

JANUARY/FEBRUARY 2022 VOL. 8, NO. 1

VALUE & OUTCOMES SPOTLIGHT

A magazine for the global HEOR community.



- 4 ISPOR MOVES FORWARD
- 8 THE VALUE OF INVESTING IN DIGITAL HEALTH
- 24 DELIVERING ON PROMISES
- 30 TREATMENT JOURNEY OF PATIENTS WITH COVID-19

VALUE & OUTCOMES SPOTLIGHT

JANUARY/FEBRUARY 2022
VOL. 8, NO. 1

TABLE OF CONTENTS

EDITOR-IN-CHIEF

Zeba M. Khan, RPh, PhD

EDITORIAL ADVISORY BOARD

Soraya Azmi, MBBS, MPH
(United States)

Ágnes Benedict, MSc, MA
(United Kingdom)

Koen Degeling, PhD, MSc
(Australia)

Aakash Bipin Gandhi, BPharm
(United States)

Ramiro E. Gilardino, MD, MSc
(Switzerland)

Karin Groothuis-Oudshoorn, PhD
(The Netherlands)

Eric Jutkowitz, PhD
(United States)

Yvonne YL Lee, PhD, MPH
(Singapore)

Sandra Nestler-Parr, PhD, MPhil, MSc
(United Kingdom)

Lucinda Orsini, DPM, MPH
(United States)

Louise Parmenter, PhD, MSc
(United Kingdom)

Marisa Santos, MD, PhD
(Brazil)

Stephen W. Schondelmeyer, PhD
(United States)

Soham Shukla, DPharm, MSc
(United States)

Mondher Toumi, MD, PhD, MSc
(France)

The mission of *Value & Outcomes Spotlight* is to foster dialogue within the global health economics and outcomes research (HEOR) community by reviewing the impact of HEOR methodologies on health policy and healthcare delivery to ultimately improve decision making for health globally.

FROM THE EDITOR

- 3 The Power of Patient Advocacy

ISPOR CENTRAL

- 4 ISPOR Speaks
Persisting in a Pandemic State: ISPOR Moves Forward
Nancy S. Berg
- 6 Examining the Impact of CHEERS 2022
- 8 Looking at the Downstream Value as Investment in Digital Health Increases
- 12 HEOR News
- 13 From the Journals
- 15 Research Roundup
- 17 Conferences, Events, Education, and Resources

FEATURE

- 20 Patient Advocacy: The Growing Voice of Healthcare
- 23 By the Numbers: The Power of Patient Advocacy

HEOR ARTICLES

- 24 Delivering on Promises: Enhancing Patient Access to Neoadjuvant Cancer Treatments
- 27 The Promise and Biases of Prediction Algorithms in Health Economics and Outcomes Research
- 30 Treatment Journey of Patients With COVID-19 in US Hospital Settings

Q&A

- 34 How Can Patients Effectively Steer the Ship of Public Policy in the Brazilian Healthcare System?
A Conversation With Aline Silveira Silva, PhD

EDITORIAL STAFF

Lyn Beamesderfer

Director, Publications
lbeamesderfer@ispor.org

Margaret M. Rafferty

Manager, Publications
mrafferty@ispor.org

Jennifer A. Brandt

Associate, Publications
jbrandt@ispor.org

ISPOR CORPORATE OFFICERS

Nancy S. Berg

Chief Executive Officer/
Executive Director

Sue Capon

Chief Operations Officer

Richard J. Willke, PhD

Chief Science Officer

Laura T. Pizzi, PharmD, MPH

Associate Chief Science Officer

Betsy Lane

Director and Chief Marketing
& Communications Officer

ISPOR HEADQUARTERS

505 Lawrence Square Blvd, S
Lawrenceville, NJ 08648
Tel: 609-586-4981
Fax: 609-586-4982
info@ispor.org
www.ispor.org

VALUE & OUTCOMES SPOTLIGHT PUBLISHING, SUBSCRIPTION, AND ADVERTISING OFFICE:

Value & Outcomes Spotlight
Online: ISSN 2375-8678
Published bi-monthly by:
ISPOR
505 Lawrence Square Blvd, S
Lawrenceville, NJ 08648 USA

Direct photocopy permission and reprint
requests to Director, Publications.

Cover photo courtesy of iStockphoto/arthobbit

© 2022 International Society for Pharmacoeconomics
and Outcomes Research.

While Value & Outcomes Spotlight is designed
to provide accurate information regarding the
subject matters covered, the views, opinions, and
recommendations expressed are those of the
contributors and not of the International Society for
Pharmacoeconomics and Outcomes Research (ISPOR).

FROM THE EDITOR

The Power of Patient Advocacy

This quote is from an actual patient—my neighbor and someone who is actively involved with her health: “I felt like my own personal ‘disease detective’ by really helping to solve my health mystery! I began to feel better just because I felt more involved.” She is a 45-year-old woman who scrupulously keeps her annual exams, walks 2 miles daily, does yoga 3 times a week, eats healthy, and takes her multivitamins. In the past 6 months, though, she has not been feeling well and has visited her doctor several times but received little satisfaction. Unconvinced, she decided to take a more proactive role in her diagnosis and began journaling her health by noting her symptoms, monitoring her blood pressure, temperature, oxygen, and weight, and logging the foods she ate. At her next doctor’s appointment, she was well prepared for a data-driven discussion with her physician. By sharing her individualized data and experiences combined with her physician’s medical knowledge, she ultimately received a diagnosis and worked with her doctor to formulate a treatment appropriate—and specifically—for her. This real-world example is just one of many that demonstrates improved outcomes and care when a patient actively engages and collaborates with a healthcare provider. A patient’s voice and personal advocacy are crucial not only to benefit their own healthcare but to drive improved care and outcomes for future patients with similar health issues. In fact, published research has demonstrated that as patients become more involved in their healthcare, they experience improved outcomes.

In today’s health-conscious environment, both patients and caregivers have access to numerous healthcare resources, including online patient blogs, communities, and advocacy organizations. These platforms bring everyday value to patients’ lives by allowing them to better coordinate their care, find knowledgeable healthcare providers, navigate complex health systems, and connect to a community of patients who may be experiencing similar health issues. Patient advocacy organizations bolster this value by actively representing patients and their interests in disease awareness, patient care, clinical research, and policy making—all in the altruistic cause of improving patient care and outcomes.

As researchers, it is essential for us to partner and engage with patients because—as evidenced in the literature—patient involvement can minimize morbidity, mortality, and costs. Representing patient views and perspectives in clinical trials can only improve timelines and reduce costs because appropriately designed studies will better capture outcomes important to patients and not just outcomes necessary for drug registration. Not only can patients serve as knowledgeable study subjects in clinical trials, but they can also enable protocol development, clinical study design, and methodology; inform manufacturers throughout the full development cycle of the product; and facilitate optimal patient enrollment in clinical trials. The ultimate result is a win-win for both patient and manufacturer.

Collaboration and transparency must exist among all healthcare stakeholders to establish trust and credibility in the healthcare system. Patients should be empowered by, knowledgeable of, and engaged in their healthcare by being a voice in the system and serving as one of the key stakeholders in decision making. ISPOR is already doing its part by engaging patients globally and hosting patient roundtables, short courses, webinars, and conferences with the goal of providing patients worldwide with a forum to actively share their experiences with other stakeholders. By involving patients today, we can only further improve patient outcomes for the generations to come.

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

Persisting in a Pandemic State: ISPOR Moves Forward

Nancy S. Berg, CEO/Executive Director, ISPOR

While it is sometimes difficult at first to see opportunities and successes when you're facing obstacles or complexities, they always exist. Even during a global pandemic when millions are affected, lives are lost, families and businesses suffer (and life just isn't the same), I am proud and pleased that ISPOR continues to engage in and achieve its mission. Your Society continues to make positive impact and important change even as we move through and beyond the effects of COVID-19.

Even in the midst of the pandemic, 2021 was an active year for ISPOR. We produced 2 major virtual conferences and dozens of educational programs, including short courses and webinars. We successfully launched the new [HEOR Solutions Center](#) and announced a new [ISPOR Science Strategy](#). With the commitment and engagement of its members in the hundreds of groups, committees, and chapters, ISPOR has remained active—ensuring that your Society's impact on healthcare decision making was strengthened.

Throughout the pandemic, your Society has firmly positioned itself as a thought leader in the HEOR community, publishing many new [ISPOR Reports](#) in our journals and on our website. ISPOR's special interest groups remain vibrant; our organization evolved to become more digital; and we are actively preparing a variety of scientific programs that will be delivered in person as well as virtually in 2022. ISPOR's annual conferences will offer opportunities for both in-person and virtual attendance. Our [ISPOR 2022](#) conference will be held May 15-18 in the Washington, DC, USA area and the [ISPOR Europe 2022](#) conference is scheduled for 6-9 November in Vienna, Austria. ISPOR chapters are also planning some in-person meetings in 2022, advancing ISPOR's mission at the local/regional levels.

In 2021, ISPOR produced several health policy [webinars](#) that updated members on major changes and challenges across the globe, and continued to build on its [payer engagement strategies](#). The [Health Technology Assessment \(HTA\) Roundtables](#) and [Patient Representative Roundtables](#) produced for each major region resulted in ongoing dialogue with several hundred HTA leaders and dozens of patient engagement organizations—just 2 examples of important multistakeholder discussions that are fundamental to ISPOR's success.

ISPOR's [Real World Evidence \(RWE\) Initiative](#) continues to progress. The objective of ISPOR's RWE effort is to support the scientific priorities developed in 2020. Throughout the process, we have seen a straight path and eager collaborators around issues involving RWE that have resulted in some high-visibility invitations to speak at small and large virtual events and to actively engage with regulatory bodies, including both the US Food and Drug Administration and the European Medicines

Agency, as well as important groups such as the US National Library of Medicine's [ClinicalTrials.gov](#). Additionally, ISPOR was recently invited to be a member of the European Network of Centres for Pharmacoeconomics and Pharmacovigilance Steering Committee. Discussions across stakeholder groups is paramount to ensure that all perspectives are included in key advancements and decisions around RWE. The [Real-World Evidence Transparency Initiative](#) has also recently launched the [RWE Registry](#), which provides researchers with a fit-for-purpose platform to register their study designs—before they begin work—to facilitate the transparency needed to elevate the trust in the results. In 2022, ISPOR will continue to highlight RWE as part of its conference programs and enhance its communication and educational efforts around this important area. The ISPOR [Real-World Evidence Special Interest Group](#) is developing plans for a future survey of members regarding their support, concerns, and questions about study preregistration.

ISPOR's publications continue to be the leading publishing platforms for health economics and outcomes research. In 2022, we anticipate 12 regular issues of *Value in Health* (plus 2 online conference abstract issues); 4 themed sections, and publication of 11 ISPOR Reports, including 6 Good Practices Reports, (one of which is the [CHEERS 2022](#) update), 4 reports from special interest groups, and 1 from a working group. There will also be 6 issues of *Value in Health Regional Issues* (which now includes content from all regions in every issue); 6 issues of *Value & Outcomes Spotlight*, and 12 issues of the ISPOR's new *HEOR News Brief* (whew!). *Value in Health* delivers a preeminent 5.725 impact factor, which represents a 20.6% increase over the previous year.

Inside the operation at ISPOR, we are designing a new content strategy to ensure that delivery of the Society's programs and discussions align not only with ISPOR's Science Strategy themes, but also incorporate late-breaking issues, as well as evolving member interests and preferences. Development of eLibrary and eLearning offerings are on the 2022 agenda, as well as an expansion of efforts to increase collaboration and engagement with members through online communities. Online communities are evolving in participation and provide members



with connections and information specific to interest areas. The new “All Member Community” planned for a mid-year launch will be a source of information-sharing and opportunity to dialogue with members and ISPOR leaders. You may have also noticed emails communicating opportunities to get involved. A new section on the ISPOR website lists [volunteer and engagement opportunities](#)—check this website often and communicate your interests.

Finally, ISPOR is sponsoring major activities in [low- and middle-income countries](#) and a Leadership Development Initiative that is being shaped to ensure that your Society has a robust pipeline of future leaders and diversity in its membership. Despite the challenges and obstacles of living in a pandemic state, ISPOR moves forward. I invite you to get involved in these or other efforts at your Society. ISPOR's success depends on the leadership and support of its members.



Members are ISPOR; ISPOR is the heart of HEOR;
and HEOR is the foundation for improving
healthcare decisions.

If you're looking for
insights into HEOR...
you'll find everything
you need at [ISPOR.org](#).



ISPOR NEWS



A new **CHEERS** 2022 report ("Consolidated Health Economic Evaluation Reporting Standards (CHEERS) 2022 Explanation and Elaboration: A Report of the ISPOR CHEERS II Good Practices Task Force") was published in the January issue of *Value in Health*. In addition to the full report, 16 other journals (including ISPOR's own *Value in Health Regional Issues*, which published a Spanish translation) co-published a summary statement endorsing the updated CHEERS reporting standards.

The initial CHEERS report was published in 2013 and has quickly become one of ISPOR's most highly cited *Good Practices Reports*. In light of its overall impact in the health economics and outcomes research (HEOR) field, **Zeba M. Khan, RPh, PhD** (Editor-in-Chief of *Value & Outcomes Spotlight*) sat down with the CHEERS Task Force Co-Chairs, **Don Husereau, BScPharm, MSc**, and **Michael F. Drummond, MCom, DPhil**, to give us a better understanding of what exactly the CHEERS reporting standards are, what precipitated the update in 2022, why our readers should care about this update, and whether the CHEERS health economic evaluation reporting standards will help improve healthcare decisions.

