

**OLIN-CoBS
Special Issue**

Business & Health

**How businesses, government, and society are
addressing the future of healthcare**

Reinvigorating
Healthcare
Professionals through
Job Design

New Competencies
in Healthcare: What
Humans Will Need
Next in the AI Era

When Medical Errors
Aren't Medical Errors:
Designing Health
Interventions That
Send Good Signals

Is Precision Medicine
Worth It?



The Business of Health at Washington University's Olin Business School is pleased to present this collection of research-backed insights on the future of health and the role business can play in making health better. This issue brings together perspectives on cutting-edge topics from expert faculty around the world. We are excited to share their work with you and hope you will share it with others in your network. Most importantly, we hope these ideas spur conversations that lead to meaningful action and open new horizons for scholarship.



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**COUNCIL on
BUSINESS & SOCIETY**
An alliance with a purpose

The Council on Business & Society (CoBS) is delighted to welcome you to this special joint publication on one of society's key issues – business and health. Bringing together the expertise of leading faculty, researchers, and industry experts from CoBS member schools and the special expertise in the field of business and health at Olin School of Business, our wish is that this publication sparks awareness, builds on your knowledge and motivates you to take part in the debate. Enjoy your reading!



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Foreword

As people live longer, healthcare is being asked to do more than ever before, and the price of this is not just what shows up on a bill. The economic cost of disease extends far beyond direct spending on healthcare. Sick individuals and their caregivers lose productivity and suffer the opportunity cost of being unable to perform other activities because of their illness. These indirect costs are difficult to measure systematically but create real consequences for communities everywhere. The intangible costs of emotional suffering, health anxiety, and reduced quality of life are potentially even greater.

And yet, healthcare itself is expensive. Manufacturing pharmaceutical and medical devices, delivering care in complex social situations, and driving new innovations to address the breadth of human health is costly, with global health spending reaching nearly \$10 trillion in 2024.

This is a price of progress. The rapid aging of the global population, in part, represents a key success of scientific innovation in the past century. Deeper understanding of the nature of disease has led to the development of effective prevention strategies for once common infections, environmentally acquired illnesses, and traumatic injuries. These strategies have combined with more effective therapies to dramatically increase life expectancy around the world. The impact, however, has been uneven with some nations, and different communities within nations, experiencing significantly greater benefit than others. Additionally, longer lives have brought about new health concerns for older populations.

Business creates the context for improvement. Whether health systems are funded by private enterprise or governmental initiatives, their effectiveness depends on an appropriate understanding of their "customers" (patients and payers), their workforce, and their finances.

When this is done well, patients receive more targeted care, the work of healthcare providers is more fruitful, and organizations sustain over the long-term. Similarly, scientific ideas alone are insufficient to create meaningful improvements in health. These improvements depend on a detailed understanding of unmet needs, funding opportunities, and strategies for implementation. These are ultimately management tasks that business school scholars are well-equipped to address.

Business scholarship has much to offer across the landscape of firms interested in improving human health. This special issue brings together scholars from around the world to elevate the important conversation about how to make health better.

The following essays explore research that expands this understanding through several themes. As it should, the first section starts with the structural environment in which improvement takes place. Any intervention designed to improve health must start with a thoughtful approach to understanding the challenge it seeks to address. Authors address the foundational elements needed to drive meaningful change. The second section evaluates how organizations can develop and manage systems that support the workforce while meeting the needs of patients. As patients get sicker and care gets more demanding, healthcare workers need leaders who set them up to succeed. Patients, in turn, benefit from a workforce that's better equipped to provide the care they need. The final section explores a broad array of topics related to innovation. From exciting advances in electronic technology and artificial intelligence to critical conversations about the structure and funding of new ideas, this section proposes a pathway to building better health.

Promoting health is an evergreen issue. We hope these articles prove valuable not only today but also for the enduring insights they offer.



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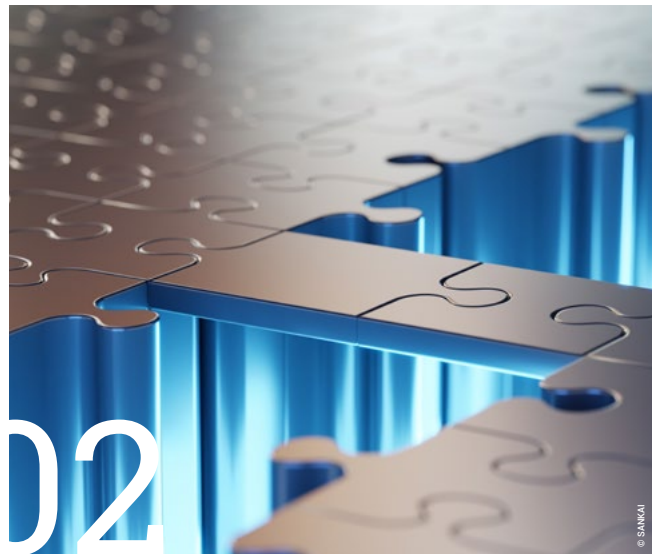
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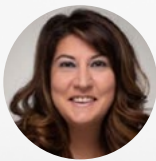
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SECTION 1 INTRODUCTION



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Scientific advances have made it easier to diagnose and treat disease. At the same time, advances in technology have resulted in an overwhelming amount of data and disagreements about the best ways to measure and report quality. This leads to friction when different sources of funding, political challenges, and competing incentives collide.

The World Health Organization defines health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.” No physician, hospital, or healthcare system can deliver that alone. And yet, societies around the world turn to these systems to provide interventions that promote the outcome of good health. While actors and organizations pursue different, sometimes conflicting goals, healthcare systems are forced to make difficult decisions.

What are healthcare systems to do in the face of these barriers? Some obstacles are easy to see. Others aren’t. The essays in this section ask what it takes to make change happen and provide guidance for leaders facing these challenges.



Hospitals Don't Lack Innovation: They lack room to implement it

Antonio Garcia Romero



Prof. **Antonio García Romero**, IE Business School at **IE University**, explores the challenges and paradoxes facing innovation in hospitals and proposes a blueprint to enable time, experimentation, learning and innovation implementation to successfully take place.

García Romero, A., et al. (2017). Guía para el análisis de la innovación en hospitales. IE Business School / COTEC Foundation.

BARRIERS TO IMPLEMENTATION: THE OPERATIONAL REALITIES OF CLINICAL CHANGE

Hospitals are often portrayed as slow adopters of innovation. In reality, they are among the most prolific producers of it. Every clinical encounter generates knowledge. Every ward that redesigns a discharge protocol, every surgical team that refines a technique, and every department that adopts a new diagnostic tool is engaging in innovation.

However, most of this activity never appears in patent databases, technology transfer reports, or OECD innovation statistics. The reason is structural. As García Romero et al. (2017) argue in their work for the COTEC Foundation, hospitals do not fit the institutional taxonomy embedded in the Oslo Manual, which is the OECD's international framework for measuring innovation across industries. The reason is that hospitals cannot be classified solely as one of the OECD's main types of organizations: research organizations, public agencies, non-profits, or service providers. The dominant frameworks used to measure innovation were simply not designed with hospitals in mind.

This invisibility has consequences. When hospitals cannot clearly identify the barriers that prevent change from being implemented, they cannot address them systematically. And those barriers are neither minor nor incidental. They are embedded in the operational realities of clinical work.

THE FRAMEWORK GAP

Part of the difficulty begins with how innovation itself is defined. The COTEC – one of Spain's leading institutions for innovation policy and research – definition, many everyday improvements in hospital operations qualify as innovation, such as redesigned care pathways, more efficient patient-transfer protocols, improved discharge practices, and better scheduling of operating theatres.

These changes are not marginal. A systematic review by Åhlin, Almström, and Wänström (2022), covering 92 empirical studies, found that persistent performance problems in hospitals frequently stem from long lead times, weak capacity coordination, and breakdowns in patient-transfer processes. Each of these challenges can be addressed through organizational innovation.

The paradox is that the innovations hospitals most need are often the least visible and least supported.

Evidence from the ITEMAS pilot study across 34 hospitals in the Spanish healthcare system clearly illustrates this gap. García Romero et al. (2017) found that nearly half of the respondents equated innovation primarily with formal research activity. Under this logic, a clinician who redesigns a discharge pathway is not considered an innovator, whereas a researcher running a clinical trial is.

This distinction is not merely conceptual. It shapes how organizations allocate attention and resources. As a result, the types of change most capable of relieving operational bottlenecks often struggle to gain institutional legitimacy, which Herzlinger (2006) described as delivery-system innovation.

THE BURDEN THAT NEVER LIFTS

Even when organizations recognize the value of such improvements, implementation faces a more immediate constraint: time.

Ask clinicians or department heads what most obstructs the adoption of new practices, and the answer is remarkably consistent. There is simply no slack in the system.

The ITEMAS study confirmed this pattern across hospitals. High clinical workload was the most frequently cited barrier to innovation, surpassing budget constraints, infrastructure limitations, and incentive structures. This is not merely a complaint about scarce resources. It reflects a structural feature of modern hospitals: change initiatives must compete directly with patient care for the same staff, the same hours, and the same cognitive attention.

Åhlin et al. (2022) document how this constraint operates in practice. Insufficient staffing, weak standardization, and inadequate planning interact across several interconnected processes: internal workflows, patient transfers, admissions, discharge, and managerial coordination.



Improving hospital innovation requires redesigning the organizational conditions that make change possible.



Improvement is possible, but it requires organizations to temporarily disrupt established routines to learn new ones.

Edmondson, Bohmer, and Pisano (2001) demonstrated this in their study of sixteen hospitals adopting a new cardiac surgery technique. Successful implementation depended on teams' willingness to tolerate deliberate disruption as a form of productive instability that enabled learning.

But that instability requires slack. Without enough operational margin to experiment safely, implementation becomes risky. Most hospital systems operate with little such margin.

The experience of Hospital Gregorio Marañón illustrates the point. Despite a strong research culture and clear enthusiasm for innovation among clinicians, the main barrier reported was not funding or strategy. It was the relentless pressure of daily clinical demand.

In hospitals, implementation does not fail only because people resist change. It often fails because the organization lacks operational space to absorb it.

THE DIFFUSION THAT NEVER HAPPENS

Even when innovations succeed locally, they often fail to spread.

The ITEMAS study shows that most innovations in Spanish hospitals remain confined to the service or unit where they originate. Only a small fraction reaches other departments within the same hospital, and even fewer reach national or international audiences.

In other words, innovation remains local rather than systemic.

This pattern is predictable when diffusion is understood as an organizational capability rather than an automatic consequence of a good idea. Berwick (2003) identified six conditions necessary for innovations to spread in healthcare organizations: mechanisms to identify promising innovations, resources to support those who develop them, time and support for early adopters, communication channels among peers, flexibility to adapt innovations to local contexts, and leadership that models commitment to change.

In the hospitals studied in the ITEMAS project, many of these enabling conditions were weak or absent.

Leadership, in particular, plays a decisive role. In the Gregorio Marañón case study, roughly three-quarters of respondents reported that management neither actively championed innovation nor moved quickly to adopt new practices. This finding runs directly counter to the diffusion conditions identified by Berwick.

The problem deepens further when organizations lack a shared understanding of what innovation actually is. Rogers (2003) emphasized that diffusion depends on a social system with shared meaning. Where clinicians, researchers, and managers disagree about whether process redesign even counts as innovation, the foundations for diffusion are already fragile.

The consequences of such misalignment can be severe. Koppel et al. (2005) documented that computerized physician order-entry systems—introduced to reduce medication errors—generated 22 new categories of error when implemented without sufficient integration into existing workflows. The technology itself was not the problem. The problem was an institutionally blind implementation.

SEEING WHAT IS ALREADY THERE

Hospitals do not lack innovation. What they lack is the organizational capacity to see, support, and diffuse the innovation they already generate.

Addressing this challenge begins with adopting frameworks that reflect the true complexity of hospital organizations. García Romero et al. identify four main types of hospital innovation: health-planning innovation, organizational and clinical innovation, participation in industry-led research, and entrepreneurial technology transfer. In practice, only the last two tend to receive systematic attention.

Hospitals also need a stronger institutional infrastructure for innovation. Dedicated support units, protected budgets, leadership sponsorship, and communication channels across services are essential conditions for scaling improvement. The evidence from ITEMAS suggests that these elements remain underdeveloped in many systems.

Most importantly, leaders must confront a difficult reality: the main barrier to implementation in clinical environments is rarely ideological resistance to change. It is structural overload.

Hospitals operate with minimal slack, yet implementation requires time, experimentation, and learning. Without creating operational “white space” where new practices can be tested and adapted, even the most promising innovations will struggle to take root.

For healthcare leaders, the implication is clear. Improving hospital innovation is not only about generating new ideas or investing in new technologies. It requires redesigning the organizational conditions that make change possible. Until hospitals create the space needed to absorb innovation, many of their best ideas will continue to stall before they scale.

REFERENCE

• Åhlin, K., Almström, P., & Wänström, C. (2022). Barriers to hospital-wide operational improvements: A systematic review. *Health Policy*.

• Berwick, D. (2003). Disseminating innovations in health care. *JAMA*.

• Edmondson, A., Bohmer, R., & Pisano, G. (2001). Disrupted routines: Team learning and new technology implementation in hospitals. *Administrative Science Quarterly*.

• García Romero, A., et al. (2017). Guía para el análisis de la innovación en hospitales. IE Business School / COTEC Foundation.

• Herzlinger, R. (2006). Why innovation in health care is so hard. *Harvard Business Review*.

• Koppel, R., et al. (2005). Role of computerized physician order entry systems in facilitating medication errors. *JAMA*.

• Rogers, E. (2003). *Diffusion of Innovations*. Free Press.



Private Equity in Health Care: What the evidence shows

Ryan McDevitt



Is private equity really harming health care in the US – or has the debate become more ideological than evidence-based? Prof. **Ryan McDevitt, Professor of Economics, WashU Olin Business School & Bursky School of Public Health and National Bureau of Economic Research** explores what research reveals about private equity's impact across hospitals, nursing homes, physician practices, and fertility clinics. While critics point to troubling examples, the evidence suggests a far more nuanced reality shaped by competition, transparency, and market incentives rather than ownership alone.

Private equity's role in health care has become one of the most heated debates in health policy. Bloomberg Businessweek declared that private equity is "Ruining American Health Care¹", a bipartisan U.S. Senate report admonished it for prioritizing "Profits Over Patients²", and the Federal Trade Commission devoted an afternoon in 2024 to criticizing the entire investment class³. In such a hostile environment, it's easy to assume the debate is settled. But having studied the research on private equity in hospitals, nursing homes, physician practices, and dialysis facilities for over a decade, I find the evidence tells a far more complicated and nuanced story.

Despite health care spending in the U.S. approaching 20 percent of GDP⁴, the system currently struggles with aging infrastructure, workforce shortages, and rising demand⁵. Over the past decade, private equity investors have put more than a trillion dollars into the health care sector⁶, in many cases filling gaps that public funding and nonprofit models had been unable to address. The question at this point is not whether private equity should play a role. It's how to harness the capital effectively.

WHAT THE RESEARCH SHOWS

A 2023 review in The BMJ⁷ offers a useful starting point for assessing private equity's track record in health care investments. The report covered dozens of studies, with nearly a third focused on nursing homes and another third split between hospitals and dermatology. The dominance of nursing homes in the current evidence base should immediately caution against broad generalizations about private equity. Of the eight studies that evaluated health

outcomes directly, only the three on nursing homes found any harmful effects; other settings showed either no change or moderate improvements.

In hospitals, my colleagues and I have found that private equity acquisitions do not lead to worse outcomes for Medicare patients admitted for conditions like pneumonia, strokes, or acute myocardial infarction⁸. Mortality, readmissions, and length of stay were largely unchanged, and in some cases improved. Other economists have reached similar conclusions. A comprehensive study in the Journal of Financial Economics last year⁹ found no change in mortality, readmissions, or hospital closures following a private equity buyout, but the authors did find a 20 percent reduction in administrative staff. Perhaps most striking, the efficiency gains from cutting administrative bloat were unique to private equity and not observed at other for-profit acquirers. Although some recent, high-profile studies¹⁰ have reported substantially worse quality at hospitals taken over by private equity, the methodological flaws and selective reporting of results, like downplaying a much larger decline in mortality¹¹, suggest these findings should be viewed skeptically until independently replicated and reproduced by others¹².

Beyond hospitals, research on fertility clinics tells a positive story about the influence of corporate investments. La Forgia and Bodner found that chain ownership was associated with a 14 percent increase in live birth rates and a 27 percent increase in IVF volume¹³, with the largest volume gains occurring at private equity-backed chains. The mechanisms through which fertility clinics succeed where other sectors struggle offer a useful guide for reforms:

1. Perlberg, Heather. "How Private Equity Is Ruining American Health Care." Bloomberg Businessweek, 20 May 2020
2. United States, Congress, Senate, Committee on the Budget. *Profits Over Patients: The Harmful Effects of Private Equity on the U.S. Health Care System*.
3. Federal Trade Commission. "Private Capital, Public Impact: An FTC Workshop on Private Equity in Health Care." Federal Trade Commission, Mar. 2024
4. Centers for Medicare & Medicaid Services. "National Health Expenditure Fact Sheet." CMS.gov
5. American Hospital Association. "Health Care Workforce: A System Under Pressure, Poised for Reinvention." AHA Center for Health Innovation Market Scan, 9 Dec. 2025
6. "Private Equity's Role in Health Care." The Commonwealth Fund, Nov. 2023
7. Borsa, Alexander, et al. "Evaluating Trends in Private Equity Ownership and Impacts on Health Outcomes, Costs, and Quality: Systematic Review." BMJ, vol. 382, 2023, e075244

8. Cerullo, Marcelo, et al. "Association Between Hospital Private Equity Acquisition and Outcomes of Acute Medical Conditions Among Medicare Beneficiaries." JAMA Network Open, vol. 5, no. 4, 2022, e229581
9. Gao, Janet, et al. "Private Equity in the Hospital Industry." Journal of Financial Economics, vol. 171, 2025, 104107
10. Kannan, Sneha, et al. "Changes in Hospital Adverse Events and Patient Outcomes Associated With Private Equity Acquisition." JAMA, vol. 330, no. 24, 2023, pp. 2365–75
11. La Forgia, Ambar, and Ryan C. McDevitt. "How Should We Assess Quality of Health Care Services in Organizations Owned by Private Equity Firms?" AMA Journal of Ethics, vol. 27, no. 5, 2025, pp. E385–91
12. Kim, Sungil, et al. "A Practitioner's Guide to Using Data on Private Equity Hospital Acquisitions." Health Affairs Scholar, vol. 4, no. 4, 2026
13. La Forgia, Ambar, and Justin Bodner. "Getting Down to Business: Chain Ownership and Fertility Clinic Performance." Management Science, 2024




The most productive debate is not about who owns health care providers. It's about whether the rules of the game reward providing affordable, high-quality care. 

- Quality is transparent, with the CDC publishing success rates for every fertility clinic in the U.S.
- Patients pay largely out of pocket and therefore remain vigilant about the value they receive.
- Markets have enough competition so that clinics have a strong incentive to invest in quality.

When patients can observe outcomes and switch providers, profit motives and patient interests align to put in place the right incentives for high-quality care.

WHERE CORPORATE INVESTMENT FALLS SHORT

Corporate investment in health care can — and sometimes does — lead to higher spending and worse outcomes. The example I return to most often comes from my own research on the dialysis industry ¹⁴. Two large chains, DaVita and Fresenius, have aggressively rolled up independent facilities over the past three decades, to the point where they now control nearly 80 percent of the market. After acquisitions, we found that staffing fell, patients received excessive doses of highly reimbursed drugs, hospitalizations increased, and virtually all outcomes got worse.

But the lesson from dialysis is not about private equity — both DaVita and Fresenius are publicly traded. The problem here, like in so many parts of our health care system, is a highly concentrated market combined with a vulnerable patient population with few means to advocate for better care and a Medicare payment model that rewards high-volume, in-center treatment over alternatives like home dialysis. A third of the U.S. population now lives in an area served only by one or both of these two companies ¹⁵, and the dominant firms have little incentive to innovate or invest in higher-quality care. Dialysis shows us clearly that ownership labels matter much less than the competitive environment.

14. Eliason, Paul J., et al. "How Acquisitions Affect Firm Behavior and Performance: Evidence from the Dialysis Industry." *Quarterly Journal of Economics*, vol. 135, no. 1, 2020, pp. 221–67

15. Xia, Xuyang, et al. "Financial Ties, Market Structure, Commercial Prices, and Medical Director Compensation in Dialysis." *JAMA Health Forum*, vol. 6, no. 6, 2025, e252659

GETTING POLICY RIGHT

Private equity's growing presence in health care is largely a response to incentives and inefficiencies built into the system. Administrative costs in U.S. health care are staggering, with physician practices spending over \$80,000 per physician per year interacting with payers ¹⁶. Payment loopholes create opportunities that any profit-motivated entity will exploit ¹⁷, and many of the business strategies private equity firms use are indistinguishable from those of large nonprofit health systems. Recent research ¹⁸, for instance, found that nearly half of primary care physicians are now affiliated with hospitals, and they charge 11 percent more than independents. Fewer than 2 percent have affiliations with private equity, on the other hand, and these groups command an 8 percent premium. Despite their lower markups and much smaller footprint, private equity-backed groups nevertheless attract considerably more scrutiny.

Policies that single out one class of investors while leaving these underlying problems in place will not do much to improve care. They also risk driving away capital that struggling providers need. A better approach would target the economic forces in these markets that harm patients, like excessive market concentration and opaque pricing, and apply such standards across all types of owners. Mandating clear, easy-to-understand outcome reporting along the lines of what the CDC already does for fertility clinics would give patients better information and give investors a reason to compete on quality, while requiring ownership transparency would help researchers and regulators track who owns what and let patients make better informed decisions about where to receive care.

The evidence on private equity in health care does not support a blanket verdict in either direction. It varies by sector, by outcome, and by the competitive conditions in each market. The most productive debate is not about who owns health care providers. It's about whether the rules of the game reward providing affordable, high-quality care. Where they do, as in fertility clinics, investors and patients tend to end up on the same side.

16. Morra, Dante, et al. "US Physician Practices Versus Canadians: Spending Nearly Four Times As Much Money Interacting With Payers." *Health Affairs*, vol. 30, no. 8, 2011, pp. 1443–50

17. Eliason, Paul J., et al. "Strategic Patient Discharge: The Case of Long-Term Care Hospitals." *American Economic Review*, vol. 108, no. 11, 2018, pp. 3232–65

18. Singh, Yashaswini, et al. "Growth of Private Equity and Hospital Consolidation in Primary Care and Price Implications." *JAMA Health Forum*, vol. 6, no. 1, 2025, e244935

What the Data Doesn't See: Three questions every healthcare leader should ask before trusting the numbers

Arlen Dean



Arlen Dean, Assistant Professor of Supply Chain, Operations, and Technology, **WashU Olin Business School**, looks at the vast amount of data generated in healthcare, what is missing, and whether AI uses it to make well-informed decisions for patients.

Healthcare generates vast amounts of data every day. As this information becomes more abundant, the focus naturally shifts toward interpreting and extracting as much value as possible. In working with health systems to turn data into operational decisions, I have seen the tremendous value this work can provide when done carefully. It can help prevent avoidable harm, inform how resources are used, or even anticipate demand before it appears. The challenge is that the same data, handled without enough scrutiny, can mislead decision-makers.

