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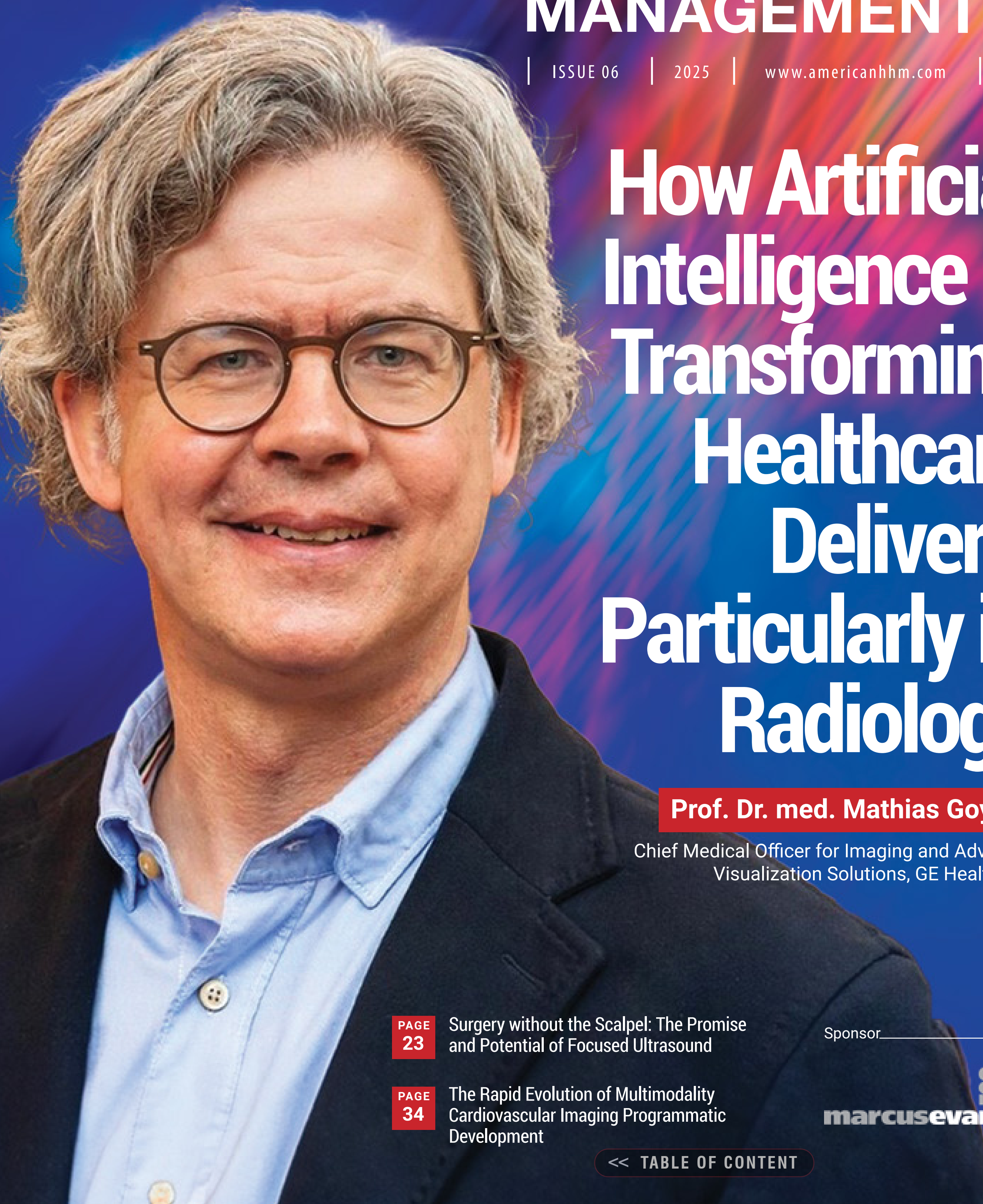

How Artificial Intelligence is Transforming Healthcare Delivery, Particularly in Radiology

Prof. Dr. med. Mathias Goyen

Chief Medical Officer for Imaging and Advanced Visualization Solutions, GE HealthCare

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Transforming Healthcare through Innovation, Leadership, and Equity

Step inside the world of healthcare transformation with American Hospital & Healthcare Management, where innovative technologies, visionary leadership, and a strong commitment to health equity are redefining how care is delivered across the globe.

From AI-powered diagnostics to groundbreaking healthcare strategies, this edition brings you face-to-face with the people, technologies, ideas, and concepts shaping modern medicine. We take a closer look at breakthroughs that are not just changing healthcare systems but also making a real difference in people's lives everywhere.

In this issue, **Mathias Goyen** explains how artificial intelligence is enhancing diagnostic accuracy, streamlining workflows, and empowering radiologists to focus more on patient-centered care. **Neal Kassell** introduces focused ultrasound as a non-invasive game changer, highlighting its potential to revolutionise treatment approaches across various medical fields. **Omar Khalique** provides insights into the evolution of Multimodality Cardiovascular Imaging, where precision, training, and AI converge to improve diagnostic capabilities and patient outcomes.

Yet healthcare innovation isn't just about machines, it's about people and leadership. Experts such as **Seleem R. Choudhury** and **Preet Kukreja** highlight how smart management, community engagement, and cost-effective strategies are driving improved outcomes across populations. Meanwhile, global thought leaders **Eirik Tjønnfjord** discusses healthcare transformation from rural clinics in Ghana to state-of-the-art labs in the U.S. this edition highlights how point-of-care tools, ethical AI, and digital transformation are closing disparities in access, quality, and outcomes. It also addresses the crucial need to strengthen the healthcare workforce to keep up with technological advancements. **Dominique J. Monlezun** shares insights on how AI, quantum computing, and local expertise are advancing public health, bridging the gap between high-tech and high-touch care.

We look at how telehealth is evolving to better serve seniors and underserved communities, how population health initiatives are combating chronic disease, and how **algorithm bias and data privacy** are being addressed to build ethical, accountable systems of care. With advancements in **neurology, cardiovascular imaging, surgery, AI in radiology, nephrology, and health equity,** this edition offers a holistic look at how innovation is transforming every corner of medical science.

Whether you're a clinician, administrator, policymaker, or healthcare innovator, this edition is your roadmap to what's next and how to lead the way.

Flip the page, and join the journey of medical innovation!

N D Vijaya Lakshmi

N D Vijaya Lakshmi
Editor

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Optimizing Healthcare

The Role of Telephone Triage and Advice Lines in Enhancing Patient Care and Reducing Costs

Telephone triage and advice lines enhance healthcare efficiency by directing patients to appropriate care levels, reducing emergency department visits, and optimizing resource allocation. This paper examines their effectiveness, cost-saving benefits, and technological advancements, including artificial intelligence, in improving patient outcomes while alleviating pressure on overburdened healthcare systems worldwide.

Dr. Seleem R. Choudhury

Chief Operating Officer at Adventist HealthCare & Shady Grove Medical Center

Healthcare systems across the United States and around the world have increasingly adopted telephone triage and advice lines as a means of directing patients to the most appropriate level of care. These services, staffed by trained nurses or medical professionals, help assess symptoms, provide medical guidance, and determine whether a patient requires emergency care, an urgent care visit, or self-care at home (Morse, Ostberg, Jones, & Chan, 2020). Countries like the United Kingdom, Canada, and Australia have implemented similar models.

Telephone triage systems can improve healthcare efficiency, reduce costs, and lead to better patient outcomes. However, these systems are not without challenges. Issues such as misdiagnosis or accessibility barriers decrease the effectiveness of telephone triage systems to meet patient needs. Ever-evolving technology and artificial intelligence play a crucial role in addressing these challenges and improving triage accuracy, ultimately alleviating strain on emergency services and healthcare providers.

Scalable solutions for mounting challenges

Telephone triage and advice lines are essential as the U.S. healthcare system faces mounting pressure from an aging population, escalating healthcare costs, and the lingering effects of the COVID-19 pandemic. With nearly 17% of the U.S. population aged 65 or older and healthcare expenditures surpassing $4.3 trillion in 2021, the demand for medical services only continues to grow (Centers for Medicare & Medicaid Services, 2022). Emergency departments and primary care providers are experiencing increased patient loads, leading to longer wait times and higher costs. Additionally, the healthcare workforce shortage—exacerbated by provider burnout and retirement—limits the system's capacity to respond effectively (Henry, 2024).