We have created a 5-minute video that captures the highlights of the CHEERS 2022 update, with a transcript of the discussion to the right.

▶ *Stay tuned for future installments of the full-length videos of each interview question and responses.*

Examining the Impact of CHEERS 2022

What is CHEERS?

Zeba Khan: Hello everyone. I'm Zeba Khan, ISPOR's Editor-in-Chief for *Value & Outcomes Spotlight*. I'm joined here with our two task force chairs, Professor Mike Drummond and Don Husereau. We will be discussing what is CHEERS and why this is important and may be useful for us as stakeholders.

The first CHEERS report was published back in 2013 and has become one of ISPOR's highly cited Good Practices Reports. Can you explain what the CHEERS report is and why is it important?



CHEERS 2022 Video Interview Clockwise from top left: Michael F. Drummond, MCom, DPhil; Don Husereau, BScPharm, MSc; and Zeba M. Khan, RPh, PhD

Don Husereau: CHEERS is an attempt to take reporting guidance that had existed in various forms and consolidate it into one useful, existing reporting guidance. It also takes into account the latest thinking in terms of how economic evaluation should be reported. We called it the "Consolidated Health Economic Evaluation Reporting Standards" (CHEERS) because we had revisited all the reporting guidance that had been developed to date and tried to make something that represented the minimal amount of information that was necessary for people to make sense of economic evaluations.

Michael Drummond: Maybe I could add to what Don said and to point out that CHEERS has been adopted as one of the guidelines in the EQUATOR Network. I think people will be familiar with CONSORT and STROBE and PRISMA, and CHEERS has that status as well as being an ISPOR Task Force Report.

What precipitated this update?

ZK: Regarding the update to the CHEERS report, we know it was just released in *Value in Health*. My question to you is what really precipitated that update and why do you feel the time was right for an update now?

MD: Well, there were basically two reasons why we felt it was time to update CHEERS. The first one is that there've been developments in the field of economic evaluation since 2013. Two areas in particular are the way that value

is being characterized. I think there was a feeling on the original CHEERS that we were just focusing on QALYs too much.

The other development has been the growth of distributional cost-effectiveness analysis (ie, the fact that we might care about who gets the benefits as well as the benefits in total). Then I think the other thing was that there have been developments in the environment in which we conduct economic evaluations, growing the use of these studies in decision-making settings.

I think the fact that there's much more interest in transparency in research to make it absolutely clear what you've done and what you've not done. Then there's a growing interest in incorporating patients and the general public in the developments in health services research. Taking all of that together, we felt it was time to revise CHEERS.

Why should *Value & Outcomes Spotlight* readers care?

ZK: The readers of *Value & Outcomes Spotlight* include both HEOR professionals and non-HEOR experts. Why should the readers of *Value & Outcomes Spotlight* about this? What does it really mean for them? Can you just go into a little bit more specifics for us?

DH: Economic evaluations, although they're often conducted and reported by specialists, have implications for everybody. They're usually intended to help make important decisions about people's health—that's either your health now or your future health. We're all patients or future patients. So, we need to care about the fact that we're doing these analyses to inform decision

making. Economic evaluations shouldn't be opaque, they should be easy to understand.

CHEERS is there to make sure that all the information that's there to help us understand is there—but in a structured way—so that we can make quick sense of what the study says and what it doesn't say.

Will CHEERS help improve healthcare decisions?

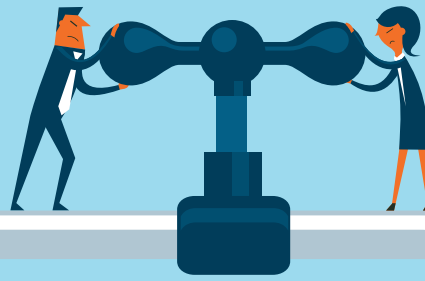
ZK: I guess one thing I would like to ask is how do you see it being used in the HEOR community and beyond? ISPOR's mission is to improve healthcare decisions—will this help improve healthcare decisions?

MD: Well, clearly as more and more economic evaluations get used in the context of health technology assessment, it's important that the decision makers get good access to what's been done in a particular study so that they can appraise it in making their decisions.

DH: But at the end of the day, it's the person who's reading the report, who's using it for decision making, that has to be sure that it meets a certain standard. I think that's what CHEERS is intending to do.

ZK: Well, this has been great. Don, Mike, thank you so much for sharing your insights into how CHEERS may be useful for all of us as various stakeholders and in various geographies to learn about this, leverage the tools, and help to improve healthcare decisions. Thank you so much...and I want to end by saying, "Cheers!"





LOOKING AT THE DOWNSTREAM VALUE AS INVESTMENT IN DIGITAL HEALTH INCREASES

Signal IN BRIEF

- According to Rock Health, for the first 3 quarters of 2021, total funding for digital therapeutics companies amounted to \$21.3 billion
- The main area of investment continues to be digital health companies using software to accelerate research and development
- The market for digital therapeutics is fairly fragmented, but a growing trend is the development of platforms that can be adopted across the digital health spectrum

Digital therapeutics are an up-and-coming segment in healthcare, with the goal of many companies to achieve regulatory and payer approval with their interventions. At the top of the market is [Pear Therapeutics](#), which went public in 2021 through a special purpose acquisition and has 3 US Food and Drug Administration-approved products: reSET®, for use as an adjuvant to standard outpatient therapy to treat patients with substance use disorder for stimulants, cannabis, cocaine, and alcohol; reSET-O®, for helping those with opioid use disorder stay in recovery programs; and Somryst®, for the treatment of chronic insomnia. Investors seem to believe in the company, with Pear's shares trading on the first Monday of 2022 more than 27% higher, despite no new corporate announcements.

But there are many startups in this space also trying to generate prescription digital therapeutics, and they have received a lot of investor attention. According to [Rock Health](#), a venture capital firm that specializes in digital healthcare, for the first 3 quarters of 2021, total funding amounted to \$21.3 billion across 541 deals, with an average deal size of \$39.4 million. This compares to \$14.6 billion 2020, when investment in digital health surpassed \$10 billion for the first time. The main area of investment continues to be digital health companies using software to accelerate research and development, delivering on-demand healthcare services, and supporting the treatment of disease. Like Pear, many of these startups are concentrating on complex mental and behavioral health support, including serious mental illness and substance use disorders. Companies receiving notable investments recently include [NOCD](#), which connects patients to Exposure and Response Prevention-trained therapists (\$33 million in September 2020); and [Quit Genius](#), which is developing workplace-employed solutions for tobacco, vaping, opioid, and alcohol addictions (\$65 million in July 2020).

"What we've seen, especially over the last 3 to 4 years, is this rapid acceleration in the investment behind these businesses at the nexus of technology and healthcare," says Tom Cassels, President and General Manager of Rock Health's Advisory business. "Along with that investment, we've also seen a significant uptick in the adoption of consumer of tools that are used for self-management and care management."

KEY TAKE- AWAYS

FOR HEALTHCARE INNOVATORS AND VALUE CREATORS:

- Digital health and digital therapeutics are expected to unlock value in the healthcare system that was previously not accessible
- Investors are more favorable to digital health ideas that address and solve specific patient problems and give patients the tools they need to address problems outside the doctor's office
- Digital therapeutics will be generating a lot of data but accessing that data to make timely and accurate actuarial and HEOR decisions is challenging
- The healthcare industry is not quite ready to take on evaluating the expected tsunami of new digital therapeutic interventions, but is preparing with more robust ROI and value frameworks

Cassels describes the marketplace for digital therapeutics and digital health as “fairly fragmented.” He states, “One of the things that is becoming more and more of a trend is the development of platforms that encompass multiple use cases for technology in healthcare that we at Rock Health call ‘the platform wars.’” Cassels adds, “I also would say that the trend that we’ve seen is likely to continue accelerating.”

While investors expect a return on the dollars, what is the “return” for those downstream in the healthcare continuum who have to evaluate the value that digital therapeutics have to offer to patients, clinicians, and payers? And how can investors direct their efforts in more innovative ways to unlock more value in the system?

Digital Therapeutics and Determining Value

Alyssa Jaffee is a partner at [7wireVentures](#) where she focuses on investments in digital healthcare and technology-enabled services that empower consumers to be better stewards of their health. Jaffee says, “Digital health enables the unlocking of a lot of value that the healthcare system wasn’t able to unlock historically.”

7wireVentures actually invested in No-Compulsion-Disorder (NOCD) for very concrete reasons of value, according to Jaffee. NOCD not only addresses the patient access challenges in finding a mental health provider by enabling teletherapy, it provides patients with wraparound tools they need outside of therapy sessions to address their triggers and a community of like-minded individuals. NOCD “actually brings your therapy to where you are and ultimately helps to improve outcomes,” Jaffee says. While she acknowledges that digital therapy cannot totally replace in-office therapy, she envisions it becoming more like a banking model, where users can deposit checks by phone apps, but can also walk into an office if needed.

Vineeta Agarwala, MD, PhD, a general partner at [Andreessen Horowitz](#), leads investments for the firm’s bio fund across therapeutics, diagnostics, and digital health, with a focus on companies that are leveraging unique datasets to improve drug development and patient care delivery. As a still-practicing physician, Agarwala has found herself referring patients to websites to get the care that is more difficult to access within the

boundaries of a large healthcare system, such as cognitive behavioral therapy for a patient with cancer or for someone experiencing sleep disorder problems.

One thing that she has noticed with digital health companies is that they are pushing the boundaries of the definition of the payer from more than just insurance companies, or Medicare and Medicaid, to patients as well, who are now paying more than \$500 billion in out-of-pocket costs every year. “The payer is a really interesting decision maker in our ecosystem because they have to be somewhat rational,” Agarwala says.

“

“Payers are particularly unique decision makers that often can give a startup or an incumbent credit for higher-quality care if it also potentially reduces the need for care.”

— Vineeta Agarwala



“What we’ve seen, especially over the last 3 to 4 years, is this rapid acceleration in the investment behind businesses at the nexus of technology and healthcare.”

— Tom Cassels

“There used to be—especially in the provider community—this view that the payer is the enemy and the payer is blocking the ability to deliver care because they’re just trying to save cost. The payer is the only entity that you know, but there’s churn, and patients aren’t on the same plan forever, and they are incented, to some extent, to think about long-term cost of care. And so payers are particularly unique decision makers that often can give a startup or an incumbent credit for higher-quality care if it also potentially reduces the need for care.” She points out that a company like NOCD can prove its downstream value by showing that well-treated OCD is easier and less expensive to manage than untreated OCD over many years.

The Challenges of Digital Health Data and Regulation

One of the things that digital health companies are doing is generating a lot of data about patients, but Jaffee and Agarwala say making that data actionable for health economics and outcomes research (HEOR) is another challenge.

“I do not want to make light of how difficult it is to actually take these data, particularly thinking about preventive healthcare, which is longitudinal data,” Jaffee says. While she has seen progress with third-party companies working with digital health companies and taking an actuarial stance to analyzing the data

and presenting the results in a more real-time, accurate way, “I would say we’re not even midway through the mountain at this point.”

Another thing to keep in mind, Agarwala states, is that part of the “tsunami” of digital health investment “is actually largely untethered to very specific regulatory pathways.” This means some of the digital health innovation that is being funded is not subject to all of the same regulations that a new drug, diagnostic test, or medical device would be. On the one hand, for example, services that would help connect a patient to care would not necessarily have to be tied to a regulatory pathway—but this could become a bottleneck for these innovations to some extent, as payers, health systems, providers, independent clinics, and patients will have the autonomy to make decisions about whether to use, adopt, and pay for these solutions.

And while some of these innovations will undergo regulatory review, the question is whether the system as it stands at present can actually handle the flood of innovation for evaluation. “No, [it’s] probably not completely ready for the extent to which we now have the capacity to create those kinds of interventions,” Agarwala says. “But is the system kind of gearing and priming for readiness?

I would say absolutely.” And the return on investment frameworks and value frameworks that have been instituted in the last few years will mature and get better and more accurate, she adds.

The Value of Digital Health and ISPOR

Cassels, Agarwala, and Jaffee discussed the highlights, possible implications, and learnings from investment activity in digital health companies at ISPOR’s fourth installment in the *Signal* series, “[Venture Capital Investment: Upstream Decision Making on Value in Healthcare](#).” The speakers examined how innovation in healthcare—from therapies to research on the best care protocols—is funded before concrete solutions come to the market, and how that paradigm can change.



“Digital health enables the unlocking of a lot of value that the healthcare system wasn’t able to unlock historically.”

— Alyssa Jaffee

ISPOR started the [Signal program](#) to bring a broader understanding of innovation (beyond product innovation), with the goal of putting these issues front and center for the HEOR community. Each episode in the series is a self-contained installment and not dependent on the previous episodes. However, all of them are connected by an intent to look at the concept of innovation and experience with it from different groups of healthcare stakeholders, building foresight into how these innovations might impact healthcare decision making in the next decade.

