robust and transparent epidemiological models, provide decision makers with reliable and understandable information for the economic and public health value of measures set in the wake of

The simplicity and flexibility of the methodology will allow government agencies to rapidly assess the financial and public health implications of adapted vaccination strategies as the epidemiological context changes.

updated at the time of this writing), user-friendly models have been developed by the University of Washington Institute for Health Metrics and Evaluation and the Centre for Mathematical Modelling of Infectious Diseases at the London School of Hygiene and Tropical

the COVID-19 pandemic. The simplicity and flexibility of the methodology will allow government agencies to rapidly assess the financial and public health implications of adapted vaccination strategies as the epidemiological context changes.

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COVID-19: A Bad Scar on Surgical Activity

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The study focused on 3 time periods corresponding to the lockdowns that were implemented in France in March 2020, October 2020, and April 2021.

Results indicate that lockdown periods were associated with a significant decrease (-24%) in overall surgical activity, especially nonurgent surgeries.

This work represents a first step in assessing the indirect burden caused by the pandemic. One immediate step would be to translate the decrease in surgical activity into monetary value by linking hospitalization costs to our results.

Introduction

The COVID-19 outbreak in early 2020 overwhelmed healthcare systems worldwide. Following the first cases detected in Wuhan, China, the Sars-CoV-2 spread swiftly across the globe, infecting millions of individuals in record time. Hospitals were quickly overloaded due to the resulting surge in activity, and healthcare professionals had to adapt their practices to face the crisis.

When facing a sudden increase in patient influx, one common response for hospitals is to postpone or cancel surgeries so that staff and equipment can be reallocated to intensive care units. However, when used over long periods of time, this strategy can lead to delays in diagnosis and treatment, resulting in significant losses of chance for patients. Considering the pandemic is still ongoing, it can be expected that COVID-19 is responsible for a substantial indirect health burden represented by postponement or absence of appropriate care in time.

COVID-19-related lockdowns were associated with a decrease in surgical activity and especially nonurgent surgeries.

A national lockdown was declared in France on March 16, 2020, and soon after, the Ministry of Health and regional health agencies issued a list of interventions that were considered urgent and interventions that could be delayed.^{1,2} We conducted a study to assess the impact of COVID-19 on surgical activity,

leveraging data from a university teaching hospital located in Paris, France. Following the recommendations from the Ministry of Health, we assumed urgent surgeries would not be impacted by the pandemic while nonurgent surgeries would either be delayed or canceled.

Assessing the impact of COVID-19 on surgical activity

The study was conducted in a French university teaching hospital of 400 beds equipped with 10 operating theaters and performing more than 17,000 surgeries per year. All surgeries for the period between January 2017 and April 2021 were extracted, and 7 surgeries of interest were considered and labeled as urgent and nonurgent by the authors (AL, LP, and PN) (Table 1). The study particularly focused on 3 time periods corresponding to the 3 lockdowns that were implemented in France in March 2020, October 2020, and April 2021. We assumed those periods would be associated with high COVID-19 activity levels, translating into a decrease in activity for nonurgent surgeries and a steady activity regarding urgent surgeries. The weekly count of surgeries was analyzed using statistical models that account for the time dimension within the data in order to measure the effect of COVID-19-related lockdowns on surgical activity.

Our results indicate that lockdown periods were associated with a significant decrease (-24%) in overall surgical activity (Figure 1, Table 2). This decline was mainly represented by nonurgent surgeries (consistent with the recommendations), and the weekly number of hip arthroplasty, forefoot, and cataract surgeries dropped by 38%, 48%

Table 1: Surgery selection.