In this challenging landscape, telephone triage services offer a scalable solution by optimizing healthcare resource allocation and ensuring patients receive appropriate care without unnecessary hospital visits. The NHS 111 service in the UK, for example, has been shown to reduce unnecessary emergency department visits while ensuring timely care for those in need (MacLellan, Turnbull, Prichard, & Pope, 2023; Fernandes, & Ray, 2023). Research has shown that nurse-led triage systems like the UK's NHS 111 and Health Link in Canada help reduce non-urgent emergency department visits while maintaining patient safety (Jeyaraman, Alder, Copstein, Al-Yousif, Suss, & Zarychanski, 2022).

These services rely on trained professionals and decision-support tools to assess symptoms and guide patients to the correct level of care. Increasingly, artificial intelligence and digital health platforms are being integrated to enhance efficiency and accuracy (Chenais, Lagarde, & Gil-Jardiné, 2023). As healthcare systems continue to struggle with workforce shortages and financial constraints, expanding and improving these services will be crucial to maintaining accessible and efficient healthcare for all.

Reducing costs by helping patients seek appropriate care

Telephone triage systems can significantly reduce healthcare costs by decreasing unnecessary emergency department (ED) visits, optimizing primary care utilization, and improving resource allocation. Many patients visit the ER for non-emergency conditions that could be treated in lower-cost settings, such as urgent care clinics or through self-care at home. Studies have shown that up to 30% of ER visits in the U.S. are non-urgent, costing the healthcare system billions annually (Weinick, Burns, & Mehrotra, 2010). By providing real-time assessments and directing patients to the most appropriate level of care, telephone triage can help reduce the financial burden on hospitals and insurers while ensuring that emergency resources remain available for true emergencies (Allen, Cummings, & Hockenberry, 2021).

For instance, a study analyzing over 868,000 cases revealed that the use of telephone triage services was inversely associated with unnecessary ambulance use, suggesting that patients received appropriate care without resorting to emergency services (Katayama, Kitamura, Nakao, Himura, & Deguchi, 2022).

In addition to lowering ED demand, telephone triage services help reduce unnecessary primary care visits. Patients often schedule doctor appointments for minor ailments that can be managed with home care or over-the-counter treatments. Triage nurses and digital decision-support tools can assess symptoms remotely and provide guidance, leading to fewer in-person visits and reducing physician workload (Gellert, G. A., Rasławska-Socha, Marcjasz, Price, Heyduk, Mlodawska, & Orzechowski, 2023). This optimization of healthcare resources also allows providers to focus on more critical cases, improving efficiency and patient outcomes (Ziebart, Kfrerer, Stanley, & Austin, 2023). As technology advances, integrating artificial intelligence into triage systems can further enhance accuracy and scalability, driving even greater cost savings across the healthcare system (Thethi, 2024; Alemede, 2025).

> Telephone triage systems can improve healthcare efficiency, reduce costs, and lead to better patient outcomes.

Improving patient outcomes

Telephone triage services have demonstrated significant improvements in patient health outcomes by facilitating timely medical guidance and appropriate care decisions. A recent study focusing on patients with cerebrovascular diseases found that those who utilized telephone triage services had higher rates of discharge to home by day 21 of hospitalization compared to those who directly called for an ambulance, indicating enhanced recovery trajectories (Deguchi, Katayama, Himura, Nishimura, & Nakagawa, 2023).

Additionally, nurse-led telephone triage systems, especially those utilizing computerized decision support systems (CDSS), have been shown to perform better than general practitioners in certain health-related assessments (Graversen, Christensen, & Pedersen, 2020). This approach resulted in lower levels of clinically relevant undertriage, thereby enhancing patient safety and outcomes.

Telephone triage services continue to prove their efficacy in improving patient health outcomes by ensuring timely, appropriate, and efficient medical care (Napi, Zaidan, Zaidan, Albahri, Alsalem, & Albahri, 2019)

Enhancing the patient experience

A nurse-led telephone advice line plays a significant role in improving patient education and empowerment by offering accessible, timely, and personalized health information. Patients can call from the comfort of their homes and receive evidence-based guidance tailored to their symptoms or concerns (Karimi, et al, 2021). This immediate access allows for enhanced understanding of their condition, appropriate self-care strategies, as well as clarity on when to seek further care, promoting autonomy and confidence in managing health. Studies have shown that patients who use nurse triage lines report improved knowledge of their conditions and greater satisfaction with self-management support (Sezgin & Bektas, 2024). This model fosters a shift from passive receipt of care to active participation, aligning with broader goals of patient-centered healthcare.

Moreover, telephone advice lines enhance the overall patient experience by offering convenience, reducing anxiety, and building trust in the healthcare system. Many patients appreciate the ability to speak with a knowledgeable healthcare professional without the time, cost, and stress associated with in-person visits. This can be especially beneficial for individuals in rural areas or those with mobility challenges. Research indicates that patients who use nurse advice lines often report high levels of satisfaction with their care, citing feelings of reassurance, improved understanding, and appreciation for compassionate communication from nurses.

In a 2017 qualitative study, Kaminsky and colleagues conducted interviews with patients who had used telephone advice services. They found that patients highly valued the emotional support and professional communication provided by nurses. Participants described feeling reassured and more confident in managing their health after the call. The study highlighted the importance of the nurse's tone, active listening, and ability to explain medical issues clearly—factors that significantly contributed to a positive experience and overall satisfaction. Telephone triage services not only address immediate clinical concerns but also help patients feel heard and supported, contributing to a more positive and holistic healthcare experience.

> By embracing telephone triage as a core component of modern healthcare delivery, systems can improve efficiency, patient safety, and overall health outcomes.

A practical solution for today's healthcare challenges

The growing adoption of telephone triage and advice lines across global healthcare systems highlights their vital role in optimizing resource allocation, reducing costs, and improving patient outcomes. As research has shown, these services effectively decrease unnecessary emergency department visits, prevent avoidable hospital admissions, and ensure that patients receive the right level of care in a timely manner (Salisbury, Chalder, Scott, Pope, & Moore, 2002; Blank, Coster, O'Cathain, Knowles, Tosh, & Turner, 2012). All of this adds up to a more efficient healthcare industry better equipped to improve patient outcomes. With increasing healthcare demands due to an aging population, workforce shortages, and rising costs, telephone triage provides a scalable and effective solution that enhances access to medical guidance while alleviating pressure on overburdened healthcare facilities.

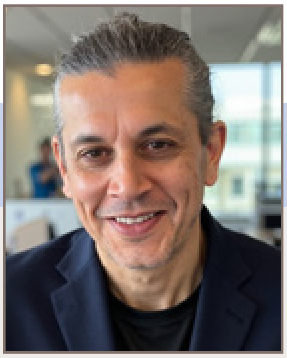
Additionally, these services promote continuity of care by helping patients navigate the healthcare system, adhere to care plans, and follow up with the appropriate provider. They also enable early detection of serious conditions, particularly in vulnerable or rural populations who may delay seeking care. In this way, telephone triage not only supports the immediate redistribution of clinical workload but also contributes to long-term improvements in public health and chronic disease management. The integration of nurse-led triage into primary and urgent care models reflects a proactive approach to healthcare delivery, positioning it as a critical component of modern, patient-centered systems.

Moreover, advancements in artificial intelligence and digital decision-support tools continue to refine triage accuracy, further strengthening the reliability of these services. These technologies assist nurses by providing evidence-based algorithms and real-time analytics to guide clinical decisions, ensuring that patients are directed to the most appropriate level of care with greater precision. Countries like the United Kingdom and Canada have successfully demonstrated the effectiveness of such systems, reinforcing their potential for broader implementation in the United States and beyond (Taylor, Chmura, Hinson, Steinhart, & Sangal, 2025). In the U.K., the NHS 111 service has become a cornerstone of urgent care, offering both digital and telephone-based triage to manage high patient volumes while maintaining quality care. Similarly, Canada's HealthLink system and Los Angeles's Health Nurse advice line have been instrumental in supporting underserved and rural communities, helping reduce disparities in access to care.