The **Signal** Series episode, "[The New Science of Cause and Effect: Causal Revolution Applied](#)," welcomed Judea Pearl, professor of computer science and director of the Cognitive Systems Laboratory, Samueli School of Engineering, UCLA, Los Angeles, CA, USA, the world-renowned computer scientist and philosopher, who made a presentation on how causal models interact with data and work in scientific applications today, and discussed the challenges with regard to application and opportunities of modern computing tools in HEOR. We will cover this episode more in-depth in a future edition of *Value & Outcomes Spotlight*.

Read more about past *Signal* events in *Value & Outcomes Spotlight*

- [ISPOR Generates a Signal for Transmitting Innovation](#)
- [From Measuring Costs to Measuring Outcomes: Revamping Healthcare at a System Level](#)
- [Beyond Cost-Effectiveness: Defining and Mapping Out Innovation at NICE](#)

For more information and to register

www.ispor.org/signal

About the author

Christiane Truelove is a freelance medical writer based in Bristol, PA.

HEOR NEWS

1 Chilean Health Ministry Is Urged to Issue a Compulsory License for the Pfizer COVID-19 Pill (Pharmalot)

Innovarte Corporacion, a nongovernmental organization, and the Chilean Association of Pharmaceutical Chemists and Biochemists are seeking to make it possible for generic manufacturers to sell versions of Pfizer's COVID-19 medicine, paxlovid, in Chile. [Read more.](#)

2 White House Seeks Out Community Digital Health Examples (pharmaphorum)

The White House Office of Science and Technology Policy is seeking information about ways to deploy digital health technologies effectively in community settings, particularly looking at community-based programs in populations that are currently underserved by healthcare. [Read more.](#)

3 Which Countries Are on Track to Reach Global COVID-19 Vaccination Targets? (Our World in Data)

As the World Health Organization sets a goal that every country will have fully vaccinated at least 70% of its population by mid-2022, the United States, many countries in Africa, and others are not on track to achieve this standard, according to recent data. [Read more.](#)

4 Hospital Lawsuits Over Unpaid Bills Increased By 37% in Wisconsin From 2001 to 2018 (Health Affairs)

Wisconsin court records from the period 2001–2018 show that lawsuits to recover patients' unpaid medical bills increased 37% during this period, from 1.12 per 1000 residents in 2001 to 1.53 per 1000 residents in 2018, with lawsuits being disproportionately directed at Black patients and patients living in poorer and less densely populated counties. [Read more.](#)

5 Germany Extends Test Phase for ePrescriptions (mobihealth news)

The launch of the country's mandate for digital prescriptions, scheduled for the beginning of January, has been postponed at the direction of the German Federal Ministry of Health because the necessary technical systems are not yet available across the board. [Read more.](#)

6 Pragmatic Clinical Trials—Ready for Prime Time? (JAMA Network Open)

Pragmatic trials, conducted in everyday clinical settings, could overcome some of the limitations of traditional trials. [Read more.](#)

7 A New Paradigm Is Needed: Top Experts Question the Value of Advance Care Planning (Kaiser Health News)

A group of prominent experts is saying efforts to get people to specify their end-of-life wishes before becoming terminally ill—including living wills, do-not-resuscitate orders, and other written materials expressing treatment preferences—should stop because they haven't improved end-of-life care. [Read more.](#)

8 France Says 110,000 Fake Health Passes in Circulation (France 24)

Some 110,000 fake health passes showing proof of vaccination against COVID-19 are in circulation in France according to the interior ministry, with hundreds of investigations launched against makers and users of the forged documents. [Read more.](#)

9 How Much Longer Can China Keep Up Its Zero-COVID-19 Strategy? (The Guardian)

While the rest of the world is learning to live with COVID-19, in China authorities are doubling down on their "zero-COVID-19" policy, trying to stamp out the disease whenever it appears and at any cost. [Read more.](#)

10 The Role of NITAGs and HTA Agencies in Decision Making for Vaccines (PRMA Consulting)

Marie Chivers, Senior Consultant, looks at the role of national immunization technical advisory groups (NITAGs) as critical stakeholders in decision making for vaccines and considers the varying role of health technology assessment (HTA) agencies in the vaccine appraisal process. [Read more.](#)

FROM THE JOURNALS

When Patients Take Charge of Their Quality of Life

Section Editors: Soraya Azmi, MBBS, MPH, Beigene, USA; Agnes Benedict, MSc, MA, Evidera, Budapest, Hungary

A Novel Patient-Derived Conceptual Model of the Impact of Celiac Disease in Adults: Implications for Patient-Reported Outcome and Health-Related Quality-of-Life Instrument Development

Leffler DA, Acaster S, Gallop K, Dennis M, Kelly CP, Adelman DC

Value Health. 2017;20(4):637-643.

<https://www.valueinhealthjournal.com/>

Celiac disease, a chronic inflammatory disease affecting the gut, can be severely debilitating in terms of its effect on patients unless managed by a gluten-free diet (GFD). It affects 1% of the population of the United States and Europe. Although the GFD can be effective, adhering to the strict dietary measures required can be a burden on patients. The combination of the symptoms of celiac disease and the GFD are highly impactful on patients' health-related quality of life (HRQOL).

To assess HRQOL, there are disease-specific instruments currently in use: the Celiac Disease Questionnaire, the Celiac Symptom Index, and the Celiac Disease Quality of

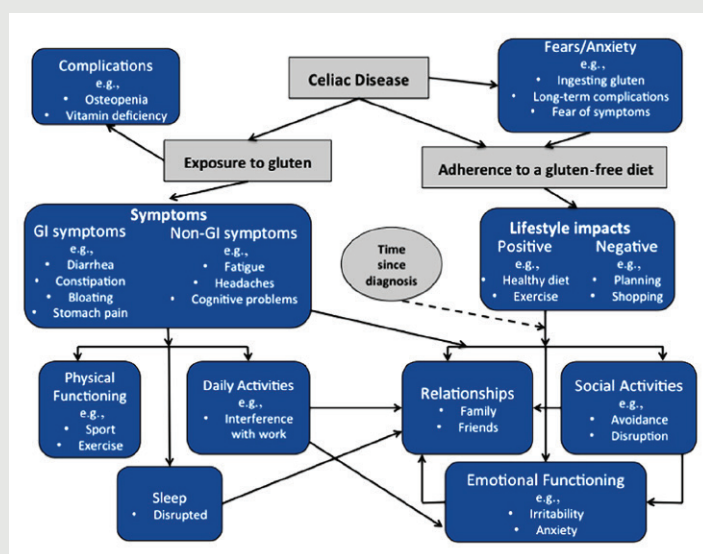
Life (CD-QOL). However, these were developed from items identified through literature reviews or clinical experts rather than from patient inputs. The study described by Leffler, et al describes a method of exploring the impact of celiac disease and GFDs on HRQOL as experienced by patients and describes how a conceptual model was derived through qualitative patient interviews.

The study followed the US Food and Drug Administration's Patient-Reported Outcome Measures Guidance for Industry (2009) and informed the development of 3 celiac-specific outcome measures: the Celiac Disease Symptom Diary, the Impact of Celiac Disease Symptoms Questionnaire, and the Impact of Adhering to a Gluten-Free Diet Questionnaire. The study design was a cross-sectional qualitative study with the sample size being determined by data saturation (the point at which no new information is obtained by new data) rather than a prespecified sample size. Patients were recruited from a celiac disease center in Boston and patients' medical charts were reviewed to ascertain whether inclusion criteria were met. Eligible patients who were 18 and older were then contacted to ascertain their interest in participating in the study. Semistructured interviews were then conducted one-on-one in person where possible and interviews were conducted by the same expert interviewer.

The data set was then coded and analyzed by experienced qualitative researchers and data were analyzed using thematic analysis. This involved an initial reading and rereading of the data to identify themes and categories, as well as to identify relationships between symptoms and impact. Qualitative analysis software was used to facilitate this process. Emergent themes and concepts were monitored with coding concordance assessed by a second coder who analyzed all the transcripts. The 2 coders met along with another team member to discuss and reconcile differences. This process continued until concept saturation was achieved. The codes and concepts identified were developed into a conceptual model upon review by all authors and an expert panel of 4 celiac disease clinical experts.

Twenty-one patients participated in the study, at which point the data saturation had been reached. The mean age was 42; 71% of the participants were women and 91% Caucasian. Qualitative analysis identified the themes that impact the HRQOL of patients with celiac disease as being as follows (**Figure 1**): fears and anxiety, day-to-day management of celiac disease, physical functioning, sleep, daily activities, social activities, emotional functioning, and relationships. Overall rate of adherence to a GFD was 90.5%.

Figure 1. Celiac disease conceptual model. The blue boxes show the areas of impact caused by the concepts in gray boxes, the arrows indicate the direction of influence, and the dotted arrow represents a potential moderating factor.



GI indicates gastrointestinal.

Highlights of the findings and themes that were identified show that celiac disease can have a significant impact on how everyday life is experienced by patients. For example, abdominal pain, nausea, and bodily pain prevented patients from going shopping and interfered with work and study.

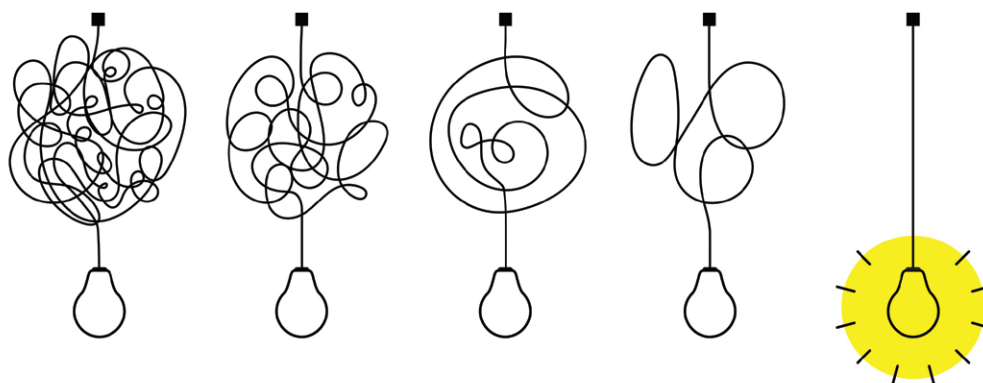
In terms of social activities, participants reported difficulties with eating out, worrying about whether restaurant kitchens could prepare a GFD meal appropriately. Sometimes that meant that participants would choose to avoid social outings.

Participants also felt depression and anxiety due to the symptoms, causing frustration with themselves. Similarly, in relationships there were times when having to discuss their need to adhere to a GFD caused some family or friends to show a lack of understanding or annoyance.

Aside from gathering evidence directly from patients to develop the new HRQOL instruments, this study was the first

to attempt to measure the impact of adhering to a GFD. This clearly is an important part of managing the disease, which improves symptoms at the same time as it is particularly burdensome on patients' lives. This shows that a key feature of patient centeredness may have been missing from prior HRQOL instruments.

The article highlights the role that patients can play in research that feeds into decision making about their well-being. It would be worth a visit to readers who are interested in ways in which patients themselves can be involved in the process of developing HRQOL measurements. The study was timely and highly appropriate given that in recent years, the role of the patient's voice is being increasingly recognized as important in making well-informed and widely accepted decisions that can improve patient treatment and quality of life outcomes.



Getting to simple is no easy task.

Synthesizing complex economic models, methods, and real-world data for healthcare decision makers is what ISPOR's HEOR news magazine does best.

For more information about submitting your research to *Value & Outcomes Spotlight*, visit [ispor.org/vos_authors](https://www.ispor.org/vos_authors)

RESEARCH ROUNDUP

Section Editor: **Aakash Bipin Gandhi, BPharm, PhD**, Research Scientist, Real World Investigator, Sanofi, Baltimore, MD, USA

Patient-centered drug approval: the role of patient advocacy in the drug approval process

Mattingly TJ, Simoni-Wastila L. Patient-centered drug approval: the role of patient advocacy in the drug approval process. *J Manag Care Spec Pharm*. 2017; 23(10):1078-1082.

Summary

This article sheds light on the evolution of the drug approval process to include a significant focus on the patient voice as opposed to only relying strongly on evidence generated through randomized controlled trials. The article underscores the need for a patient-centered approach to drug approval, especially in the case of rare diseases such as Duchenne muscular dystrophy, where it may not be possible to recruit enough participants to conduct a randomized controlled trial that is sufficiently powered to yield robust statistical inference. Overall, the article discusses the intended and potential unintended consequences of adopting a patient-centered approach to support the drug approval process.

Relevance

Incorporating the patient voice has implications for several stakeholders involved in the drug approval process. With regards to rare diseases, pharmaceutical manufacturers may have insufficient evidence to support the efficacy and safety of a drug, regulatory agencies can leverage information from patient advocacy groups to aid decision making. As a consequence of having a small patient population associated with a rare disease, pharmaceutical manufacturers are unable to conduct large clinical trials to meet regulatory requirements for drug approval. As in the case of Duchenne muscular dystrophy, inclusion of the patient voice can help manufacturers overcome hurdles associated with market entry through accelerated approval pathways provided by regulatory agencies. Importantly, for diseases with few therapeutic options, using a patient-centered approach to support drug approvals can help improve patient's accessibility to novel treatments.

