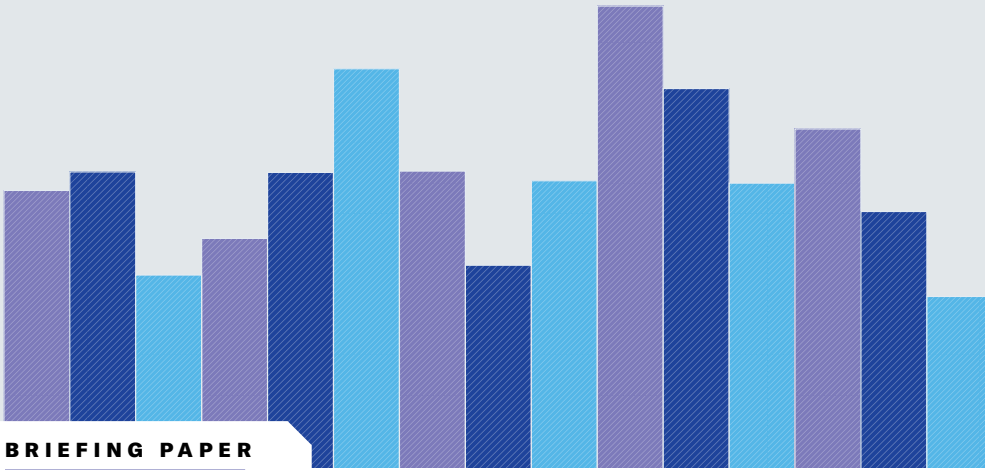




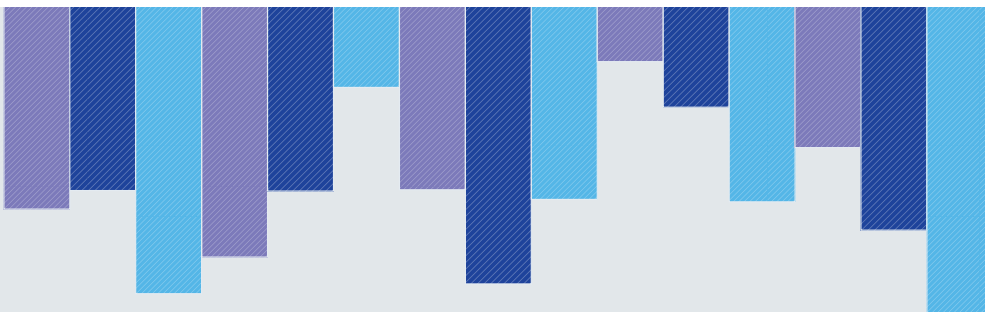
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ANALYTIC SERVICES



BRIEFING PAPER

Using Data-Driven Insights to Address Workforce Shortages in Health Care



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What can health care leaders do to address workforce shortages impacting their staff, their patients, and their organizations at large? It will be crucial to find ways to automate processes, streamline workflows, and improve staff satisfaction and retention. Otherwise, the delivery of quality care may be at risk.

This is where data-driven insights will help. Around the world, health care leaders are looking for ways to use artificial intelligence, predictive analytics, and machine learning to reduce care variability, eliminate workflow friction, and simplify complex activities. By moving up the insight-generation maturity curve, health systems can generate compounding value to improve both patient care and the staff experience at a reduced cost.

Leveraging insights in your organization sounds simple, but moving from data to insights is not always straightforward. Findings from our global [Future Health Index 2022 report](#) indicate that many health care leaders face persistent challenges unlocking the power of data. Challenges include siloed data, limited technology infrastructure, and data security concerns, to name a few. Among clinical staff members, this can lead to frustration with the lack of progress embedding insights through care pathways so they can do their jobs more effectively.

To hear how health care leaders around the world are leveraging data insights to address workforce shortages, Philips sponsored this Harvard Business Review Analytic Services report. The report explores ways in which health care organizations can work with strategic partners to bridge the gap between using data insights today and unlocking the potential of predictive analytics in the future. You will hear directly from C-suite and clinical leaders from around the world on best practices ranging from using data to provide greater visibility into the demand for services to infusing data insights into clinical research innovations for greater patient-centricity.