ASSUMPTIONS SHAPE THE STORY DATA TELLS

Our understanding of patient populations has already changed with large-scale data. Claims data, electronic health records, and wearable devices can capture a wide range of information, from medication adherence patterns to continuous behavioral signals. Natural language processing helps make sense of unstructured clinical notes and can reveal concerns that never show up in coded fields. Generative AI is expanding these capabilities even further. In my own work and that of others, these models are already showing promise in medical decision-making and personalized treatment. Moreover, millions of people already use AI-powered tools to check symptoms and prepare questions before a visit, which can reveal needs that rarely emerge in a clinical encounter.

The analytical power of these tools, though, is only as reliable as the assumptions behind them. Yet those assumptions are often invisible to the people making decisions. I've seen this play out repeatedly in my own work on healthcare operations problems. For instance, a hospital system might notice that patients in a particular ZIP code have higher rates of missed appointments. If the system treats those patients as noncompliant, the response might be reminder systems and penalties. But if the system investigates the barriers patients actually face, such as limited transit access or work and family obligations, it may find that a more effective investment is in extending hours or offering telehealth.

The underlying data is the same, yet the strategies that follow are fundamentally different. The pattern is well documented. Published research on Medicaid patients with chronically high no-show rates has found that transportation barriers, not patient indifference, are among the strongest predictors of missed appointments. The data

did not change, but the assumption about what the data meant did.

WHO ISN'T IN THE DATA

Just as important is the question of who appears in the data at all. Often, the most consequential bias is not in the numbers themselves, but in who was never counted. Every large-scale data source inherits the biases of the institution that collected it, and the disparities in healthcare are well-documented. Claims data may accurately reflect only people with insurance who seek care, leaving out the millions who stay away due to cost, distrust, or past negative experiences. Dartmouth researchers demonstrated this at scale, finding that Medicare spending per patient varied widely across U.S. regions.

The differences were driven not by patient illness but by local supply of beds and specialists, meaning that claims volume reflected system capacity rather than community need. Research on hospital readmissions reveals a similar pattern, with standard models routinely missing patients whose readmissions stem from housing instability or food insecurity alongside clinical factors.

These gaps can take other forms as well. In studying patient outcomes, our prediction models consistently flagged ICUs as performing poorly, not because care was failing, but because the training data reflected the sickest patients. Organizations can begin to address these blind spots by cross-referencing internal data against external sources, engaging community partners who serve populations outside the system, and building the discipline of asking who is missing from the dataset before acting on what it shows.

WHEN MODELS MEET WORKFLOWS

Operational context matters just as much. A model can be statistically flawless and still operationally worthless. A variable may be highly predictive yet impractical to use. Consider hospital discharge prediction. In a study my team did at a large hospital, we found that data such as physician orders and late-stage clinical notes were among the strongest predictors. These variables, however, enter the record too close to discharge to support advance planning. A bed management team hoping to plan a day



Examine the data itself. Ask who is missing, what is missing, and what additional data may be needed to see the problem more fully. If the data only reflect people who already receive care, they cannot fully inform decisions about those who do not.



ahead would find a model that uses such data to be highly accurate on paper yet devoid of practical value.

This experience highlights a broader risk of investing in analytical tools without ensuring data used to train them aligns with the decisions, objectives, and constraints of the people who will use them. Without that alignment, even the most sophisticated analytics will fail to deliver. One practical safeguard is to involve the end users of any analytical tool in its design, so that what the model predicts aligns with how and when decisions get made.

THREE HABITS FOR LEADERS

None of this diminishes the extraordinary value of data in healthcare. The capacity to identify patterns across millions of records and tailor care to entire populations represents a genuine transformation. In my own work, some collaborators and I developed a bed placement algorithm at a large academic medical center. The tool only improved placement times and assignment quality after it was designed around the workflows of the staff who used it. That experience reinforced a broader principle: Being data-driven is not about blind reliance on analytical output, but rather pairing analytical capability with the contextual understanding needed to act on it wisely. Every data source carries assumptions about who was counted, how information was recorded, and what was left out. Every model reflects the priorities of the people who built it. The organizations that succeed are the ones willing to ask what a pattern really means and what the data never captured in the first place.

For leaders trying to put these ideas into practice, the path forward comes down to three habits. First, when a finding leads to a conclusion, ask what assumption is driving it and whether a different but still reasonable assumption might lead somewhere else. Second, examine the data itself. Ask who is missing, what is missing, and what additional data may be needed to see the problem more fully.

If the data only reflect people who already receive care, they cannot fully inform decisions about those who do not. That means leaders need to be intentional not just in how they analyze data, but also in what data they choose to collect. Third, test every model against the realities of day-to-day operations. Ask frontline teams whether the information arrives early enough, in a usable format, and with enough context to influence a decision.

In healthcare, the challenge is not only gathering more data, but understanding what the data cannot see, where they can mislead, and what additional information is needed before acting with confidence.

REFERENCE

- Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 1: the content, quality, and accessibility of care. *Annals of Internal Medicine*. 2003;138(4):273-287.
- Syed ST, Gerber BS, Sharp LK. Traveling towards disease: transportation barriers to health care access. *Journal of Community Health*. 2013;38(5):976-993.
- Joynt KE, Jha AK. Characteristics of hospitals receiving penalties under the Hospital Readmissions Reduction Program. *JAMA*. 2013;309(4):342-343.



When Money Isn't the Problem: Lessons from Operation Warp Speed

Ron Adner



Why do some grand projects succeed while others fail? **Ron Adner**, Leverone Professor, Professor of Strategy and Entrepreneurship, **Tuck School of Business, Dartmouth College**, puts the spotlight on public-private partnerships in health and explores the key elements to make them successful.

WHAT OPERATION WARP SPEED TEACHES HEALTH LEADERS ABOUT PUBLIC-PRIVATE PARTNERSHIP

In November 2021, the Bipartisan Infrastructure Law allocated \$7.5 billion to construct a national network of electric-vehicle chargers. By March 2024, only seven stations had been completed. Operation Warp Speed, deploying \$18 billion against a far harder scientific challenge, had within a comparable time horizon delivered multiple authorized vaccines with hundreds of millions of doses in production and distribution. Funding is not what explains the difference. Understanding what did is essential for any public-private partnership that aspires to deliver at scale.

One ready explanation is that OWS benefited from conditions the EV rollout lacks: an acute public-health emergency, broad political consensus, and a permissive regulatory posture. Those conditions mattered. But they are not the explanation. What OWS reveals is that in ambitious public-private undertakings, the binding constraint is rarely funding. It is the capacity to orchestrate interdependent actors toward a coherent goal.

THE COORDINATION PROBLEM THAT MONEY CANNOT SOLVE

Most public-private partnerships in health are organized around financial instruments: grants, advance purchase commitments, tax credits, subsidies. These tools address individual risk-reward imbalances — making privately rational what is socially valuable. That is necessary work. It is not sufficient work.

Health challenges at scale are ecosystem challenges — and ecosystem challenges require more than reducing individual costs. A vaccine program depends on trials, manufacturing, fill-finish lines, cold chains, and trained administrators, each contingent on the others. But the problem is not simply that any one link might stall. It is that the standard sequence in which these activities proceed — each waiting on the one before — is itself the constraint. Grants leave that sequence intact. Markets, in urgent settings, cannot reconfigure it fast enough. Without an actor willing and able to restructure how the pieces relate to one another, the system cannot move at mission pace.

In OWS, that actor was the federal government — but not in any of its conventional roles. Not grant-maker. Not regulator. Not long-horizon industrial policymaker. OWS operated through what I have called coordinative fiat: the authority to convene actors, prioritize their efforts, absorb risks that would otherwise block commitment, and resolve bottlenecks as they emerged — exercised without ownership, command, or the power to compel compliance.

THREE RESTRUCTURINGS

OWS reconfigured the traditional pharmaceutical ecosystem in three distinct ways. First, it de-risked participation so activities could proceed in parallel rather than sequentially. Manufacturers built capacity at scale while Phase 3 trials were still underway, supported by federal commitments to purchase hundreds of millions of doses whether or not any given candidate received regulatory approval. By June 2020 — months before any vaccine was authorized — the federal government was already financing large-scale manufacturing capacity, accepting the risk that doses might be produced for candidates that ultimately failed.

Second, OWS restructured government's own processes to match mission pace. The FDA replaced its traditional, episodic approach with adaptive trials that tracked the pandemic in real time — engaging with data as it emerged across phases and shifting recruitment to new outbreak hotspots as case counts moved. The Department of Defense lent OWS procurement authorities that bypassed standard contracting delays. The Public Readiness and Emergency Preparedness Act was amended — months before any vaccine received authorization — to expand the pool of eligible providers, anticipating a downstream bottleneck before it could bind.

Third, it restructured relationships among partners. Rather than leaving six vaccine candidates to compete for scarce vials and fill-finish lines, OWS procured shared supplies centrally and reallocated them as the portfolio evolved. It invoked the Defense Production Act to move critical orders to the front of supplier queues and contracted Palantir to build Tiberius, a data platform that integrated proprietary supply-chain information across manufacturers — a degree of cross-firm transparency no private actor could have imposed.



Without an actor willing and able to restructure how the pieces relate to one another, the system cannot move at mission pace.



Each of these moves required government to orchestrate itself as well as others. OWS coordinated not only with NIH, FDA, and CDC but with DoD, State, and numerous private sector actors whose authorities had to be mobilized in concert. Orchestrating the internal ecosystem of government was the precondition for orchestrating the external ecosystem of firms.

WHAT THIS MEANS FOR HEALTH EXECUTIVES

Four features of the OWS model generalize beyond pandemic response.

The first is that orchestration is a distinct form of authority — the capacity to convene, prioritize, and absorb risk — that can be exercised without ownership or command. Where the most consequential health problems cross organizational and sectoral boundaries, this is increasingly what effective public-private partnerships require. The prior question for any ambitious initiative is not who will fund it but who will orchestrate it. Funding committed without a credible orchestrator tends to produce stranded investments — as the EV charging rollout illustrates.

The second is that purpose-built orchestrators outperform retrofitted ones. OWS was not housed inside an existing agency; it was constituted as a new entity, staffed with leaders credible in both industry and government, and designed to be «separate but connected» — insulated enough from existing routines to act decisively, yet tied closely enough to established institutions to access their authorities. Major cross-organizational initiatives in health are generally better served by a dedicated integrative structure than by grafting the mission onto an existing function whose primary obligations lie elsewhere.

The third is that internal alignment is a precondition for external alignment. Before a hospital system can credibly orchestrate community partners, before an academic medical center can partner with industry, before an insurer can advance a population-health initiative, the contributing functions inside those organizations must be aligned with one another. You cannot export coherence you do not have. Becoming a preferred partner in high-stakes initiatives is an internal organizational project before it is an external positioning one.

The fourth is that orchestration capacity is finite. OWS deliberately limited itself to six vaccine candidates when some observers urged more shots on goal — because the binding constraint was not funding but the organizational capacity required to orchestrate each effort. Executives who pursue every promising partnership encounter the same constraint, dissipating capacity across initiatives such that each receives too little of it to succeed at scale.

BEYOND THE PANDEMIC

The conditions that made OWS possible were distinctive. But the health system's most consequential challenges — chronic disease, aging populations, inequitable access, workforce instability — are, like the pandemic, ecosystem challenges. They will not yield to additional funding alone. They require orchestrators with the authority, design, and discipline to restructure how interdependent actors relate to one another. That capability, more than any funding commitment, is what the public-private partnerships of the coming decade must be built to provide.



Innovation does not have one audience. It has three, and each operates by its own logic of legitimacy.



The Three-Audience Test: How to build a business case that sustains innovation funding beyond the pilot

Graeme Currie, Amy Lynch & Mark Warr



Most innovation pilots die not on merit but because their business case speaks to only one audience. Research across £200 million of public-sector innovation projects, including healthcare, in the UK points to a sharper way to design and defend the case. Profs. **Graeme Currie** and **Amy Lynch, Warwick Business School**, University of Warwick, and **Mark Warr, National House Project**, United Kingdom, explore.

Related research: Johnson, R., Kerridge, G., Alderson, H., Currie, G., Friel, S., Johnson, R. & Lynch, A. (2024), «Extending Outcome Measurement for Meaningful Innovation», *British Journal of Social Work*, 54(5), 2067–2084.

You have ten months left on a two-year pilot. The early signs are promising. Frontline staff believe in the work. A handful of beneficiaries tell powerful stories. But you also know what comes next: a board paper, a finance committee, a funder review, and then a decision about whether the work continues. Most pilots in your position will quietly stop.

The question executives keep asking the wrong way is, “Did our innovation work?” The question that determines whether funding continues is different: “Whose definition of working did we satisfy?”

A four-year qualitative study of nearly one hundred government-funded innovation projects, drawing on 134 interviews and 119 hours of board and meeting observation, surfaces a hard pattern. Promising innovations stall not because they failed, but because the business case for sustaining them was built for the wrong room.

THE “WHAT GETS MEASURED” TRAP

When the deadline approaches and funding wobbles, teams instinctively retreat to whatever metric the funder watches most closely. In the empirical setting studied – children’s social care in England – that meant employment, education, training and “suitable accommodation” outcomes were assessed as outcome measures. This represents a narrow, economically framed view of success. Leaders did what most leaders do under pressure. They reshaped evaluation, board reports and case studies around the metric that paid the bills.

The cost is twofold. First, the innovation itself gets reshaped to fit the metric; what the researchers call the “what gets measured gets managed” cycle. Sustainability becomes tied to the narrowest definition of impact, and the broader purpose erodes. Second, where the headline metric is silent or thin, gaps get filled with carefully selected beneficiary stories. In one site, social workers wrote up service-user stories on behalf of young people, which managers then circulated to senior leaders to maintain political backing.

The intent was rarely cynical; it was the rational response to a short timeline and a tough funding environment. But the effect is what one interviewee called affect replacing

evidence of effect: emotion standing in for proof, and beneficiaries being mobilised as PR rather than partners. Decisions get made; legitimacy gets manufactured; and the harder questions about variability, equity and longer-term outcomes go unasked.

THREE AUDIENCES, THREE LEGITIMACIES

The deeper finding is that innovation does not have one audience. It has three, and each operates by its own logic of legitimacy.

The Funder: central government, a regulator, a foundation, a corporate parent, answers to constituencies that demand fairness, comparability and prudent use of public or shareholder money. Their evidence appetite is population-level, standardised and economically framed. To act, they need to see that the innovation works at scale across many sites, and against measures they can hold up against alternative spend.

The Organisation: the service provider answers to its board, its CFO and its elected or appointed leaders. Their legitimacy rests on shorter-horizon, cashable or strategically defensible value. The most consequential sentence in one of the study’s case sites was a pledge that the innovation would save the service provider £1.2 million in its first sustained year. Without that, funding stopped.

The Beneficiary: the customer, patient, citizen or, in this study, the young person leaving care, has a third logic. Their measure of «doing well» is subjective, developmental and experiential: identity, attachment, confidence, the ability to navigate a complex transition. None of these maps neatly onto an annual cost-benefit return.

The mistake most innovation leaders make is to treat these three as a hierarchy, assuming that if the cost case lands, the rest follows, or, conversely, that beneficiary stories are the heart of the matter and the financials will fall into place. They are not a hierarchy. They are parallel. Each audience holds the power to kill the work for entirely valid reasons of its own. Our empirical study found that attempts to consolidate or unify outcome measures across the three repeatedly failed, because the utility of each set is appropriate within its pathway, not between them.



The implication for executives is direct. If your business case speaks fluently to one audience and dimly to the other two, you do not have a business case. You have a one-sided argument that will be tested in three rooms and lose in two of them.

THE CASHABLE-BENEFITS TRAP

In a financially constrained environment, which most innovation lives in, the gravitational pull toward the cost-saving narrative is intense. Several sites in the study built their renewal cases almost entirely on cost avoidance. The risk is not that the financial argument is wrong; the risk is that it is built fast, late and on thin underlying data, and then propped up with selected beneficiary stories to compensate.

This is also where ethical risk concentrates. When end-user voices are recorded by intermediaries, edited for emotional weight and surfaced at strategic moments to keep funding warm, the people the innovation is meant to serve get used rather than included. Even where intent is honourable, the pattern erodes the integrity of the evidence and, over time, the trust of the people on whose behalf the case is being made. The cashable case can win the budget round and quietly hollow out the innovation it was meant to save.

BUILD THE EVIDENCE ARCHITECTURE BEFORE THE PILOT STARTS

The most useful shift the research points to is when evaluation gets designed. In most of the cases studied, evaluation was retrofitted, bolted on partway through, or commissioned in the final months under pressure to produce something sustaining. By then, the choices that matter have already been made.

The alternative is to treat evaluation as an architecture decision at the innovation design stage, with three tracks running in parallel from day one. The funder track specifies which population-level outcomes (the metrics the funder can compare across sites and against alternative investments) the innovation will move, and how it will produce data comparable to other programmes. If the funder's evidence appetite is for replication across, say, fifty sites, the design should make that replication possible.

The organisational track identifies, before the pilot starts, the specific cashable or strategic-value claim the renewal case will make and instruments the pilot to produce that evidence cleanly; not retrospectively, not anecdotally. If renewal will turn on cost avoidance, the comparator group, the unit cost and the counterfactual all need to be designed in.

The beneficiary track co-designs subjective and developmental outcomes with the people the innovation serves, using validated instruments where they exist and protecting end-user voice from being repurposed as managerial decoration. Co-production with the beneficiary at the design stage is what distinguishes meaningful inclusion from tokenism at the budget round.

Done well, the three tracks reinforce each other. Done late or selectively, they compete, and the innovation loses.

WHAT TO TAKE INTO YOUR NEXT INNOVATION REVIEW

Before authorising a pilot, or signing off on the next renewal case, ask three questions:

1. Who are the three audiences whose decisions will determine whether this work continues, and what does each need to see?
2. Is the evaluation designed to produce evidence for all three in parallel, or have we defaulted to whichever audience we know best?
3. Are end-user voices being co-designed in from the start, or scripted in later to fill evidentiary gaps?

Innovations that survive their pilot are rarely the ones with the most compelling story or the largest savings. They are the ones whose business case anticipated, from the start, that legitimacy is plural, and built the evidence to satisfy each room on its own terms.

A three-track checklist for the business case

- **Funder track:** Which population-level outcomes will the innovation move? How will the data be comparable across sites?
- **Organisational track:** What specific cashable or strategic-value claim will the renewal case rest on, and what counterfactual proves it?
- **Beneficiary track:** Which subjective, developmental outcomes have been co-designed with end users, using validated instruments where possible?

About this research

This article draws on Johnson, R., Kerridge, G., Alderson, H., Currie, G., Friel, S., Johnson, R. & Lynch, A. (2024), «Extending Outcome Measurement for Meaningful Innovation,» British Journal of Social Work, 54(5), 2067–2084.

The study examined the UK Department for Education's £200 million Children's Social Care Innovation Programme, with focused analysis of the £36 million Staying Close programme. Methods included 31 senior policy and practice interviews, five in-depth case studies, 103 case-study interviews and 119 hours of meeting observation conducted between 2020 and 2023.





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SECTION 2

INTRODUCTION



Patrick Aguilar, MD, MBA;
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Ideas only become realities through the work of human beings. Even in the era of automated agents, the most carefully designed strategy still requires a workforce to operationalize it and the best product requires customers to buy it. In healthcare, patients must decide what to do with the guidance of their care teams. Similarly, individuals on teams make decisions about how they do their work. In each case, these decisions result from the complex interplay of thoughts, feelings, incentives, and social pressures.

Leaders have the opportunity to create a social and technological context that supports the development of meaningful work, impactful connections, and trusting teams. When done well, this translates into better, more effective care. The same human considerations can be extended to patients, whose health is on the line.

When we understand how people think and behave, we can design environments that support their best work. Authors in this section explore how leaders can build better social contexts to equip workforces that engage more effectively with patients.



For the Love of the Game: Reinenergizing healthcare professionals through job design

Markus Baer



Markus Baer, Knight Family Professor of Organizational Behavior; Vice Dean of Executive Education, **WashU Olin Business School**, looks at intrinsic motivation and how healthcare institutions can use it to empower their medical staff, give them a voice, and help them thrive.

FROM HUNGARY WITH LOVE

Katalin Karikó’s decades-long pursuit of mRNA-based therapies was defined by extraordinary persistence and sacrifice. In 1985, when her research program in Hungary lost its funding, she sewed her family’s entire savings – roughly \$1,200 – into her daughter’s teddy bear to flee the country and continue her work in the United States.

At Temple University, her commitment was absolute. As her effective hourly rate was only \$1, Karikó was not driven by a paycheck, but rather by a profound desire to better understand the genetic script of life. While most researchers avoided the “impossible” problem of synthetic mRNA causing lethal inflammatory responses, Karikó and her colleague, Drew Weissman, obsessed over the molecular mechanisms behind it. They discovered that base-modified mRNA could abolish the lethal responses which laid the groundwork for vaccines that saved millions, earning them the Nobel Prize in Physiology or Medicine in 2023.

DEFINING INTRINSIC MOTIVATION

The drive that led Karikó to use her own savings so that she could continue her work on a problem that others may have deemed too difficult is called intrinsic motivation.

Intrinsic motivation is the experience that people gain from engaging in a task for its own sake; they may find it interesting, enjoyable, satisfying, or positively challenging. In contrast, extrinsic motivation results from trying to obtain something separate from the task itself, such as a bonus, promotion, praise from a superior, or the avoidance of something aversive.

Karikó herself made this distinction explicit. Long before the Nobel Prize, she said that others regarded her as unsuccessful; at Penn, her mRNA work struggled for funding and she was demoted in 1995. However, she did not interpret her experiences that way because she was doing exactly the type of laboratory work that she had always hoped for. This is intrinsic motivation in a nutshell – not working to obtain others’ approval, but finding the work rewarding even when the external rewards disappear.

THE ‘IKEA EFFECT’: WHY SOME TASKS ENERGIZE US

One of the most useful frameworks for thinking about what types of tasks are the most intrinsically motivating comes from job design research. The core idea is simple: work becomes more intrinsically motivating when it gives people a chance to use multiple skills, complete a meaningful whole, exercise autonomy, see that their work matters, and get clear feedback on results.

Consider a familiar example – assembling a piece of IKEA furniture. It is oddly satisfying, not because it is easy, but because it has all the ingredients that make work intrinsically motivating. You use different skills, from spatial reasoning (interpreting those diagrams where one is never sure which side is “up”), to manual dexterity (turning a hex key), and physical coordination. You take something from beginning to end, starting with a box of separate parts and ending up with a complete, identifiable bookshelf. You have autonomy over how to proceed. The task has a meaningful outcome – it might organize your home office or provide a new bed for a child going to college. And the work itself tells you whether you are succeeding; a wobbling bookshelf is immediate feedback.

THE INTRINSIC MOTIVATION BOOST

Fostering a sense of meaning and responsibility, activities that feature these qualities can also fuel greater persistence and satisfaction. According to McKinsey data, intrinsically motivated healthcare employees report 46 percent higher levels of job satisfaction and are 32 percent more committed to their roles, resulting in lower turnover rates.

Reducing turnover is important. A study by Catania and colleagues (2024) found that a 10 percent rise in nurses intending to leave was associated with a 14 percent increase in patient deaths. Thus, the retention benefit of intrinsic motivation is a matter of patient safety. Similarly, greater autonomy is connected to better general health and lower depression rates among health care professionals, reducing burnout.



Many healthcare jobs score poorly on the very dimensions that make work intrinsically motivating.