However, including the patient voice during the drug approval process may result in certain unintended consequences. For example, terminally ill patients may advocate for the approval of a novel treatment associated with insufficient safety and efficacy information. Consequently, these high-cost drugs may drive up insurance premiums and increase the cost-sharing burden among insurance plan members that may not have the disease of interest. In conclusion, an appropriate balance may need to be struck between regulatory agencies that incorporate the patient voice to help expedite the drug approval process and a patient's willingness to accept risk associated with the use of a drug despite limited evidence.

Enhancing the incorporation of the patient's voice in drug development and evaluation

Chalasani M, Vaidya P, Mullin T. Enhancing the incorporation of the patient's voice in drug development and evaluation. *Res Involv Engagem*. 2018;4(1):1-6.

Summary

The present article discusses the Patient-Focused Drug Development (PFDD) program initiated by the US Food and Drug Administration (FDA) in 2012 with the objective of collecting patient perspectives on diseases and associated treatments. As a part of the PFDD initiative, the FDA organizes public meetings that focus on engaging patients to discuss the most serious symptoms associated with their disease as well as treatment options they may pursue for their condition. These meetings may be tailored depending on the disease discussed, available therapeutic options for treating a condition, specific patient needs, or items the FDA review division may seek more information on. The PFDD meetings can include participation from patients, caregivers, or patient representatives. In summary, the FDA-driven PFDD meetings highlight the organization's priority in helping plug information gaps related to the incorporation of patient perspectives during the drug development process.

Relevance

The article underscores the need for patient involvement during the drug development process especially because patients can best describe their experience with a disease and related therapeutic treatments. Hence, they are best positioned to inform regulatory agencies and healthcare decision makers on their preferences for care. Conversely, the meetings also help the FDA understand the burden of an illness on a patient and their caregivers and the risk-benefit perception that patients have towards available treatments. This information can in turn help the FDA with decision making related to approval of products for marketing and better advise pharmaceutical manufacturers on their drug development processes.

EUPATI guidance for patient involvement in medicines research and development (R&D); guidance for pharmaceutical industry-led medicines R&D

Warner K, See W, Haerry D, Klingmann I, Hunter A, May M. EUPATI guidance for patient involvement in medicines research and development (R&D); guidance for pharmaceutical industry-led medicines R&D. *Front Med*. 2018;(5):270.

Summary

This article discusses the guidance documents prepared by the European Patients' Academy on Therapeutic Innovation (EUPATI) on following structured steps to help incorporate the

patient voice in the drug development process. The documents developed by EUPATI were based on a series of internal and external consultations with various stakeholders involved in the drug development process. They include guidance on patient involvement during the research and development phase conducted by pharmaceutical companies, approval discussions by regulatory agencies, and product-related health technology assessments.

Relevance

The article stresses the need for structured rules and steps for patient involvement in the drug development process in order to obtain effective results for all stakeholders involved. Adopting this approach can help increase transparency,

trust, and respect between patients and stakeholders including pharmaceutical companies and regulatory agencies. Importantly, it would provide a systematic approach towards ensuring that patient-related unmet needs, research priorities, and preferred clinical endpoints are considered during the drug development process.

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.



Virtual ISPOR Conferences and Events

ISPOR 2022 | In-Person and Virtual Conference May 15-18



Gaylord National Resort and Convention Center Washington, DC, USA

Join global healthcare leaders in person and virtually for this must-attend event as we convene at ISPOR 2022 for discussion and dissemination of the latest topics in health economics and outcomes research (HEOR).

ISPOR 2022 will provide you with dedicated opportunities to network and “chat” in person and virtually with your peers, HEOR experts, and thought leaders, and to discuss with a global audience how we establish, incentivize, and share value sustainability for health systems, patients, and technology developers.

The conference will be complete with plenary sessions, spotlights, breakouts, forums, daily in-person and virtual poster presentations, and an exhibit hall with sponsorship opportunities.

Notification Dates *(the Call for Abstracts has closed):*

Issue panels, workshops, other breakout sessions	January 24
Research	February 17

Please note: As a Society committed to improving health and as a global event producer, ISPOR continues to closely monitor news and reports of coronavirus disease (COVID-19) outbreaks globally. For more about health and safety at ISPOR conferences, please visit our [Health & Safety](#) page.

 More at www.ispor.org/ISPOR2022

 Join the conversation on Twitter [#ISPORAnnual](#)

 Want to get in front of your target audience for 2022? Participate in the conference Exhibitor Guide!
[View Guide Now](#)

Virtual ISPOR Education

Virtual ISPOR Short Courses



Upcoming ISPOR Short Courses include:

February 14-17 | 10:00AM - 12:00PM EST

Introduction to Health Economics and Outcomes Research

March 1-2 | 9:00AM - 11:00AM EST

Introduction to Health Technology Assessment

March 15-16 | 10:00AM - 12:00PM EDT

Going Beyond the Standard: Exploring Advanced Survival Modeling Techniques

March 22-23 | 10:00AM - 12:00PM EDT

US Payers - Understanding the Healthcare System™

ISPOR Short Courses are designed to enhance knowledge and techniques in core health economics and outcomes research (HEOR) topics as well as emerging trends in the field. Short courses offer 4 or 8 hours of premium scientific education and an electronic course book. Active attendee participation combined with our expert faculty creates an immersive and impactful virtual learning experience. Short courses are not recorded and are only available during the live broadcast.

 Watch for the robust list of 2022 ISPOR Short Courses: www.ispor.org/shortcourses

ISPOR Webinars

Live and on-demand webinars provide convenient access to core and trending topics in HEOR

March 4 | 9:00AM EST

Bariatric Surgery Reimbursement Seminar



 View upcoming and on-demand ISPOR Webinars: www.ispor.org/webinars

Virtual ISPOR Education

Signal Series

Watch for upcoming **Signal** Series events

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.

i Learn more and register at: www.ispor.org/signal



HEOR Solutions Center | The marketplace for expertise

The **HEOR Solutions Center** is an online business community that connects health economics and outcomes research (HEOR) professionals with the expertise and solutions they need for their businesses and organizations. Connect with leading health research consulting firms, contract research organizations, data management providers, digital innovators, and more. Find the right solutions to meet your business needs!

Interested in becoming an integral part of ISPOR's new online business community? For more information on joining the HEOR Solutions Center, contact exhibit@ispor.org or download the HEOR Solutions Center Product Information [here](#).

i Learn more and register at: [HEOR Solutions Center](#)





PATIENT ADVOCACY

The Growing Voice of Healthcare

Timely and proper care after receiving a chronic illness diagnosis is extremely important in order to maximize and improve health outcomes. However, navigating the very intricate healthcare system can often feel like maneuvering through a maze with no exit in sight. Patients and their families suddenly become responsible for finding the right care providers, scheduling numerous doctors' appointments, following complex treatment regimens, and even voicing their concerns to the industry and government decision makers. All of this can be laborious, difficult, and sometimes even close to impossible to manage without some assistance. Therefore, finding the right emotional and informational support at the time when everything seems to be crumbling into pieces becomes imperative. Sarah Johnson, Head of Patient Advocacy for the IQVIA Middle East and Africa region, Durham, NC, USA, points out that in the United Kingdom, healthcare professionals will often provide information about the available patient support organizations at the point of diagnosis, and even if they don't, patients can usually find the right organizations or nonorganization-centered communities online.

Giving Voice to the Patient in Patient-Centered Care

Over the past few decades, patient advocacy groups such as the American Cancer Society and the Alzheimer's Association have become increasingly more involved in disease awareness, care, and research. Most of us have likely heard of or even participated in a charity walk for breast cancer, diabetes, arthritis, or some other severe disease. These fundraising efforts help support patients and represent their interests in shaping healthcare towards more patient-centered decision making not only in physicians' offices but also in clinical research and policy making. This switch to patient-focused care is long overdue. Suzanne Schrandt, JD, Founder and CEO of ExPPect, Arlington, VA, USA, and Chairperson for the ISPOR Patient Council, Lawrenceville, NJ, USA, points out that, "Despite being the only constant in their own care, patients have been the one missing player in system-level healthcare decision making for most of the modern healthcare system." She adds that while clinician knowledge and insights are extremely valuable, they cannot replace the unique lived experiences of the patients themselves and their caregivers.

Lack of Patient Insight Should Be a Red Light

When it comes to advocating for patient-centered drug and medical device development and health policy initiatives, much of the work has been led by patients, their caregivers, the patient communities and patient advocacy organizations, explains Elisabeth Oehrlein, PhD, MS, Assistant Vice President for Research & Programs at the National Health Council (NHC). Patient advocates are often personally impacted by a disease, whether themselves, a family member, or a close friend.

When it comes to advocating for patient-centered drug and medical device development and health policy initiatives, much of the work has been led by the patient communities and patient advocacy organizations.

This drives them to challenge assumptions and reimagine healthcare and research, putting patient needs, priorities, and desired outcomes at the center. As one outstanding example, Oehrlein mentions the Parent Project Muscular Dystrophy (PPMD), an organization founded by parents of children with Duchenne muscular dystrophy (DMD), should be mentioned.

DMD is the most fatal genetic childhood disorder with no cure, and it affects about 1 in 3500 boys worldwide. When in 2013 European Medicines Agency issued their first draft guidelines for muscular dystrophy drug development and approval, it soon became apparent to the DMD community that these guidelines did not appropriately address the needs of the patients. In response, PPMD and its partners created and submitted to the US Food and Drug Administration the first-ever, externally developed guidance for industry.¹

"Despite being the only constant in their own care, patients have been the one missing player in system-level healthcare decision making for most of the modern healthcare system."

— Suzanne Schrandt, JD

Milestones like these illustrate the important role patients bring to the drug development table, not only as study subjects, but also as protocol, methodology, and policy codesigners. In fact, 2017 research conducted by Dr Bennett Levitan and his team showed that patient engagement can also benefit the manufacturers. The team estimated that patient input during the early stages of study design may help avoid research protocol amendments; improve enrollment, adherence, and retention; and consequently accelerate product launch by as many as 2.5 years and add a financial value that 500-fold exceeds the initial patient engagement investment.²

The biopharmaceutical companies are starting to realize these benefits, and in recent years, patient involvement across the drug development pipeline has gained more traction. "The world of clinical development is changing, and the patient is taking center stage, quite rightly," Johnson points out and adds that it is important to ensure that the patient engagement happens in a systematic manner, in a way that supports and protects them. In order to provide autonomy and reduce the patient burden, it's crucial to level the playing field among all involved parties. It's easy to imagine a scenario in which a patient is invited to a stakeholder meeting to voice their experiences and concerns in a room full of industry, payer, and provider representatives. While most patient advocates do feel very passionate and encouraged to communicate their

issues, being outnumbered can often feel intimidating and disempowering. Luckily, this is an easy fix, explains Schrandt, “It’s much easier to feel like you need to be silent when you’re just one person. Having multiple patients in the room really helps with the power dynamic and patients feel that not only **can** they speak up but that they **should** do it.”

In addition, patient organizations frequently convene patients, researchers, and other experts to develop tools and resources to make it easier for patients and researchers to work together. For example, NHC-led working groups have developed educational resources to help patients feel prepared to engage in conversations around patient-focused drug development, value assessment, and real-world evidence. For researchers, recently developed resources include guidelines on applying patient insights when designing real-world research, a Patient Experience Mapping Toolbox, and a Patient Engagement Fair-Market Value Calculator to guide compensation. They also collaborate with organizations internationally, such as Patient-Focused Medicines Development (PFMD), to align resources.

Operational Transparency Builds Trust and Credibility

Such an undertaking understandably comes at a cost, and funding often appears to be the topic of contention for the patient advocacy organizations. PPMD, for example, has invested over \$50 million in research and therapy development, and larger organizations such as the American Cancer Society have contributed billions of dollars to advance cancer research and improve patient quality of life.^{3,4} Since the majority of patient advocacy groups are nonprofit organizations, often a large proportion of their support comes from corporate sponsorships and is therefore viewed with skepticism by some.

While there is no question that we still have a long way to go and many more milestones to reach, patient engagement in healthcare has currently gained a momentum, and we must take advantage of it.

In 2017, Susannah L. Rose, PhD, and her team published findings of their investigative survey and showed that 67% of a national sample of patient advocacy organizations reported receiving funding from for-profit companies.⁵ Since these organizations are becoming increasingly more influential stakeholders in healthcare decision making, concerns are being raised regarding potential conflicts of interest and independence. However, Oehrlein explains that with the right protocols in place, good governance practices, and high level of transparency these concerns can be ameliorated. For example, the NHC maintains ‘Standards of Excellence’ for patient organization members related to transparency, expenditures, and governance. That is not to say that every organization that positions themselves as patient advocates has noble intentions.

As happens in every industry, on extremely rare occasions, a group identifying itself as a patient organization will instead be serving as a voice or lobbying body for a nonpatient, for-profit entity. Luckily, both experts agree that nearly everyone entering the advocacy field does so because of their passion, commitment, and willingness to improve care for themselves and future generations.

ISPOR Helps to Carry the Momentum Forward

ISPOR, too, has been involved extensively in improving patient engagement in health economics and outcomes research. Annual patient representative roundtables are being held worldwide with an aim to connect patients with other stakeholders. Additionally, through various short courses, webinars, and conferences, ISPOR works towards creating best practice guidelines and facilitates discussions between

“The world of clinical development is changing, and the patient is taking center stage, quite rightly.”