Urgent Surgery	<ul style="list-style-type: none"> Appendectomy 	<ul style="list-style-type: none"> Osteosynthesis (Hip)
Non-Urgent Surgery	<ul style="list-style-type: none"> Forefoot surgery Cataract surgery Cholecystectomy 	<ul style="list-style-type: none"> DAVF Total hip arthroplasty

DAVF indicates dural arteriovenous fistula.

and 64%, respectively. These results were in line with our initial hypothesis and show that COVID-19-related lockdowns were associated with a decrease in surgical activity and especially nonurgent surgeries. The decrease in activity can be explained by the fact that equipment and staff were re-allocated to treat COVID-19 patients. Particularly, ventilators were on high demand to treat severe COVID-19 patients while additional skilled personnel were required to perform and monitor intubations.

Inversely, increases in urgent osteosynthesis (hip) activity (+46%) and appendectomy (+24%) were observed, although results for the latter were not significant (Table 2). Results for urgent osteosynthesis (hip) can partially be explained as the hospital where the study was conducted specialized in orthopedic surgery, and it is possible that patients from nearby structures were transferred there to be treated. Another element to consider is that lockdowns may have been associated with increased risk of hip fractures, especially in elderly populations. As movements and services were limited during lockdown periods, it is possible that elderly had to take on more tasks than usual, translating into higher risks of falls and fractures. Additionally, it is likely that lockdowns were also responsible for physical inactivity, which is a risk factor associated with falls.³ However, opposite results were reported in the literature and particularly in Paccou et al who concluded to a reduction in hospitalizations for hip fractures of 11% during the first lockdown compared to a similar time period in 2019.⁴ The study was also conducted in France and leveraged the French national hospital database, gathering a total cohort of 91,160 patients. Although the results from Paccou et al should be kept in mind, they cannot be directly compared to ours because the authors focused on the first lockdown while we considered all 3 lockdowns. As such, further research is needed to confirm our hypothesis. Finally, we noted the effects of lockdowns on surgical activity were not observed immediately, but on average, with a 3-week delay (all lockdowns considered). Although our study considered a monocentric setting, the selection of a large time horizon

Figure 1: Evolution of surgical activity from 01/2017 to 07/2021 (all surgeries).