I hope the lessons these leaders share will help you find ways to alleviate workforce pressure and achieve greater efficiencies of scale in your own health system. Health care is a people-centric business, and data insights are a means to that end—saving lives and helping people live healthier, better, and longer. The more we can use data insights to make that mission easier and more rewarding for the staff delivering care, the better health care will be for all of us.




Shez Partovi

**Chief Medical, Innovation &
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Philips

Using Data-Driven Insights to Address Workforce Shortages in Health Care



Workforce shortages, along with the need to improve staff experience and retention, are chronic and critical health care issues that have only intensified since Covid-19 emerged in March 2020. Health care professionals, from physicians and nurses to technicians administering magnetic resonance imaging tests and X-rays, continue to withstand tremendous pressure. They not only are faced with imbalanced patient-to-staff ratios but also can be overwhelmed by data alerts and hampered by inefficient workflows that take time and attention away from patients.

For C-suite health care executives, these conditions make overcoming workforce challenges top of mind and cause improving the staff experience to be inextricably entwined with delivering quality patient care. These priorities have led health care organizations to invest in data-driven technologies, including analytics dashboards enabled by artificial intelligence (AI), to streamline operations so that clinicians across hospital departments and service lines can collaborate more effectively, easing some of the strain of care delivery on staff.


According to the World Health Organization, hospitals and health care systems worldwide face a shortage of at least 10 million workers in 2030.¹ Health care executives are vocal about their recognition of the staffing issue. One-third of informatics professionals surveyed for the Future Health Index 2022 report, a global study commissioned by Philips that analyzed the responses of almost 3,000 health care executives across 15 countries, said they planned to emphasize staff satisfaction to fend off staff shortages. A higher percentage of executives in Italy (41%), China (37%), and Germany (36%)


HIGHLIGHTS

Workforce shortages, **along with the need to improve staff experience and retention**, are chronic and critical health care issues.

When health care organizations, often working with trusted health technology partners, prepare their teams for **new ways of working to derive data insights more easily**, the gains resonate with staff.

Health care executives are investing in technology systems, **including those that employ artificial intelligence**, to do everything from managing the flow of patients to smoothing the workflows that doctors, nurses, technicians, and administrators use every day to schedule appointments and treat patients.





According to the World Health Organization, hospitals and health care systems worldwide face a shortage of at least 10 million workers in 2030.¹

cited staffing as a top priority. At least 30% of respondents from the U.S., Singapore, and the Netherlands, respectively, said they prioritize staff retention.

When taking on leadership roles, senior health care executives must remain aware of the power of their existing and potential employees. “Currently, we are chosen by our employees more than we choose them,” says Raymond Le Moign, CEO of Hospices Civils de Lyon (HCL), a university hospital center that includes 13 French public hospitals. “A university hospital that does not innovate, that isolates itself and abandons its mission to transform patient care pathways and develop talent, will inevitably become less attractive. Its best staff members will lose motivation or will be tempted to go elsewhere.”

Executives also understand that simply investing limited resources in new technology without laying the proper groundwork for their adoption is a nonstarter. Even the most advanced systems can’t relieve such staffing concerns without important cultural shifts and support for the professionals delivering care.


But when health care organizations, often working with trusted health technology partners, prepare their teams for new ways of working to derive data insights more easily, the gains resonate with staff. Instead of filling out forms or spending hours hunting for patient beds or scheduling (and rescheduling) patient appointments, they can take more time with patients and “practice at the top of their license,” says

Hummy Song, assistant professor of operations, information, and decisions at the Wharton School of the University of Pennsylvania. “They can really spend their time doing what they were trained to do, which is clinical care, rather than sorting out all the logistics around it. Providers feel more empowered, and they feel like they’re applying the skills they were trained to do, to make sure that the patients are receiving the best care,” Song says.

This paper explores the kinds of investments hospital systems are making to bring data-driven insights to their decision makers, from clinicians in radiology to executives in the C-suite. It discusses the issues health care professionals must address when implementing those systems to benefit both patients and the staff delivering care. The report also uncovers the reasons executives choose to engage a health technology partner to help them implement systems and how executives can champion technology implementations while realizing their benefits for patient care and staff work environments.