– Sarah Johnson

patients, the industry, and healthcare providers. While there is no question that we still have a long way to go and many more milestones to reach, patient engagement in healthcare has currently gained momentum, and we must take advantage of it. Patient voices must not only be heard, but they should also serve to lead and guide health innovation. After all, they are going to be the end-user of the product and should therefore be the priority.

References:

1. Furlong P, Bridges JFP, Charnas L, et al. [How a patient advocacy group developed the first proposed draft guidance document for industry for submission to the US Food and Drug Administration](#). *Orphanet J Rare Dis*. 2015;10(1):82.
2. Levitan B, Getz K, Eisenstein EL, et al. [Assessing the financial value of patient engagement: a quantitative approach from CTTI's patient groups and clinical trials project](#). *Ther Innov Regul Sci*. 2018;52(2):220-229. DOI: 10.1177/2168479017716715
3. American Cancer Society. [2019 Annual Report](#). January 4, 2022. .
4. [Parent Project Muscular Dystrophy](#). January 4, 2022.
5. Rose SL, Highland J, Karafa MT, Joffe S. [Patient advocacy organizations, industry funding, and conflicts of interest](#). *JAMA Intern Med*. 2017;177(3):344-350. DOI: doi:10.1001/jamainternmed.2016.8443.

About the Author

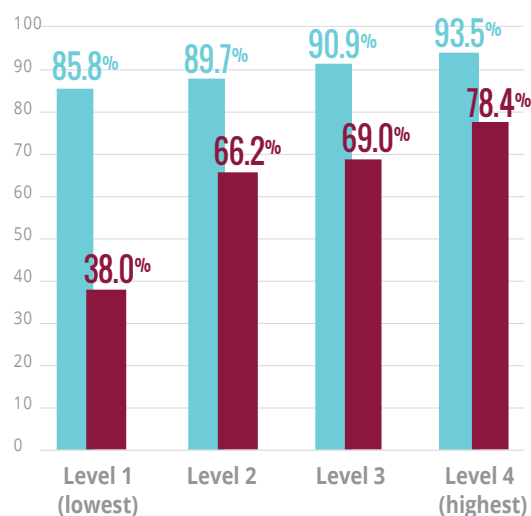
Ilze Abersone, BS, MS, is a research consultant for Vital Statistics Consulting, Hoboken, NJ, USA.

By the Numbers: The Power of Patient Advocacy

Section Editor: The ISPOR Student Network

Contributors: Ingrid A. Cox, University of Tasmania, Hobart, Australia; Clara Marquina, Monash University, Melbourne, Victoria, Australia; Sopany Saing, University of Technology Sydney, Sydney, New South Wales, Australia; Mavis Obeng-Kusi, University of Arizona, Phoenix, Arizona, USA; Prajakta Masurkar, University of Houston, Houston, Texas, USA

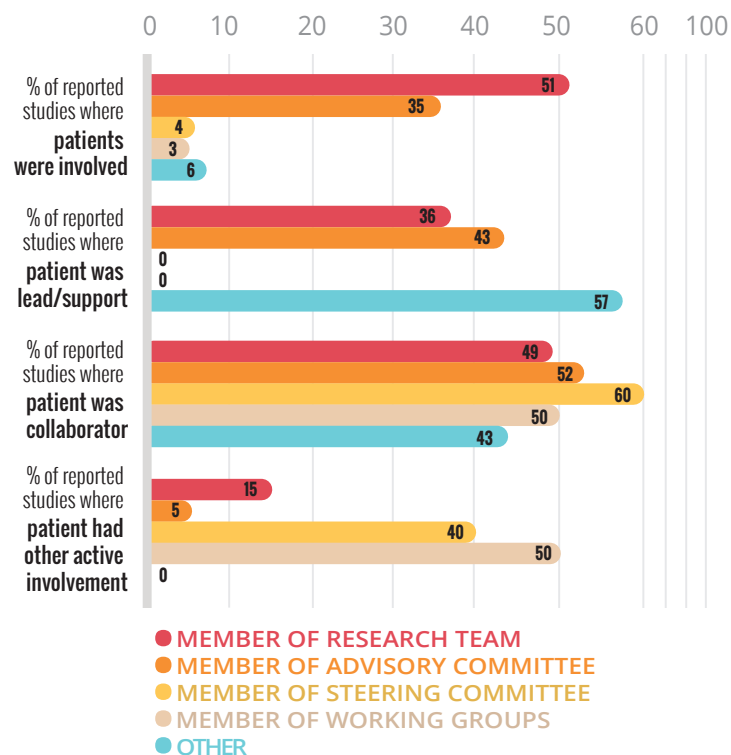
Improvement of clinical and quality-of-life outcomes with increased patient advocacy and engagement



■ Proportion of patients with good medication adherence

■ Quality of life rated as good or very good

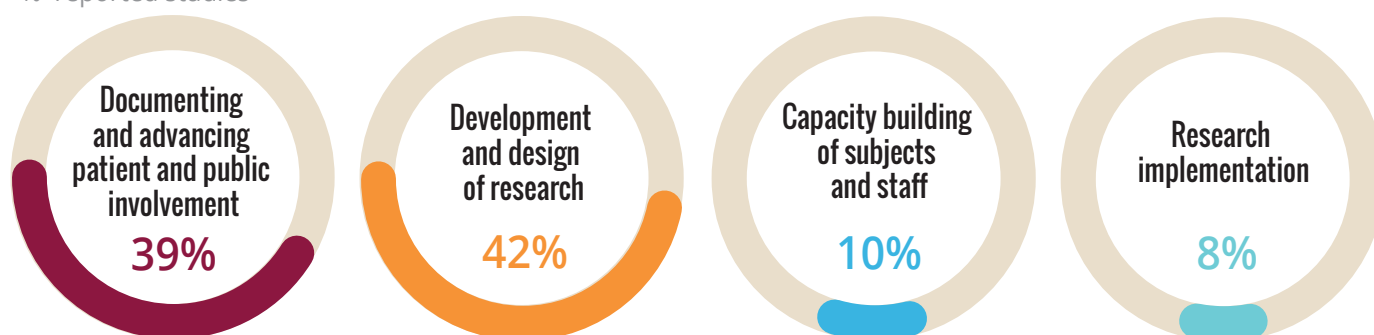
Patient involvement and roles in health research and clinical trials



● MEMBER OF RESEARCH TEAM
 ● MEMBER OF ADVISORY COMMITTEE
 ● MEMBER OF STEERING COMMITTEE
 ● MEMBER OF WORKING GROUPS
 ● OTHER

Purpose of patient involvement in healthcare research and clinical trials

% reported studies



Total number of studies/clinical trials=119

Delivering on Promises: Enhancing Patient Access to Neoadjuvant Cancer Treatments

Milayna Subar, MD, Global Medical & Scientific Affairs, Merck & Co, Kenilworth, NJ, USA; Ravinder Dhawan, PhD, Center for Observational and Real-World Evidence, Merck & Co, Kenilworth, NJ, USA; Ala'a Kutkut, MD, Global/EMEAC Oncology Policy, Merck & Co, Kriens, Switzerland; Michele Pistollato, PhD, Charles River Associates, London, England, UK

Neoadjuvant treatment for oncology patients has a high therapeutic and curative potential.

Innovative medicines in this area often need to rely on more near-term endpoints for their successful development.

Different stakeholders have different positions on the acceptability of non-overall survival endpoints, and alignment on their value and solutions is needed.

Introduction

There is universal agreement on the objective of defeating cancer. Neoadjuvant treatment administered at early potential curative settings has the potential to achieve this objective. But developing neoadjuvant treatment has unique challenges. It may take years to reach efficacy conclusions from endpoints such as overall survival, from trials in patients with early-stage disease and consequently impacting the opportunity to provide effective, potentially curative therapeutic options to patients. Although standards are slowly evolving, there is a lack of alignment among stakeholders on the suitability and value of non-overall survival endpoints and a need to increase mutual understanding to overcome the access challenges for neoadjuvant treatment in oncology.

Delivering Innovation Through Intervention

Neoadjuvant treatments for patients with cancer is vitally important and has a great potential to be curative or delay relapse and lower the overall burden of disease. In addition to improving the prognosis for patients, interventions at earlier stages of the disease (eg, nonmetastatic settings) can reduce long-term direct and indirect costs for health systems. Some of the most recent scientific advances in treating cancers are immunotherapies. These are now being applied in early stage disease settings as neoadjuvant treatment.¹ There are currently over 300 trials listed on [ClinicalTrials.gov](https://clinicaltrials.gov) exploring the use of immunotherapy in early stage disease settings across several cancer types including breast, melanoma, renal cell cancer, esophageal cancer, and lung cancer.²

There is considerable hope that the use of immunotherapies in neoadjuvant settings will activate the immune response to eradicate micrometastases thereby preventing recurrence of disease and improving overall survival while preserving quality of life.

An Access Challenge for Neoadjuvant Treatments in Oncology

There is a barrier that can affect the commercialization and fast uptake of these medicines: the lack of alignment between different stakeholders on the acceptance of endpoints other than overall survival used to demonstrate their clinical effectiveness. Market access and coverage policies for medicines have been based traditionally on randomized controlled trials that assess final outcomes such as overall survival, morbidity, and health-related quality of life.³ Given the medical need in many oncology indications and the promising benefits of immunotherapies, regulatory agencies have approved treatments increasingly based on evidence of their efficacy on biomarkers or intermediate endpoints (sometimes termed “surrogate endpoints” where there is a clear relationship with another endpoint of interest) to accelerate patient access.

Market access and coverage policies for medicines have traditionally been based on randomized controlled trials that assess final outcomes such as overall survival, morbidity, and health-related quality of life.

However, reimbursement decision bodies and health technology assessment agencies in general have been less willing to accept these endpoints.⁴ There have been some exceptions. In some circumstances, they have also made recommendations that relied entirely on treatment effects derived from trials that assessed surrogate endpoints. To date, a disease-free survival benefit has been reported in several neoadjuvant studies and adjuvant immunotherapy has been approved in melanoma based on

this endpoint, though access challenges persist in some regions.⁵ Similarly, event-free survival has been accepted to show the benefit of treatments in high-risk, early stage triple-negative breast cancer.⁶ Despite their appeal, the use of non-overall survival endpoints for reimbursement recommendations remains difficult, as payers often express concerns that these endpoints may not capture the combined risk-benefit profile of a technology, or that superiority using these endpoints may not translate into long-term benefits for patients or, if it did, the healthcare system may not judge the benefits to be good value for money.

The Debate on the Use of Non-Overall Survival Endpoints

From an industry perspective, the analysis of overall survival (the “gold standard” for a treatment’s approval) becomes less efficient in certain disease states where years may be needed in order for sufficient survival events to occur in order to demonstrate statistical benefit. Even then, the analysis of non-overall survival endpoints may be confounded by the effect of other subsequent therapies used over the duration.⁷ For this reason, the analysis of alternative endpoints (such as pathological complete response, disease-free survival, or event-free survival) is frequently incorporated in clinical trials of neoadjuvant treatments because they allow saving valuable time in the development process. Given the global scope of clinical trials, choices need to be made on which endpoints to measure and the impact that the consequent trial design can have on time to patient access. The difficulties to accept non-overall survival endpoints for reimbursement could lead to a lack of access to treatments, or to significant delays.

Given the global scope of clinical trials, choices need to be made on which endpoints to measure and the impact that the consequent trial design can have on time to patient access.

Clinicians may find alternative, non-overall survival endpoints such as a biomarker or disease response relevant

in a neoadjuvant setting as they can provide early evidence of the tumor sensitivity to treatment, may enable more efficient surgical excision, and increase the opportunity to cure early stage tumors. In breast cancer, clinical response can influence the extent of surgery and nodal dissection which, from a patient perspective, also has significant aesthetic and psychological implications. Pathological complete response (absence of invasive cancer in the breast) demonstrated at the time of resection is associated with improved prognosis and decreased risk of recurrence, and has been accepted by some as a surrogate endpoint for overall survival for nonimmunologic therapies.⁸ However, the applicability

In breast cancer, clinical response can influence the extent of surgery and nodal dissection which, from a patient perspective, also has significant aesthetic and psychological implications.

of specific endpoints to assess benefits can vary considerably across different types (and subtypes) of tumors. If the treatment goal is eradication of cancer, in general, prescribers are looking for a long-term outcome benefit (overall survival, event-free survival, disease-free survival, or invasive disease-free survival).⁹ In some instances, involvement of multidisciplinary teams can refine research protocols to better support relevant patient outcomes throughout the continuum of the neoadjuvant treatment.

In general, especially in Europe, payers argue that they want to maintain the high standard of randomized clinical trials based on overall survival and long-term safety data. They are willing to use a different endpoint only if there is a clear relationship between the endpoint and overall survival from clinical studies in relevant disease settings and target populations. Their argument is that “accelerated” regulatory approvals without overall survival data add uncertainty to their decision-making process. However, there are also calls

within some payer groups to step away from the “traditional paradigm of overall survival” and take a more holistic approach to consider the value of neoadjuvant treatment can deliver in a physician’s treatment strategy. In this case, the argument is that physicians are ready to prescribe neoadjuvant treatments to patients, but the healthcare systems (and the payers) are not ready yet.