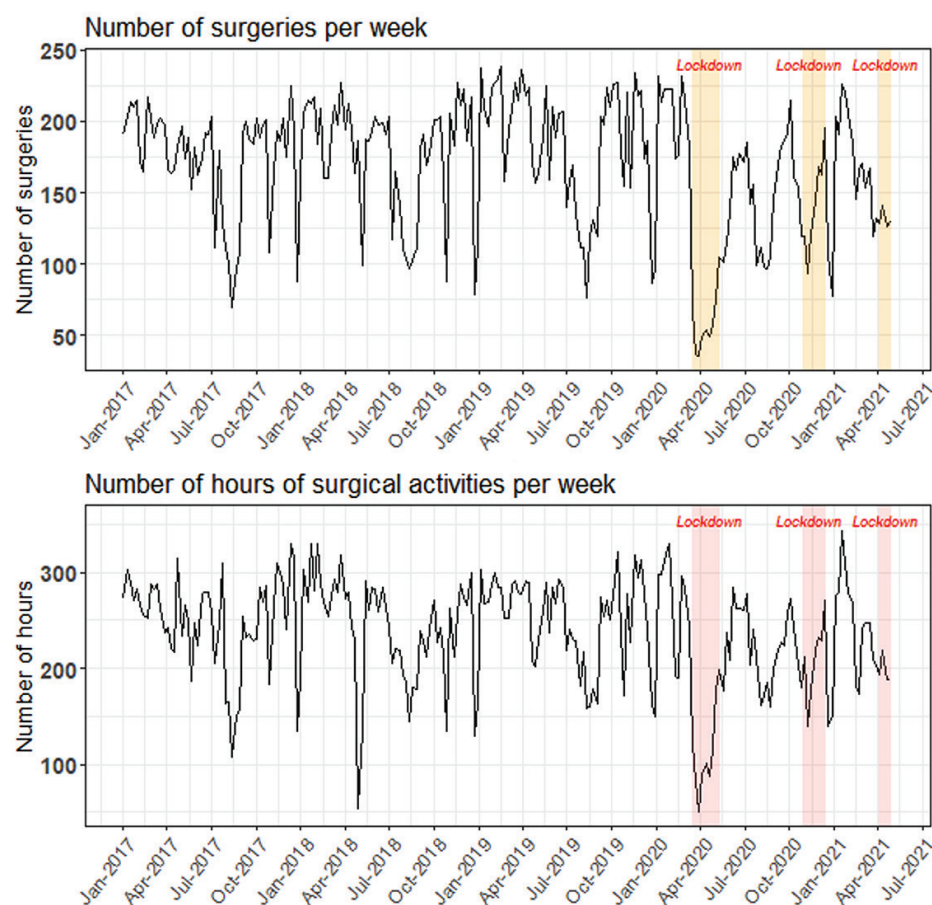


Table 2: Impact of lockdowns on surgical activity.

	Variation in activity following lockdown	CI _{95%}	Delay (weeks) [†]
Surgery (All)	-24%**	(-35% ; -11%)	3
Surgery (Urgent)	+5%	(-5% ; +16%)	3
Osteosynthesis (Hip)	+46%*	(+6% ; +99%)	3
Appendectomy	+24%	(-12% ; +74%)	3
Surgery (Non-urgent)			
Total hip arthroplasty	-38%*	(-60% ; -5%)	3
Forefoot surgery	-48%**	(-65% ; -21%)	3
Cataract surgery	-64%***	(-70% ; -56%)	0
DAVF	-25%	(-61% ; +35%)	3
Cholecystectomy	-3%	(-33% ; 38%)	3

CI indicates confidence interval; DAVF, dural arteriovenous fistula.

Note: Quarters and Years were added as controls in the regression models.

*/**/** Value is statistically different from 0% at the level of significance of 5% / 1% / 0.1%.

[†] Number of weeks elapsed before observing the effect of lockdowns.

and control period (4 years and 3 years respectively) brings a sound robustness to our results.

One limitation of our work is that patient transfers across hospital were not taken

into account. Indeed, patient transfers were common during the pandemic to reduce the strain of the pandemic on highly affected geographical areas like the Paris region. A second limitation lies in the choice of surgery types selected

for this study. The study center being highly specialized in orthopedic surgery, most of the included surgeries were related to this specialty, and hospitals specialized in different areas might not show similar results.

This work represents a first step in assessing the indirect burden caused by the pandemic and one immediate step would be to translate the decrease in surgical activity into monetary value by linking hospitalization costs to our results. More challenging research would involve assessing the impact of delays on quality of life and involve clinicians in extrapolating what could have been the consequences in terms of disease progression and/or loss of chance for patients. Ultimately, our insights advocate for broadening the scope of indirect burden and not limit it to wage loss as is commonly seen in economic evaluations. Expanding the scope of indirect burden could be considered in future health economic evaluations related to infectious diseases susceptible to overload healthcare systems such as COVID-19, influenza or, respiratory syncytial virus and would allow for further reinforcing the value of vaccination.

Looking ahead

To this date, the COVID-19 pandemic is estimated to be responsible for more than 22 million cases and 100,000 deaths in France.⁵ Although this direct burden is important, it can be assumed that the virus is linked to an equally significant indirect burden, delays in surgery being one aspect of it. Delays

will probably have a substantial impact in the near future as patients who required intervention would see their conditions progress and/or deteriorate. In our study, it is likely that delays in forefoot surgery or total hip arthroplasty translated into reduced mobility and additional pain for patients, ultimately leading to a degraded quality of life for an extended period of time.