By embracing telephone triage as a core component of modern healthcare delivery, systems can improve efficiency, patient safety, and overall health outcomes. These services also support continuity of care by seamlessly integrating with electronic health records and allowing for appropriate follow-up and referrals. In an era where healthcare systems must do more with fewer resources, telephone triage lines stand as a practical and forward-thinking solution, cementing their role in the future of healthcare. Their adaptability, cost-effectiveness, and patient-centered focus make them indispensable in the evolving landscape of digital and community health services.

In my years as a nurse and healthcare leader, I've learned that sometimes the most powerful care starts with a simple conversation. I've spoken with patients who were scared, uncertain, or just needed someone to listen—and that voice on the other end of the phone made all the difference. Telephone triage isn't just about directing traffic in a busy system; it's about meeting people where they are, offering guidance, comfort, and timely care. As we face growing challenges in healthcare, these personal connections—powered by both compassion and technology—are more important than ever.

References are available at www.americanhhm.com



AUTHOR BIO

Dr. Seleem R. Choudhury, DNP, MBA, RN, CEN, FAEN, is a seasoned healthcare executive and clinician with over 30 years of experience. He currently serves as a senior hospital leader at Adventist HealthCare and is dedicated to advancing population health, patient-centered care, and innovative health system transformation.

The Journey from Innovation to Institution

Interventional Neurology Today

Now entering its fourth decade, interventional neurology has matured into a vital, precision-driven discipline at the crossroads of neurology and neurosurgery. This editorial explores how minimally invasive techniques transform outcomes in stroke, aneurysms, AVMs, and more, revealing how far the field has come and where it is heading.

Camilo R. Gomez, MD, MBA

Professor of Neurology, University of Missouri-Columbia, President & CEO, CK Strategic Solutions Group, LLC

Interventional neurology, once considered an aspirational outgrowth of clinical neurology, has evolved over the past three decades into an indispensable component of modern neurovascular care. This dynamic subspecialty bridges the intellectual framework of neurology with the technical precision of catheter-based therapies, offering targeted, often life-saving, interventions for acute ischemic stroke, cerebral aneurysms, arteriovenous malformations (AVMs), venous thromboses, and other complex conditions.

In reviewing the history of interventional neurology, its journey began with the conceptual groundwork laid nearly a century ago. In 1927, Egas Moniz conceived cerebral angiography and essentially created the possibility of visualizing the brain vasculature in vivo. A neurologist by training, Moniz envisioned a world where diseases of the brain could be understood, and eventually treated, through the vessels that supplied it. In all fairness, because of his severe gouty arthritis, he was forced to delegate the task of angiographic procedural completion to his colleague and partner, neurosurgeon Pedro Almeida Lima. As it turns out, Moniz was awarded the 1949 Nobel Prize in Medicine, not for introducing cerebral angiography, but for his work in the application of cerebral leucotomy (lobotomy). However, the decades

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that followed saw neuroangiographic procedural innovation gravitate away from neurology toward neuroradiology and, to some degree, neurosurgery. In parallel, Moniz's original vision was being operationalized and morphed into a bona fide interventional discipline.

During the latter part of the 20th century, advances in neuroimaging, catheter technology, and clinical emergency systems aligned to bring neurologists back into the procedural arena. In the United States, the 1980s and 1990s saw isolated yet visionary efforts by neurologists who believed they could offer more than observation and diagnosis. Early organized initiatives at Saint Louis University and the University of Alabama at Birmingham led to the development and implementation of operational initiatives such as "Code Stroke" alerts, intended to systematize and operationalize the rapid evaluation and intervention of acute ischemic stroke.

These initial protocols laid the foundation for a neurologist-led procedural model. Initially, due to a lack of a politically acceptable and inclusive neurointerventional infrastructure, partnering with interventional cardiologists, the handful of neurologists directly involved in the incipient subspecialty developed workflows designed to reduce stroke diagnostic and treatment times dramatically. It was in these crucibles of urgent care that neurologists began to reassert procedural credibility, especially as outcomes spoke louder than skepticism. Our own work proved not only that neurologists could perform urgent neuroendovascular rescue but that such a procedural perspective could easily become the anchor point for further procedural development, with progressive amplification of the operators' interventional skillset.

In parallel, other neurologists around the world were making similar strides and, looking back, the rise of interventional neurology from isolated efforts into a burgeoning movement can be objectively traced and examined. As different programs began to coalesce and subspecialty educational fellowships were introduced, first informally, then through more official pathways via organizations such as the Accreditation Council for Graduate Medical Education (ACGME) and the United Council for Neurologic Subspecialties (UCNS). By 2008, the University of Minnesota had launched the first ACGME-accredited fellowship in "endovascular surgical neuroradiology", the politically correct name by which the "all-inclusive" training programs used to be known.

Interventional neurology today stands on that foundation. It is no longer an experiment. It is a field with defined competencies, a growing body of literature, and a global network of operators. Its practitioners routinely perform not only thrombectomy (i.e., the most common procedure included under the rubric "neuroendovascular rescue") but also aneurysm coil embolization and flow diversion, liquid and particle embolization for AVM and tumors, angioplasty and stenting of extracranial and intracranial stenotic lesions, treatment of venous sinus thrombosis, endovascular closure of arteriovenous fistulas and, although less frequently, the application of endovascular interventions to the management of spinal disorders.

Unlike many other subspecialists, particularly radiologists, the role of interventional neurologists does not begin at the procedure and end at device deployment. Instead, it resembles the scope of practice of interventional cardiologists, encompassing the full clinical care continuum: initial clinical evaluation, diagnostic imaging interpretation, procedural counseling and planning, catheter-based procedural application, and post-procedure neurocritical management. This level of incorporation brings both intellectual fulfillment and accountability. The ability to integrate clinical signs with imaging patterns and determine the need for intervention constitutes the core skill set of interventional neurologists.

> Interventional neurology today stands on a strong and well-established foundation. It has evolved beyond the experimental stage into a recognized specialty with clearly defined competencies, an expanding body of literature, and a global network of operators.

Such a broad scope of practice also underscores the need for structured, high-quality training. Yet herein lies one of the field's persistent challenges: Training pathways remain heterogeneous. In the U.S., a typical route involves completing a neurology residency followed by fellowships in vascular neurology or neurocritical care, and then a one- or two-year interventional fellowship. However, many training sites remain embedded in neurosurgery or radiology departments, which keep control of access very "close to the vest" and can easily restrict access for neurology-based learners.

In Europe, parts of Asia, and Latin America, the situation varies. In countries such as Colombia and Spain, interventional neurology is often regarded as a "second specialty," pursued after obtaining board certification in neurology or neurosurgery. These programs may emphasize diagnostic imaging, hands-on catheter skills, and hybrid rotations across specialties. And yet, they too often lack standardized certification mechanisms or formal recognition by regulatory bodies.

Professional societies have played a key role in closing these gaps. The Society of Vascular and Interventional Neurology (SVIN), the Society of Neurointerventional Surgery (SNIS), and the World Federation of Interventional and Therapeutic Neuroradiology (WFITN) all advocate for greater inclusion of neurologists and multidisciplinary training. The SVIN, in particular, has supported early-career development through mentorship, research platforms, and educational initiatives. These efforts are beginning to show results, with an almost exponential growth of the number of interventional neurologists joining the ranks of practicing subspecialists.

On the flip side, the ever-increasing need for interventional neurologists is not hypothetical. Stroke remains a leading cause of death and disability worldwide. The advent of thrombectomy for strokes caused by large (and not-so-large) arterial occlusions has revolutionized the care of these patients, but access to such expert care remains uneven. Many hospitals, particularly in rural or underserved areas, lack adequate interventional neurology coverage. Nevertheless, in geographic locations where interventional neurologists are available, systems of care become more agile, integrated, and responsive to patients' needs. As a result, outcomes improve, functional recovery rates climb, and the overall quality of neurovascular care is quickly optimized.

Moreover, the impact of interventional neurology extends beyond urgent treatment of ischemic stroke. The elective securement, via coil embolization or flow diversion, of an unruptured aneurysm can prevent a devastating subarachnoid hemorrhage. Timely embolization of an AVM can greatly facilitate surgical removal, which, in turn, can result in better seizure control, reduced risk of hemorrhage, and progressive neurological decline. Treating venous sinus thrombosis with catheter-directed therapy can salvage lives when anticoagulation fails to correct malignant intracranial hypertension quickly. Each of these interventions embodies the field's ethos: minimally invasive, highly targeted, and informed by neurologic context.