From a policy perspective, there exist different tools to deal with uncertainty (ranging from horizon scanning to anticipate system readiness to pipeline products, to generation and use of real-world data to better address information gaps). As payers and HTA bodies are more receptive to treatments used in early stage disease settings if uncertainty is reduced, there should be more consideration of these tools. However, some of these mechanisms, such as managed entry agreements, can be particularly complex to implement, even face legal barriers, and add to the challenges for neoadjuvant treatment. Options to address these complexities include efforts to improve data quality and analytic methods and increased clarity and infrastructure for the collection and use of real-world data.

There is a need to develop a shared understanding of the challenges and discuss the different solutions that could advance the debate on access to neoadjuvant treatment in oncology.

A Fine Line to Travel for Faster Patient Access

Overall, the demands from healthcare decision makers to have more certainty about the value of a medicine needs to be balanced with the desire from patients for faster access to effective treatments, especially in areas of great unmet need. In the oncology space there are numerous endpoints widely accepted to provide patients with novel therapies to treat cancers at later stages (eg, progression-free survival in stage III and IV tumors).¹⁰ However, this willingness has not consistently

translated into treatment for earlier stages of disease. The complexity of the access challenges requires particular alignment between the stakeholders (patient, payers, physicians, regulators, and industry), especially on the consideration of endpoints. To ensure that no opportunity is missed because of the lack of mutual understanding, there should be a joint effort to identify and implement solutions that would enable the development of novel effective medicines and patient access in neoadjuvant oncology settings.

References

1. Krishnamoorthy M, Lenehan JG, Maleki Vareki S. Neoadjuvant immunotherapy for high-risk, resectable malignancies: Scientific rationale and clinical challenges. *J Natl Cancer Inst*. 2021;113(7):823-832.
2. Helwick C, Mittendorf EA. [What's the Current Status of Neoadjuvant Immunotherapy?](#) Published April 25, 2020. Accessed July 31, 2021.
3. Fitzpatrick R, Davey C, Buxton MJ, Jones DR. [Evaluating patient-based outcome measures for use in clinical trials](#). *Health Technol Assess*. 1998;2(14):i-iv,1-74.
4. Harbeck N, Schneeweiss A, Thuss-Patience P, et al. [Neoadjuvant and adjuvant end-points in health technology assessment in oncology](#). *Eur J Cancer*. 2021;147:40-50.
5. US Food and Drug Administration. [FDA Approves Pembrolizumab for Adjuvant Treatment of Melanoma](#). Published December 6, 2021. Accessed July 31, 2021.
6. US Food and Drug Administration. [FDA Approves Pembrolizumab for High-Risk Early-Stage Triple-Negative Breast Cancer](#). Published July 27, 2021. Accessed July 31, 2021.
7. Topalian SL, Taube JM, Pardoll DM. [Neoadjuvant checkpoint blockade for cancer immunotherapy](#). *Science*. 2020;367(6477).
8. Huang M, O'Shaughnessy J, Zhao J, et al. [Evaluation of pathologic complete response as a surrogate for long-term survival outcomes in triple-negative breast cancer](#). *J Natl Compr Canc Netw*. 2020;18(8):1096-1104.
9. Tolaney S, Garrett-Mayer E, White J, et al. [Updated standardized definitions for efficacy end points \(STEEP\) in adjuvant breast cancer clinical trials: STEEP Version 2.0](#). *J Clin Oncol*. 2021; 39(24):2720-2731.
10. Gyawali B, Hey SP, Kesselheim AS. [Evaluating the evidence behind the surrogate measures included in the FDA's table of surrogate endpoints as supporting approval of cancer drugs](#). *EClinicalMedicine* 2020;21:100332.

The Promise and Biases of Prediction Algorithms in Health Economics and Outcomes Research

Sara Khor, MASc; Aasthaa Bansal, PhD, The Comparative Health Outcomes, Policy, and Economics Institute, University of Washington School of Pharmacy, Seattle WA, USA

Predictive algorithms hold the promise to improve healthcare decisions and revolutionize payment models.

To fully harness their potential to improve healthcare and outcomes for all people, there is a need to consciously build fairness considerations into the development and adoption of these models.

At the center of identifying, addressing, and preventing racial biases in algorithms is the need to understand the meaning of race and fairness.

The Promise of Prediction Algorithms

There is growing interest in developing prediction algorithms for healthcare and health economics applications. “Big data” are becoming increasingly available with the integration of electronic health records and the standardization of administrative health databases. More recently, the development of genome informatics and personal health monitoring wearables such as smart watches and GPS trackers further pushes the boundaries of health data, the complexity and volume of which often exceed the capacity of the human brain to comprehend. Machine learning methods and advanced analytical tools enable the meaningful processing of these treasure troves of data, promising to uncover insights from these data that may be hidden from the human eyes and to provide higher quality and more efficient care using personalized diagnoses and treatments based on collective data and knowledge.

Smart algorithms can also be incorporated into health systems to reduce medical errors, recommend appropriate care, or identify patients who will derive the greatest benefit from population health programs.

Algorithms that predict risks of an event, such as disease diagnosis or progression, or death, are frequently found in the clinical literature. These tools can be used in shared decision making to facilitate clinician–patient communication on risks and guide decisions regarding testing and treatment. Smart algorithms can also be incorporated into health systems to reduce medical errors, recommend appropriate care, or identify patients who will derive the greatest benefit from population health programs.^{1,2} Predictive models also have been

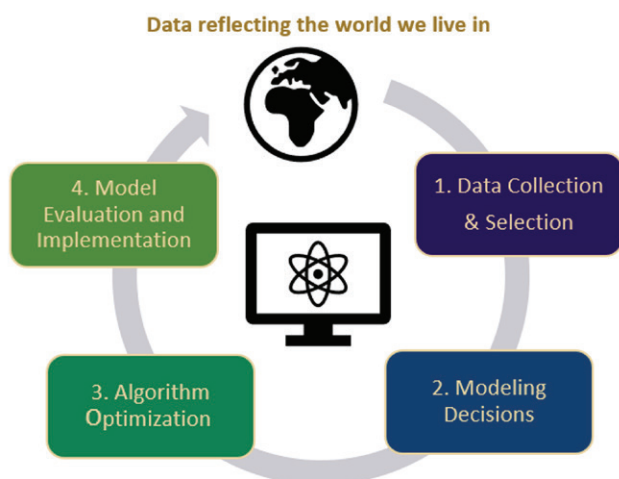
used for forecasting health spending and risk adjustment of health plan payments to facilitate the allocation of appropriate healthcare funding according to individuals’ risks.^{3,4} By applying appropriate risk adjustment, health plans and health organizations are incentivized to provide high quality and efficient care while disincentivized from “cherry-picking” healthier individuals.

In addition to increasing processing power and efficiency, there is also hope that the use of algorithms can reduce the conscious and unconscious biases of human decisions. Logical automated algorithms, sometimes perceived as being free from human interference, are believed to have the potential to produce decisions that are devoid of human flaws and biases.

Defining the Problem

In reality, algorithms are often far from being neutral. In fact, because algorithms are developed by humans using data reflecting human behavior, biases can exist at every stage of their development (see **Figure**). From (1) the collection of raw data (*who is and who is not using the health system? Whose data are being captured in the electronic health data records?*) and the selection of the model training dataset (*who is excluded from the training data?*) to (2) making modeling decisions around model inputs and structures, to (3) choosing what metrics to optimize the algorithms on, and finally, to (4) deciding on how to evaluate and implement the model once it is developed, bias can be in each of these steps because human decisions are at every stage. Even if the above steps are perfect, models are trained to mimic the historical data that reflect the world we live in, which is plagued by structural racism and inequality. When algorithms are trained using biased data that are encoded with racial, gender, cultural, and political biases, the results may perpetuate or amplify existing discriminations and inequities.

Figure. Simple schematic showing each of the steps of prediction model development.



Awareness of Bias

Seemingly well-performing algorithms built using biased data or inappropriate methods can lead to erroneous or unsupported conclusions for certain populations. If these biased algorithms are used to make healthcare treatment or funding decisions, not only are the algorithms far from being neutral, they can further create, propagate, or amplify systemic biases and disparities in healthcare and health outcomes. Awareness of algorithmic bias in healthcare is growing and many investigations have led to calls for the removal or revision of several existing problematic clinical tools. One example is a widely used risk-prediction tool that large health systems and payers rely on to target patients for expensive “high-risk care management” programs.² The tool used past healthcare costs as a proxy for health to estimate clinical risk but because White patients tended to have better and more frequent access to the health system and therefore higher healthcare expenditure compared to Black patients, the algorithm generated higher risk scores for White patients than for Black patients who had similar health status. Implications of such differential scores include fewer referrals for Black patients for care management programs, contributing further to racial healthcare disparities and spending discrepancies.

The Debate Around the Inclusion of Race in Prediction Algorithms

At the center of identifying, addressing, and preventing racial biases in algorithms is the need to understand

the meaning of race and fairness. Race is a social construct and its effect on health reflects that of racism and inequities in socioeconomic, structural, institutional, cultural, and demographic factors. Currently there is a lack of consensus on how race and ethnicity should be included in prediction algorithms. Opponents to including race as a predictor in algorithms are concerned about racial profiling or that the use of individual features for decision making is inherently

unfair—a concept sometimes referred to as “process fairness.”⁵ The use of a social construct as a predictor in algorithms may also erroneously suggest biological effects and condones false notions about biological inferiority among racial or ethnic minority groups. There are increasing concerns around race-based clinical decision making that can result in unequal treatment across racial groups, promote stereotyping, and shift attention and resources away from addressing the root causes of the disparities of illness such as structural inequities and social determinants of health.⁶

When algorithms are trained using biased data that are encoded with racial, gender, cultural, and political biases, the results may perpetuate or amplify existing discriminations and inequities.

These concerns around race-adjusted algorithms have led to calls for the removal of race in some existing clinical algorithms, such as the estimated glomerular filtration rate (eGFR) and the vaginal birth after cesarean (VBAC) calculators. The inclusion of race as a predictor in the eGFR algorithm resulted in higher eGFR values for Black patients, which suggested better kidney function.⁷ As a result, Black patients may

be less likely than White individuals to be referred to a specialist or receive transplantation, further exacerbating the existing disparities in end-stage kidney diseases and deaths among Black patients. Similarly, the VBAC algorithm systematically produces lower estimates of VBAC success for African American or Hispanics, which may dissuade clinicians from offering trials of labor to people of color and contribute to the high maternal mortality rates among Black mothers.⁸ These tools have been widely criticized and in many institutions across the United States, the algorithms were revised to remove the adjustment for race.

Black patients may be less likely than White individuals to be referred to a specialist or receive transplantation, further exacerbating the existing disparities in end-stage kidney diseases and deaths among Black patients.

Should race be removed from all algorithms? And more importantly, does the removal of race as a predictor make the algorithms fair? Some have argued that in situations where accurate prognostication is the goal, for example, in algorithms that aim to guide individual care plans such as cancer surveillance intensity, not considering race can result in inaccurate prediction that can then lead to inappropriate allocation of treatment, which can also differentially harm racial or ethnicity minority groups. Additionally, the effects of race are often already encoded in other variables in the model. Without fully understanding and incorporating the drivers of the disparities in outcomes, researchers have argued that race-blind models that simply ignore race may not make the algorithms fair.

Colorectal Cancer Recurrence as a Case Study

To further understand the impact of the inclusion or exclusion of race or ethnicity as a predictor in clinical algorithms on model performance, we used colorectal cancer (CRC) recurrence as a case study.

CRC recurrence risk models have been proposed to guide surveillance for recurrence for patients with cancer, the goal of which is to move past one-size-fits-all surveillance approaches and move towards personalized follow-up protocols based on prognostic markers. Patients identified with high risk of recurrence could be recommended for more intensive surveillance, and those with low risk could be recommended for less

Without fully understanding and incorporating the drivers of the disparities in outcomes, researchers have argued that race-blind models that simply ignore race may not make the algorithms fair.

frequent active surveillance, which can reduce the costs and burden associated with unnecessary visits and tests. Using data from a large integrated healthcare system, we fitted 3 risk prediction models that estimated patients' risk of recurrence after undergoing resection. One model excluded race/ethnicity as a predictor ("race-blind"); one included race/ethnicity ("race-sensitive"); and the third was a stratified model where separate models were built for each race/ethnicity subgroup.

According to standard performance measures based on sensitivity and specificity, such as the area under the ROC curve (AUC), the "race-blind" model performed well on the overall cohort (AUC=0.7) but had differential performance across racial subgroups (AUC ranging from 0.62-0.77).

Additionally, the model had lower sensitivities and higher false-negative rates among minority racial subgroups compared to non-Hispanic White

individuals, suggesting that the model may be disproportionately missing more true cases in these minority racial subgroups. The implication of using such an algorithm for decision making is that more individuals in these minority racial subgroups who should be getting resources may not be receiving them. Interestingly, the inclusion of a predictor for race/ethnicity or the use of race stratification did not address the problem of differential performance across racial groups, further underscoring the need for caution when developing and using these algorithms for decision making. Careful consideration of the role of race in prediction models is essential but may not be sufficient, and the simple omission or inclusion of race may not fix the problem of algorithmic bias. It is important for those making or using prediction algorithms to assess and report how these models perform in subgroups to ensure that they are not contributing to health disparities.