A similar observation can be made regarding delays in diagnosis as the CDC has already observed a drop in cancer screenings of 87% for breast cancer and 84% for cervical cancer in April 2020 compared to the previous 5-year averages.⁶ The health and economic consequences of delays were modeled in a UK study that estimated delays in diagnosis for 4 different cancer sites (breast, colorectal, esophageal, and lung cancer) following the first COVID-19 wave would result in 32,700 QALY and £103.8 million lost in the next 5 years.⁷

Delays will also take time to resorb, translating into longer waiting lists for patients and additional and continued efforts required from healthcare professionals. Furthermore, many individuals have developed a fear of the virus over the pandemic and have avoided contacts with healthcare professionals and would then need to be encouraged to swiftly seek care again.⁸

Although literature on this topic is continuously being added, delays in surgery and diagnosis only represent a proportion of the indirect health burden of COVID-19 and future research should

also focus on other areas such as the impact of COVID-19-related lockdowns on physical/mental health/education and consequences on healthcare providers.

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Implementing Data Lessons From COVID-19 Could Improve Health Policy Decisions for Cancer Care

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The spillovers from COVID-19 had detrimental effects on cancer care and patients, resulting in delayed diagnoses and treatments.

While the universal “stay at home” public health advice proved successful at preventing patients with cancer from contracting COVID-19, these policies reduced capacity in healthcare settings, which often translated to reduced or suspended cancer screening services.

Applying the real-time data collection and analysis practices employed for COVID-19 to cancer care could improve the quality and quantity of evidence available to inform decision making.

COVID-19 detrimentally disrupted many facets of life, including how we collect and report disease incidence. The number of COVID-19 cases diagnosed and the associated numbers of patients hospitalized and in intensive care were published daily for nearly every country around the world. Individuals downloaded apps to their phones showing breakdowns of this data by location. This mass real-time data reporting represents a monumental change in how data on disease incidence are captured, analyzed, and published. The availability of these real-time data provided vital timely information to policy makers and their advisors, priming them to make public health decisions and issue guidance.

Inefficiencies and Imperfect Information

COVID-19 created further inefficiencies (in the allocations of goods and services) and information asymmetries in the delivery of healthcare services, both of which already plague the healthcare industry and can lead to market failures. In general, much inefficiency in the delivery of healthcare arises from unnecessary services, medical errors, or underuse of beneficial interventions.¹ The initial “stay at home” public health advice as an infection protection measure reduced capacity in healthcare settings which, coupled with the redeployment of health services staff, translated into reduced or suspended services. So, while some services were inundated, others were underused, causing delayed diagnoses, treatments, and canceled procedures, including surgeries.

Traditionally in healthcare we think about individuals having imperfect information and therefore relying on healthcare providers (who have more information) to act as gatekeepers or principals to make the best decisions or recommendations for them. COVID-19, like other new conditions and variants, introduced another source of uncertainty—healthcare providers lacked information

on the virus, how it spread, the incubation period, symptoms, and effective treatments. Very rapidly, public healthcare officials and organizations, along with clinicians and even politicians, recognized the need to collect data on the incidence and associated factors of COVID-19. And so, it was collected, analyzed, and published daily. These “big data” provided valuable real-time information, which reduced some of the imperfections and uncertainties of information, informed modeling, and ultimately informed healthcare policy decision making. Within weeks, data capture and analyses for the novel virus was light years ahead of traditional disease reporting. Similar efforts are underway for reporting vaccine uptake. The incentives for this rapid progress are clear—COVID-19 was not only disrupting individual's health but also national and global economies.

The availability of these real-time data provided vital timely information to policy makers and their advisors, priming them to make public health decisions and issue guidance.

But COVID-19 isn't the only healthcare crisis facing us. The commitment to and investment in capturing data on COVID-19 needs to be applied to other areas to enhance health policy, including, but not limited to, cancer. One in every two people are now predicted to develop cancer in their lifetime^{2,3} with over 19 million new cancer cases being diagnosed annually.⁴ The spillovers from the COVID-19 disruptions have detrimental effects in other disease areas (including cancer), owing to the opportunity costs associated with stay-at-home orders, reduced capacity, and paused services causing delayed diagnoses and treatments.⁵

Cancer Incidences Continue to Grow

As cancer incidences continue to grow internationally, early detection is vital to improving health outcomes and mortality. This is facilitated through cancer screening programs and referrals from general practitioners, both of which have been impacted by COVID-19, causing what some are calling “a cancer pandemic”⁶ with missed and late diagnoses. To realize the European Commission Cancer Mission, “By 2030, more than 3 million lives saved, living longer, and better,”⁷ this cancer pandemic needs to be halted and remedied. More, better quality, and earlier data could help.