On the other hand, the tools of interventional neurology are only as effective as the clinicians who wield them. That is why the profession must invest in people as much as in educational platforms. Fellowship programs need to be better resourced and hold their graduates to a high standard of critical evaluation. In my personal opinion, interventional neurology is the most complex and challenging field of medical practice currently in existence, and even minimally competent operators do not convey an acceptable level of patient safety and high-quality results.

Conclusion:

In this context, neurology residencies should introduce procedural concepts earlier, while academic departments should promote research and foster collaboration between specialties. Hospitals should recognize that hiring an interventional neurologist is not merely adding a proceduralist; it is acquiring a comprehensively oriented practitioner, one who will seamlessly move between the diagnostic and therapeutic dimensions required for the management of this patient population.

Three decades in, interventional neurology has earned its place not by replacing other disciplines but by complementing them, offering a perspective that bridges diagnosis, intervention, and long-term management. It has moved from being an innovation to becoming an institution. The challenge now is to preserve the pioneering spirit while expanding access, refining systems, and mentoring the next generation.

Interventional neurology is no longer a question of "why" or "if"; it is a discipline of "how" and "what's next." It has proven that when neurologists pick up the catheter, they do more than treat vessels; they elevate the neurovascular standard of care.

References are available at www.americanhhm.com

AUTHOR BIO

Camilo R. Gomez, MD, MBA, is a board-certified neurologist specializing in vascular, critical care, and interventional neurology. With over four decades of experience, he has pioneered advancements in cerebrovascular treatment and mentored numerous physicians. A passionate educator, Dr. Gomez challenges conventional thinking through engaging lectures and his extensive publications. Holding a Lean Six Sigma Black Belt, he has led quality improvement teams to measurable success in clinical operations. Recently, Dr. Gomez has integrated negotiation strategies from law enforcement and business into medicine, enhancing physician communication and reducing burnout. As a speaker and consultant, he assists organizations in optimizing clinical operations, resolving conflicts, and fostering a healthier work culture.

Digital Heart Health

Leveraging Technology for Cardiovascular Disease Prevention

Nigar Babazade
MD, MSC, Vice President of the Global Society of Cardiology

The prevalence of cardiovascular disease is increasing, requiring urgent innovation. Digital technologies, including AI, telemedicine, wearable devices, and smartphone applications, enable scalable, patient-centred care. This article explores the necessity, benefits, and challenges of integrating digital health tools into cardiovascular prevention, highlighting evidence-based innovations and future directions for global impact.

Cardiovascular diseases (CVD) are the leading cause of death worldwide, responsible for nearly 18 million fatalities each year (World Health Organization, 2024). Although advancements in medical and surgical treatments have improved outcomes, the global prevalence of CVD continues to rise, particularly in low- and middle-income countries.

Therefore, the foundation of public health initiatives is prevention. However, traditional prevention strategies frequently encounter several challenges, including low patient engagement, limited resources, and delays in intervention.

As digital health technologies continue to develop, there is a significant opportunity to enhance cardiovascular disease prevention. These tools enable continuous health monitoring, personalized recommendations, and remote engagement, shifting care from a reactive approach to a proactive one. Digital innovations maintain the potential to engage patients more effectively, mitigate risk factors early, and decentralize healthcare delivery.

Evolution of Digital Health in Cardiology

In recent years, irregular clinical visits and patient self-reporting have been key components of cardiovascular prophylaxis. Static clinical settings often employ risk assessment instruments, such as the Framingham score. However, the development of wearable sensors and smartphones has enabled the gathering of dynamic, real-time insights into the physiological data and behaviors of patients.

Electronic Health Records (EHRs) have established a foundation for integrating digital health data into clinical workflows. Telemedicine has expanded access to preventive counseling, especially during the COVID-19 pandemic. Meanwhile, the Food and Drug Administration (FDA) and other regulatory bodies have started to approve digital therapeutics and AI-based diagnostic tools, and this has strengthened their legitimacy and acceptance in clinical practice.

In addition, the increasing affordability of consumer-grade health technologies has further accelerated the adoption of digital platforms among the general public. Large-scale digital health projects are increasingly being financed through public-private partnerships. For instance, in the UK, National Health Service (NHS) trusts are testing AI-assisted cardiovascular screening programs, which enable physicians to identify diseases more accurately in the early stages than with conventional screening techniques. This shift has turned patients from passive recipients of care into active participants in their health journey.

Key Digital Technologies in Cardiovascular Prevention

Wearable Devices

Heart rate, activity levels, sleep patterns, and sometimes even ECGs can be continuously monitored with devices like the Apple Watch, Fitbit, and Omron HeartGuide. According to Perez et al. (2019), the Apple Heart Study demonstrated that wearable technology can reliably identify atrial fibrillation in asymptomatic individuals. These early detection techniques allow patients to seek therapies promptly.

Wearables are increasingly integrated into clinical pathways for risk stratification and follow-up care. Furthermore, to strengthen cardiovascular resilience, some contemporary models monitor oxygen saturation and stress levels and provide guided breathing exercises. Remote patient monitoring programs utilizing wearables have demonstrated promise in reducing hospital readmissions for patients with heart failure.

Mobile Health Applications (mHealth)

Applications such as MyFitnessPal, Kardia, and the NHS's Digital Weight Management Programme provide lifestyle coaching, medication adherence reminders, and blood pressure tracking. A systematic review published in the Journal of Medical Internet Research found that mobile apps significantly improved dietary behavior and physical activity among patients with cardiovascular disease.

These apps also frequently incorporate behavioral science strategies, such as reward-based systems and gamification, to enhance user retention and promote long-term changes in health-related behaviors. In order to facilitate real-time data exchange between patients and providers, many programs are now directly connected to primary care physicians, which improves the outcomes of preventive care.

Telemedicine

Telehealth platforms offer routine risk assessments, consultations, and follow-up care. During the pandemic, telemedicine demonstrated significant utility in maintaining continuity of care and reducing cardiovascular events through early interventions (AHA, 2025).

Modern telehealth platforms are expanding beyond virtual consultations by progressively incorporating data dashboards that enable doctors to review metrics from patients' health applications and wearable devices. Video consultations also enhance the delivery of culturally sensitive health education, which is essential for promoting lifestyle modifications in diverse populations. Digital cardiac rehabilitation is one of the several telerehabilitation systems that are currently being widely used to improve secondary prevention following myocardial infarction (MI).

Artificial Intelligence (AI)

AI algorithms analyze large datasets to predict cardiovascular risk.

For instance, the NHS tested an AI-ECG risk prediction tool called Aire, which can interpret subtle ECG changes to predict early mortality and detect structural heart disease (The Guardian, 2024). AI is also utilized to tailor interventions and identify at-risk populations through EHR-integrated tools. ▶

Other cutting-edge AI applications include risk calculators for statin therapy, predictors of heart failure readmissions, and even voice analysis to detect stress-induced cardiac anomalies. Deep learning models can process vast data points from ECGs, imaging, lab reports, and patient histories to support diagnostic and preventive decision-making. The expanding role of AI will increasingly impact the practice of preventive cardiology globally.

Benefits of Digital Health in CVD Prevention

Enhanced Patient Engagement

Patients equipped with wearables and apps are more likely to monitor their health metrics and adopt lifestyle changes. AHA (2025) highlights how digital tools foster sustained behavioral change by making health tracking intuitive and rewarding.

Engagement metrics from recent studies show that patients using mobile platforms log higher levels of daily activity, improved medication adherence, and fewer missed appointments. In populations with previously low health literacy, visual tools and reminders offered through apps have demonstrated an improved understanding of cardiovascular risk factors.

Early Detection and Intervention

Real-time data allows for earlier detection of arrhythmias, hypertension, and sedentary behavior. The mSToPS trial showed that patch-based monitors improved AF detection and led to earlier initiation of anticoagulants (Turakhia et al., 2020).

This shift to real-time monitoring creates a preventive window, enabling healthcare providers to intervene before symptom onset. App-enabled devices for at-home blood pressure monitoring have accelerated medication titration in patients with hypertension and improved blood pressure control. On top of that, acute decompensations in heart failure patients have been prevented in part by early warning signs of weight increase.