THE CRISIS: WHEN DOCTORS BECOME ‘DATA CLERKS’

Now let’s examine the reality of many health care professionals.

Highly trained physicians spend an average of two hours on repetitive, low-skill data entry for every one hour of direct patient contact. Reducing medical experts to “data entry clerks” degrades task importance, limits autonomy, and is the primary driver of the current burnout epidemic.

In many hospitals, a patient’s journey is split among dozens of rotating specialists who only see a “slice” of the case rather than the “whole” person. This lack of task identity can create “informational discontinuity,” which has been linked to fatal medical errors.

Additionally, during resource shortages, clinicians are often forced by rigid institutional protocols to follow rules that may run counter to what they know is right for their patients, degrading their autonomy and causing stress. Often, clinicians also receive exhaustive feedback on “quality scores” yet receive almost no feedback on the long-term health outcomes of the patients they discharge.

In other words, many healthcare jobs score poorly on the very dimensions that make work intrinsically motivating.

THE PATH FORWARD: RESTORING THE ‘LOVE OF THE GAME’

Long-standing evidence shows that nurses’ practice of self-scheduling – one of the cleanest, most concrete autonomy interventions – can improve autonomy and satisfaction. A new study on AI-based scheduling suggests that algorithmic support, with clinician override, can offer nurses an even greater sense of autonomy, thereby increasing intrinsic motivation.

A clinician cannot experience autonomy or task identity if the day is dominated and fragmented by inbox management, checkbox documentation, and billing-driven note production. AI automation can restore autonomy, relieving clinicians from administrative duties and thereby concentrating their efforts on patient care.

Next, healthcare providers could grant clinicians autonomy to lead “policy pruning” audits. This would involve a systematic process to identify and eliminate redundant, nonsensical, or low-value institutional rules that interfere with clinical judgment. This moves clinicians from being passive followers of rigid protocols to becoming architects of policy.

To restore task identity, healthcare roles could be redesigned to move away from disjointed, “slice-of-care” tasks toward models that span more of the care continuum. In practice, that means primary nursing, stable teamlets in ambulatory care, or explicit responsibility for a defined patient panel through admission, discharge, and follow-up.

Alternatively, giving clinicians and nurses ownership of small improvement cycles can increase task identity, as well as autonomy and feedback. In instances such as nurse-led falls projects or physician-led redesigns of discharge communication, workers are able to see things from “start to finish” as they identify the problem, implement the change, and evaluate the outcome data.

Finally, most healthcare feedback is sterile; instead, healthcare institutions could implement “patient outcome testimonials” that provide nurses and clinicians longitudinal patient-reported outcomes months after a patient has been discharged. Rather than relying on generic, numerical scores, clinicians could receive qualitative, video testimonials about how their specific interventions – such as a particular therapy technique or a clear explanation of a condition – impacted the patient’s long-term quality of life. This makes the human impact visible and actionable, allowing clinicians to fine-tune their practice based on actual health results, thereby closing the feedback loop.

By increasing autonomy, task identity, and human impact that is visible and actionable, institutions can foster the same “love of the game” that drove Katalin Karikó, and ensure that future healthcare professionals won’t just survive their roles, but thrive in them.

REFERENCES

- Catania, G., Zanini, M., Cremona, M A., Landa, P. Musio, M. E., Watson, R., Aleo, G., Aiken, L. H., Sasso, L., & Bagnasco, A. (2024). Nurses’ intention to leave, nurse workload and in-hospital patient mortality in Italy: A descriptive and regression study. *Health Policy*, 143, 105032. doi: 10.1016/j.healthpol.2024.105032.
- The State of Human Capital 2012: False summit. A joint report from The Conference Board and McKinsey, October 2012.



The Subtle Signals Leaders Send: How everyday behavior shapes organizational climate in healthcare

Hannah J. Birnbaum & Andrea G. Dittmann



Heavy workload and hierarchical inflexibility may lead to healthcare employee burnout and errors that put the health of patients at stake. **Hannah Birnbaum**, Assistant Professor of Organizational Behavior, **WashU Olin Business School**, takes a long, hard look at the leadership qualities needed to put this straight.

INTEGRITY ON THE RISE

Preventable medical errors are a costly threat to patient safety, with the estimated financial toll reaching \$2.9 million per hour.^{1,2} Physician burnout costs the U.S. healthcare system an estimated \$4.6 billion annually in turnover and reduced productivity.³ These two seemingly separate problems share a common root: organizational climate.

Checklists, protocols, and training programs help. They save lives.⁴ But they are not enough. In many healthcare settings, patient safety still depends on whether a junior resident feels comfortable challenging a senior physician or a nurse feels empowered to question a surgeon. When people hesitate to speak up, missed steps can go uncorrected and small problems can escalate. And yet, speaking up is not just a matter of individual courage. No checklist can override a climate where staff stay silent, and no protocol can make someone feel valued enough to stay.

How can leaders create climates where people feel comfortable raising concerns, motivated to do their best work, and appreciated? The answer lies in the signals leaders send every day. Which signals matter?

SIGNAL 1: THE WARMTH AND OPENNESS THAT LEADERS PROJECT

Even in small moments, the warmth and openness that leaders project determine who feels comfortable contributing to the conversation. This includes cues such as an informal tone of voice, eye contact, and genuine smiles.

An informal tone is not about being casual or social. It is about removing the implicit distance that hierarchy creates. It sounds like asking open-ended questions such as “What is your read on this?” rather than “Do you have anything to add?” Eye contact is about actually looking at other people rather than glancing at your phone or at the door, and making sure that attention extends to everyone present, not just the most senior person. A genuine smile is one that you can feel. It tells people they are welcome, and this warmth is often reciprocated.

What’s striking is just how easily people register these signals. In our research, we found that just 30 seconds of a leader’s behavior is enough to predict who speaks up and who stays silent.⁵ Employees are constantly reading the room and drawing conclusions from even the briefest interactions. Leaders set the tone for what is considered acceptable behavior.

This is particularly consequential in places like healthcare organizations where speaking up can feel risky, especially for those lower in the hierarchy. We found that when leaders do not actively project warmth and openness, people question whether they are included. And employees who do not feel included actually perform worse at work.⁶

SIGNAL 2: THE ISSUES LEADERS REMAIN SILENT ON

Silence, too, is a powerful behavior. Consider how leaders respond to a medical error: a medication dose is miscalculated, a surgical step is skipped, or a piece of equipment malfunctions. Employees watch closely. In our research, we found that when leaders stay silent, employees take notice and remember this silence.⁷ Silence is not perceived as neutral. Instead, employees view it as an active form of communication and draw

1. Kohn, L., Corrigan, J. & Donaldson, M. To Err Is Human: Building a Safer Health System. (National Academy Press, Washington, D.C., 1999).
2. Makary, M.A. & Daniel, M. Medical error—the third leading cause of death in the US. *BMJ* i2139 (2016) doi:10.1136/bmj.i2139.
3. Han, S. et al. Estimating the Attributable Cost of Physician Burnout in the United States. *Ann Intern Med* 170, 784–790 (2019).
4. Haynes, A.B. et al. A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *N Engl J Med* 360, 491–499 (2009).

5. Truong, M. et al. Professors’ “feminine” behavioral cues in the classroom close gender gaps in participation. *Journal of Experimental Psychology: General* 155, 276–291 (2026).
6. Nemhard, I.M. & Edmondson, A.C. Making it safe: the effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behavior* 27, 941–966 (2006).
7. Birnbaum, H. J., McClanahan, K. J. & Unzueta, M. Silence on injustices speaks volumes: When and how silence impacts perceptions of managers. *Journal of Applied Psychology* 110, 336–357 (2025).



Employees are acutely sensitive to whether the behaviors an organization asks them to engage in are also genuinely valued by their organization. 

conclusions about what leaders do and do not support based on their silence. Thus, organizational climate is shaped not just by what leaders choose to speak up about, but also by what they let pass without comment.

SIGNAL 3: MATCHING WORDS TO ACTIONS

Leaders routinely announce new organizational values, initiatives, or commitments. But stated values are only one piece of organizational climate. In our research, we found that employees are acutely sensitive to whether the behaviors an organization asks them to engage in are also genuinely valued by their organization.⁸ For example, when organizations require employees to

collaborate and work together, but then only reward and promote individual achievement, employees notice the decoupling—and it costs organizations dearly. We found that this mismatch leads employees to feel less included and, in turn, more likely to quit and find work at another organization.

The gap between enacted and valued behavior is consequential precisely because employees are not passive recipients of messaging from leaders and organizations. They are active observers who track the difference between what their leaders say and what they reward, staff, or fund. A leader who champions work-life balance while increasing overtime, or an organization that declares its people its greatest asset while cutting support staff, is not just making a policy misstep. They are training employees to distrust the next initiative before it even launches. In healthcare organizations, where burnout and turnover are already alarmingly high, that erosion of trust can carry direct consequences for patients and organizations alike.^{9,10}

WHAT CAN LEADERS DO?

The good news is that because employees are so attentive to subtle cues from leaders, improving organizational climate can start with smaller changes than a new program or initiative. However, to be effective, these smaller changes require thoughtful attention.

On warmth and openness: Consider whether your warmth is actually landing during small moments. Many leaders assume it is, but well-intentioned cues can often register differently than they are meant to. Look around you. Notice whether people make eye contact with you or look away, whether they speak freely or give short, cursory answers, or whether, after you enter a room, conversations continue or seem to end abruptly. Showing warmth and openness may mean pausing toward the end of rounds to ask what other people noticed, greeting the nurse in the room before turning to the next task, or taking a moment to genuinely ask someone how they are doing before moving on to the clinical discussion.

On silence: Reflect on how you respond when something goes wrong and whether you say something or let it pass. Employees are attuned to silence in the moments that matter most: when an error is made, a conflict arises, or there is difficult news. How you respond in these moments will be remembered. The good news is that merely choosing to speak up in moments you might have otherwise stayed silent has the power to shift these memories. Speaking up does not necessitate a lengthy conversation; it can be as simple as acknowledging what happened rather than moving past it.

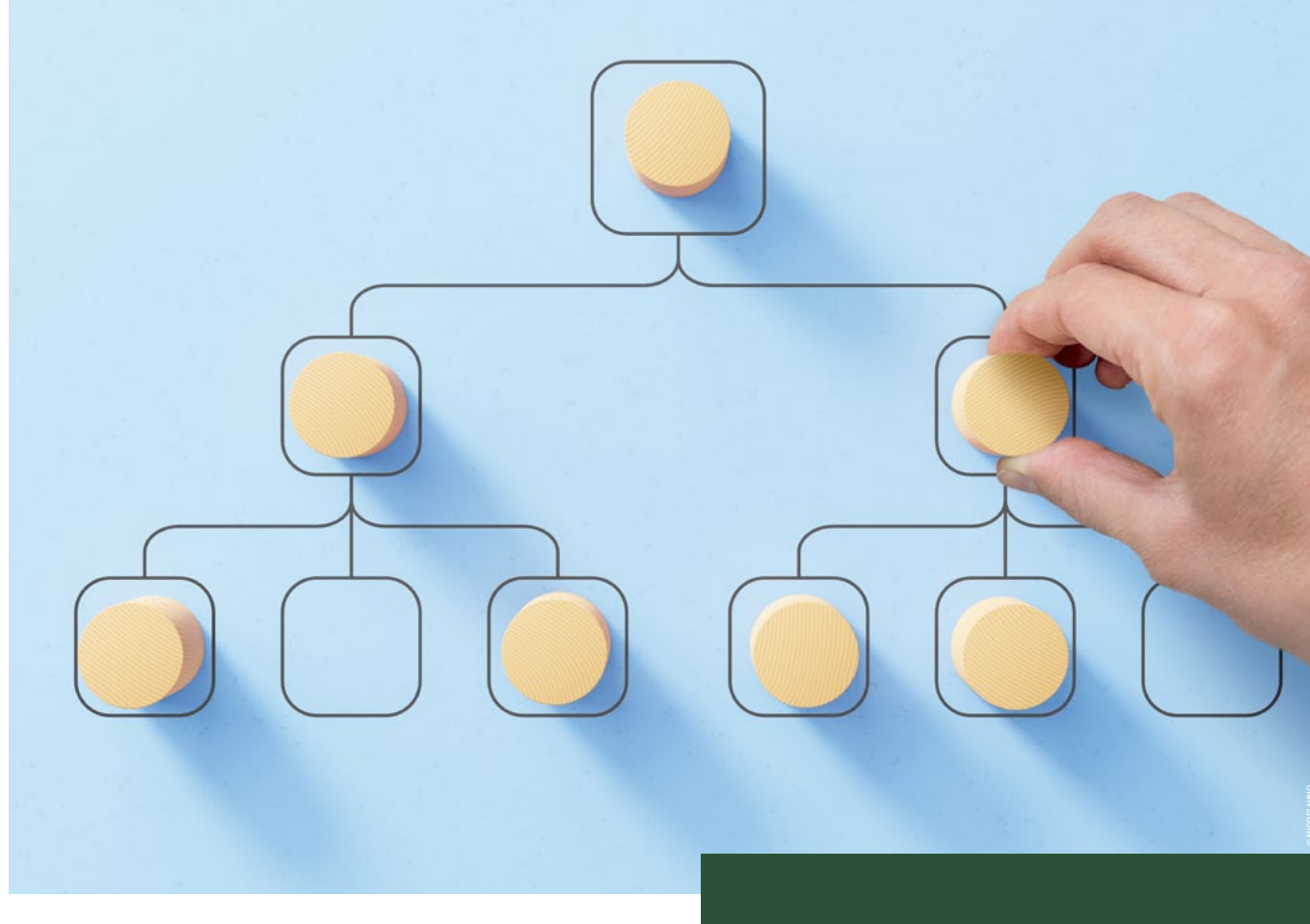
On matching words to actions: Consider whether your behavior affirms the commitments you announce. Reflect on what you actually reward, fund or promote, and whether that matches what you claim to value. If these things don't match, think about ways you can better align your actions with your words. For example, if you ask people to collaborate but only recognize individual achievement, consider whether there is a way to also acknowledge team contributions during performance reviews. If you want to champion work-life balance but need people to work overtime, consider whether you can protect certain hours from meetings, add small in-shift breaks, or even explicitly recognize it as the extra ask that it is.

These are not grand gestures. They are daily choices that accumulate over time to build or erode a climate in which people feel safe enough to speak up, catch errors, and question when something feels wrong. This matters for employees. It matters for patients. Checklists work when organizational climates support them. Operational rigor does not precede climate; it depends on it.

8. Dittmann, A. G., Stephens, N.M. & Townsend, S. S. M. Interdependent behavior only benefits employees from working-class backgrounds when it is both enacted and valued. *Journal of Experimental Psychology: General* 153, 720–741 (2024).

9. Khullar, D. Burnout, Professionalism, and the Quality of US Health Care. *JAMA Health Forum* 4, e230024 (2023).

10. Mohr, D. C., Elahal, S., Marks, M. L., Derickson, R. & Osatuke, K. Burnout Trends Among US Health Care Workers. *JAMA Netw Open* 8, e255954 (2025).



Same Hospital, Different Worlds: Why healthcare culture is built team by team

Andrew P. Knight



Andrew Knight, Bank of America Professor, Senior Advisor to the Chancellor, Executive Director of the Bauer Leaders Academy, **WashU Olin Business School** and Washington University in St. Louis, shares research insights into the dynamics behind leadership and the wellbeing and performance of healthcare teams. The culture of care, he concludes, is shaped not by broad institutional forces but by the dynamics within individual teams.

Imagine two units in the same hospital. In the ICU, nurses regularly speak up about patient concerns, staff openly report near-misses, and the team debriefs together after difficult cases. Down the hall, in the operating room, the same behaviors—raising questions, flagging errors, asking for help—are met with silence, impatience, or worse. Same hospital. Same executive leadership. Same mission statement on the wall. Entirely different worlds.

This is not a hypothetical. In large-scale survey research my colleagues and I conducted across more than 60,000 healthcare workers¹, contrasts exactly like this one appeared repeatedly—not as outliers, but as the norm. The pattern reveals that the culture of care is shaped not by broad institutional forces but by the dynamics within individual teams—a finding with significant implications for how we build healthier, higher-performing healthcare organizations.

CULTURE IS LOCAL

Before I became a professor, I helped to launch a healthcare analytics company focused on patient safety and collaboration. Working with large healthcare systems, my colleagues and I consistently observed that a worker's local unit, not the larger hospital, is the dominant force shaping culture. Across seven dimensions including teamwork climate, safety climate, and morale, work unit membership explained three to six times more variance in perceptions than hospital membership. Even how workers perceived their hospital executives was shaped more by their local unit than by the hospital itself.

This finding reframes how we should think about culture change in healthcare. When hospitals invest in broad policy initiatives, system-wide training programs, or executive communications, they are working at precisely the level where culture has the least traction. The real leverage lies closer to the bedside—with the local leader—which means we need to understand what local leaders actually do that makes teams thrive or fail. Research comparing high- and low-performing hospital units consistently finds that the gap in patient outcomes—infection rates, medication errors, patient satisfaction—is large enough to matter clinically.² Research also

shows that high-quality teamwork drives measurable improvements in patient safety and quality metrics³. The unit-level culture your team inhabits is not background noise—it is a powerful predictor of the care your patients receive.

THE DOUBLE-EDGED NATURE OF HIERARCHY

The most consequential local dynamic is hierarchy. Contrary to widely held views, hierarchy is not simply an obstacle to overcome. In research on trauma surgery teams in a complex academic medical center, my colleagues and I found that a clear role structure provides an essential backbone in a setting where team composition changes frequently.⁴ When a new resident rotates onto a service or a specialist is called in mid-procedure, hierarchy enables the team to coordinate without renegotiating authority from scratch.

The problem is that hierarchy carries baggage alongside these benefits. In my research on operating room teams, my co-authors and I found that physicians routinely assessed teamwork quality as significantly higher than did the nurses and anesthesiologists working alongside them.⁵ What looks like a well-functioning team from the top can look, from the middle or the bottom, like an environment where speaking up or voicing a different opinion carries real risk. The leaders most responsible for setting the tone are often the least accurate in reading it.

3. Gallup (2023). *State of the Global Workplace Report*. Gallup Press. High-engagement business units show a 21% difference in profitability and 17% difference in productivity compared to low-engagement units.

4. Klein, K. J., Ziegert, J. C., Knight, A. P., & Xiao, Y. (2006). Dynamic delegation: Shared, hierarchical, and deindividualized leadership in extreme action teams. *Administrative science quarterly*, 51(4), 590-621.

5. Sexton, J. B., Makary, M. A., Tersigni, A. R., Pryor, D., Hendrich, A., Thomas, E. J., ... & Pronovost, P. J. (2006). Teamwork in the operating room: frontline perspectives among hospitals and operating room personnel. *Anesthesiology*, 105(5), 877-884.

1. Knight, A. P., & Eisenkraft, N. (2009). Patient safety culture is local. *Pascal Metrics*.

2. Wears, R. L., & Sutcliffe, K. M. (2019). *Still not safe: Patient safety and the middle-management of American medicine*. Oxford University Press.

Hierarchy also distorts whose knowledge gets used. In a study I conducted with Aparna Joshi on research and development labs, we found that influence in teams follows two distinct pathways.⁶ When team members defer based on demonstrated expertise, performance improves. When deference is driven by liking, it undermines effectiveness—routing decisions away from the people who know the most. In a clinical setting, the nurse who has seen this complication before and the resident who caught the discrepant lab value are precisely the members who most need to be heard. The task for local leaders is not to dismantle hierarchy but to manage its baggage.

PSYCHOLOGICAL SAFETY AS THE FOUNDATION

Doing this requires what Amy Edmondson calls psychological safety—the shared belief that one can speak up, raise concerns, or admit mistakes without fear of punishment or humiliation. In a foundational study of hospital nursing teams, Edmondson found that teams with higher psychological safety reported more errors—not because they made more mistakes, but because members felt safe enough to surface them. The errors were always there; psychological safety made them visible and actionable⁷.

Yet, like perceptions of teamwork quality, psychological safety does not distribute evenly across a team's hierarchy. In a study of neonatal intensive care units, Nembhard and Edmondson found that nurses and respiratory therapists reported far less safety than physicians—and that inclusive leadership dramatically narrowed these gaps.⁸ Inclusive leadership shows up in specific actions like asking direct questions of junior members, responding to concerns with curiosity rather than dismissal, and crediting contributions from across the hierarchy.

6. Joshi, A., & Knight, A.P. (2015). Who defers to whom and why? Dual pathways linking demographic differences and dyadic deference to team effectiveness. *Academy of Management Journal*, 58(1), 59-84.

7. Edmondson, A.C. (2004). Learning from mistakes is easier said than done: Group and organizational influences on the detection and correction of human error. *The journal of applied behavioral science*, 40(1), 66-90.

8. Nembhard, I. M., & Edmondson, A.C. (2006). Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behavior*, 27(7), 941–966.

WHEN TEAMS BURN OUT

When these conditions are chronically absent—when hierarchy suppresses expertise and speaking up goes unnoticed or, worse, punished—the accumulated cost shows up as burnout. And just as culture is local, so is burnout. My research on hospital culture found that morale—closely linked to exhaustion, cynicism, and diminished efficacy—was among the most locally determined aspects of culture, with the work unit accounting for nearly 13 percent of the variance in workers' experience. Hospital membership contributed a fraction of that.

When surveys report that more than 40 percent of physicians show symptoms of burnout, the aggregate number obscures enormous variation within institutions. Institutional wellness programs will have limited reach for the units that need help the most because the forces driving burnout are disproportionately local. And burnout spreads: a team member who has begun to disengage creates downward pressure on the emotional climate around them, pulling others toward disengagement. Estimates suggest that physician burnout costs the U.S. healthcare system upwards of \$4.6 billion annually in turnover and reduced productivity⁹.

BUILDING RESILIENCE: THE LEADER'S CHARGE

Understanding what corrodes teams makes it possible to work in the opposite direction. There is a cluster of psychological resources—hope, self-efficacy, optimism, and resilience—that form *psychological capital*.¹⁰ Crucially, these resources can be developed: leaders who invest in building them are actively creating resilience, not merely selecting for it. A second buffer is meaningful work: professionals who maintain a clear sense of human purpose behind the clinical task show markedly greater durability under stress.

9. Han, S., Shanafelt, T. D., Sinsky, C. A., Awad, K. M., Dyrbye, L. N., Fiscus, L. C., Trockel, M., & Goh, J. (2019). Estimating the attributable cost of physician burnout in the United States. *Annals of Internal Medicine*, 170(11), 784–790. Estimates the annual cost of physician burnout—attributable to turnover and reduced clinical hours—at approximately \$4.6 billion in the United States.

10. Luthans, F., Youssef-Morgan, C. M., & Avolio, B. J. (2015). *Psychological Capital and Beyond*. Oxford University Press.

The leader who makes visible why the work matters after a difficult case is not offering consolation; rather, she is restoring a resource that stress steadily erodes. And at the team level, resilience requires structured recovery: the honest debrief, the deliberate reconnection before the next demand arrives. Teams that skip these moments accumulate a deficit that compounds.

All of this converges on local leadership as both the diagnosis and the prescription. Three priorities stand above the rest. First, close the perception gap: create channels through which team members across the hierarchy can surface their actual experience. Second, build a culture of expertise-based deference by asking junior members direct questions, following their leads visibly, and signaling that—in this unit—knowledge governs authority. Third, protect the internal climate by treating relational failures as directly as clinical ones, watching for the quiet early signs of burnout, and managing your own emotional presence.