Within weeks, data capture and analyses for the novel virus was light years ahead of traditional disease reporting.

Over the past 2 decades, cancer screening has become a vital component of public and preventive health in most developed countries. It enables early identification of patients, often at a presymptomatic stage (ie, before patients experience any symptoms). This facilitates early treatment, hopefully mitigating symptoms and other consequences, thereby improving health outcomes of the population at a reasonable cost. Furthermore, as disease detected earlier can be treated easier and less expensively, screening programs are considered to be cost-effective.⁸ That is to say, the additional costs are worth the additional benefits. As a result, screening for several cancers including breast, cervical, and colorectal cancer are recommended in many countries.⁹

For others, early symptoms may be detected during routine or dedicated consultations with general practitioners who refer the individual on for diagnostic tests. However, during the pandemic, opportunities for seeking help were also reduced with diminished general practice services and the move to teleconsultations. Furthermore, individuals’ fears of clinical environments, owing to risk of contracting COVID-19, altered their health-seeking behaviors with some people avoiding preventive

and primary care even where these were available to them.⁵

Impact of COVID-19 on Cancer Services

While the universal “stay at home” public health advice proved successful at preventing patients with cancer from contracting COVID-19, these mandates/policies, coupled with the redeployment of staff, reduced capacity in healthcare settings, which often translated to reduced or suspended cancer screening services.

A recent review of international literature by a team of researchers in University College Cork examining the impact of COVID-19 on patients with cancer found evidence that between 30% to 92% fewer screening tests were performed in 2020 compared to the same period in 2019.⁵ This significantly reduced the number of new cancers diagnosed, a worrisome trend as you are more likely to survive cancer if you find it at an early stage. Early estimates of the downstream effects are sobering. For example, one study based in the United Kingdom suggests 3500 colorectal cancer cases were missed during the pandemic, as there was a 92% reduction in colorectal screenings.¹⁰ The review also found segregated evidence of treatment delays, postponements, cancellations, and deaths.

We can learn from the innovative data approach adopted to inform polices during COVID-19 to establish, strengthen, and integrate data collection in cancer diagnosis and management services.

While many screening services have resumed, some people are still fearful of getting COVID-19 in clinical environments. In many areas, service levels are still reduced to adhere to public health guidelines so beneficial interventions continue to be underused. Furthermore, there are backlogs so it is likely that many patients will continue to be diagnosed at a later stage when

treatment is more complex. This “cancer pandemic” impacts patients’ quality of life as well as their health outcomes and ultimately survival. This also increases demand for cancer treatment services, which are already stretched in most jurisdictions.

Additionally, underusing these beneficial interventions or employing treatments at suboptimal stages impacts the expected value of these interventions, worsens health outcomes, and increases healthcare expenditures. To reduce inefficiencies arising from underutilization and attain the expected clinical and cost-effectiveness, the services need to be re-established, with redeployed staff reinstated, and attendance levels returned to pre-COVID-19 levels.

Having real-time data in all health areas would improve how health policies are designed and implemented so as to deliver the right care at the right time for the right patients.