Personalized Care

Digital tools enable the customization of health advice based on real-time data. AI can generate individualized risk scores by combining genomic, lifestyle, and biometric data (Nature Reviews Cardiology, 2024).

Instead of relying solely on population averages, digital systems now enable care pathways to be customized based on individual behavioral patterns, genetic predispositions, and environmental exposures.

Improved Accessibility

Remote monitoring and telemedicine services reach rural and underserved populations and, consequently, reduce the urban-centric model of cardiovascular care.

In countries with a limited number of specialists, mobile platforms are enabling access to preventive cardiology. Risk factor screening and referring high-risk individuals would be enabled by community health workers who are equipped with digital health tablets and apps.

Even during natural disasters or geopolitical conflicts, cloud-based platforms have enabled continuous care and reinforced the healthcare systems' reliance.

Challenges and Considerations

Data Privacy and Security

The risk of breaches increases with the amount of data collected. Sustaining patient confidence requires adherence to GDPR and HIPAA.

As digital health becomes more popular, security measures must also change. Along with digital health implications, security protocols should also be developed. Health data is guaranteed via the use of biometric logins, encryption standards, and real-time anomaly detection systems.

Digital Divide

Unreliable internet and limited smartphone access may be difficulties in many places. Additionally, these tools may not be as helpful to those who are less accustomed to or less experienced with them (AHA, 2025).

Digital imbalance is a social and technological problem. Offering multilingual digital health material, subsidizing mobile devices for patients with chronic illnesses, and training underprivileged and older populations in digital health literacy are some solutions.

Regulatory Hurdles

Digital tools must pass regulatory scrutiny. There is considerable variability in approval standards across countries, which can lead to delays in implementation. AI tools require strict validation before they can be deployed clinically.

> The expanding role of AI will increasingly impact the practice of preventive cardiology globally.

To harmonize regulations, agencies such as the FDA, EMA, and WHO are collaborating to establish common frameworks for assessing digital tools.

Clinical Validation

Despite their potential, many digital interventions have not been studied in extensive randomized controlled trials. It is a research priority to ensure their effectiveness across various populations. Several pragmatic studies on the brink of design utilize digital tools in actual healthcare settings. These trials aim to address questions about usability, effectiveness, cost-efficiency, and scalability, offering a more comprehensive understanding of digital health’s preventive potential.

Case Studies and Real-World Applications

Apple Heart Study

Conducted with over 400,000 participants, the study validated that smartwatches can detect

AF and prompt clinical follow-up (Perez et al., 2019).

AI-ECG Risk Estimation (Aire)

Aire is an AI tool used in the NHS to analyze ECG data and predict the risk of early heart disease and sudden cardiac death.Some initial findings show potential for effectively stratifying risk. (The Guardian, 2024).

DAPHNE Platform

This EU-funded project uses cloud analytics, sensors, and mobile platforms to provide individualised coaching for managing cardiovascular risk factors and obesity (Wikipedia, 2024).

Future Directions

Integration of Genomic Data

Shortly, cardiovascular prevention will likely involve the systematic use of polygenic risk scores combined with digital health tools. These scores provide more profound insights into genetic predisposition, facilitating earlier detection and more individualized preventive strategies through the combined analysis of genomic and wearable data.

Advancements in AI

AI in cardiology is advancing rapidly, moving beyond risk prediction to provide real-time clinical support. These technologies can aid in early diagnosis, informed treatment decisions, and patient monitoring by analyzing data from imaging, biosignals, and clinical notes.

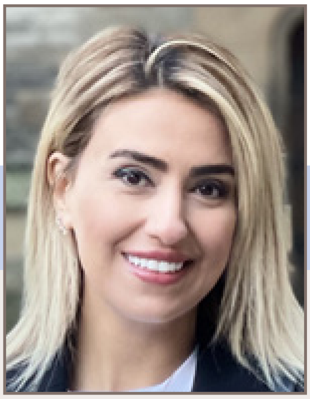
Policy Development

A significant challenge ahead lies in creating unified regulatory frameworks for digital health. Governments and international organizations must collaborate to ensure interoperability, equity, and safety in the use of digital tools. Establishing clear standards for data protection, algorithm transparency, and reimbursement models will be essential to mainstream adoption.

Conclusion

In conclusion, there is a growing burden of cardiovascular disease calling for a fundamental transformation in how we approach prevention. Digital tools now play a key role by enabling early detection, supporting patient engagement, and tailoring care to individual needs. To realize their full potential, we must ensure equitable access, strong clinical validation, and unified global policies.

References are available at www.americanhhm.com



AUTHOR BIO

Dr. Nigar Babazade is a GMC-registered cardiologist with international expertise in heart failure, cardiac imaging, and medical education. A Chevening Scholar and MSc graduate from the University of Glasgow, she currently serves as Vice President of the Global Society of Cardiology, where she promotes innovation and collaboration in cardiovascular care worldwide.

Surgery without the Scalpel

The Promise and Potential of Focused Ultrasound

Focused ultrasound is a noninvasive therapeutic technology using precisely targeted sound waves to treat tissue without incisions. With applications in over 180 diseases, it enhances drug delivery, boosts cancer immunotherapy, and offers an alternative to surgery. This breakthrough is poised to revolutionize treatment, much like MRI transformed diagnosis.

Neal F. Kassell

MD, founder and chairman,
Focused Ultrasound Foundation

When most people think of ultrasound, they picture a noninvasive diagnostic tool—perhaps a sonogram during pregnancy or an imaging test used to examine organs and soft tissues. But in recent years, a new and transformative form of ultrasound has entered the medical landscape: focused ultrasound. No longer limited to diagnostics, ultrasound is now being used to treat disease in ways that are precise, effective, and completely noninvasive.

What is Focused Ultrasound?

Focused ultrasound is a rapidly advancing therapeutic technology that uses sound waves—targeted and intensified—to treat tissues deep within the body. What sets it apart is that it can do this without the need for incisions, needles, general anesthesia, or radiation. For patients, this means fewer risks, shorter recovery times, and less time spent in the hospital. For healthcare systems, it holds the promise of more efficient use of resources, reduced costs, and improved outcomes.

The US FDA has approved focused ultrasound for nine indications to date, including essential tremor, Parkinson's disease, prostate and liver tumors, and uterine fibroids. Around the world, the technology has been approved for more than 30 indications and is in various stages of research and development for more than 180 diseases and conditions. With each passing year, its clinical potential continues to expand.

At its core, focused ultrasound works by concentrating multiple beams of sound energy on a precise point inside the body, similar to how a magnifying glass can focus sunlight on a single spot. The individual sound waves pass harmlessly through tissue until they intersect at the target area. There, the combined energy can create thermal, mechanical, or biological effects that treat the disease in question. Imaging, often MRI or ultrasound, allows clinicians to guide and monitor the treatment with exceptional precision.

The biological effects of focused ultrasound are diverse—currently, more than 30 mechanisms of action have been identified. Some, like tissue ablation or blood clot disruption, create permanent changes; others, such as opening the blood-brain barrier (BBB) or altering nerve activity, are temporary and reversible. Because of this broad range of mechanisms, focused ultrasound can be tailored for a wide variety of clinical applications, from oncology and neurology to women's health and pain management.

Oncology and Immunotherapy

One particularly exciting application of focused ultrasound is in oncology, where it can both destroy tumor tissue directly and also stimulate the body's own immune system to attack tumors. When these tumors are treated with focused ultrasound, the damaged cells release proteins and signals that alert the immune system to the presence of cancer, potentially generating a localized or even a systemic immune response capable of targeting metastatic disease.

This immune-activating effect has led researchers to explore focused ultrasound as a powerful complement to immunotherapy, especially for tumors that have so far proven to be resistant to this class of therapies, such as breast, pancreas, brain, and prostate cancer. Preclinical laboratory studies suggest that focused ultrasound may enhance the effectiveness of immunotherapy by improving drug delivery and making tumors more recognizable to the immune system. There are early-stage clinical trials, including one at the University of Virginia combining focused ultrasound with pembrolizumab for metastatic breast cancer, that are currently underway to assess these immune modulatory effects in patients afflicted with cancer.