Improving the Staff Experience

The improved management of clinical assets—staff, inpatient beds, operating and examination rooms, and equipment—is a common target for hospitals’ technology investments. The Fondazione Policlinico Campus Bio-Medico, a major university hospital and teaching institution in Rome, provides a window into the challenges and opportunities in such an



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Civils de Lyon**



To be able to distinguish patients with different clinical needs—a stroke victim, for example, or myocardial infarction, compared to the follow-up of a pancreatic cyst—is important, says Prof. Dr. Carlo Quattrocchi, head of diagnostic imaging and interventional radiology at Campus Bio-Medico.

effort. And executives' choices in the diagnostic imaging and radiology department show how an effective approach can address resource challenges while improving clinicians' work environment.

In 2017, Prof. Dr. Carlo Quattrocchi saw a big resource challenge heading straight toward his department, spurred by a dramatic rise in cases due to a change in the Italian health care system. Quattrocchi serves as head of diagnostic imaging and interventional radiology at Campus Bio-Medico, a 350-bed not-for-profit medical center that has a registry of 600,000 patients. In the past, radiologists at the hospital only had to review and report imaging scans for inpatients and outpatients. Today, radiologists also are fully involved in multidisciplinary meetings, visit and communicate with patients, and manage a cultural framework for outpatients' routine health checks, resulting in what Quattrocchi describes as an exponential increase in workload.

The need to manage more scans led Quattrocchi's team to invent a new way of working, enabled by a workflow system that integrates information from a range of sources, such as staff schedules, emergency department patient referrals, inpatient appointments, outpatient health checkups, and research studies.

The new workflow system categorizes patients according to their conditions and the urgency of their examinations and makes it possible for managers to assign patients to radiologists based on their expertise, as well as their availability according to staff schedules. The new workflow system went live in January 2020, after a technology selection process and four months of staff training.

Once the system was implemented, the increased visibility into the Campus Bio-Medico clinicians' workloads, patient scheduling, and overall demand for radiology testing enabled the department to prioritize patients based on their needs. This change can lead to faster treatment and better outcomes for patients with urgent conditions, such as those suffering from a stroke. To be able to distinguish patients with different clinical needs—a stroke victim, for example, or myocardial infarction, compared to the follow-up of a pancreatic cyst—is important, Quattrocchi says. "Some need results in minutes. Others can wait a week," he adds.

The workflow system also led to workforce management improvements. This system was critical because, even as demand for service increased, department staff (including 25 radiologists, 33 technicians, 10 nurses, and six scheduling secretaries) were not eager to volunteer for extra overnight and weekend work shifts, Quattrocchi says. Now his team can better manage the flow of patients. Radiologists can attend to patients whose needs correspond to their subspecialty, and newer doctors can be given a lighter caseload so they can interact more with patients and sharpen their skills. The workflow system also schedules emergency room coverage by the radiology team so that each radiologist maintains broad-based skills. The overall impact leads to an improved work environment for clinicians and improvements in patient care and quality of service.

Quattrocchi says the proof of the system's value is evident. There is more clarity about when examinations can be scheduled and test results delivered. And confidence among hospital professionals in radiology reporting has risen, while average time to report scan results has decreased, especially with respect to reporting accountability.

Providing Greater Visibility into Demand for Services

Analyzing hospital systems data to strengthen clinical practices is a cornerstone of the strategic vision that executives have begun to execute at OU Health, a nonprofit academic health care system based in Oklahoma City and the clinical partner of the University of Oklahoma Health Sciences Center.

Sean Whip is director of vascular interventional radiology at OU Health. Whip says his department has been developing new dashboards that will provide visibility into a range of clinical activities, such as the number of patients served, efficiency of its services, room utilization, and staff time spent on different patient-related tasks. With its first stage implemented in June 2022, the dashboards and other data analytics projects are one or two years away from realizing the vision of a data-driven clinical practice, Whip says. But even the steps taken so far have meant a decrease in manual data-handling work. And managers have greater visibility

into the demand for services from around the medical system and a stronger handle on scheduling of staff and resources.

