Insights Series

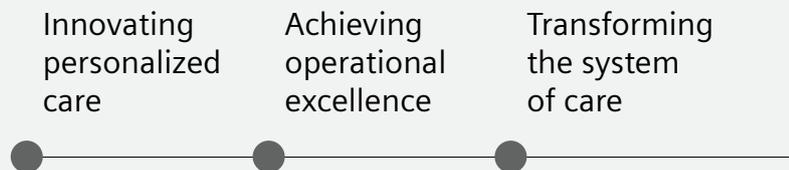# Building a human-centered workplace

How Jefferson Health empowers
its workforce and optimizes safety

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Preface

The Insights Series

The Siemens Healthineers *Insights Series* is our preeminent thought leadership platform, drawing on the knowledge and experience of some of the world's most respected healthcare leaders and innovators. The Series explores emerging issues and offers practical solutions to many of today's most pressing challenges in healthcare.

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Executive summary

Building a human-centered workplace

Today's sophisticated medical equipment and processes, like much of the new technology that surrounds us, can be highly complex, resulting in opportunities for user error. It often seems that much of it is not designed with end users in mind. As a result, we cling to the view that people must adapt to machines, rather than embracing a view that machines and processes should be designed and adapted for people.

Jefferson Health, a multistate 17-hospital health system centered in Philadelphia, has done just that: they have successfully created a workplace designed with a human element—and the results, in terms of outcomes and financial performance, have been impressive. They avoided all hospital-acquired infection penalties, and they improved performance in value-based programs and external rankings. External recognition, including awards for safety excellence, has further validated their success.

This paper explores how Jefferson Health created a more human-centered workplace, highlighting their innovative approach and the transformative impact it has had.

- At the heart of Jefferson Health's approach has been a mindset shift: instead of focusing on individual performance, they seek to change systems and processes where relevant. Some simple changes have had a significant impact; for example, the neonatal intensive care unit removed the option for ordering inappropriate drug dosages for infants, reducing the risk of medication errors.

- Jefferson Health also emphasizes the intelligent use of data to support caregiver decision-making. By integrating the usage of data and AI into existing workflows, caregivers can more easily access relevant information when it's needed.

- Creating a learning organization is another key aspect of Jefferson Health's approach. They encourage feedback and risk communication, ensuring that employees feel valued and empowered to contribute to improvements, while incident reporting programs have made it easier to report issues before they develop into serious problems.

By embracing a human-centered approach, healthcare organizations can achieve greater efficiency, reduced costs, and improved outcomes while prioritizing the well-being of their workforce. Jefferson Health's experience serves as a valuable example of how the interaction between humans and technology can be optimized to deliver high-quality care and create a sustainable and supportive work environment.

Introduction

Designing technology that is aligned with its users is not a new idea. Ergonomic furniture provides comfort and relief for millions. A well-designed tool or piece of equipment can make the most routine task more pleasant. And even with complex pieces of technology, a well-designed interface can make such devices simpler and more enjoyable to use—as Apple has demonstrated for decades.

In the field of medical technology and healthcare processes, however, we often still cling to the notion that it is people who have to change, not machines. People must be trained, re-trained, and must adapt their working routines to the technology that surrounds them. This is partly due to the complexity of much of today's medical technology—there is an implicit belief that we just have to accept it as it is.

A second issue is our willingness to often invest those who work in the medical field with almost superhuman abilities. We place tremendous expectations on them and hold hopefully onto the belief that they have mastered all the latest technology, absorbed all the latest research, and that they are uniquely qualified to solve any problem we may have.
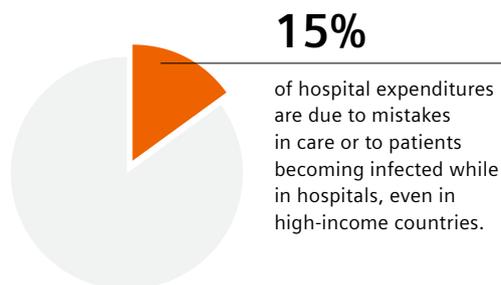
Yet this faith in the abilities of healthcare workers to perform flawlessly is often unrealistic and can create unrealistic demands and unbearable pressure. The reality is that humans cannot always perform flawlessly. Even in high-income countries, approximately 15% of hospital expenditures are due to mistakes in care or to patients becoming infected while in hospitals.[1]

The toll on healthcare workers—even before the COVID-19 pandemic—was significant. Many complain about burnout, which isn't just about long hours. It's about a fundamental disconnect between health workers and the mission to serve that motivates them.[2] According to Elsevier's *Clinician of the Future* survey, more than 47% of clinicians in countries including the U.S., Germany, and the UK plan to leave their current role in the next two to three years, with 39% wanting to leave the healthcare profession entirely.[3] According to one study, there is a shortage of more than 43 million health workers globally.[4]

Clearly, the way we deliver care is not always achieving its desired results. Workers suffer from exhaustion and burnout. The patient experience is compromised. Outcomes are often sub-optimal. And the performance and reputation of hospitals can be negatively affected.