However, achieving this in the midst of an ongoing pandemic is challenging and requires real-time data. The literature review conducted by the University College Cork mentioned above included 73 papers reporting on the health impacts of COVID-19 on cancer diagnosis, treatment, and services, of which 97% used secondary data, but only 11% employed national registry-type data. The remainder relied on hospital data (84%) and/or collected primary data (7%). Those employing national registry-type data were confined to the United Kingdom, Germany, France, Slovenia, and Brazil, which represented 23% of the countries in the study.⁵ While the study-specific question does impact the data employed, these studies were conducted during phase I of the pandemic and we are confident the authors employed the best data available at the time. If more and better quality real-time data were available, it could improve the quality and quantity of research/evidence available to inform decision making.

Opportunities to Improve

It is widely acknowledged that COVID-19's disruption to cancer care will take time to resolve. Unfortunately, for many it will come too late. There is a phoenix opportunity here particularly for jurisdictions whose data systems lagged best practice (eg, no electronic health records or unique patient identifiers like Ireland).^{11,12} We can learn from the innovative data approach adopted to inform policies during COVID-19 to establish, strengthen, and integrate data collection in cancer diagnosis and management services. For example, real-time tracking tools on patient symptoms could improve health outcomes and communication with clinicians while also enhancing patients' symptom management.¹³ Tracking incidence rates, survival, and outcomes fosters and enables real-time, appropriate decision making. This high-quality research could enhance evidence-based decisions about service provision and care.¹⁴ While some health systems have sophisticated cancer registries with such ability, it can still take up to 5 years to reach 100% completion owing to late submissions and incomplete data.^{14,15} Having real-time data in all health areas would improve how health policies are designed and implemented so as to deliver the right care at the right time for the right patients; existing cancer registries provide a practical starting point.

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The Challenges of Economic Analysis of COVID-19 Interventions

A Conversation With David D. Kim, PhD, MS

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Photo courtesy of David D. Kim

Q&A

I had the opportunity to speak to David D. Kim, PhD, MS, Institute for Clinical Research and Health Policy Studies, Center for the Evaluation of Value and Risk in Health (CEVR), Tufts Medical Center, Boston, MA, USA, about the economic and societal impacts of COVID-19. We spoke about the challenges of conducting economic evaluations of COVID-related interventions and how HEOR methods and models can help inform decision making regarding the value of treatments, resource allocation, and health equity.

“It is still imperative for researchers to apply a framework that could identify and mitigate the equity harms and to generate cost-effectiveness evidence for most vulnerable populations to guide targeted interventions to improve health equity.”

VOS: The COVID-19 pandemic is devastating on the economy and society, causing human losses, suffering, and long-term consequences. You recently released a systematic review of economic evaluations of COVID-19 interventions. What were the most important nonhealth consequences of COVID-19?

David D. Kim: Undoubtedly, COVID-19 has made unfathomable health impacts, as the United States just reached more than one million COVID-related deaths, and globally, more than 6.2 million lives have been lost due to COVID-19. In the meantime, COVID-19 and interventions to prevent the spread of COVID-19, particularly nonpharmaceutical interventions (eg, stay-at-home orders and social distancing), have posed [substantial nonhealth impacts](#), including lost productivity due to COVID-19, caregiver time, increases in unemployment, sluggish economic growth, lack of educational attainment due to remote learning, and changes in motor vehicle accidents and crimes. In [our review](#) of economic evaluations of COVID-19 interventions, the most common nonhealth impacts included lost productivity because of illness, changes in gross domestic product, and education impacts.

VOS: Despite the [Second Panel's recommendations](#), many HTA agencies and researchers failed to include nonhealth consequences. Why does that happen and why is it important to include these effects in economic analyses?

DK: A [review](#) of 45 international HTA guidelines revealed that most guidelines (67%) recommend either a narrower healthcare payer or healthcare sector perspective as the reference perspective, and the use of a broader societal perspective has not gained much

traction. The lack of uptake for a societal perspective indicates some practical and analytic challenges—namely, the absence of strong incentives to consider nonhealth impacts among decision makers with explicit healthcare budgets, difficulties in changing established practices, and the lack of available data to quantify nonhealth impacts (eg, on informal caregiver time or nonlabor market productivity). Still, the lack of consideration for the nonhealth impacts of interventions could lead to an incomplete assessment of an intervention's value and potentially result in a misallocation of healthcare resources.