The teams that care for us are shaped, moment by moment, by the leaders within them. Culture is local—which means that local leadership is needed to change culture.


The teams that care for us are shaped, moment by moment, by the leaders within them. Culture is local—which means that local leadership is needed to change culture.


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When Medical Errors Aren't Medical Errors: Designing health interventions that send good signals

Jon Bogard



What if “medical errors” were properly named as human and institutional errors? And how can behavioral science help in providing solutions? **Jon Bogard**, Assistant Professor of Organizational Behavior, **WashU Olin Business School**, explores.

In 1995, a 51-year-old man with severe diabetes, Willie King, entered a Florida hospital for a routine leg amputation. When he woke up, he discovered a nightmare: The surgical team had amputated the wrong leg. Mr. King had the right leg amputated days later, senselessly leaving him a double amputee for the rest of his life.

Stories like this are shocking but not rare. Some analyses suggest that medical error may be the third leading cause of death in the United States, killing approximately 250,000 people annually¹. Hundreds of thousands more are seriously maimed each year, and the financial toll on health systems runs into the tens of billions annually.

Such cases are referred to as “medical errors,” but are these errors truly medical? Most don't result from a lack of technical knowledge or medical expertise—physicians know when antibiotics are unnecessary, nurses know the importance of hand hygiene, and surgeons know how to amputate legs. Instead, we suggest, they are better understood as human and institutional errors, driven by poorly designed workflows, cognitive overload, flawed reasoning, and misaligned incentives.

BEHAVIORAL INTERVENTIONS IN HEALTH

Behavioral science has uncovered tools for addressing precisely these kinds of failures. In recent decades, healthcare systems have deployed small, psychologically informed interventions (i.e., “nudges”) that have yielded impressive results:

- **Mandatory Justification:** When physicians were required to first write a justification before prescribing antibiotics against medical guidelines, off-guideline prescribing plummeted from 23 percent to 5 percent.²
- **Default Settings:** Setting prescriptions in electronic health record systems (“EHRs”) to default to generic

rather than branded medications has saved millions of dollars without compromising patient outcomes³. Comparable benefits emerged when New York City hospitals made plant-based food the default meal choice.⁴

- **Social Proof:** Telling clinicians what share of their colleagues consistently wash their hands has been shown to increase hand-washing rates⁵, even more effectively than warnings about medical risks⁶.
- **Feedback from the Coroner:** Physicians sharply lowered opioid prescribing after being notified by a medical examiner that a patient they had prescribed opioids to had recently died of an overdose⁷.

Beyond individual nudges, broader “organizational repairs” (e.g., checklists, workflow redesigns, and structured decision processes) can reduce the probability of error.^{8,9} These interventions do not rely on perfect vigilance. Instead, they redesign the environment in which decisions are made, presuming human fallibility.

WHEN THE SAME INTERVENTION PRODUCES DIFFERENT RESULTS

Despite all this evidence, recent meta-analyses have revealed that the effects of nudges are often mixed,

1. Makary, M. A., & Daniel, M. (2016). Medical error—the third leading cause of death in the US. *Bmj*, 353.

2. Meeker, D., Linder, J. A., Fox, C. R., Friedberg, M. W., Persell, S. D., Goldstein, N. J., ... & Doctor, J. N. (2016). Effect of behavioral interventions on inappropriate antibiotic prescribing among primary care practices: a randomized clinical trial. *Jama*, 315(6), 562-570.

3. Patel, M. S., Day, S. C., Halpern, S. D., Hanson, C. W., Martinez, J. R., Honeywell, S., & Volpp, K. G. (2016). Generic medication prescription rates after health system—wide redesign of default options within the electronic health record. *JAMA internal medicine*, 176(6), 847-848.

4. Morgenstern, S., Redwood, M., & Herby, A. (2025). An innovative program for hospital nutrition. *American Journal of Lifestyle Medicine*, 19(2), 320-323.

5. Gaube, S., Fischer, P., Windl, V., & Lerner, E. (2020). The effect of persuasive messages on hospital visitors' hand hygiene behavior. *Health Psychology*, 39(6), 471.

6. Gaube, S., Fischer, P., & Lerner, E. (2021). Hand (y) hygiene hospital insights: Applying three theoretical models to investigate hospital patients' and visitors' hand hygiene behavior. *PLoS one*, 16(1), e0245543.

7. Doctor, J. N., Stewart, E., Lev, R., Lucas, J., Knight, T., Nguyen, A., & Menchine, M. (2023). Effect of prescriber notifications of patient's fatal overdose on opioid prescribing at 4 to 12 months: a randomized clinical trial. *JAMA network open*, 6(1), e2249877.

8. Soll, J. B., Milkman, K. L., & Payne, J. W. (2015). A user's guide to debiasing. *The Wiley Blackwell handbook of judgment and decision making*, 2, 924-951.

9. Larrick, R.P. (2004). Debiasing. *Blackwell handbook of judgment and decision making*, 316-338.



succeeding in one hospital but failing in another.^{10,11} Offering an explanation for such discrepancies, a recent *BMJ* paper points out that “details matter” in intervention design¹². Tiny changes—the way a message is displayed, the timing of a prompt, the informational context of the intervention—can have an outsize impact on effectiveness. Explaining why these small details matter so much, scholars typically point to situation-specific factors that alter the effectiveness of an intervention.

WHAT INTERVENTIONS ACTUALLY TELL PEOPLE

10. DellaVigna, S., & Linos, E. (2022). RCTs to scale: Comprehensive evidence from two nudge units. *Econometrica*, 90(1), 81-116.
11. Szasz, B., Higney, A., Charlton, A., Gelman, A., Ziano, I., Aczel, B., ... & Tipton, E. (2022). No reason to expect large and consistent effects of nudge interventions. *Proceedings of the National Academy of Sciences*, 119(31), e2200732119.
12. Fox, C. R., Doctor, J. N., Goldstein, N. J., Meeker, D., Persell, S. D., & Linder, J. A. (2020). Details matter: predicting when nudging clinicians will succeed or fail. *bmj*, 370.

Our recent research offers an alternative explanation: The details of a behavioral intervention can function as *signals of important information*. When a physician or patient encounters a nudge, they do not simply react to its mechanics; they interpret it. They ask, implicitly, “What does this intervention tell me about my options? What does it reveal about the context and designer *behind* the intervention?” Those inferences then shape behavior in ways the original design may never have anticipated.

Consider two examples:

- 1. The Power of Recommendations:** When an EHR requires a justification for a certain treatment, it isn't just adding friction to the act of prescribing branded medications. It is also signaling a *recommendation* to the physician, who may reasonably infer, “The organization thinks I might be making a mistake.”
- 2. The Choice of Frames:** Imagine a physician presenting the risks of an exploratory surgery to a patient. The physician's choice between saying surgery has a “90 percent survival rate” versus a “10 percent chance of death” may reasonably affect patients' decisions.^{13,14} Though these statistics are informationally equivalent, patients may naturally interpret the doctor's choice to use one frame or another as revealing something important about what the doctor thinks is best.

We argue that the particularities of how a behavioral intervention is designed can considerably alter how it is interpreted and therefore how people respond. Evidence for this perspective abounds across the behavioral sciences. For instance, framing a policy as a tax on unhealthy behavior versus a credit for healthy behavior—economically equivalent—produces different responses because each implies something different about the policymaker's attitudes¹⁵. As another example, incentive schemes can signal whether an organization distrusts its members, which can undermine the very behaviors the incentives were designed to encourage¹⁶. Finally, a recent paper in *PNAS* demonstrated that a commonly used behavioral intervention actually increased burnout when physicians drew negative inferences from how it was designed¹⁷. These examples highlight an important lesson for intervention designers: Small details convey critical information.

13. McNeil, B. J., Pauker, S. G., Sox Jr, H. C., & Tversky, A. (1982). On the elicitation of preferences for alternative therapies. *New England journal of medicine*, 306(21), 1259-1262.
14. McKenzie, C. R., & Nelson, J. D. (2003). What a speaker's choice of frame reveals: Reference points, frame selection, and framing effects. *Psychonomic bulletin & review*, 10(3), 596-602.
15. Tannenbaum, D., Valasek, C. J., Knowles, E. D., & Ditto, P.H. (2013). Incentivizing wellness in the workplace: Sticks (not carrots) send stigmatizing signals. *Psychological science*, 24(8), 1512-1522.
16. Fehr, E., & Schmidt, K. M. (2004). Fairness and incentives in a multi task principal-agent model. *The Scandinavian Journal of Economics*, 106(3), 453-474.
17. Reiff, J. S., Zhang, J. C., Gallus, J., Dai, H., Pedley, N. M., Vangala, S., ... & Croymans, D.M. (2022). When peer comparison information harms physician well-being. *Proceedings of the National Academy of Sciences*, 119(29), e2121730119.

DESIGNING WISER INTERVENTIONS

The original advocates of nudging observed that there is no such thing as a neutral choice architecture—*something* has to be at eye level on the shelf so it might as well be healthy. Nudging is unavoidable, they argued, so nudge wisely. To this we add: Every intervention signals something, so signal intentionally. Behavioral interventions don't arrive in a vacuum; they arrive as communications from health system to physician or from physician to patient. Design choices, however small, signal something about the intentions and judgments of the designers.

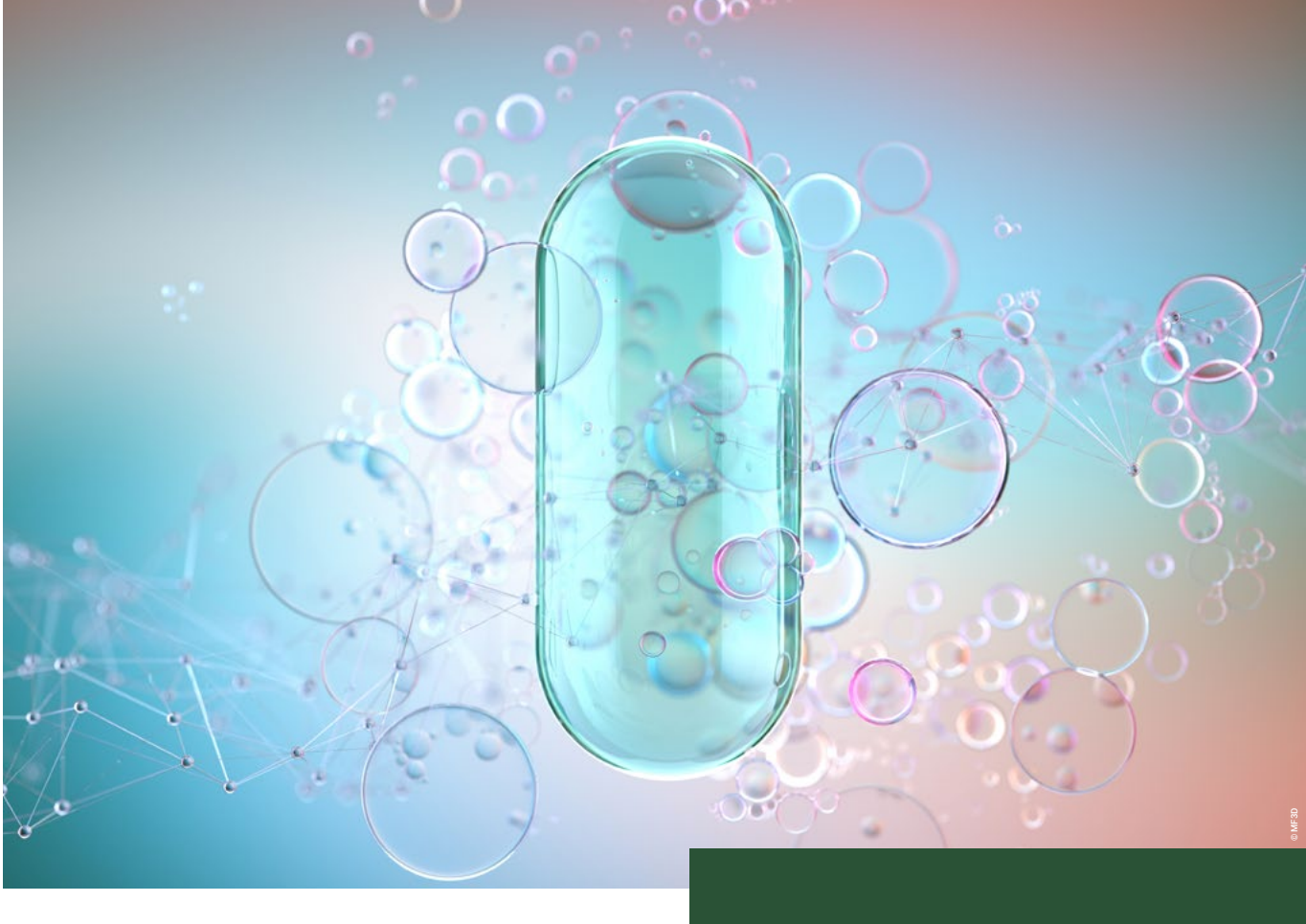
For leaders in health systems, this has practical implications. Before rolling out a new protocol, incentive scheme, or digital interface, it is worth asking not only, “What behavior will this target?” but also, “What will this communicate?” To help with this process, we drew on our recent research¹⁸ to develop a chat-based intervention audit tool¹⁹. By inputting a description of a planned policy, intervention designers receive a checklist of possible inferences the target audience might draw, enabling refinement before interventions go live.

To conclude, revisit the example of Willie King. His tragedy was not a failure of medicine; it was a failure of organizational process and choice architecture. Yet the lesson is not simply “use a nudge to improve choice architecture.” It is to design and implement interventions cognizant of the messages they broadcast. Our recent research tries to help.

An intervention that feels like bureaucratic mistrust may be resisted. One that signals shared commitment to patient safety may be embraced.

Intervention design, then, is not only about frictions and incentives; it is about meaning.

18. Reiff, J. S., & Bogard, J. E. (in press). Behavioral intervention construal: A framework for understanding inferences from behavioral interventions. *Organization Science*. <http://ssrn.com/abstract=6690458>
19. <https://chatgpt.com/g/g-6852f5cbd3f08191b32debbf637f3ed1-inferences-from-interventions-audit-tool>



Trust as a Competitive Advantage: What health systems can learn from institutional transparency

Keikoh Ryu



Prof. **Keikoh Ryu, Keio Business School**, Japan, shares research into post-COVID information disclosure and university social responsibility that could provide healthcare institutions with a framework for considering trust as a management strategy and competitive advantage.

Related research: JSPS KAKENHI project “Post-Corona International Comparative Research on University Information Disclosure and University Social Responsibility,” Research Project No. 23K02561.

Trust is often discussed as a moral virtue. For healthcare institutions, it is also a strategic resource. Patients must accept diagnoses, treatment recommendations and estimates of risk that they cannot independently verify. Families must rely on unfamiliar professionals at moments of fear and vulnerability. Physicians, regulators, payers and communities likewise depend on information that the institution itself largely controls.

This asymmetry does not make trust automatic. It makes trust fragile. A hospital asks stakeholders to believe that its care is safe, its clinicians are competent, its prices and priorities are defensible, and its response to error will be honest. When these claims are not supported by clear and reliable information, skepticism is not a failure of public understanding. It is a rational response to opacity.

My research begins in a different expert institution: the university. As part of the JSPS KAKENHI project on post-COVID university information disclosure and University Social Responsibility (USR), I study how institutions make responsibility visible to stakeholders. Universities and health systems differ in mission and risk, but they share a governance problem: outsiders must evaluate complex organizations whose core work they cannot fully observe. The university evidence is therefore useful here as a supporting parallel. The immediate question, however, is what healthcare leaders should do.

HEALTHCARE INSTITUTIONS AND THE TRANSPARENCY PROBLEM

Health systems sit within dense networks of dependence. Their stakeholders include patients and families, clinical and non-clinical staff, emergency services, suppliers, insurers, government agencies, local communities, research partners and the media. They receive public trust, public resources and intense public attention. In return, they are expected not only to provide effective care, but also to explain how decisions are made, how risks are governed and how the organization learns when care falls short.

From outside, these institutions are exceptionally difficult to understand. A patient may see a physician, a consent form and a bill, while the quality of the outcome also depends on staffing, handovers, procurement, data systems, infection control, escalation protocols and board oversight. Even insiders may see only part of this system. That is why disclosure is not a communications

accessory. It is one way to make an otherwise invisible management system assessable.

USR offers a useful conceptual bridge. It treats disclosure not merely as compliance or community engagement, but as the process by which an institution demonstrates alignment between its mission, governance and social obligations. Translated into healthcare, this means that a health system earns legitimacy by showing how patient welfare, professional standards and public value are built into its decisions.

TRANSPARENCY MEANS MORE THAN MORE DATA

Transparency should not be confused with volume. More information does not automatically create more trust. A long technical report may satisfy a regulator while doing little for a patient trying to understand likely outcomes, alternatives, costs or what will happen if something goes wrong. Useful disclosure is accurate, timely, accessible, comparable and relevant to a real decision.

Effective disclosure therefore begins with a stakeholder question: who needs this information, for what purpose, at what moment and in what form? Patients need intelligible explanations of benefits, risks, alternatives and follow-up. Families need clear routes for raising concerns. Clinicians need a psychologically safe way to report incidents and evidence that the organization will learn from them. Boards need indicators that reveal patterns rather than isolated anecdotes. Regulators and communities need credible evidence of accountability and public value.

A socially responsible health system does not treat these groups as passive audiences. It treats them as participants in a relationship of trust. Three pillars make that relationship manageable: transparency, reliability and consistency.

TRANSPARENCY

Transparency is the willingness to make material information visible, including information that is uncomfortable. In healthcare, it includes explaining treatment choices, disclosing harmful events to affected patients and families, reporting safety patterns to oversight bodies and showing what corrective action follows. The purpose is not radical openness about



Stakeholders depend on expert institutions whose operations they cannot fully observe.

every internal detail. It is decision-useful openness about matters that affect stakeholder welfare and institutional accountability.

Strategically, this reduces uncertainty and signals confidence in the institution's own systems. It also creates an internal discipline: an organization that expects to explain its choices is more likely to clarify responsibility, document reasoning and correct weak processes. Transparency can therefore improve governance before it improves reputation.

RELIABILITY

Reliability is the second pillar. Trust depends on whether conduct matches claims. A hospital that promises patient-centered care must make it possible for patients to ask questions, obtain records and raise concerns without fear.

An institution that promotes safety must support incident reporting, protect learning processes and act on recurring signals. A system that claims preparedness must be able to maintain care and communication under stress.

The COVID-19 pandemic made this especially visible. Information about infection risks, service restrictions, staffing, testing, vaccination and continuity of care changed rapidly. Stakeholders did not expect perfect foresight, but they did need timely explanations and dependable action. Reliability in a crisis comes from acknowledging uncertainty, updating information and doing what the institution has said it will do.

CONSISTENCY

Consistency is the third pillar. Trust weakens when different stakeholders receive incompatible accounts or when public claims conflict with lived experience. A health system cannot credibly advertise compassion while making complaints difficult to file, or claim a learning culture while punishing staff for reporting near misses. Stakeholders eventually compare words with experience.

Consistency also matters over time. Trust is not built by one campaign, one quality award or one public apology. It accumulates through repeated behavior: regular reporting, honest responses to criticism, visible corrective action and follow-through. Disclosure must be part of governance, not an intervention activated only when reputational risk becomes severe.

TWO ROUTES TO TRANSPARENCY: WHAT INSTITUTIONS SHOULD DO AND WHAT THEY MUST DO

The voluntary route — the University of Michigan. Beginning in 2001, the University of Michigan Health System moved away from a conventional “deny and defend” posture. Its disclosure-and-offer approach sought to identify harmful events, investigate them, keep patients and families informed, apologize when appropriate and offer compensation when care had been unreasonable. Crucially, the program was connected to patient-safety and peer-review systems. Disclosure was not a public-relations gesture after the fact; it was part of how the organization learned.

A retrospective before-and-after study reported that, following full implementation, the monthly rate of new claims fell from 7.03 to 4.52 per 100,000 patient encounters, the lawsuit rate fell from 2.13 to 0.75, and claim resolution became faster. The authors appropriately cautioned that the design could not prove causation and that malpractice claims were also declining elsewhere in Michigan. Even with that limitation, the case challenges the assumption that candor necessarily increases liability. It shows the strategic value of choosing what should be disclosed before regulation or litigation forces the choice.

The regulatory route — Japan's response to the Hiroo Hospital case. In 1999, a postoperative patient at Tokyo Metropolitan Hiroo Hospital died after disinfectant was mistakenly administered intravenously in place of an anticoagulant solution. The case became especially damaging because the cause was not promptly and honestly reported: the hospital director ordered a false death certificate and police were not notified for 11 days. In 2004, Japan's Supreme Court upheld the director's conviction for violating the statutory reporting duty. Along with other high-profile accidents, the case intensified public concern and exposed the weakness of relying on professional discretion alone.

Japan subsequently developed a more structured, learning-oriented response. Under the Medical Accident Investigation System, which took effect in 2015, a medical institution that identifies a qualifying, care-related unexpected death or stillbirth must explain the matter to the bereaved family, report it to the independent Medical Accident Investigation and Support Center, conduct an internal investigation, explain the result to the family and submit its report to the Center. The system is designed for causal analysis and prevention rather than individual blame.

The distinction is important. Japan's system is not a requirement to publish every error to the general public; it covers a defined category of deaths and creates a formal process of reporting, investigation and explanation. It therefore represents a minimum institutional floor—what must happen when opacity and ad hoc handling are no longer acceptable. The Michigan model represents the complementary possibility: what a health system may choose to do because candor supports patients, learning and long-term legitimacy.

FROM DISCLOSURE TO COMPETITIVE ADVANTAGE

This comparison clarifies the difference between compliance and social responsibility. Regulation can define what must be reported. It cannot fully define what patients and other stakeholders need to know, how respectfully they should be treated or how visibly the institution should learn. A responsibility-based approach supplies the “should”: it asks what information is material to stakeholders even when no rule expressly requires its disclosure.

Public relations can communicate trust, but it cannot create trust by itself. Trust is created by institutional behavior. Disclosure works only when it is connected to internal controls, clinical governance, risk management, patient support, staff reporting, financial accountability and board oversight. An institution that wants to be trusted must build this infrastructure of trust.

For executives and boards, three practical questions follow. Do stakeholders receive the information needed to make consequential decisions? When the institution's performance contradicts its promises, is there a reliable process for explanation, remedy and learning? And do disclosures remain consistent across departments, audiences and time? These questions turn transparency, reliability and consistency from abstract values into management tests.

There are risks. Candor may expose weaknesses, invite comparison and create short-term criticism. But opacity rarely protects an institution for long. When a health system identifies a problem, explains it accurately and shows how practice will change, it can transform vulnerability into credibility. The competitive advantage is not the appearance of perfection. It is a demonstrated capacity to recognize imperfection and respond responsibly.

The same lesson returns to universities, where trust affects student choice, faculty commitment, public funding and social legitimacy. Across both sectors, stakeholders depend on expert institutions whose operations they cannot fully observe. That is why transparency, reliability and consistency are not optional additions to reputation. They are its foundations.

Leading health systems make transparency part of identity, reliability part of management and consistency part of performance.