How can health systems build greater resilience, deliver high-quality care to patients sustainably, and reduce the stress and pressure of healthcare professionals? A big part of the answer is finding ways for people and medical technology to work together more effectively, in a sustainable healing environment to positively impact patient experience and staff satisfaction. Creating such a workplace is an essential component of achieving operational excellence.

Jefferson Health, a multistate health system serving the greater Philadelphia region and southern New Jersey, has developed an approach which recognizes that healthcare workers are human, with all the strengths and vulnerabilities that go along with that. Humans can make mistakes, humans can suffer from fatigue, humans can perform at a peak level for only a certain number of hours a day. To expect humans to perform like machines is unrealistic and unhealthy. The success enjoyed by Jefferson Health provides a striking and informative example of how medical technology and processes can be designed in a more human-centered way—with impressive results.

15%

of hospital expenditures are due to mistakes in care or to patients becoming infected while in hospitals, even in high-income countries.

The challenge

Rapid growth in the development of medical technology

The number of patent applications in medical technology has surpassed that of digital communication

+45%

20 000

15 000

10 000

5 000

0

2012   2014   2016   2018   2021

- Medical technology
- Digital communication
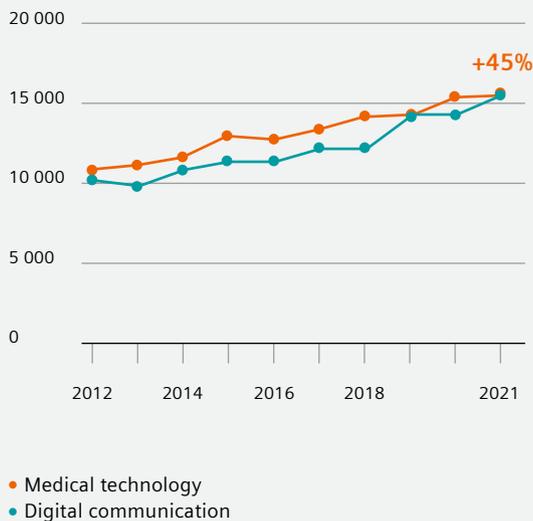
Source: European patent office

The problems resulting from technology and systems that fail to address the human element are particularly serious in the healthcare sector. Clearly, the stakes are high. An incorrect action or decision, be it the result of fatigue or a poorly designed machine or process, can literally be a matter of life and death. In addition, many medical technologies and processes are extremely complex, placing extraordinary demands on all those who work in that environment, from support staff to the most senior physicians. All are expected to understand the vast array of machines and systems they interact with on a daily basis.

Not only is the volume and breadth of technology expanding at an extraordinary rate, the time healthcare workers must spend on technology-related tasks is growing at a similar pace. Today, almost all hospitals (96%) use electronic health records (EHRs) in the U.S.[5]

While these make accessing data easier, they also require people to correctly input, manage, and organize this data, all in a timely way. According to a patent trend study, patent filings for the healthcare industry have been dramatically increasing.[6] Rapid adoption of complex emerging technologies such as artificial intelligence (AI), robotic systems, telehealth, or other virtual models of care require caregivers to not only carry out their day-to-day work, but also to continually learn new skills. This becomes particularly difficult at a time when the pace of technological innovation is also increasing rapidly.

The promise of all technologies is that they will make work easier, safer, and more efficient. Yet far too often technologies that are introduced in the healthcare sector have the opposite effect, making work more stressful—and in some cases, more difficult and even unsafe. Somewhat paradoxically, 75% of physicians who reported burnout in a recent study attributed some or much of it to the work associated with maintaining and updating EHRs.[8]

A more human-focused approach to technology can result in a range of benefits. Mistakes can be avoided resulting in enhanced patient safety and outcomes. As the number of traveling nurses and staff who are usually not familiar with the working environment is on the upward trend, designing potential mistakes out of the system is highly beneficial. Technology that is easier to use makes it easier to train new staff. A more intuitive and comfortable interface with machines means less caregiver stress and burnout. Operations become more sustainable. Efficiency is enhanced.