For both clinicians and support staff, the new data views give staff members more knowledge about what to expect. “[More data] absolutely helps them plan the day out better. It also makes them understand where they can improve on their efficiency. And it allows them to focus on some of the bigger case hierarchies,” Whip says.

Managers also can evaluate data frequently. “That helps us manage a daily process of how many patients are actually coming in from the inpatient side, the pediatric side, how many cases are in stasis. Being a Level 1 trauma center, we see a lot of strokes, a lot of trauma that comes in, and a lot of cases take a lot of time. And we also have to take into consideration that we have a lot of other [examinations] to perform, whether inpatient or outpatient,” Whip adds.

Using data to improve resource and staff management doesn’t occur without the close collaboration of health technology partners, hospital executives say. For Quattrocchi and his team at Fondazione Policlinico Campus Bio-Medico, for example, the technology selection process included a valuable visit to a health technology provider’s laboratory to learn how the new workflow system they were considering would adapt to the Roman hospital’s environment. That experience set the stage for later training and implementation work.

At HCL, successful implementation of several cutting-edge technologies, from a new fleet of imaging systems to the adoption of AI algorithms in clinical practice, began with a major commitment in December 2015, when HCL signed a 12-year contract with one of its health technology partners. More than merely providing technological solutions and services, the partnership also includes a joint research and innovation program built on shared strategic agendas and driven by effective governance of the collaboration.

Infusing Data-Driven Insights into Innovations

When hospital systems embark on technology strategies designed to improve patient care management, innovations in one department are likely to affect others. At HCL, this boundary crossing is deliberate. Over and above the scope of deployment, the rolling out of a new technological approach has induced effects in terms of collective learning about transformation management. Data-driven management guided by artificial intelligence will spread to all hospital activities beyond clinical and technical services and affect the management of logistics and administrative activities.

“Whether it concerns research or the delivery of inpatient or outpatient care, the philosophy guiding HCL’s technology development and implementation strategy is patient-centric,” Le Moign says.



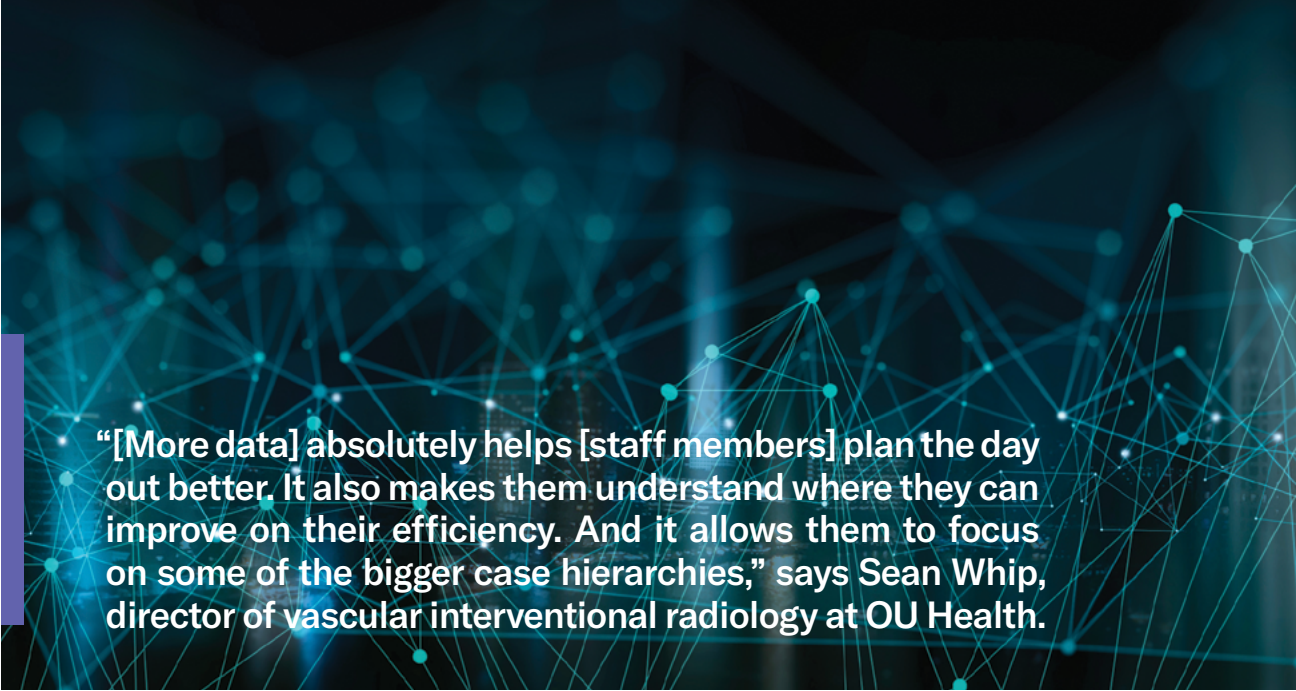
The improved management of clinical assets—staff, inpatient beds, operating and examination rooms, and equipment—is a common target for hospitals’ technology investments.