Looking Ahead

Our case study showed that simply evaluating and reporting algorithm performance using a single metric (eg, AUC) in the overall sample can be misleading and may conceal the models' differential performance across subpopulations. While our case study illustrated the unfairness in model performance across racial subgroups, it is important to point out that there is no universal definition of fairness and the choice of fairness criteria may depend on the context and decision makers' value judgment.

Predictive algorithms have the potential to improve healthcare decisions and revolutionize payment models, but to fully harness their potential to improve healthcare and outcomes for all people, there is a need to build ethical considerations into the development and adoption of these models. The shift towards fair algorithms requires

transparent and thoughtful model-building approaches and critical appraisal by deliberate users, including clinicians, health systems, researchers, and patients. By incorporating conscious antiracist approaches and engaging the broad community and diverse stakeholders, predictive algorithms carry the potential to fulfill their original promise—to harness data and knowledge to help us make decisions that could lead to better and fairer healthcare for all.

References

1. Corny J, Rajkumar A, Martin O, et al. [A machine learning-based clinical decision support system to identify prescriptions with a high risk of medication error](#). *J Am Med Inform Assoc*. 2020;27(11):1688-1694.
2. Obermeyer Z, Powers B, Vogeli C, Mullainathan S. [Dissecting racial bias in an algorithm used to manage the health of populations](#). *Science*. 2019;366(6464):447-453.
3. Rose S. [A machine learning framework for plan payment risk adjustment](#). *Health Serv Res*. 2016;51(6):2358-2374.
4. Navarro SM, Wang EY, Haeberle HS, et al. [Machine learning and primary total knee arthroplasty: patient forecasting for a patient-specific payment model](#). *J Arthroplasty*. 2018;33(12):3617-3623.
5. Grgic-Hlaca N, Zafar MB, Gummadi K, Weller A. [The Case for Process Fairness in Learning: Feature Selection for Fair Decision Making](#). Presented at Symposium on Machine Learning and the Law at the 29th Conference on Neural Information Processing Systems. 2016; Barcelona, Spain.
6. Vyas DA, Eisenstein LG, Jones DS. [Hidden in plain sight—reconsidering the use of race correction in clinical algorithms](#). *N Engl J Med*. 2020;383(9):874-882.
7. Eneanya ND, Yang W, Reese PP. [Reconsidering the consequences of using race to estimate kidney function](#). *JAMA*. 2019;322(2):113-114.
8. Vyas DA, Jones DS, Meadows AR, Diouf K, Nour NM, Schantz-Dunn J. [Challenging the use of race in the vaginal birth after cesarean section calculator](#). *Womens Health Issues*. 2019;29(3):201-204.

Treatment Journey of Patients With COVID-19 in US Hospital Settings

Rena C. Moon, MD, MPH, Harold Brown, MBA, Ning Rosenthal, MD, MPH, PhD, PINC AI Applied Sciences, Premier Inc, Charlotte, NC, USA

This is the first study focusing on the journey of patients with coronavirus disease 2019 (COVID-19) in the US hospital settings using a national database.

The study showed that both inpatients and outpatients with a COVID-19 diagnosis had a high level of emergency department utilizations.

About 1 in 5 inpatients were admitted to intensive care units during index hospitalization and over a third of inpatients needed additional healthcare services posthospital discharge.

Introduction

While public health measures lowered hospital volume related to COVID-19 after the initial surge in March and April of 2020, the number of COVID-19-related hospital visits was still high throughout 2020.¹⁻⁴ Furthermore, the number of new cases increased substantially in October 2020 through February 2021, overwhelming the hospital systems again.^{3,4}

Therefore, appropriate allocation of healthcare resources is especially important during the long stretch of a pandemic. To do so, we need a better understanding of the treatment journey of patients with COVID-19—both inpatients and outpatients—including the source of admission, utilizations of intensive care units (ICUs) and invasive mechanical ventilators (IMVs) during their visits.

The main objective of this study is to describe the treatment journey of patients with COVID-19 from the first, or “index” hospital visit to 30 days after discharge for inpatients and hospital-based outpatients in the United States using national real-world data.

Data Source, Study Design, and Population

This study used Premier Healthcare Database (PHD) COVID-19 special release (PHD-SR). PHD-SR is currently being widely used by academic and industrial institutes as well as US government agencies such as the Centers for Disease Control and Prevention and the National Institutes of Health for COVID-19 research.^{5,6}

A retrospective cohort study was performed for all adult (≥ 18 years old) patients with COVID-19-related visits in the PHD-SR. COVID-19-related inpatient and outpatient visits were identified using the principal or secondary discharge diagnosis of COVID-19 and discharge dates between April 1, 2020 and February 28, 2021. Based on the type of index visit, patients were categorized as either inpatient or outpatient.

Endpoints

Endpoints during an index visit included: point-of-origin (ie, nonhealthcare facility, clinic, transfer from an acute care facility, transfer from a long-term care facility, other), admission through the emergency department (ED) (yes vs no), discharge status (ie, expired, home, home health, transfer to nursing or rehabilitation facility, transfer to another acute care

While public health measures lowered hospital volume related to COVID-19 after the initial surge in March and April of 2020, the number of COVID-19-related hospital visits was still high throughout 2020.

facility, hospice, other), and in-hospital mortality during index visit. For inpatients only, the following endpoints during index hospitalization were also included: ICU admission (yes vs no), IMV use (yes vs no), and extracorporeal membrane oxygenation (ECMO) use (yes vs. no). Endpoints within 30 days after index visit (among patients who did not die during index visit) included: COVID-19-related ED visits, non-ED outpatient visits, hospitalizations (readmissions for inpatients and return hospitalizations for outpatients), hospitalizations with ICU, and inhospital mortality.

Patient, Visit, and Hospital Characteristics

Patient demographic and clinical characteristics assessed at index visit included age, sex, self-reported race and ethnicity, primary insurance payer, and comorbidities. Hospital characteristics included urban/rural population served, teaching status, US census geographical region (ie, Midwest, Northeast, South, or West), and size (ie, 1-299, 300-499, 500+ beds).

Comorbidities, including hypertension, history of smoking, morbid obesity, and

individual comorbidities in the Charlson-Deyo Comorbidity Index (CCI)⁷ were identified using discharge diagnosis codes during the index visit or any visit to the same hospital within 180 days prior to the index visit. The CCI score categories (0, 1-4, 5+) were also examined using a previously validated method.⁸

Statistical Analysis

We used descriptive statistics to present baseline patient, visit, and hospital characteristics of patients with COVID-19 as well as their treatment journey, separately for inpatients and outpatients. All analyses were performed using SAS version 9.4 (SAS Institute Inc, Cary, North Carolina, USA).

Results of the Study

A total of 1,454,780 adult patients with one or more COVID-19-related discharges from 909 hospitals were identified in PHD-SR from April 2020 to February 2021. Of these patients, 481,216 (33.1%) were inpatients in 871 hospitals and 983,564 (66.9%) were outpatients in 895 hospitals at their index visit.

Characteristics of COVID-19 Inpatients

Among COVID-19 adult inpatients, the average age was 64.4 years and approximately half were male, about 2/3 were White, 18% were Black, and 17% were Hispanic (Table 1). Comorbidities were common, in the order of hypertension (70.3%), diabetes (42.4%), chronic pulmonary disease (23.6%), morbid obesity (21.3%), chronic kidney disease (18.5%), and congestive heart failure (18.5%). Most patients (45.8%) were hospitalized in the South (reflective of hospitals included in PHD) and in urban hospitals (87.9%), but patients were evenly distributed across small, medium, and large hospitals, categorized by number of beds.

Characteristics of Hospital-Based COVID-19 Outpatients

Among 973,564 COVID-19 adult outpatients, the average age was 48.8 years and 44.1% were male, 63.7% were White, 16.5% were Black, and 19.8% were Hispanic (Table). The most common comorbidities were hypertension (22.8%), diabetes (12.2%), and chronic pulmonary disease (8.6%), but 76.8%

Table. Baseline demographics of patients with COVID-19 at their index visit, stratified by the patient type.

	Inpatients n=481,216	Outpatients n=973,564
Patient Characteristics		
Age Category, years, n (%)		
18-34	35,125 (7.3)	261,938 (26.9)
35-49	59,364 (12.3)	244,478 (25.1)
50-64	125,769 (26.1)	253,284 (26.0)
65-79	161,331 (33.5)	159,710 (16.4)
80+	99,627 (20.7)	54,154 (5.6)
Age, years, continuous		
Mean (std)	64.4 (17.5)	48.8 (18.5)
Median (q1, q3)	66.0 (53.0, 77.0)	48.0 (33.0, 63.0)
Gender, n (%)		
Female	231,713 (48.2)	542,105 (55.7)
Male	248,950 (51.7)	428,969 (44.1)
Unknown	553 (0.1)	2490 (0.3)
Race, n (%)		
White	306,564 (63.7)	619,762 (63.7)
Black	85,126 (17.7)	160,997 (16.5)
Other	89,526 (18.6)	192,805 (19.8)
Ethnicity, n (%)		
Hispanic or Latino	81,418 (16.9)	192,758 (19.8)
Not Hispanic or Latino	320,574 (66.6)	621,977 (63.9)
Unknown	79,224 (16.5)	158,829 (16.3)
Payer, n (%)		
Medicaid	64,605 (13.4)	152,689 (15.7)
Medicare	267,223 (55.5)	229,140 (23.5)
Private Insurance	112,334 (23.3)	449,611 (46.2)
Other/Uninsured	37,054 (7.7)	142,124 (14.6)
Baseline Comorbidities, n (%)		
Morbid Obesity	102,407 (21.3)	37,096 (3.8)
Hypertension	338,121 (70.3)	22,2075 (22.8)
History of Smoking	40,573 (8.4)	59,871 (6.1)
Myocardial Infarction	49,973 (10.4)	15,029 (1.5)
Congestive Heart Failure	88,961 (18.5)	23,479 (2.4)
Peripheral Vascular Disease	22,298 (4.6)	7541 (0.8)
Cerebrovascular Disease	21,970 (4.6)	8062 (0.8)
Dementia	62,563 (13.0)	13381 (1.4)
Chronic Pulmonary Disease	113,571 (23.6)	83,837 (8.6)
Rheumatic Disease	11,759 (2.4)	503 (0.4)
Peptic Ulcer Disease	5628 (1.2)	198 (0.2)
Diabetes Mellitus	20,4263 (42.4)	14,157 (11.2)
Hemiplegia or Paraplegia	6684 (1.4)	181 (0.1)
Chronic Kidney Disease	89,265 (18.5)	3376 (2.7)
Mild Liver Disease	5394 (1.1)	246 (0.2)
Moderate or Severe Liver Disease	5493 (1.1)	160 (0.1)
Any Malignancy	24,161 (5.0)	1391 (1.1)
Metastatic Solid Tumor	6334 (1.3)	295 (0.2)
HIV Disease	1389 (0.3)	246 (0.2)
CCI Score Category, n (%)		
0	133,349 (27.7)	100,142 (78.9)
1-4	282,003 (58.6)	24,847 (19.6)
5+	65,864 (13.7)	1979 (1.6)
CCI Score, mean (std)		
	2.0 (2.2)	0.4 (1.1)
Hospital Characteristics		
Hospital Size, n (%)		
1-299 beds	183,753 (38.2)	52,112 (41.0)
300-499 beds	147,038 (30.6)	32,080 (25.3)
500+ beds	149,766 (31.1)	42,534 (33.5)
Other/Unknown	659 (0.1)	242 (0.2)
Teaching Status, n (%)		
Non-Teaching Hospital	252,269 (52.4)	67,075 (52.8)
Teaching Hospital	228,947 (47.6)	59,893 (47.2)
Population Served, n (%)		
Rural	58,236 (12.1)	14,313 (11.3)
Urban	422,980 (87.9)	112,655 (88.7)
Geographic Location, n (%)		
Midwest	99,197 (20.6)	23,939 (18.9)
Northeast	93,432 (19.4)	27,672 (21.8)
South	220,256 (45.8)	62,917 (49.6)
West	68,331 (14.2)	12,440 (9.8)

CCI indicates Charlson-Deyo Comorbidity Index.

of the patients had 0 CCI score. Most patients (53.1%) visited hospitals in the South (reflective of hospitals included in PHD), urban hospitals (79.9%), and small hospitals (1-299 beds, 45.8%).

Treatment Journey of COVID-19 Inpatients

Most hospitalized patients originated from a nonhealthcare facility (79.9%) or were transferred from another acute care facility (10.1%), and 94.5% of the patients were admitted through the ED (**Figure 1**). Of these patients, 22.5% required an ICU stay and 12.8% were put on IMV, and 13.9% died during index hospitalization. Less than half of the patients (44.3%) were discharged home; 15.1% were discharged to a nursing or rehabilitation facility and 11.6% were discharged to home health. After discharge, 2.7% returned to the ED and 5.3% were readmitted to the same hospital within 30 days. Among readmitted patients (n=22,017), 24.2% (n=5377) required ICU admission and 16.8% (n=3708) died.