Understanding and building systems that are more efficient, human-centered, and safe for caregivers is what "human-factor engineering" or "usability engineering"

is all about. The term human-factor engineering first emerged almost a century ago when the U.S. military was developing the B-17 bomber. It was an important part of the war effort—a high-flying, long-range plane with a reputation for toughness. Yet despite its many qualities, the B-17 was plagued by unexplained crashes, often in non-combat situations. Initially, these crashes were blamed on pilot error. But after the war a critical design flaw was identified: the controls for the landing gear and for lowering the wing flaps looked identical. This made it easy for pilots to confuse the two, often with tragic results. The short amount of time available for pilot training further exacerbated the problem. The B-17 redesign was an early example of recognizing that machines should be designed to accommodate human behavior rather than training humans to understand and adapt to machines.[9]

The principles of human-factor engineering are now applied not only to sophisticated machinery but to a wide range of tools and devices, and even more broadly to systems and to processes. Here, too, an approach focused more on the needs and capacities of people can yield important results.

75%

of physicians who reported burnout identified the work associated with Electronic Health Records as a cause.

The solution

Jefferson Health approached the challenge of creating a more human-centered working environment in three ways. First, by adopting a mindset shift whereby the first approach to solving a problem was to "change the system, not the people." Second, through the more intelligent use of data to augment caregiver decision-making. And third, by creating a true learning organization.

1   **Mindset shift: Change the system, not the people**

One of the essential elements of transitioning to more human-centered operations is to embrace a mindset shift—to move away from the view that if something isn't working, it is most likely the result of human error resulting from poor training or carelessness. As with the B-17 bomber, often the machine, or the system, can be the problem.

Jefferson Health adopted this approach. They work to change systems and processes to make them work smoothly for the people using them instead of focusing on various methods to change clinician behavior to accommodate poor system design. A simple example: instead of expecting all caregivers to always remember precisely the correct dosage of every drug, the option of ordering a drug dosage inappropriate for infants was entirely removed from the physician order entry process.

Many changes like these did not result in any extra costs to Jefferson Health. Instead, many of the changes were quickly made by small, multidisciplinary teams, often with support from system and human factors engineers and strong engagement from nursing and physician informatics—a far simpler process than trying to train or re-train thousands of clinicians in a short period of time. The safety team at Jefferson Health, responsible for driving many of these reforms, regularly collaborates with human factors and systems engineers on the design of these solutions.

System Safety Huddle

A problem that every health system faces is how to efficiently risk-stratify the feedback collected from front line staff to rapidly identify and resolve significant systems issues. System Safety Huddle is how Jefferson Health tackles this issue. As the name implies, it is a system-focused huddle and is different from the usual safety huddles. When there is a safety issue in EMR, sometimes it can take up to 90 days to address in similar complex systems. With the System Safety Huddle, this process can triage and escalate these issues with people who can resolve them right away, often within hours.

The team meets weekly to assign a number to a risk that is identified. This helps to triage and prioritize the risks, and to determine the resources and leadership needed to resolve it. The team consists of the right people who can effectively resolve the issue, for example, experts in IT, pharmacy, and EMR. And as the team is on-call, these experts are ready to respond and fix any critical issues that may arise.

Workflow simulation

One way to identify potential hurdles that staff may encounter is by using workflow simulation tools to predict operational inefficiencies and to obtain data-based insights to ensure optimal workflows. This allows staff to focus on patient care and for providers to get the most out of their equipment.

2 Smart use of data to augment caregiver decision-making

The second element of Jefferson Health's transition was embracing a more human-centered approach to data with the goal of making it one click away. Data, like technology, should be used as a tool to support human decision-making. Rather than having people spend large amounts of their time managing or inputting data, Jefferson Health's goal was to enable caregivers to spend more time on what matters most—providing care to patients.

In order to augment the decision-making of medical staff, methods to incorporate data and AI should be built into existing workflows, making it easier to access when it's needed. Requiring medical professionals to search or click outside of existing workflows makes it far less likely that data will be used effectively.

A particular challenge facing Jefferson Health was that not all hospitals in its network were using the same electronic medical records (EMRs). This was partly the result of acquisitions and legacy systems.