Neurodegenerative Conditions

Focused ultrasound is also breaking new ground in the treatment of neurological diseases. One of the greatest challenges in treating brain diseases is the blood brain barrier (BBB), a protective lining on the inside of brain blood vessels, that prevents most drugs from reaching brain tissue. While essential for brain health, the BBB has limited the effectiveness of treatments for conditions like Alzheimer's Disease, ALS, and Parkinson's Disease.

Focused ultrasound may offer a solution. By injecting microbubbles into the bloodstream and directing ultrasound waves at specific brain regions, clinicians can temporarily and noninvasively open the BBB. This process allows large therapeutic moleculesto pass through and reach their targets. The barrier typically reseals within 48 hours, minimizing any risks and side effects.

This technique has already been used in patients with Alzheimer's disease to facilitate the delivery of aducanumab, an FDA-approved drug that targets amyloid plaques—a hallmark of the disease. Early studies showed that combining focused ultrasound with the drug resulted in significantly greater plaque reduction in treated areas, with 30% faster clearance and a 50% greater total reduction compared to untreated regions. Another recent study demonstrated both a reduction in amyloid and improvement in one neuropsychiatric test, suggesting early signs of clinical benefit. ▶

> The impact is undeniable: focused ultrasound is improving quality of life, extending survival, and in many cases, saving lives.

Focused ultrasound is also being investigated as a tool for noninvasive neuromodulation, with the potential to precisely alter brain activity in neurodegenerative conditions like Parkinson's disease and ALS. Researchers are now exploring whether focused ultrasound can modulate dysfunctional neural circuits to improve nerve conduction and also open the BBB to enhance drug delivery — innovative approaches that may open new therapeutic pathways for two diseases that have long lacked effective treatment options.

Psychiatric Conditions

Additionally, focused ultrasound has emerged as a promising therapeutic option for many psychiatric disorders, including depression, obsessive-compulsive disorder (OCD), and opioid addiction. Using focused ultrasound as a thermal ablation device, researchers at Sunnybrook Health Sciences Centre in Toronto published long-term positive results from early clinical trials using MR-guided focused ultrasound to treat OCD and major depressive disorder, with especially strong results in patients with OCD after one year of follow-up. In another study from Korea, 10-year follow-up data confirmed that focused ultrasound is a safe and effective treatment for OCD, with participants reporting significant symptom reduction and improved daily functioning.

Focused ultrasound can also be used to perform neuromodulation and alter the activity of neurons for a variety of psychiatric conditions, including depression, anxiety, schizophrenia, OCD, PTSD, and various addictions such as alcohol, tobacco, and opioid usage.

The Future of Focused Ultrasound

As with any breakthrough medical technology, integration into mainstream clinical practice takes time. Regulatory approvals, reimbursement structures, and physician training are all important pieces of the puzzle, as well as communication and collaboration between researchers and institutions. But momentum is building.

Today, the field includes more than 70 device manufacturers along with a wide network of microbubble developers, imaging equipment makers, and distributors that are driving global adoption. In the last year alone, nearly 151,000 patients were treated using more than 2,300 focused ultrasound systems worldwide, bringing the total to over one million patients treated to date.

For those across the healthcare ecosystem—whether in hospital leadership, policy, advocacy, or health IT—focused ultrasound represents a powerful convergence of safety, innovation, and patient-centered care. It addresses many of the system's greatest challenges: high surgical costs, long recovery times, and the risks of invasive procedures. By offering a truly noninvasive, image-guided alternative, focused ultrasound is redefining what it means to undergo surgical procedures.

For patients, the benefits are clear: faster recovery, fewer complications, including reduced risk of infection, bleeding, and tissue damage, and less fear.

Looking ahead, the potential of focused ultrasound is immense. It is not just a new tool—it is a transformational platform that is reshaping how we treat disease. As a noninvasive, highly targeted, and versatile approach, it offers a safer, faster, and more precise therapeutic tool.

But every day without focused ultrasound means unnecessary suffering, preventable disability, and lives lost to conditions we already have the technology to treat. The next step is not invention it's awareness, access, and adoption.

The impact is undeniable: focused ultrasound is improving quality of life, extending survival, and in many cases, saving lives. For healthcare professionals committed to advancing care, this is not just the future of medicine it is the future we must build together. ■

AUTHOR BIO

Neal F. Kassell, MD, is the founder and chairman of the Focused Ultrasound Foundation and former co-chair of neurosurgery at the University of Virginia. He has published more than 500 scientific papers and book chapters, and his research has been supported by over $30 million in NIH and industry grants and contracts. The latest information on the focused ultrasound field can be found in the Foundation's 2024 Year in Review report

LABORATORY AUTOMATION AND EFFICIENCY

While challenges remain, the benefits of automation Laboratories are the backbone of healthcare systems, providing critical diagnostic data that informs patient care decisions. With the increasing demand for rapid and accurate test results, laboratories face significant challenges, including managing high workloads, ensuring precision, and maintaining cost-efficiency. Laboratory automation has emerged as a game-changer in addressing these challenges, transforming the landscape of clinical diagnostics by enhancing efficiency, reducing human error, and optimizing workflows.

In this article, we will explore the evolution and impact of laboratory automation, its benefits, the different types of automated systems in clinical laboratories, and the future direction of this transformative technology. The discussion is grounded in my experience as a Medical Laboratory Scientist, Research Scientist, and Public Health Expert, combined with scientific evidence from the field.

The Evolution of Laboratory Automation

Laboratory automation has a long history, with its roots traced back to the mid-20th century.

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Laboratory automation revolutionizes healthcare by improving diagnostic accuracy, reducing turnaround time, and enhancing workflow efficiency. This article explores the impact of automated systems in clinical laboratories, highlighting how they streamline processes, minimize human error, and ultimately optimize patient care within hospital and healthcare settings.

Dennis Odoi
Medical Laboratory Scientist, Research Scientist, and Public Health, Sonotech Medical and Diagnostic Center

Early innovations focused on automating simple tasks, such as pipetting and mixing reagents, to reduce manual errors and increase throughput. However, it wasn't until the advent of advanced computing technology and robotics in the 1980s and 1990s that laboratory automation truly began to revolutionize the clinical laboratory setting.

The automation systems of today are far more sophisticated, capable of performing complex workflows from specimen reception to result reporting with minimal human intervention. This includes pre-analytical, analytical, and post-analytical phases of testing, where automation ensures that sample handling is consistent and efficient throughout the process. Modern automated laboratories integrate multiple instruments into a cohesive, streamlined system, providing enhanced accuracy and reducing variability that can arise from manual handling. ▶

Types of Laboratory Automation Systems

There are various levels of automation in clinical laboratories, each offering unique advantages based on the laboratory's needs and resources. These systems can be broadly classified into two categories: Total Laboratory Automation (TLA) and Modular Automation.

Total Laboratory Automation (TLA)

TLA systems are comprehensive, end-to-end solutions that automate all phases of the laboratory process, from sample receipt to result reporting. These systems include a combination of pre-analytical, analytical, and post-analytical automation to handle tasks such as sample sorting, centrifugation, aliquoting, testing, and data management.

One example of TLA is the Siemens Healthineers Atellica Solution, which offers automated workflow solutions that seamlessly integrate different laboratory disciplines. TLA systems also often include track-based technologies, where samples are transported between instruments on an automated conveyor belt, reducing the need for manual sample movement.

TLA systems provide significant advantages, particularly in large, high-volume laboratories. They maximize efficiency, reduce turnaround time, and improve standardization across multiple testing platforms. However,

> Laboratory automation is a transformative technology that has revolutionized clinical diagnostics by improving efficiency, accuracy, and workflow integration.

they also come with high initial costs, requiring significant investment in infrastructure and training.

Modular Automation

Modular automation, on the other hand, allows laboratories to automate specific sections of their workflow based on their needs and budget. This flexibility enables laboratories to gradually incorporate automation, scaling up as required. For example, laboratories can begin by automating the pre-analytical phase, such as sample sorting and barcode labeling, and then progress to automating the analytical and post-analytical phases over time.

One of the key advantages of modular automation is that it can be tailored to the size and scope of the laboratory. Smaller laboratories may not have the need or financial capacity for full TLA, but they can still benefit from automating critical steps to enhance efficiency and accuracy.