This work also enables talented employees to contribute to projects of international significance alongside research partners from the academic world and the medical technology sector. Providing such employment opportunities is a way to attract new talent or to retain valuable employees.

Take the radiology department as an example. Nearly 10% of positions in this area are vacant, Le Moign says. The radiology technicians at HCL are testing an innovative teleradiology solution. In addition to remote interpretation, which has been practiced for years, this solution should allow for remote assistance in the performance of examinations, thanks to expert technicians present at different sites. This approach will allow for better recognition and development of their skills, despite a very tight job market in a rapidly growing field, he says. This partnership, among others, Le Moign says, “helps attract, retain, and develop the individual and collective commitment of health care professionals.”

As further evidence of management’s commitment to this strategy, HCL has established an “artificial intelligence committee” to promote the use of AI within the professional community, to support the implementation of AI projects, and to validate projects, while ensuring their regulatory compliance involving such things as personal data protection and IT security regulations.

The commitment has been successful. In 2022, HCL has completed the process of building its health data warehouse to consolidate the institution’s AI capabilities. Several brainstorming sessions held by HCL with its health technology partner to discuss the opportunities presented by health data and AI algorithms recently resulted in four proof-of-concept projects which the institution plans to develop further, Le Moign says. One of these projects is “GlobalEvidence,” a platform for conducting continuously updated meta-analyses to facilitate the production of regularly updated clinical guidelines. Additional proof-of-concepts include a project focused on diagnostic and therapeutic endoscopy making use of artificial intelligence to standardize practices in the



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treatment of upper digestive tract disease; a new “smart search tool” to view activities in patient records; and a project involving the use of diagnostic laboratory imaging tools developed by the university hospital’s imaging research unit to help research teams conduct image analyses and create databases.

Streamlining Health Technology Workflows for Clinical Staff


At OU Health, there is a similar philosophy that technology investments will have a dramatic influence on the way the health system operates while benefiting both patients and employees. Executives are calculating that their recently launched slate of strategic technology investments, from instituting a new electronic health records system to developing predictive analytics dashboards in both operational and clinical settings, will not only help them manage the flow of patients but also give them insights to provide better services. They also expect the systems, once operational in 2023, to enhance employee working conditions and benefit their clinical staff retention and recruiting efforts, says Casey Woods, interim president, OU Health Adult Services, and chief operating officer, OU Health University of Oklahoma Medical Center.

In addition to the dashboard and analytics projects in radiology, OU Health’s plans include putting analytics insights in the hands of physicians, clinicians, and administrators

to enable them to make more data-driven decisions. The electronic health records system will improve the quality and integrity of the data these applications use and lead to developing new metrics for operations, finances, and clinical performance. Plans also call for automated insights into patient movements and resource use in emergency, surgical, and other departments.

Woods says the impact will be widespread, but especially valuable for managing the flow of patients. “The most important [issue] is for us to understand utilization by our service lines, to be able to really monitor that on a day-in and day-out, week-in and week-out basis throughout our governance structure. [We need] to be able to really make decisions quickly on when new surgeons come on or new service lines are needed, [because] they have increased their utilization, they have a volume demand that warrants it,” he says.