But it often made it difficult to access necessary patient data when it was needed. Jefferson Health made complexity reduction a priority and decided to implement a single EMR platform across their entire system. Another recent merger led to two EMRs in the system, however, they were recently awarded a PCORI Grant as part of the Health System Implementation Initiative (HSII). This supports efforts to accelerate data transparency and system alignment toward evidence-based medicine in practice, even when using multiple EMRs.

Though challenging, this effort is necessary as it sets the basis for strong data analytics and clinical workflow programs. Standardized, familiar access to data allows all members of a care team to not only make operational and care decisions but to increase efficiency and address gaps in care.

An example to illustrate how data supports decision-making took place during the COVID-19 pandemic, when equitable access to healthcare was particularly important. Jefferson Health is centered in Philadelphia, the poorest large city in the U.S. During the pandemic, it became apparent that persons of color were being vaccinated at disproportionately lower rates, presenting an equity gap that needed to be addressed. Jefferson Health was quick to address the situation by identifying vulnerable populations and increasing vaccinations among them using easily accessible EMR data in Phase I and mobile vaccination units to focus on underserved communities.

From EMRs, it was possible to identify high-risk patients based on current pandemic criteria and these patients were advised to schedule a vaccination appointment. Staff were able to review the data to identify patients who weren't responding and could proactively reach out and address any barriers to scheduling appointments.

In Phase II the mobile vaccination team focused on addressing barriers to vaccination in communities with disparities in COVID vaccination rates evident in the data.

More than 80% of the vaccinations administered by the mobile vaccination team were delivered to people of color, a significantly higher rate than that of traditional clinics (48.7%). Mobile clinics also vaccinated a higher proportion of non-English speakers (37.2%) than routine clinics (8.8%).

Health equity is an important factor for Jefferson Health when designing system improvements. They received the 2022 HIMSS Davies Award for the way they harnessed information and technology to boost health equity and mitigate infections among their acute care patients. Other ongoing programs, for example, those which monitor maternal morbidity and mortality, as well as breast cancer screenings, also reflect this commitment.

3 Creating a learning organization

The third component of Jefferson Health's move to human-centered technology and processes was to create a learning organization. In simple terms, this meant encouraging all health team members to offer ideas and feedback on how systems or processes could be improved without fear of criticism that they themselves were somehow at fault because they used a machine incorrectly or "hadn't learned the system" properly.

In a learning organization, feedback is welcomed. It leads to improvements that make the workplace better for everyone—employees and patients. Jefferson

Health went about this by adopting a new approach to risk communication and by establishing programs to engage their entire staff and capture feedback in a consistent way.

Capturing feedback with incident reporting tool

A further innovation at Jefferson Health was the creation of programs to engage caregivers and capture feedback. Incident reporting is an important tool to gather information that can enhance quality and patient safety.[10] Yet many employees are reluctant to report incidents that they fear could reflect negatively on their own work performance.[11]

Jefferson Health developed a program called OnPoint, a system-wide, integrated quality and safety management system that encompasses all 17 of their hospitals. This was a departure from the previous programs which were hospital-, department- or project-based. The program makes it easier to report incidents or near-incidents and tracks real-time quality performance. It empowers every employee and member to participate in continuous improvements in the areas of safety, quality and experience.

While Jefferson Health always focuses on individual performance, team performance, accountability, and culture, these are only half of the equation. Jefferson

Health is equally committed to building systems that account for human capabilities and limitations.

By making it easier to report incidents through OnPoint, Jefferson Health saw a 52% increase in reports of improvement opportunities at a time when the national trend in the U.S. moved in the opposite direction. As an example, one employee at Jefferson Health recognized that a pediatric drug was being mistakenly prescribed as an adult dose. This error was reported through the OnPoint program, and system engineers quickly made changes to the software. The error was also escalated to Epic, an electronic health record company serving thousands of other hospitals, and they too took steps to change it. Similar employee reports have led to a redesign of heparin or magnesium sulfate ordering processes, addressing unnecessary risks that existed in the original process. This more streamlined reporting process has also made it easier to prioritize issues, and for investigations to start more quickly. While it previously took nine days for an investigation to begin, this was reduced to less than three days.

Jefferson Health also recognizes that education is critical to adoption of new processes and systems. While real-time data is a critical element of the Safety Huddle Dashboard, which provides all that the user needs to take corrective actions at the push of a button, it became clear during testing that more end user education was needed. Dashboard workshops were held virtually and tip sheet links were embedded directly into the dashboard to ensure immediate access to the most current version of education within the tool itself.

As a result of these various efforts, Jefferson Health paid no hospital-acquired infection penalties, which led to them exceeding budgeted performance in value-based programs. In fiscal year 2022, Jefferson Health booked more than US$7 million in unbudgeted gains due to these types of system-building initiatives.