The Impact of Laboratory Automation on Efficiency

1. Increased Throughput and Productivity

The primary driver of laboratory automation is the ability to handle high volumes of samples in a shorter time frame. Automated systems can process thousands of samples per day without experiencing fatigue or inconsistency, which is a common issue with manual handling. In high-volume clinical settings, such as hospitals and reference laboratories, this increased throughput is invaluable, allowing for faster diagnosis and treatment of patients.

2. Improved Accuracy and Precision

Laboratory errors, particularly during the pre-analytical phase, can significantly affect patient outcomes. Errors such as sample mislabeling, incorrect sample handling, and manual pipetting inaccuracies can lead to false results, delayed diagnoses, or unnecessary repeat testing. Automation minimizes the risk of human error by ensuring that samples are consistently handled, labeled, and processed.

3. Enhanced Workflow Integration

One of the most significant benefits of laboratory automation is the ability to integrate different aspects of the laboratory workflow into a cohesive system. Traditionally, laboratories relied on separate instruments for different tests, often requiring manual intervention to move samples from one machine to another. Automation bridges these gaps, allowing for seamless transitions between testing platforms.

Automation systems can also be integrated with Laboratory Information Systems (LIS), enabling automatic data entry and real-time result reporting. This integration reduces the need for manual data input, further minimizing the risk of transcription errors and speeding up the overall process.

4. Cost-Effectiveness and Resource Optimization

While the initial investment in automation systems may be high, the long-term cost savings and resource optimization make them highly cost-effective. Automated systems reduce the need for manual labor, lowering staffing costs and allowing laboratory personnel to focus on more complex, value-added tasks. Additionally, automation systems often reduce reagent consumption through more precise pipetting and aliquoting, leading to further cost savings.

Automation and the Role of Laboratory Professionals

Contrary to concerns that automation may lead to a reduction in the need for laboratory personnel, automation actually enhances the role of laboratory professionals by allowing them to focus on more specialized tasks. Automated systems handle routine, repetitive tasks, freeing laboratory scientists and technicians to engage in more complex problem-solving, quality control, and interpretation of results.

In addition, laboratory personnel are still essential for maintaining and troubleshooting automated systems, validating test results, and ensuring that the systems are functioning optimally. As automation becomes more widespread, the role of the laboratory professional is shifting towards that of an operator and manager of sophisticated technologies, requiring continuous training and education.

Challenges and Considerations

While the benefits of laboratory automation are clear, there are challenges that must be considered, particularly for laboratories transitioning to automated systems. Some of the key challenges include:

High Initial Investment:

The cost of purchasing and implementing automated systems can be a significant barrier, particularly for smaller laboratories with limited budgets. Laboratories must carefully assess the return on investment (ROI) and consider long-term savings in labor and reagent costs when evaluating automation systems.

System Downtime and Maintenance:

Automated systems, like any technology, are subject to technical issues and breakdowns. Laboratories must have contingency plans in place to address system downtime, including trained personnel who can troubleshoot and repair issues promptly. Regular maintenance is essential to ensure that the systems continue to operate efficiently.

Training and Skill Development: Implementing laboratory automation requires personnel to acquire new skills in operating and maintaining automated systems. Ongoing training is critical to ensure that laboratory staff are proficient in using these technologies and can adapt to evolving advancements in automation.

The Future of Laboratory Automation

Looking ahead, the future of laboratory automation is promising, with ongoing advancements expected to further enhance efficiency and diagnostic accuracy. Emerging technologies, such as artificial intelligence (AI) and machine learning, are poised to play a key role in laboratory automation. These technologies can be integrated into automated systems to optimize workflows, predict maintenance needs, and enhance data analysis, ultimately improving diagnostic capabilities.

Moreover, the trend towards personalized medicine and precision diagnostics will drive the need for more sophisticated automation systems that can handle complex molecular and genetic testing. As laboratory automation continues to evolve, it will become an indispensable tool in improving patient care and advancing healthcare outcomes.

Conclusion

Laboratory automation is a transformative technology that has revolutionized clinical diagnostics by improving efficiency, accuracy, and workflow integration. As healthcare demands continue to grow, the adoption of automation will be critical in meeting the increasing need for rapid and reliable test results. For laboratory professionals, automation offers an opportunity to enhance their roles, focusing on more specialized and value-added tasks.

While challenges remain, the benefits of automation far outweigh the costs, making it a worthwhile investment for laboratories of all sizes. By embracing automation, laboratories can optimize their processes, improve patient care, and contribute to the overall efficiency of the healthcare system.

AUTHOR BIO

Dennis Odoi is a Medical Laboratory Scientist, Research Scientist, and Public Health, Sonotech Medical and Diagnostic Center in Ghana. With extensive experience in clinical diagnostics and public health, he is passionate about sharing his knowledge globally and contributing to healthcare advancements through innovative solutions and education.

The Rapid Evolution of Multimodality Cardiovascular Imaging Programmatic Development

Cardiovascular Imaging Services is one of the fastest growing areas of the healthcare market. The traditional model of siloed imaging departments is being disrupted as the volume and complexity of cases increase. Multimodality Cardiovascular imaging practice, training, and service line organisation must evolve to meet the demands of the current healthcare environment

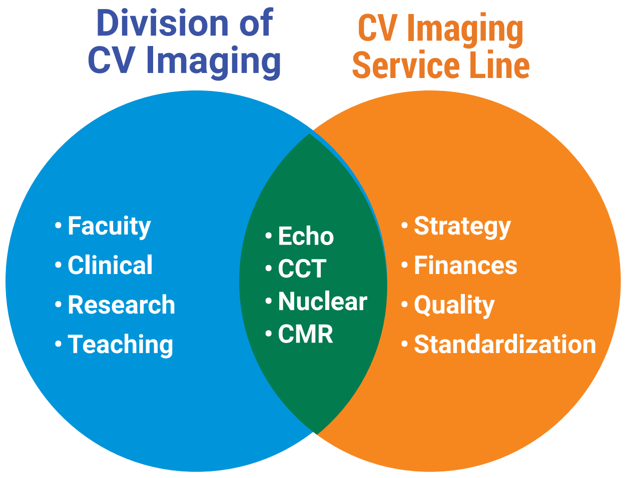
Dr. Omar Khalique

MD, FACC, FSCCT, FASE, FSCMR, FSCAI, Director, Division of Cardiovascular Imaging, St. Francis Hospital and Catholic Health

A Brief History and Description of Siloes of Multimodality Cardiovascular Imaging

As technology progressed, various CVI modalities were developed in the 20th century. These included M-mode echocardiography (echo) in 1953 (Edler and Hertz), single photon emission Computed Tomography (SPECT) in 1963 (Kuhl and Edwards), cardiac computed tomography (CCT) in 1972 (Hounsfield), Positron Emission Tomography (PET) in 1973 (Phelps and Hoffman), Cardiac Magnetic Resonance (CMR) in 1973 (Lauterbur), and the important hybrid field of Structural Heart Disease Imaging (SHDI) in 2007 (Hahn, Leipsic, Leon). Due to the sequential nature of the CVI modalities that were developed at different times and in different locations with different technological factors, each progressed separately. This created 4 general categories of CVI: 1) Echocardiography, 2) Nuclear Cardiology (SPECT + PET), 3) CMR, and 4) CCT It was rare that a physician was an expert in more than 1 of these CVI modalities.

The rapid evolution of the field of structural heart disease and SHDI demonstrated clearly that expertise was required in multiple CVI modalities to facilitate pre-procedural planning and intra-procedural case guidance. Multimodality Imaging (MMI) expertise is becoming more common for new trainees and is routine for those focused on imaging practice.



Current and Future Growth of Cardiovascular Imaging

Cardiovascular Imaging (CVI) is one of the fastest growing areas of the healthcare market. From 2013 to 2022, United States Medicare data have shown that PET, CMR, and CCT volumes have more than doubled, tripled, and quadrupled, respectively, whereas echo volumes have slightly declined and SPECT volumes have declined by 1/3. In total, given that echo and SPECT are the highest volume modalities, a slightly decline in total CVI procedures has occurred. However, the projections for CVI moving forward estimate a compound annual growth rate (CAGR) of 6-8% moving forward, with a higher CAGR expected from CCT and PET as compared to other modalities. Cardiologist billing for the combination of CCT, CMR, and PET has decreased from 73.6 to 58.6% of the procedures from 2013 to 2022, while Radiologist billing has increased from 19.7% to 35.2%.