Medical Crisis Directors: Designing hospital resilience and preparedness

Marie-Léandre Gomez



A pandemic, cyberattack, fire or power outage can rapidly turn a hospital into a place where ordinary routines no longer apply. Medical Crisis Directors show why preparing for such moments is not simply a matter of having a plan: it is a collective capacity to organize, adapt and keep care moving under pressure. Prof. **Marie-Léandre Gomez, ESSEC Business School**, profiles a new French hospital leadership role.

GOMEZ, M.L., KERVELLANT, M., LANGLOIS, M., LOT, N. and RAUX, M. (2023). Organizational innovation under constraints: The case of covid patients' flow management in Parisian hospitals. *Health Services Management Research*, 36(2), pp. 137-144.

Hospitals have traditionally associated crisis with a sudden influx of patients: victims of disaster, attack, accident or pandemic. Yet hospitals now also face disruptions that arise within their own walls or directly undermine their ability to operate, such as fires, floods, hurricanes, cyberattacks and power failures. In such circumstances, the question is not only how many patients arrive, but how to continue treating them when the building, bed capacity, information systems, or medical workforce are under strain.

How can care be organized when normal procedures are no longer possible? How can patient flows be managed when beds, operating rooms, medicines, communications or digital records are unavailable?

In France, one answer has been the creation, in 2019, of the Medical Crisis Director (MCD) role. MCDs are hospital physicians appointed by the hospital director to help prepare, coordinate and steer the medical response in crisis situations. Many of the first MCDs entered the role just before, or during, the COVID-19 pandemic. Their experience reveals that crisis management is not an auxiliary task reserved for the moment of emergency. It is a continuing organizational activity that links preparation, response, learning and redesign.

Our multidisciplinary research team¹ has followed this role across 12 French hospitals, including an overseas hospital affected by a major hurricane. We interviewed MCDs and other hospital professionals, observed preparedness exercises, and followed crisis meetings during COVID-19 and a cyberattack. The cases show how hospitals organize care when crisis mode is activated.

A MEDICAL ROLE WHOSE CORE TASK IS ORGANIZATIONAL

MCDs do not replace clinicians at the bedside or make every clinical decision. The MCD's distinctive contribution lies less in being the most clinically expert person in the room than in coordinating decisions, resources, and actors across the organization. For example, during

1. The research team is composed of Marie-Léandre Gomez, Marie Kerveillant, Matthieu Langlois (MD) and Philippe Lorino, ESSEC Business School, Reiko Hasegawa and Jan Verlin, ENS-Ulm chair of Geopolitical risks, Michael Babin, Reims University, Aurore Fiérobe and Mathieu Raux (MD) Sorbonne Santé Université, Nicolas Lot, EDF.

COVID, those MCDs who were anesthesiologists closely worked with heads of emergency department and infectious disease departments. Their central task is to create the conditions under which care can continue. Alongside the hospital director and crisis unit, they define a strategic medical response and translate it into workable arrangements.

Clinical credibility matters, particularly when MCDs must engage peers in difficult decisions. Yet their legitimacy also rests on detailed knowledge of the hospital, its constraints and the people who can act quickly. MCDs must know whom to call, what information is trustworthy and where a technical failure will have clinical consequences. They connect clinical departments with support functions, senior governance, emergency services, neighboring hospitals and public authorities.

In mass-casualty situations, for instance, damage-control principles may require teams first to stabilize patients and postpone definitive procedures until resources or patient conditions permit. Such a shift can be unsettling for clinicians accustomed to comprehensive, individualized pathways. MCDs help make the collective logic explicit: when time and resources are constrained, a decision concerning one patient can affect the ability to treat many others.

Their work is the simultaneous organization of four interconnected flows: patients (admissions, triage, transfers or beds); people (clinical and support staff); material resources (medicines, equipment and transport); and information. A hospital cannot coordinate its response without a credible shared picture of resources, patient load and likely evolution. This coordinating work also requires translation. National or regional directives must be interpreted in the light of a hospital's actual configuration. Conversely, the difficulties encountered on the ground must be made visible to decision-makers. MCDs therefore spend a large part of a crisis gathering, filtering and explaining information so that broad strategic directions become workable local action.

PLANS ARE STARTING POINTS, NOT SCRIPTS

These principles underpinned several organizational innovations observed during COVID-19. In one case, MCDs and intensive-care teams developed a more granular scale for classifying patients. This made it possible to distinguish patients still requiring close



monitoring from those needing the most acute intensive care. Hospitals could then create 'light' intensive-care capacity in newly created units, preserving their most experienced nurses and highly specialized beds for the patients with the greatest need. The innovation was not a new medical treatment. It was a new way of organizing patients, expertise and capacity. In another hospital in French islands after a natural disaster that partly destroyed the hospital, ambulances and trucks, the MCD mobilized patients' families and their pick-up cars to transport medical supply from the airport. The response depended on improvisation, but not on individual heroism. It relied on rapidly identifying available resources, bringing people into a common effort and recombining them around an immediate objective.

These decisions are not purely technical. Choosing which services reduce activity, when to transfer patients, or how to prioritize supplies redistributes burdens and risks. The MCD does not make such choices alone, but creates a forum in which medical, administrative and logistical perspectives can be compared quickly enough to support action.

Preparedness plans are indispensable, but cannot anticipate every combination of disruption, uncertainty and urgency. MCDs use protocols as resources, not rigid scripts. They decide what can be maintained, simplified or invented.

This may mean asking clinical teams to move temporarily to a 'degraded' mode of care.

Cyberattack makes this organizational dimension especially visible. When electronic records, laboratory results, medical devices or communication channels fail, an IT incident becomes a direct challenge to care. In one hospital, the MCD assembled senior clinicians familiar with paper-based work. Large whiteboards at the emergency entrance recreated room maps, patient locations and staff schedules in real time. Digital resilience is not only an IT concern; it is a clinical and organizational capability.

FROM CRISIS RESPONSE TO CRISIS READINESS

The most significant evolution of the role occurred after COVID. MCDs, who were initially appointed to act once hospital crisis had been activated, gradually extended their work into non-crisis time. Having seen the limits of existing arrangements first-hand, they became involved in drafting plans, organizing training, designing exercises and building links between services before the next disruption occurs. The perspective of the 2024 Olympic Games in France also reinforced the need to get prepared to potential inflows of victims and cyber-attacks of hospitals.

Exercises matter when treated as learning opportunities rather than compliance rituals. Effective simulations involve medical teams, switchboard operators, reception staff, facilities, logistics, signage, security and those managing relatives' arrivals. They test the interfaces at which crises become difficult: how information travels, how decisions reach a ward, or how families are informed while clinicians remain focused on care.

Some hospitals have developed annual cycles combining local exercises within departments and larger simulations involving hundreds of participants. Others use short, practical training sessions to build familiarity with a specific risk, such as a chemical incident, a cyberattack or a mass-casualty event. The objective is not to turn every hospital employee into a crisis specialist. It is to ensure that people know their role, recognize the escalation pathways and can shift to an alternative way of working without losing precious time.

MCDs also acknowledge that a single designated individual is rarely enough. Many have encouraged their hospitals leaders to appoint teams of MCDs, with complementary experience in areas such as pandemics, cybersecurity, chemical or radiological risks, and mass-casualty incidents. Some MCDs also include in crisis preparation nurses, pharmacists and other professionals whose operational knowledge is essential to managing flows. They are reinforced by a growing peer network through which MCDs exchange experiences, seek advice and mobilize expertise across hospitals.

This development helps build what many interviewees call a 'crisis culture'. The phrase does not mean accepting crisis as normal, nor pretending that every shock can be controlled. It means making preparedness a routine organizational responsibility: talking about vulnerabilities, rehearsing decisions, learning from experience and recognizing that support services and clinical services are inseparable when care is under pressure.

A crisis culture also requires humility. Exercises can create a false impression of mastery when they merely repeat familiar scenarios. The more productive approach is to use them to surface assumptions, identify the workarounds teams may need and discover which connections fail when normal hierarchies, spaces or technologies are disrupted. This is why some MCDs include patient representatives and local stakeholders in preparedness activities.

LESSONS FOR LEADERS BEYOND HOSPITALS

The experience of French MCDs offers lessons for leaders in any organization facing disruption. First, crisis leadership is not the work of a solitary hero. It is the collective creation of a temporary but credible organization, one that connects specialists, makes trade-offs visible and enables coordinated action.

Second, preparation and response are not separate phases. The arrangements built during exercises, the contacts developed across departments and the tools used to map resources all shape what becomes possible in the moment of crisis. Conversely, each crisis reveals weaknesses that should alter the next round of preparation.

Third, organizations should treat apparently technical incidents as organization-wide challenges. A cyberattack, power outage or building failure quickly affects customers, front-line teams, supply chains, communications and decision-making. The question is never simply whether a system has failed. It is how the organization will continue to operate while it is unavailable.

Finally, effective coordination depends on legitimacy grounded in real work. MCDs can persuade clinicians to modify routines because they understand the constraints of care and share the same professional commitment to patients. Their example shows that management and professional expertise need not be opposites. Under pressure, management becomes a way of protecting the conditions in which professional work can be done well.

Hospitals cannot eliminate the unexpected and threatening situations. They can, however, become more capable of creating workable, provisional order when the unexpected arrives. Medical Crisis Directors demonstrate that resilience is not a document stored on a shelf. It is an organizational, collective practice, repeatedly built before, during and after crisis.



What Patients Want

Sydney Scott



Why do so many people instinctively trust natural remedies, even in an age of groundbreaking scientific advances? **Sydney Scott**, Associate Professor of Marketing, **WashU Olin Business School**, uses research results to highlight the psychology behind people's attraction to natural health interventions, and reveals how beliefs on safety, effectiveness, and the moral value of nature continue to shape the choices we make about wellness, prevention, and medical care.

In 2026 alone, there have been a whirlwind of headlines about medicine, trust in our healthcare system, and natural and alternative treatments. Consumers find themselves asking questions like: How should I make sense of the new vaccine schedule? Should I worry about microplastics? Should I change my diet to avoid ultra-processed foods? Meanwhile, in our day-to-day lives, activities that were once a bit fringe are more commonplace. More people are not only meditating and practicing yoga, but also drinking adaptogens, microdosing, and pursuing other alternative ways to wellness.

I study how consumers think about science, natural medicine, and health. As a behavioral scientist, I collect data from hundreds or even thousands of people, trying to understand their beliefs and choices when it comes to the food they eat, the medicine they take, and the information they seek out. What does this data tell us about how to understand the appeal of natural and alternative medicine? I see three big lessons to take from my work.

LESSON 1: NATURAL APPEALS BECAUSE IT SEEMS SAFE AND GENTLE

When it comes to health, probably the most important thing to understand is that natural is viewed as safe. In one recent study, I found that 64% of people agreed that, in general, natural things are safer than artificial versions of the same things. By contrast, only 12% disagreed. People think a natural approach is just less likely to cause harm. Of course, this could be a reasonable rule of thumb. For example, some natural treatments have been around for a long time, and so it is easier to have confidence that a treatment has minimal risks when people have been doing it for hundreds of years.

However, natural is not always safer. Some of the most dangerous chemicals in the world are natural. Botulinum toxins, for example, are naturally occurring, powerful neurotoxins produced by bacteria. A tiny dose is deadly, which is why we worry about foodborne botulism in imperfectly preserved foods. Moreover, when a society or regulatory system assumes that natural means safe, this assumption can backfire. If people always assume natural things are safer, then people are less likely to test and identify natural products that are dangerous.

Although people think natural medicines are safer, they also think these medicines are less powerful or effective. Intuitively, they seem gentler. Said differently, unnatural medical interventions are seen as stronger, more powerful, and therefore as creating bigger possible benefits. These beliefs help shed light on why people are eager to avoid unnatural interventions in some domains but not others.

LESSON 2: NATURAL IS ESPECIALLY APPEALING FOR PREVENTATIVE HEALTH

This set of beliefs that natural is safe but also less powerful is one reason why natural is especially appealing in general wellness and disease prevention. When things are good, when we feel healthy and we want to stay healthy, we gravitate towards a safer, gentler option. But people don't always think natural is better. When we are sick, when the chips are down and we need a solution, that's when we opt for the powerful scientific innovations.

The desire for natural health and wellness approaches can help illuminate the uptick in reluctance to vaccinate, especially in conjunction with distrust in science and medicine.

First, consider a case where people fully trust the medical institutions and recommendations. In this case, adherence to the vaccine schedule is likely to be high. (It won't be perfect. Other barriers will remain, like transportation, financial costs, et cetera.) Second, consider a case where trust declines, as has happened at least in some cases and for some people as of late. When people do not trust the medical recommendation, they may gravitate towards what seems tried-and-true, letting nature take its course. Avoiding unnatural interventions feels like a safer, gentler option to default to, especially for preventative healthcare and when providers or institutions recommending unnatural interventions are distrusted.



Trust in nature is deeply ingrained as a belief, and the abstract principle that natural is benevolent is a hard one to change.



LESSON 3: SPECIFIC TREATMENT PREFERENCES CHANGE OVER TIME, BUT FAITH IN NATURE STAYS STABLE

While trust in health, science, and institutions may be changing, does our trust in nature change a lot too? In addition to thinking of natural as safe and gentle as mentioned above in lesson 1, people also think natural is just good and moral and right. Like other ethical or religious beliefs, the belief in the goodness of nature cannot be boiled entirely down to a calculated assessment of safety and benefits. Even if natural things are chemically identical to their unnatural alternatives, people prefer the natural version. And there are some unnatural things plenty of people think we should never do, no matter it's risks and benefits, like genetically engineer our food.

Do views about the benevolence of the natural world change over time? Yes, in some ways, but not much in other surprising circumstances that would seem likely to prompt change. If anything were ever to challenge a belief in the benevolence of nature, you might think it would be a natural disaster like a flood, a hurricane, or a tornado. However, even people whose lives have been affected by a natural disaster believe in the benevolence of nature. In fact, I find that their beliefs look no different from other people's! Trust in nature is deeply ingrained as a belief, and the abstract principle that natural is benevolent is a hard one to change.

That said, our attitudes to specific treatments surely do change over time. Because of course, we look not just to cues about naturalness, but to what our peers are doing, what our providers are recommending, what we've heard in the news or on social media. So while yoga and microdosing fall in or out of vogue, belief in nature endures.

In order to help guide patients, practitioners can ask about these beliefs. For instance: How do you feel about natural interventions? Is it more important to you for a treatment to be gentle or to be effective?

For some people, naturalness holds a deep appeal as gentle and benevolent. Naturalness can also feel moral and right and consistent with one's self-image. Moreover, focusing patients on risks and benefits instead of self-image concerns could be useful. For example, practitioners could try using concrete language about symptoms and treatments to help focus on treatment goals during decision making. Ultimately, we need to understand where our patients are coming from in order to get them where they want to go.



The Next Frontier - Innovation, Technology & Global Reach

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SECTION 3 INTRODUCTION



Patrick Aguilar, MD, MBA;
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Challenges notwithstanding, path-breaking innovations are on the horizon for healthcare around the world. New technologies, new economic models, and new ways of thinking about health are each expanding what's possible. Leaders around the world are investigating and implementing solutions to improve health outcomes.

Importantly, this effort is global as well as local. For solutions to be effective, they must work in the context of the specific problems they address. This means that a solution in Africa or Asia may look different than one in Europe or North America. The lessons from these innovations, however, provide useful insights world-wide.

This section addresses both new solutions to old problems and new problems we all face. The next decade of healthcare will be defined by creating new ways of thinking and developing sustainable solutions that work locally and inform progress around the world.



Bridging the AI Gap in Healthcare: Lessons from business for a high-stakes industry

Dennis J. Zhang



The use of AI in healthcare remains conspicuously behind that of business. **Dennis Zhang**, Professor of Supply Chain, Operations, and Technology & Professor of Marketing, **WashU Olin Business School**, draws on research to set a blueprint for bringing this breakthrough technology to clinics, hospitals and teams.

Artificial intelligence has fundamentally changed how the modern business world operates. Algorithms are constantly adjusting prices, personalizing content for hundreds of millions of users, and optimizing complex global supply chains. Yet if you look at healthcare—an industry where optimized decisions actually save lives—it remains conspicuously behind. A majority of clinical workflows still rely on human judgment, paper-based protocols, and legacy information systems.

This isn't just a technological lag. It's a strategic opportunity. The primary hurdles holding back healthcare AI—human-algorithm interaction, fragmented data infrastructure, the inherent risks of generative models—are the same roadblocks that other industries have already navigated. Drawing on my collaborators' and my own field research deploying AI in real organizations, we see three distinct areas where hard-won business insights can accelerate healthcare's AI transformation.

BUILDING THE AI-READY CLINICAL WORKFORCE

In e-commerce or digital advertising, algorithms largely run the show. A pricing engine doesn't need a human to review the thousands of listings it adjusts every hour. Healthcare is a profoundly different endeavor. Physicians make the diagnosis, nurses deliver the care, surgeons perform the operations. AI is a supporting player at best. This human-in-the-loop reality causes friction—but it also creates a clear market advantage for organizations that figure out how to design systems around the people using them.

Even the most sophisticated algorithms sit idle if clinicians refuse to engage with them. Often, this resistance is rooted not in the technology's shortcomings, but in incorrect prior beliefs about its reliability or fears about liability and professional autonomy. My colleagues and I studied gig-economy workers and found that hands-on experience with an algorithm shattered those initial biases—workers who used the system dramatically updated their beliefs about its value, which drove sustained, voluntary adoption¹. For hospital leaders, the implication is clear: simply making an AI tool “available” is not enough. You must actively

reshape clinicians' priors through structured exposure, demonstration programs, and peer-led pilots that give physicians firsthand evidence of what AI can and cannot do.

Design matters just as much. When studying large-scale warehouse operations, my co-researchers and I noticed a glaring disconnect: the bin-packing algorithm was optimizing for a mathematically perfect world, completely ignoring how human workers process spatial information and physically handle objects². Once we redesigned the algorithm to respect those human constraints, the system's effectiveness improved substantially. The parallel to healthcare is direct. If an AI diagnostic tool is clinically brilliant in theory but ignores how an emergency physician might think and communicate under intense time pressure, it will fail.

Then there is the critical matter of fairness. Workers need to believe an algorithm is equitable, not just accurate. In our research, my colleagues and I documented that when task assignments felt unfair, productivity dropped sharply, even if the algorithm was technically doing its job³. In a hospital setting, where AI might assist with triage or resource allocation across different patient demographics, the stakes are exponentially higher. Transparently building fairness into the system isn't just an ethical requirement; it's a competitive differentiator that builds clinician trust without which no AI tool survives.

UNLOCKING DATA INFRASTRUCTURE THROUGH TRUST

No algorithm can fix a broken data pipeline. Right now, healthcare data is fragmented across providers, insurers, and public health agencies, with electronic health records that still struggle to communicate with one another. Without integrated, high-quality data, even the most sophisticated AI is useless.

2. Sun, J., Hu, H., Van Mieghem, J. A., and Zhang, D. J. (2020). Predicting Human Discretion to Adjust Algorithmic Prescription: A Large-Scale Field Experiment in Bin Packing Warehouse Operations. *Management Science*.

3. Bai, B., Dai, H., Zhang, F., Zhang, D. J., and Hu, H. (2022). The Impacts of Algorithmic Work Assignment on Fairness Perceptions and Productivity: Evidence from Field Experiments. *Manufacturing & Service Operations Management*.

1. Cao, X., Hu, C., Sun, J., and Zhang, D. J. (2026). How Forced Intervention Facilitates AI Adoption. *Manufacturing & Service Operations Management*, forthcoming.



Healthcare is certainly not the first sector to struggle with AI adoption, human-algorithm collaboration, or data governance. It is, however, the one where getting it right matters most.



Privacy concerns sit at the center of this bottleneck—and they are one of the primary reasons so many healthcare processes remain difficult to digitize in the first place. Patients understandably withhold consent when they don't know how their data will be used, and institutions default to hoarding information in silos to avoid regulatory exposure. But privacy attitudes are not set in stone. My colleagues and I studied a major digital platform and found that users change their minds about data sharing when platforms clearly explain the trade-offs between privacy and service quality⁴. Stronger protections reduced data exposure as intended but also degraded the quality of algorithmic recommendations—a cost that users had not anticipated.

Healthcare institutions need to invest in privacy-preserving technologies like federated learning and differential privacy. But more importantly, they need to treat patients as partners—educating them on exactly what their data enables, and what withholding it costs. In the emerging health data economy, trust is the real competitive currency.

HARNESSING GENERATIVE AI FOR CLINICAL RIGOR

Traditional machine learning already works well for structured tasks like predicting readmissions or flagging anomalies in medical imaging. Generative AI introduces an entirely new set of possibilities. Large language models can parse unstructured clinical notes, synthesize information across disparate sources, and manage nuanced conversations. The potential applications—clinical documentation that practically writes itself during a patient visit, decision-support systems that draw on the full breadth of the medical literature—are enormous.

But healthcare is completely unforgiving. A hallucination in a creative application is a nuisance. A fabricated drug interaction in a hospital is catastrophic. And there is a deeper statistical problem: the general internet data these models train on looks very different from real, highly specific medical data. Patient populations, clinical language, and care workflows all carry domain-specific patterns that general-purpose models may not faithfully represent.

4. Chen, G., Chan, T., and Zhang, D. J. (under review). The Intended and Unintended Consequences of Privacy Protection in Social Media: A Large-Scale Field Experiment and Structural Analysis. Major revision at *Marketing Science*.

My co-researchers and I have developed a method that addresses this gap head-on. Instead of trusting generative AI to produce final clinical answers, we use large language models to generate synthetic data, which then serves as a predictive feature within rigorous econometric models—preserving the statistical guarantees that clinical settings demand⁵. This approach could change the math for areas plagued by data scarcity: rare diseases, underrepresented patient populations, and early-phase clinical trials where sample sizes are too small for conventional methods. Generative AI becomes a tool for enriching evidence while maintaining the inferential rigor that medical decisions require.

FROM BUSINESS RESEARCH TO CLINICAL IMPACT

Healthcare is certainly not the first sector to struggle with AI adoption, human-algorithm collaboration, or data governance. It is, however, the one where getting it right matters most. Decades of business research show us how to successfully integrate AI into human-driven workflows. We know that adoption requires hands-on exposure, not just availability. We know that algorithms must respect human limits, and that trust and fairness are non-negotiable. We also know that even generative AI can be made rigorous with the right methodological discipline.

The healthcare industry does not need to reinvent the wheel. The strategic question for the next decade is not whether AI can transform healthcare—it is which organizations will step up to build the systems, the partnerships, and the trust required to make it happen.

5. Wang, M., Zhang, H., and Zhang, D. J. (2026). Large Language Models for Market Research: A Data-Augmentation Approach. *Marketing Science*, forthcoming.



New Competencies in Healthcare: What humans will need next in the AI era

Ayushi Tandon



Prof. **Ayushi Tandon, Trinity Business School, Trinity College Dublin**, draws on in-the-field research that focuses on a case of collaboration between healthcare teams, AI, and the patient to provide a competency framework for best practice – and positive results.

Related research: Kulkarni, R., Agrawal, M., Biswas, T., Sivapuram, M. S., Bobba, B., Pal, N., Gade, S., Koloti, R., Salam, A., Tandon, A., Biswas, C., Gade, A. S., & Biswas, R. (2025). Rethinking complex care using participatory medical cognition and user-driven learning amidst multimorbidity: Participatory action research study. *Journal of Participatory Medicine*, 17, e81950. <https://doi.org/10.2196/81950>

Artificial intelligence is no longer a distant forecast in healthcare; it is already embedded in clinical conversations, evidence retrieval, patient monitoring, and decision support. As AI assumes an expanding share of cognitive labour, a critical question emerges for educators, practitioners, and policymakers: what competencies must humans develop to remain effective, responsible, and irreplaceable within AI-augmented systems? The prevailing tendency to frame AI as a substitute for human skill is both conceptually reductive and professionally dangerous. The real transformation is considerably more demanding.