The improvements made at Jefferson Health have also been recognized externally. In 2021, the hospital was awarded an ECRI & ISMP PSO Safety Excellence Award and a Hospital Quality & Safety Award by the Greater Philadelphia Business Coalition on Health. In addition, they received a 2022 HIMSS Davies Award and a 2023 Healthcare Improvement Foundation and Excellence in Healthcare Award.

These successes enjoyed by the hospitals are acknowledged not only in the boardroom or on the balance sheet, they are also shared with all associates.

Jefferson Health celebrates success and regularly recognizes the contributions made by their entire care team. Those who gave feedback that made an impact are recognized during weekly forums and honored at monthly operational meetings and quarterly summits. And once a year, those whose input has had the biggest impact receive prizes, trophies, and additional leader-ship recognition. Making all caregivers feel valued and appreciated reinforces their motivation to continue investing their time in improving quality care for patients throughout the entire Jefferson Health system.

New approach to risk communication

Risk communication refers to raising flags or advising others of threats or potentially harmful situations. Employees often hesitate to flag risks for the fear of being blamed or reprimanded, which can result in avoidable threats remaining hidden before they surface again or cause harm. Instead of placing blame on anyone who brought risks to light, the quality team at Jefferson Health adopted a program consisting of tiered recognition and celebrations to demonstrate the importance of sharing feedback and the gratitude for the impact towards improving the system. In addition to local weekly and monthly Great Catch Awards, there is a quarterly enterprise Great Catch (Golden Glove Award) and Annual Great Catch (Platinum Glove Award) which in the past consisted of a shout-out from one of the Philadelphia

Phillies, an American professional baseball team based in Philadelphia.

Tier-huddles for effective escalation

Jefferson Health also established an escalating huddle program for the entire system. These daily, 5-minute tier-escalating huddles are highly structured meetings between front-line staff and the organization's executive leadership. Any unmitigated risks are escalated and leadership engagement ensures that all issues are tracked to rapid resolution, typically within 24 hours. The goal is for all members of care teams to make one another aware of issues and help one another out, no matter how large or small the issue. The cumulative effect of these exchanges can have a big impact.

5-minute escalation meetings across hierarchies enable fast-tracked mitigation of risks.

Conclusion

Predicting the future in a field as complex as healthcare is challenging. Yet one issue on which experts agree is that the interaction between human caregivers and technology will increase in the years ahead. Staffing shortages combined with growing demands for care mean that technology must play an increasingly central role. Yet the essential role of human caregivers—whether it's the instincts of a doctor with years of practice, or the empathy of a skilled nurse—cannot be replaced by a machine. The need for humans and machines to work together in seamless partnership will only grow.

When the stakes are as high as they are in healthcare, one has to develop systems that can autonomously prevent errors before they happen. As a result, human-centered technology will emerge as an even more important factor in the years ahead, improving outcomes, making working life less burdensome for clinicians and staff, and even helping with recruitment and retention.

In the years ahead, healthcare leaders must ensure that systems are designed around people and that processes are in place to address issues that may arise. Therefore, it is important to procure equipment, technologies, and tools that are designed with optimal user experience in mind. Software interfaces need to be intuitive and workflows needs to fit the user and not cause additional stress. Plans for user feedback and preparation for optimization are also important.

Healthcare leaders must also invest in assembling the right talents, such as user experience designers, to ensure that the processes, tools, and technology interactions support caregivers. Leaders can look to upskilling their employees in the area of system engineering— something Jefferson Health does internally.

Finally, leaders must recognize that while healthcare workers are professionally trained and devoted to what they do, they are human—and humans make mistakes. A working environment that expects people to be perfect is not realistic, but building resilient systems that support what they do can help them to deliver the best care possible to patients.

Achieving operational excellence is a complex and multi-faceted challenge. One essential part of this task is identifying and implementing ways for people and technology to work seamlessly together in order for both to perform at the highest possible level.

As this paper demonstrates, a commitment to achieving operational excellence need not be an expensive and complex search for hidden treasures or silver bullets. An ongoing series of small steps can lead to significant results, and often the best ideas often come from front-line workers.

It also demands a shift in mentality. All individuals should be encouraged to share ideas on improvement, people should not be penalized for mistakes, and failures should be seen as opportunities. Continuous improvement is only possible in a non-hierarchical environment in which everyone feels empowered to contribute.