VOS: What do you think is an essential target for future research in this area?

DK: The COVID-19 pandemic emphasized how health impacts are closely connected with broader social impacts. It is essential for [economic evaluations](#) to account for both health and nonhealth impacts to generate reliable and comprehensive evidence on trade-offs between effects on health, health-related costs, and nonhealth impacts. As a step forward, widespread use of the [impact inventory](#) and reporting disaggregate outcomes would provide the relevant information in a comprehensive, consistent, and transparent manner to guide decision makers with different preferences. Other emerging research areas include [quantifying health equity impacts](#) and addressing the [equity-efficiency trade-offs](#); a better reflection of [individuals' risk preferences](#) in economic evaluations; consistent and reliable measurement of [novel elements of value](#) (eg, option value, value of hope, and scientific spillovers); and accounting for [implementation and behavioral factors](#) to guide resource allocation decisions.

VOS: We now have antivirals that have been found to be effective against COVID-19. What is the most difficult aspect in evaluating and applying these cost-effectiveness studies?

DK: A key challenge in evaluating therapeutic interventions and vaccines against COVID-19 is [how to assess the value of these interventions](#). Although cost-effectiveness analysis provides a useful value metric in the form of an incremental cost-effectiveness ratio, the choice of analytic perspective—that determines which costs and benefits should be considered—can influence the estimated cost-effectiveness ratio and subsequent reimbursement and coverage decisions. For example, [ICER's early assessment](#) of remdesivir focused on a healthcare sector perspective, omitting [potential nonhealth benefits](#) of increasing the healthcare system's capacity by reducing hospital length of stay. Although estimating the full value of COVID-19 interventions is difficult, an analysis accounting for the pandemic's substantial nonhealth impact will serve as an important input into pricing discussions.

VOS: Another element of the COVID-19 epidemic is how it affects diverse groups of people. How do the COVID-19 economic models address questions of equality and the differential impact of nonpharmacologic interventions on vulnerable groups?

DK: We know vulnerable populations (eg, individuals with chronic conditions, those of economic disadvantage, and people of color) are more likely to experience adverse outcomes because of COVID-19. Nevertheless, [our review](#) found that most economic evaluations only reported summary outcomes at a population level. In addition, although a handful of studies reported summary measures stratified by age groups, only 2 explicitly focused on vulnerable populations, such as [racial and ethnic minorities](#) or [individuals experiencing homelessness](#). None of the reviewed articles conducted distributional equity impact analysis. The dearth of distributional analyses is likely because of a lack of concrete estimates of the economic impacts of different initiatives on subgroups of interest. However, it is still imperative for researchers to apply a framework that could [identify and mitigate the equity harms](#) and to generate cost-effectiveness evidence for most vulnerable populations to guide targeted interventions to improve health equity.

VOS: How do you develop an economic model while dealing with the uncertainty of new virus variants and possible new waves of infection?

DK: During the pandemic, urgent public health decisions, such as whether and when to reopen schools or reinstate mask mandates, need to be made without sufficient data. [Modeling](#) has been at the forefront of [informing such decisions](#) by combining multiple data sources and assessing key assumptions. With substantial uncertainties in predicting the path of the COVID-19 pandemic, a few things would make pandemic models more useful. First, transparent reporting of key assumptions, justification of their choices, and their impacts on results (ie, robustness check) would be important to communicate. Second, [iterative and adaptive modeling](#) to reflect emerging situations and uncertainties, along with updating data inputs, is needed. Open-source models can play a key role in expanding the usability and adaptability of pandemic models. Finally, when multiple models exist, [comparative modeling](#), which combines forecasts from multiple models into a single “ensemble” forecast, could provide more [reliable and accurate predictions](#), as highlighted by the [US COVID-19 Forecast Hub](#).



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