An action research study published in the *Journal of Participatory Medicine* offers an empirical foundation for this discussion. A healthcare professionals team managed the complex care of a 44-year-old woman in rural India presenting with multiple chronic conditions, including type 2 diabetes, hypertension, corneal dystrophy, recurrent infections, and pain syndromes, using a collaborative online platform built around a Patient Journey Record (PaJR). Over a six-month period, a globally distributed multidisciplinary team, the patient's advocate, and multiple AI tools including Meta AI, Perplexity, ScholarGPT, and ChatGPT collaborated asynchronously to optimize her clinical management. The outcomes were clinically significant: the patient discontinued all antihypertensive medications and substantially reduced her antidiabetic regimen. This was achieved not through technological intervention alone, but through the intelligent, critical, and contextually informed human orchestration of available digital and AI resources.

This case is not merely a record of clinical success. It functions as an instructive model for the kinds of human competencies that AI-integrated healthcare environments will require. Three core competencies emerge from this evidence, with implications for healthcare students, educators, practitioners, and policymakers.

1. COLLABORATIVE MEDICAL COGNITION WITH AI

The first and most foundational competency is the capacity to reason with AI rather than simply through it. This distinction is consequential. Reasoning through AI implies passive consumption of generated outputs; reasoning with AI requires their active interrogation, contextualization within a broader evidential framework, and critical evaluation against patient-specific data and clinical expertise.

In the PaJR case, team members consulted AI tools for specific, bounded tasks: summarizing literature on the relationship between inflammation and hyperglycaemia, evaluating evidence for antibiotic use in hordeolum, and substantiating dietary correlates of glucose variability. Crucially, no AI output was accepted as definitive. The team consistently applied slow, deliberate, and analytical cognitive thinking to interrogate AI-generated suggestions in relation to patient-reported data, biometric records, and specialist expertise. When AI proposed a finding, clinicians asked whether it was consistent with the patient's lived experience and whether the underlying evidence was of sufficient quality to justify clinical action.

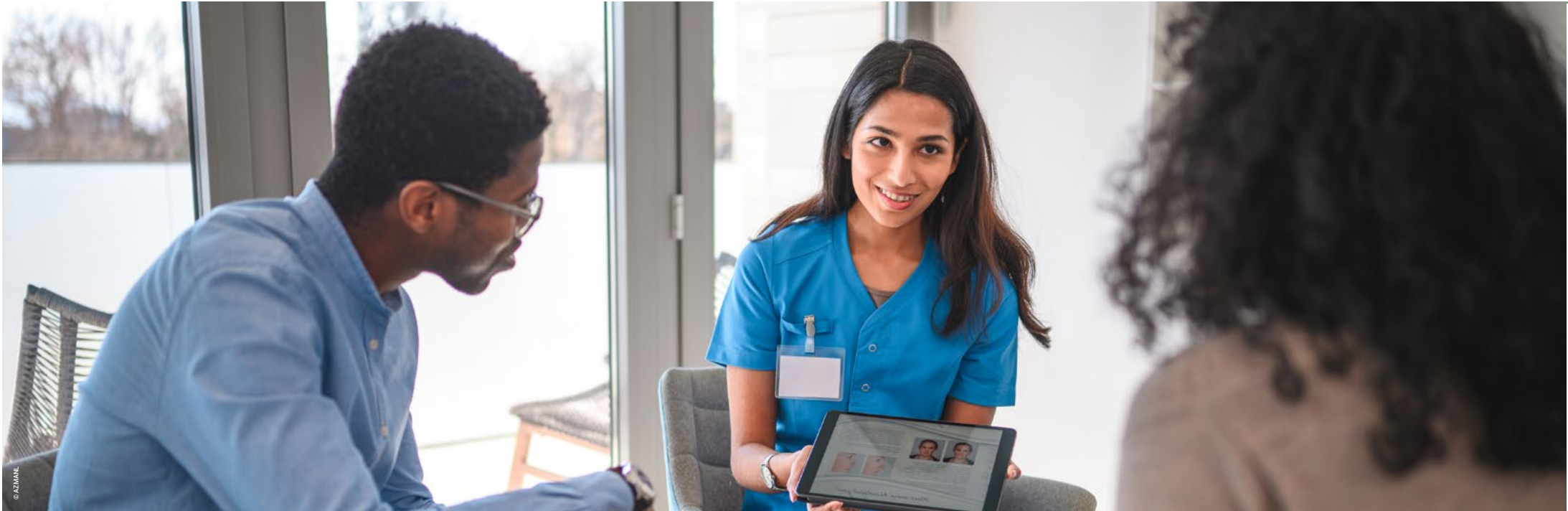
This represents a new cognitive frontier. Human value in AI-integrated healthcare does not lie in processing speed or information volume; it lies in the depth, contextual sensitivity, and ethical grounding of interpretive judgment. Professionals who can critique, contextualize, and collaborate around AI outputs will prove irreplaceable. Those who uncritically defer to them will not.

Pathways for development:

- **Healthcare Students:** Integrate AI as a formal participant in case-based learning discussions. Assessment criteria should reward both the effective use of AI-generated insights and the articulate identification of their limitations.
- **Healthcare Practitioners:** Introduce structured morbidity and mortality discussion forums that explicitly document how AI inputs shaped, and where necessary, were challenged within clinical decision-making.
- **Healthcare Policymakers:** Fund and standardize PaJR-style platforms that require transparent AI decision logs, creating institutional accountability for AI use and override.

2. DATA LOGGING, SENSEMAKING, AND PATIENT ADVOCACY

The second competency is quieter in profile but equally essential: the ability to co-create rich, longitudinal health records and derive clinically meaningful patterns from them. In an era characterized by continuous glucose monitors, wearable biometric sensors, dietary photo logs, and real-time symptom reporting, the challenge is no longer one of data scarcity. It is one of sensemaking.



The proliferation of AI in healthcare does not diminish the need for human competency; it raises the standard for what human competency must entail.



The PaJR case illustrates this in concrete terms. The patient's advocate logged hourly activities, meal photographs, blood pressure readings in multiple positions, and detailed symptom narratives across several months. This granular longitudinal dataset allowed the clinical team to correlate dietary intake with glucose trends, identify postural hypotension, resolve discrepancies between home and clinical monitoring devices, and ultimately construct the evidential basis necessary for the safe deprescription of multiple medications. None of this would have been achievable through a single outpatient consultation or a conventional electronic medical record.

Of particular significance is the transformation this process produced in the patient herself. The study describes her evolution from a passive recipient of care into what the authors term an epistemic contributor: an individual whose observations, annotations, and daily records actively shaped the team's clinical reasoning. She reported not only improved health outcomes but a renewed sense of agency, noting that she had regained a much better quality of life and the ability to manage her own daily activities. Data literacy, understood in this sense, is simultaneously a clinical skill and an act of empowerment.

Pathways for development:

- Healthcare Students: Design e-log projects requiring learners to coach simulated patient advocates, building competencies in structured data collection, longitudinal pattern recognition, and narrative interpretation.

- Healthcare Practitioners: Adopt journey-based records for inter-visit monitoring, particularly for patients managing multiple chronic conditions in resource-constrained settings.
- Healthcare Policymakers: Standardize secure, patient-annotatable digital platforms incorporating AI-powered data visualizations that render longitudinal health data interpretable for non-clinical users.

3. AI LITERACY, TOOL SELECTION, AND BOUNDARY-SETTING

The third competency addresses a challenge that will intensify as the AI landscape continues to diversify: the ability to identify which AI tool is appropriate for a given task, to deploy it with discriminating judgment, and to override it when clinical or ethical considerations require.

Not all AI systems are equivalent in design, training, or epistemic scope. The PaJR case demonstrates a sophisticated level of tool differentiation across the clinical team. Meta AI, accessed via WhatsApp, served rapid definitional and educational queries. ScholarGPT supported in-depth literature synthesis and the generation of diagnostic differentials. Perplexity addressed therapeutic clarification on specific clinical questions. ChatGPT handled translation and diagram generation. NotebookLM synthesized source materials

for academic documentation purposes. Each tool was selected based on a reasoned assessment of its comparative strengths, and none was treated as a universal authority.

This constitutes a new form of professional literacy – one that extends beyond tool familiarity to encompass a working understanding of each system's epistemological assumptions, training limitations, and conditions of unreliability. Equally important is the institutional confidence and professional authorization to override AI outputs when human judgment demands it. The study frames AI tools explicitly as dialogic partners that provide competing interpretations and reference points for human evaluation, rather than as final arbiters of clinical truth. This framing is one that every healthcare professional, educator, and policymaker would benefit from internalizing.

Pathways for development:

- Healthcare Students: Complete structured comparative exercises applying multiple AI tools to identical clinical cases, with formal reflection on output divergence and the conditions under which human override was warranted.
- Healthcare Practitioners: Develop institutional AI-use taxonomies and task-specific protocols that specify which tools are appropriate for which clinical functions and under what governance conditions.

- Healthcare Policymakers: Mandate human-in-the-loop governance frameworks for AI-assisted clinical decisions and commission dedicated research on patient AI rights, transparency obligations, and accountability standards.

FROM REPLACEMENT TO ORCHESTRATION

What the PaJR study ultimately demonstrates is that the proliferation of AI in healthcare does not diminish the need for human competency; it raises the standard for what human competency must entail. The three domains outlined above are not peripheral additions to professional training. They represent the emerging core curriculum for any individual working at the intersection of medicine, data, and technology.

Professionals who develop collaborative reasoning skills, longitudinal sensemaking capacity, and critical AI literacy will not be displaced by automated systems. They will become the indispensable orchestrators of participatory care, capable of something that no current AI system can replicate, holding the full complexity of a human life in view, and acting with wisdom, accountability, and compassion within it.



Can a Little Tech Ease the Burden on Nurses?

Profs. **Beste Kucukyazici** and **Vedat Verter, Smith School of Business**, Queen's University, share research that used real-time location system data and subsequent algorithms to improve nursing performance, reduce staff fatigue, and boost patient care.

Beste Kucukyazici & Vedat Verter



Groups like the Canadian Federation of Nurses Unions have been saying it for years: nursing shortages are a ticking time bomb.

In hindsight, the pandemic may have finally lit the fuse. A 2019 analysis suggested that Canada will be short 117,600 nurses by 2030. Two years later, health-care job vacancies in this country hit 100,300 — up 57 per cent from 2019. Canadian hospitals had the highest vacancy rate of any sector.

The reasons for the nurse exodus, particularly in hospitals, were spelled out in a Royal Society of Canada-funded study in 2022. It echoed many previous reports: Nurses are burnt out, dissatisfied and don't feel they are getting proper support.

Combine all of this with already stretched hospital resources, an aging population and growing patient-care complexity, and hospitals are now looking far and wide for any solution that will help ensure Canadians get the care they need.

PERFORMANCE AND EFFICIENCY WITHOUT SACRIFICING PATIENT CARE

One area getting more attention is called "nursing workforce management". It basically looks at how nurses in a hospital can be more efficiently deployed without sacrificing patient care.

In some cases, technology can lend a big hand with nursing workforce management. This doesn't completely solve nursing workforce shortages, but rather than having to throw a whole bunch of money at the problem, it could level the playing field for nurses and make it a bit easier for them.

Exhibit A comes from a recent study we co-authored with Dr. Pooya Hoseinpour, a research associate at Smith School of Business.

Using real-time location system (RTLS) data from a large tertiary hospital, we tried to develop algorithms that hospital managers could use to optimize nurse-patient assignment decisions and make the work of nurses more efficient. This is just one example of a growing interest in how technology can ease the health-care crunch in hospitals. And as with many proposed technological

changes, it required careful attention to the concerns, anxieties, and perceptions of those whose work it affected.

FOLLOW THE NURSE

Our study "Nurse Workload Balancing Using Real-Time Location Data" is currently being reviewed for publication in a leading academic journal. It looks at the daily decisions of nurse managers.

Every morning, these managers have one big question: How do they assign the existing and incoming patients to the nurses on the floor? Obviously one of the worst things they can do is to overload a nurse with too many patients.

It's also inefficient to give individual nurses too many patients that need a lot of attention or to make them walk long distances in hospitals to get from patient to patient. Helping these managers make good decisions about evenly distributing that workload is what this study was all about.

To begin, we partnered with the surgical department at Montreal's Jewish General Hospital. Using a RTLS installed throughout the department, we were able to track the movements of every patient, nurse and physician 24 hours a day for about 10 months. This allowed us to see when nurses were at patient bedsides, how long nurses provided direct care to each patient, and how much time nurses spent walking from patient to patient.

After months of crunching the data, we developed algorithms that could be used to significantly increase nurse workload equity. With these algorithms in hand, the results showed that the mean variation in total direct care was reduced by 47 per cent. In other words, the average difference between the direct care load on the busiest nurse and the least busy nurse went down by 47 per cent. Also, the variations in the walking distance for nurses and the number of assigned patients per nurse were shortened by 65 per cent and 30 per cent, respectively.

When used with a RTLS and patient data, these algorithms could be plugged into the decision support software used by a nurse manager. The resulting recommendations were to assign patients X and Y to nurse A, patient Z to nurse B, et cetera. It would predict that on a rolling basis every day or every shift given what had been happening with the patients.



If nurses, physicians and other hospital workers believe technological solutions will replace their jobs rather than complement their skills, those solutions are doomed.



BUYING INTO AI?

As promising as this study is, it's just one of an increasing number looking at how technology might help ease the health-care crisis in hospitals. The Healthcare Analytics Initiative at Smith School of Business investigates how data analytics techniques can be applied to improve health-care delivery.

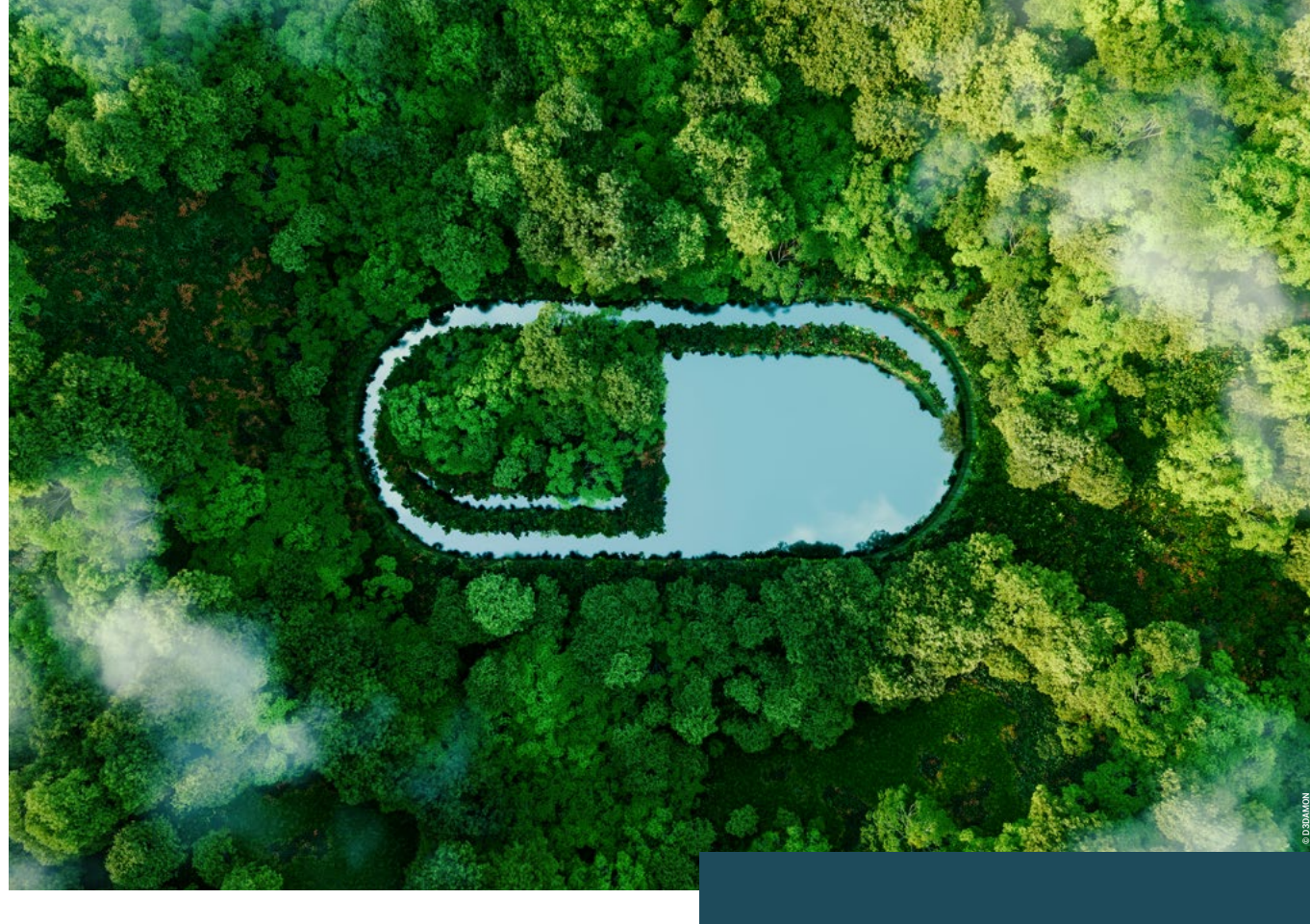
Hospitals currently seem to be particularly interested in the potential of artificial intelligence technology. One such example is a large hospital in Kingston, Ontario, where they are looking at how they can use generative artificial intelligence technologies to do some of their more mundane work. This may translate into AI drafting reports so that the physicians spend less time on paperwork every day and devote more of their time to direct care.

Whether hospitals will end up using AI to its fullest extent depends on the funds available to explore it. Indeed, AI-piloted tasks cannot operate without strong IT departments, and to have a strong IT department you have to have the budget. The widely recognized issue is that hospitals are already stretched thin.

The expanded use of technology in hospitals will also depend on how it's perceived by the people it affects. If nurses, physicians and other hospital workers believe technological solutions will replace their jobs rather than complement their skills, those solutions are doomed. We dealt with these concerns first-hand during our study at Jewish General Hospital. Worried about the RTLS, some nurses wondered if the study would be used to cut jobs.

We had to learn quite a bit about change management, and we had to have quite a few meetings with the nurses to reassure them. But it was a good lesson in that, yes, technology can be quite efficient and useful. But then there's the human component. And to the extent that you ignore that, there's no way you're going to launch your technology successfully.

As researchers and academics, we are cautiously optimistic that technology will make a big impact on the challenges that hospitals face. We believe that there are lots of these potential pockets of excellence, but change is uncomfortable. In this light, there's a lot more work to do to go from those pockets to across the entire system. We remain hopeful, however, big changes can indeed happen.



Is Precision Medicine Worth It?

Karine Lamiraud & Julien Patris



Karine Lamiraud, Professor of Health Economics and holder of the **Chair of Innovation and Health** at **ESSEC Business School**, and **Julien Patris**, external lecturer at ESSEC Business School, explore how advances in genomics, biomarkers, and AI are accelerating precision medicine adoption while raising new economic questions.

WHAT ARE “PRECISION MEDICINES”?

Precision medicines are not simply more advanced drugs. Rather, they represent a shift toward more specific mechanisms of actions to better serve some specific patient subpopulations where conventional therapies tend to be less precise. They share three defining features. The first one is *biological specificity*. They target precisely defined mechanisms or distinct patient groups instead of broadly managing symptoms. The second one is *platform logic*. A single scientific platform can generate multiple applications across diseases, creating economies of scale that challenge the assumption that targeted therapies must always be more expensive. The third one is *lifecycle expansion*. Their full clinical and economic value often emerges over time as new indications are identified, real-world evidence accumulates, and R&D and manufacturing processes become more efficient and less risky.

An example of precision therapies is gene therapy in the context of rare disease. Examples include Zolgensma (Onasemnogene abeparvovec) and Spinraza (Nusinersen) in Spinal Muscular Atrophy, Casgevy (Exagamglogene autotemcel) or Lyfgenia (Lovotibeglogene autotemcel) in Sickle Cell Disease, Zynteglo (beti-cel) in Beta-Thalassemia, Luxturna (voretigene neparvovec) in Inherited Retinal Disorders.

Another example of precision therapies is CAR-T cell therapy in the treatment of cancer that affects blood cells. RNA-based therapies represent another important category. RNA interference (RNAi) therapies, such as Onpattro (patisiran) for hereditary transthyretin amyloidosis and Leqvio (inclisiran) for hypercholesterolaemia, silence disease-causing genes with high specificity. Messenger RNA (mRNA) technology, validated at unprecedented scale through COVID-19 vaccines, is now being explored for personalised cancer vaccines and rare genetic disorders.

HOW ARE PRECISION MEDICINES DEVELOPED?

Because they function as adaptive platforms, precision medicines are developed in a specific way. Developers typically start where clinical uncertainty is lowest and unmet medical need is highest, most often in rare,

severe, or specialized genetic diseases. As biological confidence in the platform increases, the technology is then expanded into broader disease areas. This process involves overcoming three distinct risk types.

Platform risk asks whether the underlying biomolecular technology works safely at all. Translation risk questions whether an observed biological mechanism will actually translate into a measurable clinical benefit for the patient. Finally, scale risk determines whether success in a narrow, rare indication can successfully extend to other diseases with similar pathophysiology.