As a champion for the strategy, Woods notes that he is deeply embedded in consuming system updates. He can see daily reports that show current conditions at the hospital system, tracking data on variables like available beds and patients being admitted from other hospitals in the region. For next year, he’s envisioning consuming predictive reports that will anticipate needs with insights that scale across the health care organization. And he expects the analysis the systems provide will engage other managers and employees, inculcating a data-driven culture at OU Health.



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**Casey Woods, interim president,
OU Health Adult Services, and chief
operating officer, OU Health University
of Oklahoma Medical Center**



“Ultimately, many of these tools are really trying to improve patient flow, streamline the work so that providers can refocus their time on the patient care itself, and hopefully reduce burnout,” says Hummy Song, assistant professor of operations, information, and decisions at the Wharton School of the University of Pennsylvania.

Adding a predictive component, he says, “will start delivering a greater opportunity for our frontline teams, and our leadership, to really understand what they need to be doing at certain times of the day to ensure that bottlenecks that historically occurred no longer occur. And then we have a whole new paradigm on how we deliver patient care and what the patients can expect when they come to our facilities.”

Enabling Staff to Focus on Patient Care

Implementing systems to smooth the flow of patients in a hospital may have a primary goal of improving management practices, but there’s no doubt a related benefit goes to the working environment, says the Wharton School’s Song.

“Ultimately, many of these tools are really trying to improve patient flow, streamline the work so that providers can refocus their time on the patient care itself, and hopefully reduce burnout. That’s a big part of it,” she says.

The reason that more precise scheduling boosts staff retention is that people like consistency and predictable work routines. “People learn what the load is like and what the consistency of the schedule is like. And those things, when improved, will also help with recruiting new staff, who hear good things about how the system works in a specific facility or hospital,” Song says.

Keeping talented people and recruiting new employees is a top-of-mind challenge for hospital system executives who remain under pressure to improve the efficiency of their operations while simultaneously devoting resources to elevating the quality of patient care. Astute use of data can solve the challenges that hospitals and health systems face as they seek to obtain data-driven clinical and operational

insights at scale—in which insights are embedded in organizational workflows.²

Health care organizations are investing in technology systems, including those that employ artificial intelligence, to do everything from managing the flow of patients to smoothing the workflows that doctors, nurses, technicians, and administrators use every day to schedule appointments and treat patients. While any adoption of new technology will encounter resistance, successful projects help health care staff perform administrative tasks more efficiently so they can spend more time serving patients, while gaining experience working with new technologies. These are benefits that help organizations retain clinical staff and address workforce challenges.

Knowing how to succeed and drive a value-adding alliance strategy with leading technology partners is a new, differentiating skill for health care providers that wish to excel in attracting and retaining staff. In the case of HCL, the robust results of its technology partnerships have resulted in forging other alliances that can help it extend care capacity and also burnish its brand as an employer. “These collaborations have clearly reinforced HCL’s ambition to stand out in terms of its support for innovation and the evolution of care,” Le Moign says.

DISCLAIMER

The Future Health Index 2022 report examines the experiences of almost 3,000 health care leaders and their expectations for the future. The research for the Future Health Index 2022 report was conducted in 15 countries (Australia, Brazil, China, France, Germany, India, Indonesia, Italy, the Netherlands, Poland, Russia, Saudi Arabia, Singapore, South Africa, and the United States). The study combines a quantitative survey and qualitative interviews conducted from December 2021 to March 2022.

Endnotes

- 1 World Health Organization, “Global Strategy on Human Resources for Health: Workforce 2030: Reporting at Seventy-fifth World Health Assembly,” June 2, 2022. <https://www.who.int/news/item/02-06-2022-global-strategy-on-human-resources-for-health--workforce-2030>.
- 2 Harvard Business Review Analytic Services, “The Journey toward Insights at Scale for Health Care Providers,” October 20, 2022. <https://hbr.org/sponsored/2022/10/the-journey-toward-insights-at-scale-for-health-care-providers>.



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