Operational excellence is an important criterion for success not only in healthcare but in all businesses and organizations. Creating human-centered hospital operations can improve staff satisfaction and attract new talent. Greater efficiency, less waste, reduced costs, and more satisfied customers are all essential, especially in light of challenges including workforce shortages, budget constraints, and an increasingly competitive marketplace.

Examples of user-centered design

At Siemens Healthineers, products are designed with the users at the center of the process. Feedback from users is continually collected during the repeated loop from product definition, ideation, design, prototype building, to testing, thereby ensuring that caregivers can work with final products in a frictionless way.

As an example, artificial intelligence (AI) turns data into built-in expertise in diagnostic imaging. This helps radiographers and radiologists efficiently achieve reproducible results by unlocking the full potential of their medical imaging devices. Operators are guided by AI through diagnostic procedures so that they can interact easily and naturally with both patient and technology, generating consistent and comprehensive results.

1	Project Initiation Phase	6	Design
2	Project Planning	7	Prototype
3	Understand	8	User Involvement
4	Define	9	Handover for Implementation
5	Ideation	10	Product Lifecycle User Experience

↗ Suggested follow-up on

siemens-healthineers.com/insights/achieving-operational-excellence

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References

1. Low Quality Healthcare is increasing the burden of illness and health costs globally [Internet]. World Health Organization. World Health Organization; [cited 2023 Jun 30]. Available from: **who.int/news/item/05-07-2018-low-quality-healthcare-is-increasing-the-burden-of-illness-and-health-costs-globally**

2. Murthy VH. Confronting health worker burnout and well-being. New England Journal of Medicine. 2022;387(7):577–9.

3. Goodchild L. Clinician of the Future Report 2022. Amsterdam: Elsevier; 2022.

4. Lozano R. Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet [Internet]. 2022 May 23;399:2129–54.

5. National trends in hospital and physician adoption of Electronic Health Records [Internet]. National Trends in Hospital and Physician Adoption of Electronic Health Records | HealthIT.gov. [cited 2023 Jun 30]. Available from: **healthit.gov/data/quickstats/national-trends-hospital-and-physician-adop-tion-electronic-health-records**

6. Gaudry K, Franklin T. Patent trends study part six: Medical Devices Industry [Internet]. IPWatchdog.com | Patents & Intellectual Property Law. 2019 [cited 2023 Jun 30]. Available from: **ipwatchdog.com/2019/05/08/patent-trends-study-part-six-medical-devices-industry/id=108972**

7. Read S. Factors in the growth of Medical Device Innovation [Internet]. Abel + Imray. [cited 2023 Jun 30]. Available from: **abelimray.com/resources/newsletters/factors-in-the-growth-of-medical-device-innovation**

8. Robertson SL, Robinson MD, Reid A. Electronic health record effects on work-life balance and burnout within the i3 population collaborative. Journal of Graduate Medical Education. 2017;9(4):479–84.

9. Zetlin M. A World War II plane that kept crashing helped lead to Steve Jobs's … [cited 2023 Jun 30]. Available from: **inc.com/minda-zetlin/steve-jobs-boeing-b-17-wwii-paul-fitts-alphonse-chapanis-code-shaping-ergonomics-design.html**

10. Fukami T, Uemura M, Nagao Y. Significance of incident reports by medical doctors for organizational transparency and driving forces for patient safety. 2020;

11. Farley DO, Haviland A, Champagne S, Jain AK, Battles JB, Munier WB, et al. Adverse-event-reporting practices by US hospitals: Results of a national survey. Quality and Safety in Health Care. 2008;17(6):416–23.

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With the unique combination of our strengths in patient twinning[1], precision therapy, as well as digital, data, and artificial intelligence (AI), we are well positioned to take on the greatest challenges in healthcare. We will continue to build on these strengths to help overcome the world's most threatening diseases, enable efficient operations, and expand access to care.

Our portfolio, spanning in vitro and in vivo diagnostics to image-guided therapy and cancer care, is crucial for clinical decision-making and treatment pathways. We are committed to improving healthcare access for all, limiting our environmental impact as we pioneer breakthroughs, and engaging our diverse Healthineers to achieve this impact on a global scale.

Motivated by our purpose and guided by our values, we are building an inclusive culture, where we embrace diversity in all its forms. We are a team of more than 71,000 Healthineers in over 70 countries passionately pushing the boundaries of what is possible in healthcare to help improve the lives of people around the world.

[1] *Personalization of diagnosis, therapy selection and monitoring, aftercare, and managing health.*

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