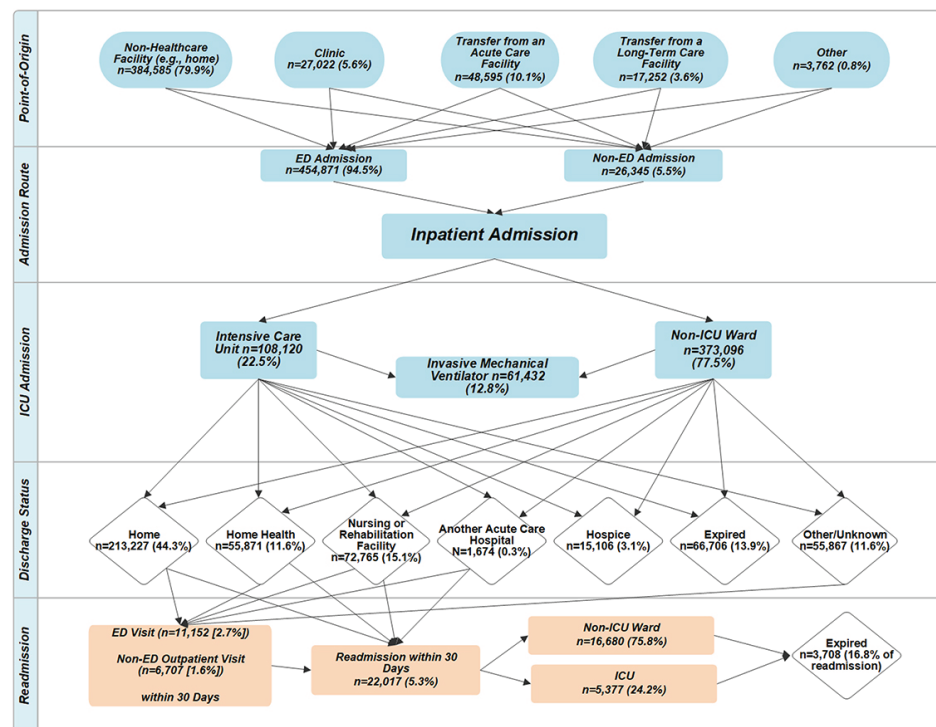
Treatment Journey of Hospital-Based COVID-19 Outpatients

Most outpatients originated from a nonhealthcare facility (74.7%) or clinic (18.4%), and 60.2% of the patients were ED outpatients (**Figure 2**). Non-ED outpatient visits included diagnostic testing (17.4%), clinic visit only (8.5%), observation (3.8%), and same-day surgery (1.7%). Most patients were discharged home (78.5%) after the index outpatient visit. After discharge, 6.5% returned to the ED and 4.1% had a return hospitalization within 30 days. Among hospitalized patients (n=39,626) within 30 days, 17.5% (n=6953) required ICU admission and 8.6% (n=3420) died during hospitalization.

Closing Thoughts

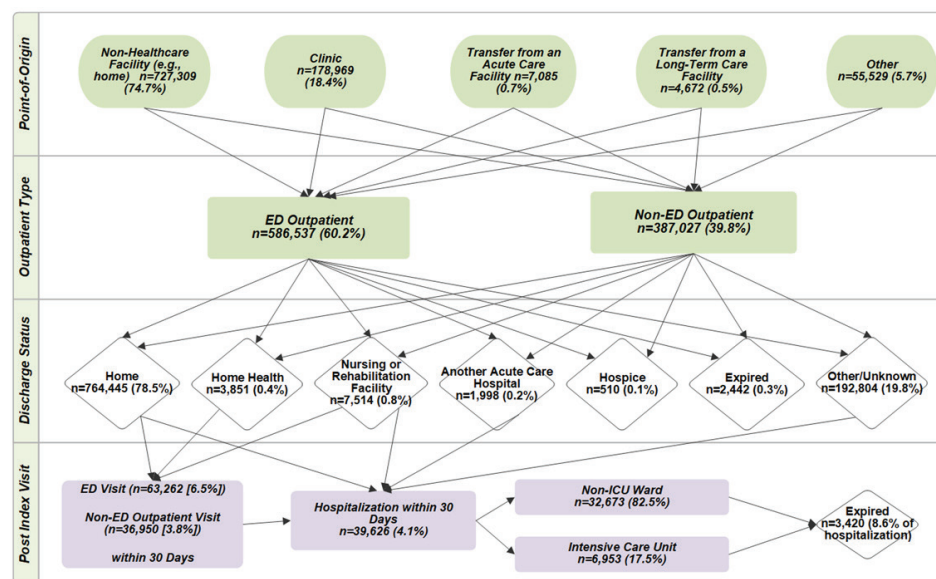
Our study is the first to report the journey of patients with COVID-19 in US hospital settings using a national database. We would like to note that 95% of inpatients were admitted through the ED. Furthermore, while the percentage of ED utilization was lower (~60%) among hospital-based outpatients compared to that of inpatients, the absolute number of outpatients utilizing ED exceeded that of inpatients (n=454,871 vs n=586,537). Approximately 6% to 7% of outpatients also had follow-up ED visits within 30

Figure 1. Treatment journey and healthcare resource utilization of COVID-19 inpatients.



ED indicates emergency department; ICU, intensive care unit.

Figure 2. Treatment journey and healthcare resource utilization of hospital-based COVID-19 outpatients.



ED indicates emergency department; ICU, intensive care unit.

days. High utilization of ED among patients with COVID-19 could also hinder the treatment of without COVID-19 ED patients, consequently extending the impact of pandemic to those needing

critical care beyond COVID-19.⁹ Our findings highlight the significant role of EDs during a pandemic and the importance of appropriate resource allocation.

This study also showed high utilization of ICU, IMV, and postdischarge healthcare services among inpatients. Almost a quarter of inpatients were admitted to the ICU and 13% needed IMV use during index hospitalization. A substantial proportion of patients needed continued care either through home health services (12%) or nursing or rehabilitation facilities (15%) or other services (15%) after index hospitalization—indicating a severe burden of COVID-19 on various types of healthcare systems. Our study also showed that in-hospital mortality during index hospitalization was relatively high at 14%.

The proportion of ED utilization was high for both inpatients and hospital-based outpatients in the United States. Among inpatients, the utilization of ICU and IMV were high, and greater than a quarter were discharged to home health or nursing/rehabilitation care facility, highlighting the burden of COVID-19 on various sectors of healthcare services.

References

1. Asch DA, Sheils NE, Islam MN, et al. [Variation in US hospital mortality rates for patients admitted with COVID-19 during the first 6 months of the pandemic.](#) *JAMA Intern Med.* 2021; 181(4):471-478.
2. Nguyen NT, Chinn J, Nahmias J, et al. [Outcomes and mortality among adults hospitalized with COVID-19 at US Medical Centers.](#) *JAMA Netw Open.* 2021;4(3):e210417.
3. The Johns Hopkins University. [COVID-19 Dashboard by the Center for Systems Science and Engineering at Johns Hopkins University.](#) Accessed March 26, 2021.
4. Centers for Disease Control. [CDC COVID Data Tracker.](#) Centers for Disease Control and Prevention. Accessed March 26, 2021.
5. Lavery AM, Preston LE, Ko JY, et al. [Characteristics of hospitalized COVID-19 patients discharged and experiencing same-hospital readmission—United States, March–August 2020.](#) *MMWR Morb Mortal Wkly Rep.* 2020;69(45):1695-1699.
6. Premier. [Premier Healthcare Database Being Used by National Institutes of Health to Evaluate Impact of COVID-19 on Patients Across the US.](#) Published 2020. Accessed March 26, 2021.
7. Deyo RA, Cherkin DC, Ciol MA. [Adapting a clinical comorbidity index for use with ICD-9-CM administrative databases.](#) *J Clin Epidemiol.* 1992;45(6):613-619.
8. Rosenthal N, Cao Z, Chung J, et al. [Updated Coding Algorithm for Assessing Charlson Comorbidity Index Using Large Hospital Administrative Data.](#) ISPOR 22nd Annual International Meeting; (PHP184). May 21, 2017; Boston, MA.
9. Gormeli Kurt N, Gunes C. [How has COVID-19 pandemic affected crowded emergency services?](#) *Int J Clin Pract.* 2020;74(12):e13624.

Editor's Note: This article is a companion piece to a larger study that will be published in May 2022 in a COVID-19 themed section in Value in Health.

How Can Patients Effectively Steer the Ship of Public Policy in the Brazilian Healthcare System?

A Conversation With Aline Silveira Silva, PhD

Section Editor: Marisa Santos, PhD, MD,
Instituto Nacional de Cardiologia,
Rio de Janeiro, Brazil



Photo courtesy of Dr Aline Silveira Silva

Q&A

“Patients need to be told and understand their right to be involved with healthcare decision making. Their involvement now could make an enormous difference for them later and for future generations.”

I spoke with Aline Silveira Silva, PhD, Health Sciences and Technologies, University of Brasília, Brasília, Brazil, about patient and public involvement in the incorporation of new health technologies into the Brazilian Public Health System (SUS) and how it has been rapidly evolving.

Silveira Silva has been working with and researching patient and public involvement in health technology assessment (HTA) for more than 10 years. She is a researcher and independent patient advocate and partner and was a technical advisor for HTA in the Brazilian Ministry of Health.

VOS: How do you see the current situation in SUS in terms of patients' participation in the adoption of new technologies?

AS: Patient participation (or more commonly called patient and public involvement [PPI]) is a continuous process. In Brazil and Latin America, it has been developing gradually in the last few years. We have seen more interest in the subject and new participation methods.

The Brazilian HTA committee ([CONITEC](#)) started its activities in 2012, but we only started observing initiatives to encourage social participation in 2014. This is an ongoing process and there is no “one-size-fits-all” model; each country has developed its own method of working with it. In Latin America, other countries such as Colombia, Mexico, and Uruguay show an increased interest in involving citizens and patients lately. Brazil might be in the vanguard of Latin America, but greater systematization and transparency are needed, always having in mind the avoidance of tokenistic participation.

VOS: Could you elaborate on the dangers of “tokenism”?

AS: It's necessary to provoke this reflection when considering PPI. It's critical to think about the aim of a patient's participation, to seek genuine engagement and real impact on the decision making. I always use this emblematic example to illustrate tokenism: a company “sells” inclusion and diversity showing people of color, with disabilities, LGBTQ+ in their marketing campaigns, but none of its employees are part of these under-represented communities.

It's important to pay attention to not only involve the patient in the HTA process, but to genuinely listen to what they have to say. Patients want to have a voice in the decisions that are made. The impact of patient participation does not have to be necessarily a change in the final decision. It can be a lot bigger than that; it can improve access to healthcare depending on what they bring as colloquial evidence and how this practical evidence is assessed.

VOS: Do you believe the patients should have a vote in the deliberative processes in HTA?

AS: In my opinion, having patients as individuals with decision-making power is utopian. "Information" (or "communication") and "consultation" are the most basic levels of participation, and according to the literature, the PPI strategies do not go beyond the consultation level in most HTA bodies that involve patients and the public. And even at this level, patients have reported that sometimes they don't see their perspectives reflected in the assessment reports, let alone in the decision making. This can be very frustrating and discourage participation.

In Canada, it's common to follow the Spectrum of Public Participation developed by the [International Association for Public Participation](#), in which we see "involvement," "collaboration," and finally "empowerment" as the highest level of participation when the final decision making is in the hands of the public. However, this last level is unlikely to be achieved in our field, which ideally needs to consider a multistakeholder perspective. That's why I believe in pursuing true collaboration, to partner with the public and patients in each aspect of the decision.

VOS: For HTA, including medications and devices, Brazil has a one-of-a-kind deliberation process. The preliminary decisions are subject to public comments, called "public consultation." Methodologists have criticized the procedure of public consultation; what are your thoughts on it? What are the barriers for effective contributions?

AS: The objective of my doctoral project was to analyze the Brazilian advances regarding social involvement in the incorporation of Health Technologies into SUS, bringing

proposals of feasible strategies to encourage this involvement. Public consultation is the main participation tool in the Brazilian HTA process. However, the society does not know how the results of the public consultation are assessed. It's one of the barriers found in our study¹ which highlights the lack of a methodology and systematization of this PPI process and the public consultation itself. I once presented results regarding the Brazilian PPI to a Canadian audience and they were shocked that a public consultation on a rare condition in Brazil received 30,000 comments.

With this volume, how can we have qualified contributions and how is this being analyzed? There was a project led by a Brazilian research institution where the general objective was to qualify CONITEC's public consultation process, to develop methods to analyze and synthesize the received comments. However, I am not aware of its completion nor implementation.

It's important to communicate that a public consultation is not the same as voting; the inputs should be qualified and it would be great to have a systematized methodology to analyze them.

VOS: Patients and lay people can take part in HTA in Brazil by testimony ("patient experience") and public experience. What is your tip for more effective participation for patients and lay people?

AS: HTA bodies need to reflect on their PPI process, evaluate it, and seek genuine patient and public involvement to show its impact with maximum transparency. And citizens and patients need to be told and understand their right to be involved with healthcare decision making. Their involvement now could make an enormous difference for them later and for future generations. We, mainly in Latin America, need to lose the fear of speaking up and get more engaged in public decision making, including in the HTA process.

References

1. Silveira Silva A, Facey K, Bryan S, Galato D. [A framework for action to improve patient and public involvement in health technology assessment](#). *Int J Technol Assess Health Care*. Published December 20, 2021. Accessed December 30, 2021.



ISPOR

Improving healthcare decisions

ISPOR-The professional society for health economics and outcomes research
505 Lawrence Square Blvd, South
Lawrenceville, NJ 08648 USA
www.ispor.org