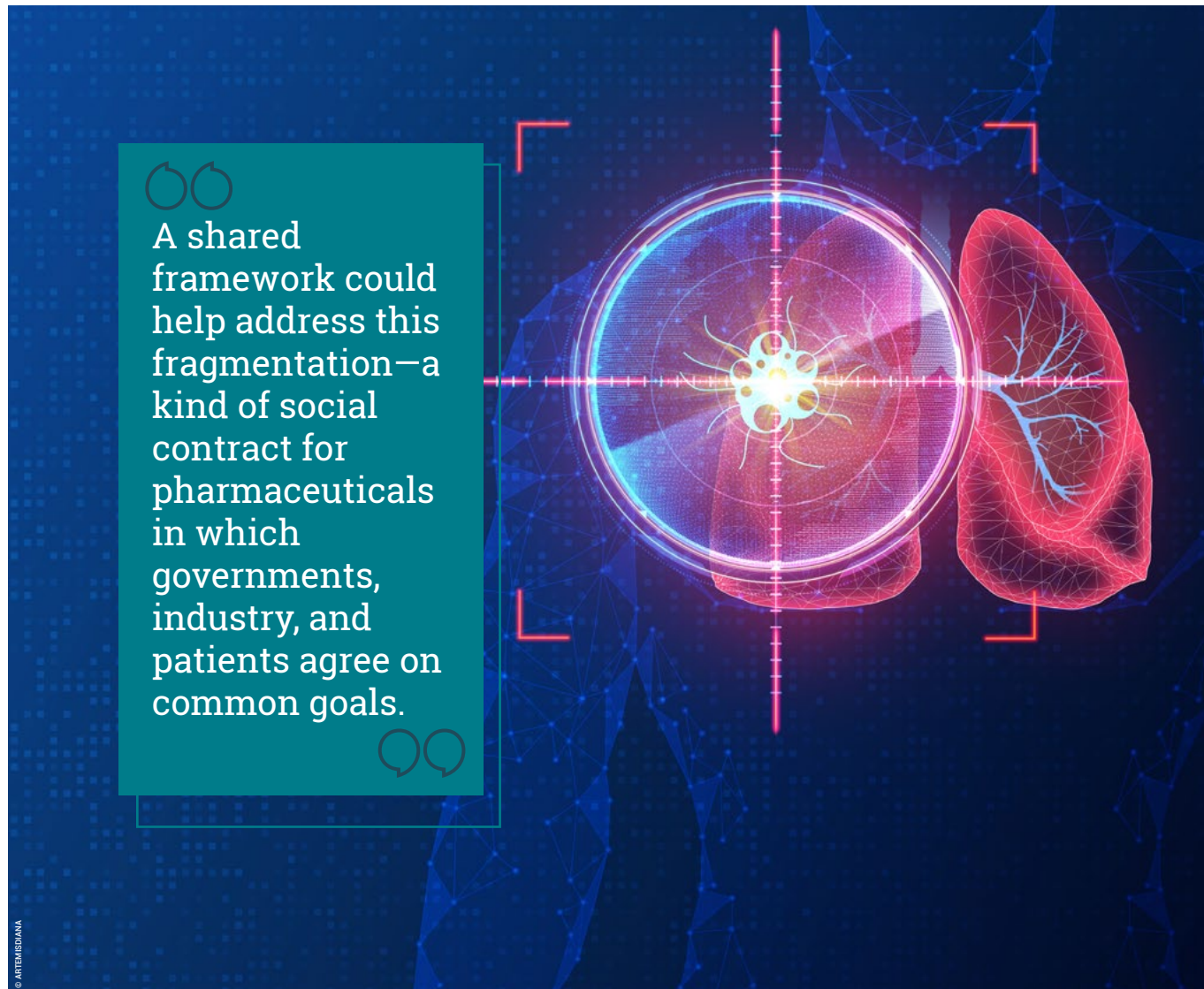
To what extent are advances in genomics, biomarkers, and AI accelerating precision medicine development?

Improvements in scientific and technological inputs do not necessarily translate into proportional gains in drug development productivity or clinical success (Scannell et al., 2012). The impact of advances in genomics, biomarkers, and AI on the development of precision medicine depends on whether they improve predictive validity and clinical decision-making, a bottleneck that remains a central challenge for precision medicine.

WHAT ARE THE EFFICACY AND COSTS OF PRECISION MEDICINE?

The clinical benefits of precision medicine can be substantial. These therapies may address patient populations for whom no treatment was previously available, and in some cases may be curative. For example, in a pivotal study of Kymriah (tisagenlecleucel) in pediatric and young adult patients with relapsed or refractory acute lymphoblastic leukemia, 82% achieved remission within three months, and estimated relapse-free survival among responders was 62% at 24 months.

The cost of precision medicine can also be substantial. Because precision medicines are expensive to produce, they often enter the market at significantly higher prices than conventional treatments. Some precision medicines have entered the market with public prices with six- or seven-digit figures. For example, when Zolgensma (onasemnogene abeparvovec) was launched in the United States in 2019, it was priced at approximately US\$2.1 million per patient, making it the most expensive therapy ever brought to market at that time.



The “value for money” of precision medicines has been assessed through formal economic evaluation studies. These so-called cost-effectiveness analyses compare the benefits and costs of these new therapies against standard care, typically determining the cost per quality-adjusted life year (QALY) gained. These analyses measure whether the benefits of the drugs outweigh the cost. The majority of studies suggested that precision medicine interventions are cost-effective compared to usual care (Kasztura et al., 2019; Zhang et al., 2026).

WHAT ARE THE MAIN MARKET CHALLENGES?

However, access to precision medicine is highly uneven and lagging, especially outside the US. Over half of new drugs are launched first in the U.S. before being launched

in other countries, with an average lag of about one year between launch in the U.S. and launch in another country (Mulcahy, 2024). Regarding reimbursement, only 48% of approved CAR-T indications receive public reimbursement across G20 countries (Ge et al., 2026). Access also varies widely within European countries, as shown for CAR T-cell therapies (Tan et al., 2026) where France, Germany, and Switzerland had the fastest time to reimbursement decision.

Furthermore, there have been many cases of market failures. For example, Glybera (alipogene tiparvovec), a one-time treatment for patients with familial lipoprotein lipase (LPL) deficiency, was the first approved gene therapy in Europe (EU, 2012). It was withdrawn from EU market in 2017 after only a handful of patients had been treated. It is frequently referred to as the first gene therapy that died because the system could not absorb it.

WHY DO EXISTING REGULATORY AND HTA SYSTEMS STRUGGLE?

Healthcare systems generally operate under annual budget constraints. Thus, they are ill-equipped to absorb large upfront costs for treatments that may generate economic savings decades later.

Furthermore, existing regulatory and Health Technology Assessment (HTA) systems were constructed to evaluate traditional drugs. Structurally, pricing regulations typically rely on single-indication assessments. In most health care systems, approving a medicine for a second indication usually triggers a mandatory downward price cut for the entire molecule, regardless of the clinical value the new indication provides. In addition, HTA frameworks often demand static evidence snapshots—requiring hard clinical endpoints over long durations to make binary, yes-or-no reimbursement decisions.

This framework is not adapted to the reality of precision medicines, which are inherently multi-indication and feature evidence bases that evolve over time. Because precision medicines target rare or newly understood conditions, initial data may be limited, but uncertainty is actively reduced over time as real-world evidence and patient registries supplement initial clinical trials.

This penalty is compounded by international reference pricing (IRP): a price reduction granted in one country can spill over into other markets through external reference-pricing mechanisms, further disincentivizing indication expansion, particularly in smaller or lower-income countries.

HOW COULD HEALTHCARE SYSTEMS EVOLVE?

Several possible evolutions have been discussed, drawing on emerging contractual innovations, pricing mechanism reforms, process improvements, and broader ecosystem thinking.

Multi-Year Multi-Indication (MYMI) Agreements

Multi-year multi-indication (MYMI) agreements can be a useful tool for addressing the multi-indication penalty. These are holistic arrangements covering both current and future indications over several years, with pre-agreed pricing tiers and evidence-generation obligations (Armstrong et al., 2025). The concept was first piloted in Belgium and the Netherlands in 2017 for PD-(L)1

checkpoint inhibitors in oncology. Evidence suggests that Belgium’s MYMI scheme accelerated access by more than 550 days compared to conventional single-indication procedures, while the Dutch model reduced average time to reimbursement from approximately 308 to 75 days (Armstrong et al., 2025). Denmark has since adopted similar arrangements. As multi-indication medicines expand beyond oncology into immunology and inflammation, the MYMI model may offer a scalable framework, though its success depends on data infrastructure, horizon scanning, and governance capacity (Maes et al., 2023).

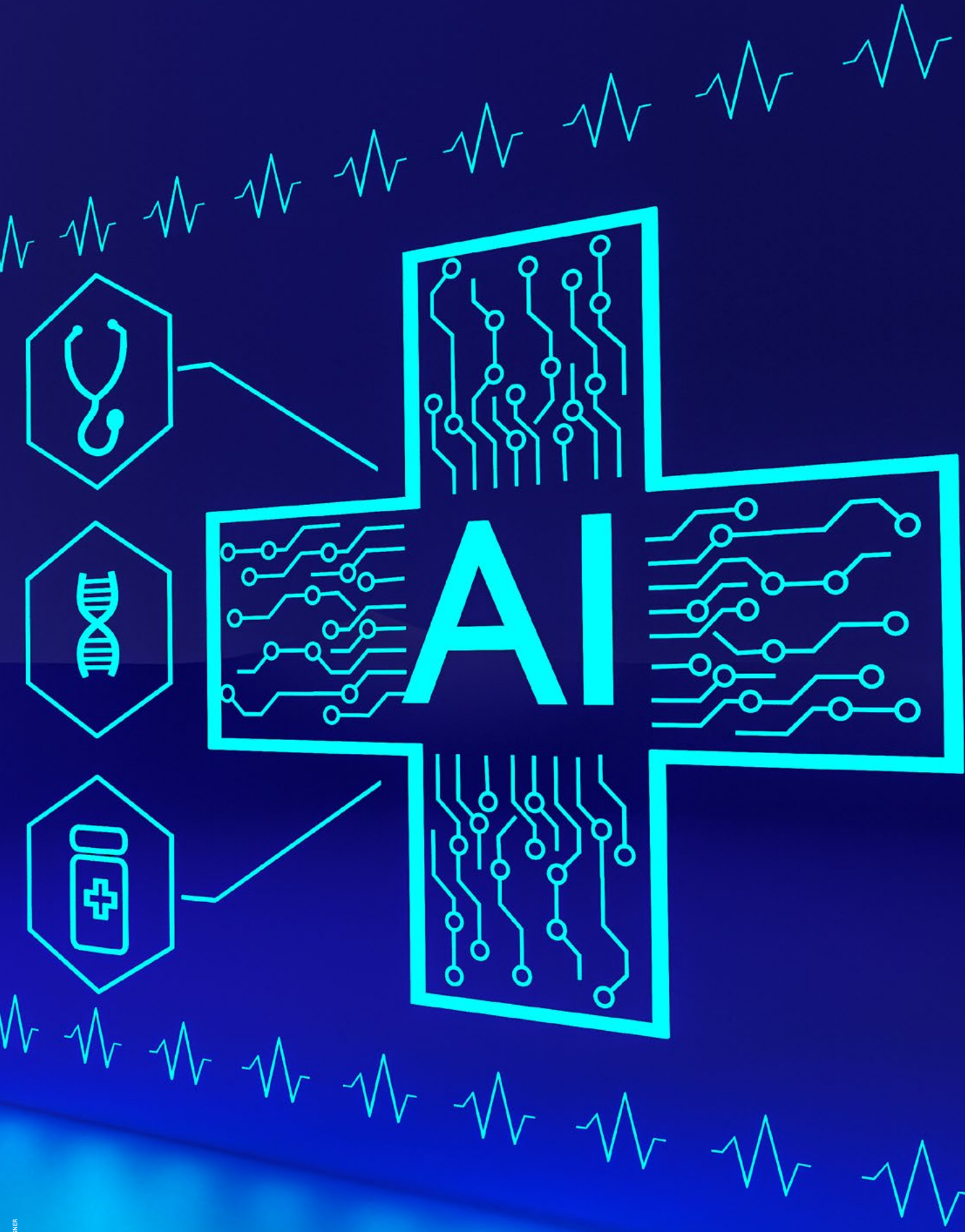
Lifecycle Dynamic Pricing (LDP)

LDP is one mechanism within a broader toolkit. Rather than setting a static launch price, healthcare systems could temporarily accept higher prices for innovation, accompanied by pre-agreed periodic price revisions triggered by time, accumulation of new evidence, or the addition of new indications. LDP acknowledges that the value of precision medicines is revealed progressively and that pricing should evolve accordingly.

Value-Based Negotiation Frameworks (VBNF)

Beyond contractual and pricing mechanisms, the process of negotiation itself could evolve. Current negotiations between manufacturers and payers are often adversarial: each side pursues its preferred position without systematic identification of shared concerns or structured alignment on priorities. This adversarial dynamic produces longer negotiation timelines, higher implementation burden, and suboptimal outcomes for patients.

A Value-Based Negotiation Framework (VBNF) has been proposed to address this process failure (Whittall et al., 2022). The VBNF is a stepwise process that systematically identifies and prioritises evidential and affordability concerns from both manufacturer and payer perspectives, then selects mutually acceptable managed entry agreement terms that address priority risks with the lowest possible implementation burden. The framework assumes that existing financial and outcomes-based tools are sufficient, but that their use is constrained by a lack of structured negotiation processes. Experimental evidence supports this idea, showing that better outcomes can be achieved when negotiators start from shared criteria or explicitly communicate priorities (Lamiraud et al., 2024), although most of the additional value appears to accrue to buyers.



Toward an Ecosystem Approach

If we look across Europe, most countries negotiate drug prices in much the same way: by seeking to drive prices as low as possible. Yet when it comes to precision medicines, this approach creates a problem. If the main objective is simply to pay less, the system provides no clear signal about the kinds of innovation society values and is willing to pay. Price should not be treated merely as a cost; it should reflect societal priorities and help steer investment toward the treatments patients need most.

At present, no one in Europe is responsible for ensuring that access and innovation work together. Each of the 27 EU member states negotiates independently with global pharmaceutical companies, without a shared strategy or common objectives.

A shared framework could help address this fragmentation—a kind of social contract for pharmaceuticals in which governments, industry, and patients agree on common goals. By aligning regulation, investment incentives, and pricing mechanisms around a shared purpose, Europe could enable fair access and cutting-edge innovation to advance hand in hand—not as competing priorities, but as complementary outcomes of a smarter system.

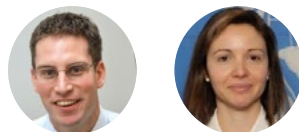
REFERENCES

- Armstrong, H., Petrova, A., Wilsdon, T., Homoki, H., Roediger, A. (2025). Multi-Year Multi-Indication Agreements for Supporting Patient Access to Oncology Medicines with Multiple Indications. *Journal of Market Access & Health Policy* 13(1), 2.
- Ge, A.Y., Feldman, W.B., Kaiser, M.F., et al. (2026). Global access to commercial CAR T-cell therapies: a cross-sectional study of health technology assessment across the G20 countries. *Blood* 147 (14): 1521–1531.
- Kasztura, M., Richard, A., Bempong, N.E., Loncar, D., Flahault, A. (2019). Cost-effectiveness of precision medicine: a scoping review. *International Journal of Public Health* 64, 1261–1271.
- Lamiraud K, Patris J, Vranceanu R (2024). Can attentional nudges improve efficiency of bilateral multi-attribute negotiations? *Journal of Behavioral and Experimental Economics* 110, 102205.
- Maes, I., Kok, E., De Torck, P.J., Mestre-Ferrandiz, J., Simoens, S. (2023). Not one, but many: developing a multi-indication pricing model for medicines in Belgium. *Frontiers in Pharmacology* 14, 1199253.
- Mulcahy, A.W. (2024). Comparing New Prescription Drug Availability and Launch Timing in the United States and Other OECD Countries. *Rand Health Q* 11(3):4. PMID: 38855389; PMCID: PMC11147638.
- Scannell, J.W., Blanckley, A., Boldon, H., Warrington, B. (2012). Diagnosing the decline in pharmaceutical R&D efficiency. *Nature Reviews Drug Discovery* 11, 191–200.
- Tan, Y.Z., Breislin, E., Woods, M., et al. (2026). Time to access matters: patient gains from faster CAR T-cell reimbursement in Europe. *J Med Econ.* 29(1):481–497.
- Zhang, Y., Lin, Z., Teerawattananon, Y., et al. (2026). The value for money of artificial intelligence-empowered precision medicine: a systematic review and regression analysis. *npj Digital Medicine* 9,78. <https://doi.org/10.1038/s41746-025-02259-w>
- Whittall, A., Jommi, C., De Pouvourville, G., Taylor, D., Annemans, L., Schoonaert, L., Vermeersch, S., Hutchings, A., Patris, J. (2022). Facilitating More Efficient Negotiations for Innovative Therapies: A Value-Based Negotiation Framework. *International Journal of Technology Assessment in Health Care* 38(1), e23, 1–8. doi:10.1017/S0266462322000095



Advancing Planetary Health Inspired Management Approaches for Improving Human Health Outcomes and Environmental Sustainability

Fred Dahlmann & Ana Raquel Nunes



Prof. **Fred Dahlmann, Warwick Business School**, and Prof. **Ana Raquel Nunes, Warwick Medical School**, suggest adopting a planetary health lens to enable business to address multiple interconnected issues.

Related research: Dahlmann, F. and Nunes, R., 2026. Managing with a planetary health lens: how business can create co-benefits for ecological sustainability and human well-being. *Corporate Governance: The International Journal of Business in Society*, pp.1-16. <https://doi.org/10.1108/CG-08-2025-0530>

HEALTH AND SUSTAINABILITY AS INTERCONNECTED BUSINESS CHALLENGES

Health matters to all of us but it is not just an individual concern. While our inherited DNA has a huge influence, there is growing evidence that health is also strongly shaped by a range of societal factors. In fact, many factors play a critical role in affecting our health, which the WHO conceives as encompassing physical, mental, and social well-being rather than merely the absence of disease.

Public health researchers and practitioners have long called for greater engagement with the social determinants of health. These include, for example, the conditions in which people are born, grow, live, work and age as well as their access to power, money and resources. More recently, however, research has additionally stressed the increasingly negative impacts of a deteriorating natural environment on our human health. In response, there are calls for integrating all these concerns under the umbrella term of *planetary health*.

This perspective also shines a light on the private sector as key driver of many of such effects and outcomes, and especially their impacts on both human health and environmental sustainability. Yet traditionally, this subject has been largely approached in disciplinary and functional silos, treating health as a precondition for organisational success and economic prosperity. As a result, we lack a common understanding of how organizations can recognise their role in affecting all types of health outcomes and purposefully contribute to them in positive ways.

Importantly, the healthcare sector sits uniquely at a junction where its core purpose is to address human health issues and concerns, yet due to its size and scale of activities, it also finds itself challenged to address the very significant environmental impacts caused by its operations – a fact that has been recognised by leaders in the UK's NHS which in 2020 became the world's first national health system to commit to net-zero emissions by 2045, explicitly because of the threat climate change poses to patient health.

Here we argue organizations generally, and especially the healthcare sector, must recognise and integrate their approaches to managing their engagement with both human health and the natural environment. Specifically,

we propose that adopting a planetary health lens entails organizational efforts to achieve, or at least contribute to, a state of physical, mental and social well-being within the ecological constraints provided by sustainability. These constraints include planetary boundaries relating to climate change, loss of biodiversity, changing water cycles, and emergence of other pollutants such as "forever chemicals".

OVERCOMING SILO-BASED APPROACHES TOWARDS SOCIAL AND ENVIRONMENTAL ISSUES

By shifting managerial attention to addressing both health and sustainability together, organizations can potentially develop stronger and more effective approaches that overcome the tendency to perceive different stakeholders and beneficiaries in isolation. For instance, on the one hand, common business approaches include corporate social responsibility efforts such as concerns for employee health, safety and wellbeing. On the other hand, corporate sustainability efforts entail separate responses to global environmental challenges such as greenhouse gases, waste, and pollution.

Similarly, the widely adopted framework of ESG identifies a range of metrics and indicators of relevance to both nature and humans, but again treats these as distinct organisational outcomes. Likewise, the triple bottom line model offers managers a lens for accounting for their business impacts on people, planet and profits, but this also often results in practical challenges when reconciling these three different pillars. For managers, this raises tough questions about how to effectively respond to these diverse issues and concerns.

A planetary health approach, by contrast, at least partially offers organizations an opportunity to reflect on the important interconnections between human health and sustainability. Importantly, recognising health as an important nexus concept allows connecting the physical and mental wellbeing of employees and all other stakeholders with the need for counteracting widespread environmental degradation. As such, a planetary health lens inherently encourages leaders to consider the potential spillover effects and co-benefits for both people and planet.



Planetary health inspired approaches provide a potentially impactful lens for bundling organisational choices and decisions in ways that create multiple benefits for human health and environmental sustainability.



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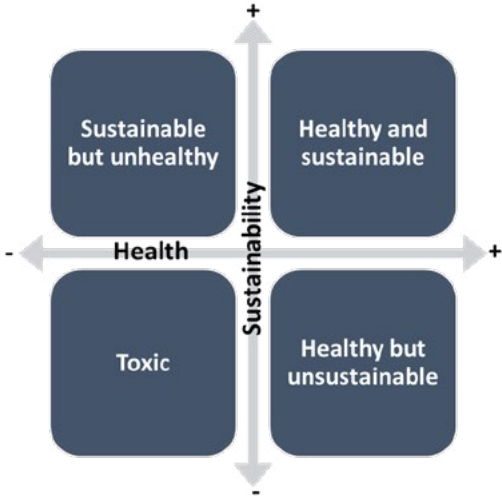
KEY CONSIDERATIONS FOR MANAGING WITH A PLANETARY HEALTH LENS

Adopting a planetary health lens requires an integrated approach that stretches across different functions and practices. They include considerations on organizational purpose, strategic orientation, choice of inputs and design, decisions on processing and especially pacing, as well as relationships with people and nature more broadly.

For most organizations, the purpose of their existence is shaped strongly by underlying industry and sectoral factors, product and service offerings, as well as ultimately owner and investor considerations. While most of these are broadly unchangeable in the short term, a planetary health perspective calls on directors and executives to reflect on and integrate wider systemic health considerations into organizational concerns.

Naturally, there are tensions and trade-offs. For some industries planetary health is difficult to reconcile with their business models. For others, and especially the healthcare sector, a more deliberate focus on supporting the health of all life and systems can potentially provide stronger alignment between the commercial business goals and a wider justification for organisational existence.

In practice, such orientations require strategic choices regarding how value is created and for whom. While many existing efforts aim to make things "less bad", a planetary health approach encourages organizations to go beyond mitigation efforts and instead consider societal restoration and ecological regeneration as central strategic ambitions through which value is created. Importantly, such a positioning has to extend beyond the organization to capture and incorporate similar considerations for all value chain partners including suppliers and customers in order to be coherent.



MAKE IT CIRCULAR, SIMPLE, AND DECELERATED

Beyond their strategic direction, the sourcing and integration of key inputs such as raw materials, commodities and other supplies offer opportunities for creating positive planetary health impacts. Ideally, these choices are made on the basis of selecting natural, circular and renewable resources to avoid pollution and toxicity which directly and indirectly harm the health of humans and other species. For example, as part of the NYC Health + Hospitals' Plant-Based Lifestyle Medicine Program, dietitians prescribe plant-forward eating to treat chronic disease — the same shift that, at scale, reduces the emissions tied to livestock production. Elsewhere, drawing on biomimicry and nature-based solutions can offer further new avenues for product and service design and innovation that reflect an integrated planetary health consideration. In essence, the aim is to identify and implement single decisions that have dual or even multiple (co-)benefits.

Moreover, organisational processes strongly influence human wellbeing when combined with reflections on how and why businesses operate in the way they do. While speed, agility and efficiency have a role to play in avoiding waste and administrative complexity, increasingly, new business models and sectors are starting to emerge that value deliberate deceleration in organisational processes and simplicity of offerings.

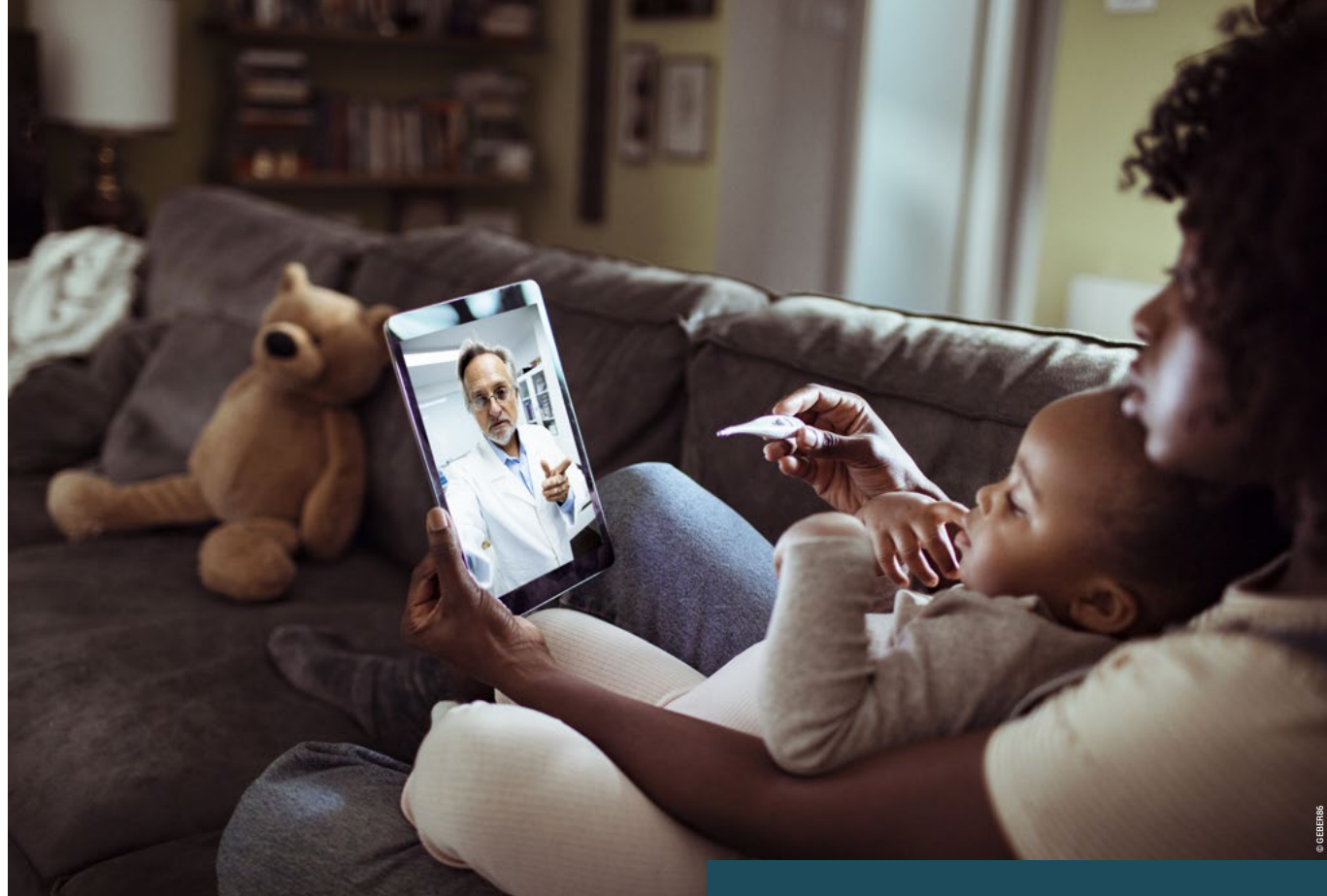
Often these emphasise quality and mastery of products and production, or even reward "digital detoxification" in recognition of both human and environmental health impacts. With growing geopolitical and technological disruption companies are forced to reevaluate the benefits of operational redundancy and resilience which themselves can be sources of restoration and regeneration.

THE POWER OF EMPATHY AND ALTRUISM

Ultimately, relationships lie at the heart of these emerging approaches in ways that transcend purely transactional commercial interactions. Organizations that integrate planetary health aim to incorporate the interests and concerns of humans and other life forms through empathic management and biophilia (i.e. recognition of humanity's innate connection to other species and the environment). Doing so unlocks their ability to create value for a range of stakeholders simultaneously, rather than seeking to address individual concerns in isolation.

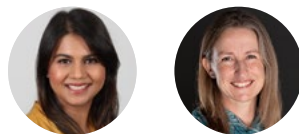
Organizations in all sectors are struggling to make sense of and navigate a wide range of complex issues and challenges. The healthcare in particular has to recognize that despite its benevolent services and offerings, it too contributes to widespread ecological degradation. Planetary health inspired approaches provide a potentially impactful lens for bundling choices and decisions in ways that simplify justification and create strategic coherence and benefits.

While many other issues and challenges persist, organizational leaders should recognise their role as embedded actors with strong direct and indirect impacts on both human health and environmental sustainability. More research is needed to strengthen the evidence base and provide advanced guidance but a planetary health lens can serve as a foundation for novel and impactful management approaches and practices.



E-Referrals: What is the impact on South Africa's healthcare ecosystem?

Tasneem Motala & Natasha Blanckenberg



Researchers **Tasneem Motala** and **Natasha Blanckenberg**, of **Stellenbosch Business School**, analyse the effect of Vula – the smartphone medical app – upon a developing country's healthcare system.

Related research: *Facilitating remote access to specialist medical expertise through the scaled-up adoption of a smartphone application: A South African case*, South African Medical Journal, DOI: 10.7196/SAMJ.2022.v112i2.15799

THE BIG DISPUTE: HEALTHCARE IN DEVELOPED VS DEVELOPING COUNTRIES

South Africa as a country has come a long way since post-independence days and has managed to rebuild its healthcare system where necessary. However, as an emerging nation, providing public healthcare to a large population doesn't come easy while specialist expertise and care are evidently scarce. With the Western Cape Government Health Department declaring **Vula** – an electronic referral application – as the main communication tool for medical experts, can this technology be considered a breakthrough in South African public healthcare?

Many countries have experienced progressive growth in the healthcare system with the use of referrals, but e-referrals are still a novel invention for developing regions. With the advancement of technology, healthcare has observed a revolutionised shift. However, globally, there are many countries still wading through obstacles to fix their healthcare system.

While healthcare is expensive as it is, when spiced up with high-tech appliances and innovations, the bills aren't cheap. Unfortunately, it's just the countries with already developed healthcare arrangements that afford the advancement faster than most, and the middle-to-lower income countries keep mending their medical services in their own budgeted way.

Zeroing in on the diverse country of South Africa, which carries with it a hefty concern of social, wealth, and health inequality since and before its independence, it has been tirelessly working to improve its healthcare ecosystem. With a population of almost 60 million people, South Africa's public health services are based on a primary health care (PHC) model which serves approximately 85% of the population. Expert and professional care for severe conditions aren't easily found and the rising population of the country is taking a toll on healthcare workers.

However, according to past studies, the concept of a referral system, which is when medical professionals can refer the patient to another specialist doctor and help them find the right kind of treatment quickly, has been very impactful. Studies narrow down on topics such as maintaining demand for referrals or improving the quality of referrals provided. Currently, with the increasing usage of e-referrals systems, studies have wandered towards the efficiency of the new web service.

As most of this research has been conducted in well-resourced countries like the UK, the USA, Canada, and other parts of continental Europe, there is a large chasm regarding the widespread and effective online communication practice for medical referrals in developing countries.

ABOUT VULA: THE E-REFERRAL APP

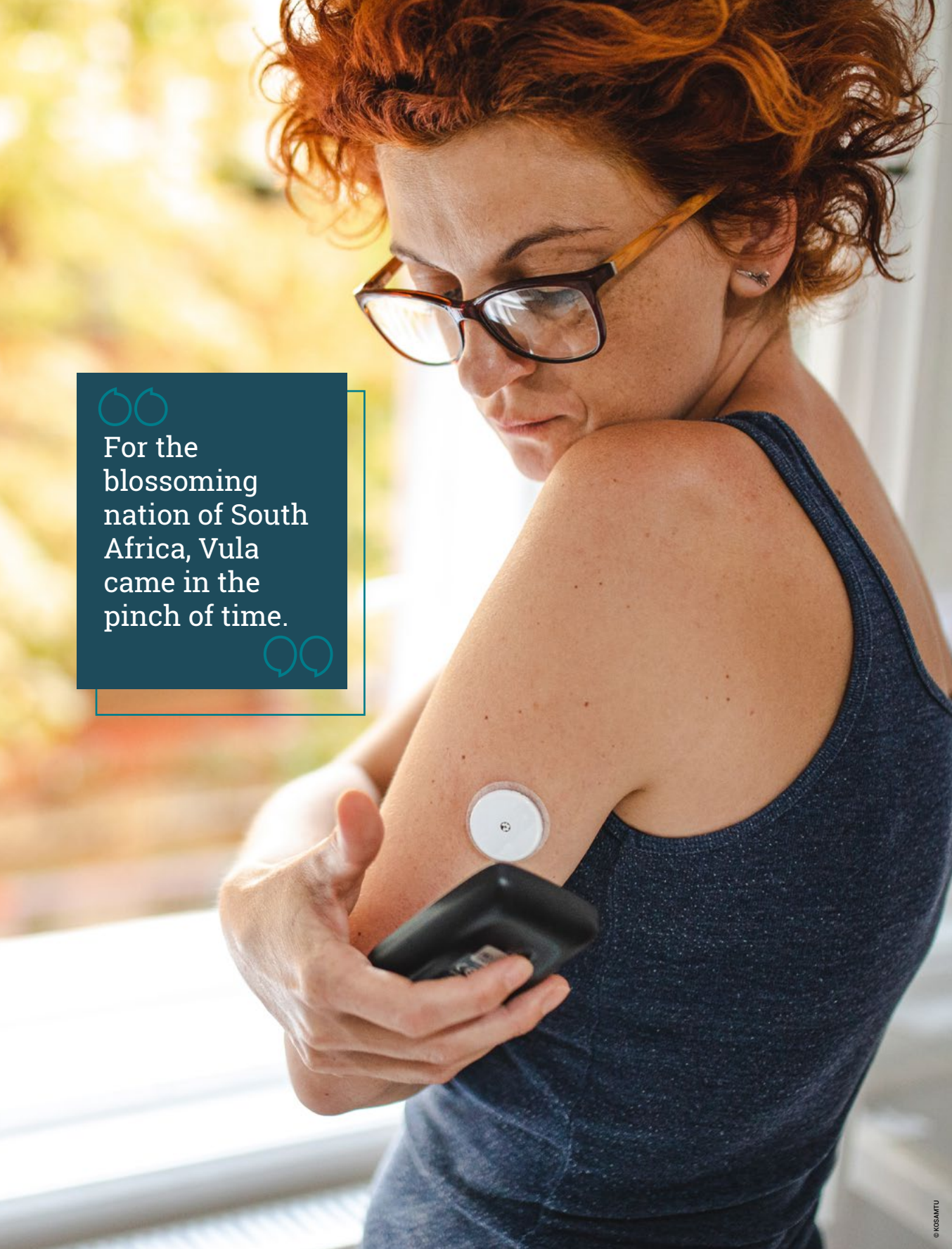
In 2018, Western Cape Government Health (WCGH), the primary healthcare provider in South Africa, announced the mobile e-referral application – **Vula** – as the principal media to issue referrals for medical experts. Officially launched in 2014 to amend the scarcity of medical specialists, this referral app was created to benefit the public health service in South Africa. Vula was a starting point for tech being actively used alongside healthcare and as a modern innovation in the market, but its prospective impact was still unknown.

As this application had the scope to make a large difference in the South African health sector, researchers Natasha Blanckenberg and Tasneem Motala believed understanding the functionality and usage of Vula is key to further discussing its impact and thus conducted a descriptive study of the application.

WHEN TECHNOLOGY MEETS HEALTHCARE

Using Vula's Mobile database, the researchers carefully categorised the data received and dug deeper into understanding how doctors have been using the e-referral application.

First and foremost, versatility shines out to be Vula's key strength as it is favourably used for both acute and non-urgent cases. This is rare, as most electronic case reporting technologies in the past solely served the purpose of non-urgent cases. What's more, Vula is a one-of-a-kind smartphone application that victoriously progressed past the pilot phase, while being an application exclusively created to ease out the referral process on a large scale in a middle-income country. The dyad benefit that Vula further brings along is its expedited response time experienced by receiving doctors, and secondly, with the rise of emergency medicine, Vula is as apt as it could get in terms of sending and receiving e-referrals for specialty doctors.



For the blossoming nation of South Africa, Vula came in the pinch of time.

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It bridges the gap between doctors and creates an effortless direct connection between the referring doctor and the relevant specialists, which even allows them to share pictures securely and progressively leading to reduced time, as compared to the previous non-electronic ways. Vula also personalised the whole experience for doctors to follow up on patients, while providing the correct guidance concerning their cases. Furthermore, Vula makes itself even more desirable and grabs the title of a demand management tool by reducing the burden of work on healthcare workers and screening the referrals sent and received by doctors to check for their intactness, suitability, and level of urgency.

Moreover, Vula was more than just a shift in using smartphone applications for medical purposes in South Africa. It brought along with it a cultural and mindset drift that increased trust, not only in referring and specialist doctors but also in patients. Specialist knowledge has also been a severe need, and as Vula partially solves this big issue, doctors haven't held back in using the application as it serves the purpose of getting their patients the right care.

KNIGHT IN SHINING ARMOUR – CHANGING THE MEDICAL SPHERE THROUGH E-REFERRALS

Vula won the hearts of South African healthcare workers as it showcased how well it serves its vital purpose of being an inter-communicative and co-dependant medical advisory platform. In today's day and age, even Primary Care Physicians (PCP) can manage patients at the centres where they seek help, while walking hand-in-hand with the exceptional knowledge of specialists through Vula. This eased the whole in-person consultation process with specialists, especially for cases that aren't highly pressing. Throughout the pandemic too, the need for the application only increased as it assisted in safely conducting social distancing measures with the reduced mobility at the time.

Apart from being a critical player in clinical care and assisting patient-oriented supply networks, Vula plays a major role as a large-scale single database that helps track referrals, their patterns, and types. Moreover, it examines the level of the caseload that the virtual consultation provides throughout this service. This previously-unknown data wasn't prominently present in healthcare organisations, especially when the internet was absent.

DIGITAL INNOVATION DRIVING GROWTH IN HEALTHCARE

The referral process in specialist departments in the country took a large leap from previously being conducted through telephone calls and other applications like WhatsApp to now being securely and swiftly sent through Vula. Vula's usage in South Africa exhibits that even across a large number of people, in a country with fewer resources, if technology is used in the right areas, it doesn't necessarily have to be an expensive technological advancement to make a large difference.

For the blossoming nation of South Africa, Vula came in the pinch of time and moderated the communication process between referring and receiving doctors, without the need for any other technological intervention. The application proved its necessity and eminence in the healthcare sector and claimed its rightful place in three spots – as a demand management tool, a consulting platform, and an e-referral service.



Delivering Inclusive Healthcare in India: Three innovative models

Sourav Mukherji



Prof. **Sourav Mukherji, IIM Bangalore**, explores three innovative healthcare organizations in India which through an operating strategy of accessibility, availability and affordability may serve as models for inclusive health around the world.

Related research: This article is based on the chapter Inclusive Healthcare from my book *Inclusive Business Models: Transforming Lives and Creating Livelihoods*, (2021, Cambridge University Press).

THE CHALLENGE OF INCLUSIVE HEALTHCARE IN INDIA

Despite decades of economic growth and health policy reforms, delivering inclusive healthcare across India remains a formidable challenge. Large segments of the population, particularly in rural and semi-urban areas, face significant barriers in access, *affordability*, and *availability* of healthcare services. These barriers lead not only to unmet medical needs but also to financial hardship and impoverishment for vulnerable households. Professor A. Krishna's study on stage of poverty across the world¹ indicated that medical expenditure was the most dominant reason for households to become poor or remain trapped in poverty.

In India, access to care varies starkly by geography. Surveys indicate that only about 10% of the rural population in India have access to healthcare within a 10 km radius, and roughly 15% report a doctor's clinic within a 5 km distance². With approximately 65% of India's population living in rural areas, these gaps highlight why millions find it difficult or impossible to access good quality healthcare.

The structural origins of these inequalities are low public spending on healthcare relative to need, uneven distribution of facilities and workforce, and a heavy reliance on private providers. Together, these system characteristics mean that inclusive healthcare requires deliberate design so that it is financially sustainable and requiring less dependency on public finance or charity.

This article is based on our research on three Indian healthcare organisations who have, over the past decades, developed healthcare delivery models that collectively reveal how inclusive healthcare can be operationalised and made financially viable. These are Vaatsalya Hospitals, Aravind Eye Care, and Narayana Health. Each of them started to focus on one of three distinct dimensions of inclusion – *Accessibility*, *Availability*, and *Affordability* – and evolved to address the other two dimensions. We believe these case studies offer important insights for practitioners and policymakers

whose intention is to create inclusive healthcare systems at scale.

VAATSALYA HOSPITALS: IMPROVING ACCESSIBILITY

Founded with a mission to serve patients in underserved towns, Vaatsalya Hospitals recognised that many Indian households cannot reach quality healthcare in a timely manner because of India's urban centric healthcare model. Traditional healthcare infrastructure was concentrated in major cities, leaving rural and semi-urban populations dependent on distant facilities or informal providers.

Vaatsalya's model was conceptualized on physical proximity and local presence. Contrasted to large tertiary care hospitals in metropolitan centres, it established multiple 50-bed, cost-efficient primary and secondary care hospitals in smaller towns where there was unmet demand for general medicine, surgery, obstetrics, and paediatrics. By bringing essential services closer to communities, the model reduced not just the clinical cost, but also the economic cost of accessing care – travel expenses, lost wages, and the time burdens often associated with distant treatment.

Operationally, Vaatsalya kept costs low through standardised infrastructure design, centralised procurement, and human resource strategies that attracted doctors to practice in smaller markets. It enforced ethical practices such as a strict no-commission policy, which strengthened trust with local patients. Instead of competing with traditional local practitioners, it collaborated with them, providing them inputs on better medical practices and guidelines on when to refer their cases to Vaatsalya hospitals. While Vaatsalya found it difficult to become profitable, their founders hoped that they would be able to breakeven once they were able to establish large number of such hospitals and derive economies of scale.

By knitting healthcare into communities, Vaatsalya addressed Accessibility, one of the most persistent barriers in India's healthcare system.

1. Krishna, Anirudh. "Who Became Poor, Who Escaped Poverty, and Why? Developing and Using a Retrospective Methodology in Five Countries." *Journal of Policy Analysis and Management*, vol. 29, no. 2, 2010, pp. 351–372.

2. Bharat Health Index Survey, 2023



Inclusive healthcare requires an integrated strategy ensuring services reach people where they live, are affordable when needed, and exist in sufficient volume and capability to meet demand.

ARAVIND EYE CARE SYSTEM: EXPANDING AVAILABILITY AT SCALE

Blindness and visual impairment have historically posed a silent but massive public health problem in India, especially cataract-related blindness which is largely preventable and treatable. Recognising this, Dr G Venkataswamy, the founder of the Aravind Eye Care, designed a model that dramatically expanded the availability of high-quality ophthalmic services across multiple economic strata.

Aravind's success stems from combining high-volume surgical capacity with extensive community outreach. Its hospitals routinely perform tens of thousands of eye surgeries annually, rivalling global benchmarks in productivity and outcomes. Rather than waiting for patients to present themselves, Aravind conducts rural screening camps, identifies patients needing surgery, and supports their transfer to surgical centres – often at subsidised or no cost.

A critical innovation for Aravind has been para-skilling. Dr Venkataswamy realized that the standardized nature

of cataract surgery made it amenable to creating an assembly-line operation where mid-level ophthalmic personnel, paramedics, were trained to perform routine pre- and post-surgery care, enabling surgeons to focus only on the surgical procedures. Patients were lined up one after another by the paramedics, reducing waiting-time for the surgeons, thus dramatically increasing efficiency.

Aravind translated its efficiency gains to cross subsidize poor patients. At a steady state, every full-paying patient cross-subsidized two poor patients, which not only made the model inclusive but also provided it with economies of scale. At Aravind every surgeon conducted three times the average number of surgeries conducted by ophthalmologists globally, while achieving success rates that were among the best in the world. Yet they were not paid more. Dr V was categorical in stating that surgeons at Aravind were not working for financial incentives but were privileged to be able to deliver sight to the blind through their services. While surgeons were inspired by Dr V's words and the inclusive model of Aravind, they also pointed out that the intense experience that they had at Aravind was invaluable for their careers and were likely to be rewarded by the markets, as and when they decided to practice elsewhere.

By combining efficiency gains with a model of cross subsidy, Aravind Eye were able to address the dimension of Availability, or capacity constraint that afflicts healthcare in populous countries like India.

NARAYANA HEALTH: DRIVING AFFORDABILITY THROUGH SCALE

While Vaatsalya improved access and Aravind expanded availability, Narayana Health focused on Affordability for tertiary and highly specialised cardiac care. It challenged the prevailing notion that advanced medical procedures such as cardiac surgery cannot be delivered in an inclusive manner. While they were inspired by the principles of cross subsidy as practiced at Aravind Eye, cardiac surgery was more complex, less standardized and more expensive than cataract surgery. Therefore, it combined a high degree of process efficiency and relentless focus on cost-control to bring down the cost of cardiac surgery and use the surplus to cross-subsidize poor patients.

Dr Devi Shetty, founder of Narayana, explained that only 7% people in the world can afford cardiac surgery and

therefore, it was more an economic problem instead of a medical problem. Through extensive use of technology, the accounting system at Narayana was able to generate 'daily surplus', enabling the doctors to decide how many free surgeries could be conducted on a given day. They bargained with suppliers, creating innovative revenue sharing models instead of incurring capital expenditure and worked with the government designing a medical insurance scheme for making cardiac surgery affordable for the masses.

Narayana's model shows that affordable tertiary care can be achieved through rigor in operations and volume-driven efficiencies, rather than through charity or subsidies alone. It also requires multiple players in the healthcare ecosystem to work together if an expensive procedure such as cardiac surgery were to be made affordable for all.

TOWARD INTEGRATED INCLUSION

India's healthcare sector faces intertwined challenges of vast geography, scarce providers, and high out-of-pocket costs that leave households vulnerable to financial strain. The healthcare delivery models of Vaatsalya, Aravind, and Narayana show that inclusion can be engineered through design choices that systematically address the three dimensions of inclusive healthcare, namely accessibility, availability, and affordability.

While each of organizations described here started focussing on one dimension, none operated in isolation. Vaatsalya managed cost and ensured availability of medical practitioners, Aravind's outreach enhanced accessibility while its cross-subsidy ensured affordability. Narayana's scale supported broad service availability and it extensively used tele-medicine to increase its reach. Together, they illustrate that inclusive healthcare cannot be delivered by isolating only one barrier but requires an integrated strategy that simultaneously ensures services reach people where they live, are affordable when needed, and exist in sufficient volume and capability to meet demand.

By learning from these models and adapting their core principles to local contexts, populous and emerging countries like India can make substantive progress toward healthcare that is inclusive and financially viable, regardless of income, location, or clinical complexity of patients.

Afterword

Scientific advances over the last 150 years produced successes that extended life expectancy and improved health around the world, and many more advances are on the horizon. They also drove up the cost of disease and treatment.

The present opportunity is to continue creating better science while developing and managing the systems that put it to work: meeting patients where they are, improving conditions for those who care for the sick, and carrying innovations through to lasting use. Prevention and treatment depend on the interests and motives of patients. Innovations that ignore these interests will fall flat. Workers who deliver care deserve organizations that give them purpose, lead them with integrity, and support high-functioning teams. Innovations need to be built for the market, launched effectively, and sustained beyond the pilot.

Business turns better science into better care. When done well, this reduces both the visible costs of disease and the ones no one counts.



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A close-up photograph showing a doctor in a white lab coat with a stethoscope around their neck, shaking hands with a person in a dark blue business suit. The handshake is the central focus, symbolizing a partnership between healthcare and business.

**Business, Health
And you?**

As science advances life expectancy and improves health, academia and education serve a key role in studying the opportunities and challenges it will bring, how business and society can shape these for the best for all, and contribute to nurturing tomorrow's ethical and effective leaders and teams.

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