Challenges

Both Cardiologists and Radiologists are currently facing worsening national supply-demand mismatch within their fields. Cardiologists in training receive minimal education in the newer CVI modalities of CCT, CMR, and PET. To become proficient in these, extra training beyond the 3 years of Cardiovascular Diseases Fellowship is usually required. In most hospitals around the United States, CCT and CMR programs are run within the Department of Radiology

> Integration of a Division of Cardiovascular Imaging into a dedicated service line is critical to streamline this complex healthcare workflow.

which can further limit and complicate training for Cardiology Fellows. As CVI fellowships are not accredited by the Accreditation Council of Graduate Medical Education, CVI is not a universally recognized subspecialty of Cardiology. While the American Board of Radiology certifies Radiologists to read CVI studies, the training and exposure to cardiovascular anatomy, physiology, and clinical cardiovascular implications may be limited during General Radiology Residency. As CVI study acquisition and interpretation is more technically challenging and time consuming than the vast majority of Radiology non-CVI studies, image quality and turnaround times may suffer.

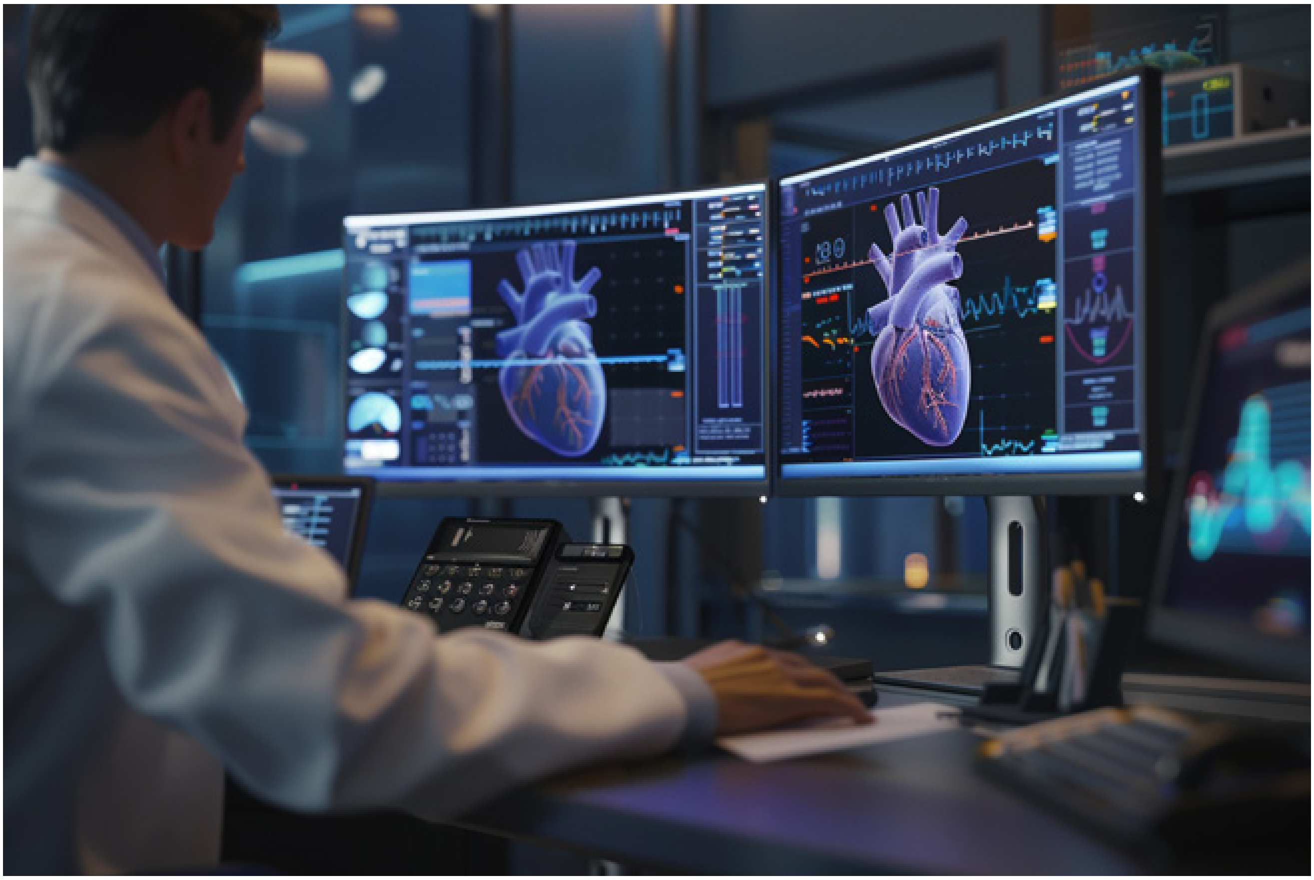
Reimbursement is another challenge for CVI, as noninvasive diagnostic studies are reimbursed at a lower rate than invasive diagnostic studies and therapeutic interventions. The facility fee and read of a coronary CCT for example, is reimbursed at a few hundred dollars whereas an invasive diagnostic angiography without intervention would be reimbursed ~10 fold higher for a similar time of assessment. Many cardiologists are also encouraged to participate in structural heart disease imaging (SHDI) due to the massive manpower demands of the field, and are then exposed to radiation and orthopedic risks which are incongruous with salary. Reimbursement based limitations in the salary of an imaging physician and occupational risks lead to lower recruitment into the field. Practice patterns in both Cardiology and Radiology result in limited dedicated time to read CVI studies. The above factors may further lead to job dissatisfaction.

Due to the rapid growth of CVI, training, quality assurance, and throughput are major challenges. While attempts are being made to enhance training quality and increase the number of training slots to produce more Cardiologist and Radiologist imaging physicians, other solutions must be pursued in parallel. Artificial intelligence (AI) is prevalent within non-cardiac Radiology workflows and to some degree within CVI workflows. However the accuracy and reproducibility within cardiac workflows is more challenging given the complexity of CVI and the field must ensure that before AI adoption in the attempt to improve efficiency, that further overburdening CVI physicians with verifying AI workflows does not occur in which case no true increase in efficiency would be achieved.

The development of new training statements is struggling to keep pace with the evolution of the field. As an example of the rapid knowledge increase in the field, a Pubmed search of "multimodality cardiac imaging" demonstrates an increase in publications from 8 in 2004 to 1,617 in 2024, a greater than 20,000% increase in 20 years. After training is completed, continued training occurs rapidly on the job through a variety of resources; however, due to the exponential increase in information, ongoing education remains a significant challenge.

Organizing Cardiovascular Imaging Services

Traditionally, the subspecialities organized within Cardiology include Interventional, Electrophysiology, and Heart Failure & Transplantation. Newer models include Adult Congenital Heart Disease (overlap with Pediatric Cardiology) and Preventive Cardiology. Organization of the CVI modalities within a dedicated Division of Cardiovascular Imaging (DCVI) is a preferred method of solidifying this field into a recognized subspecialty of Cardiology within institutions. The CVI physicians work within the DCVI in their clinical, research, and teaching roles. In parallel, a Cardiovascular Imaging Service Line (CVISL) can be developed which includes management of all of the CVI modalities across hospital and ambulatory locations within a health system. The leadership who governs the service line is



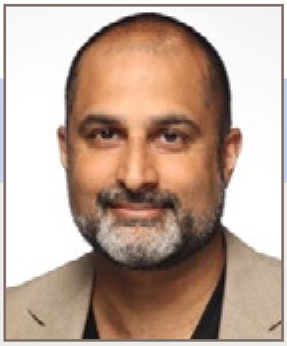
responsible for overseeing and implementing strategic, financial, and quality initiatives for the CVISL.

The DVCI/CVISL is a more efficient way of handling these initiatives and eliminating traditional silos within CVI. The CVISL model also facilitates incorporation of the significant technical resources necessary for the innovation heavy CVI space. Other unique aspects of the CVISL result from the involvement of Cardiologists and/or Radiologists who perform clinical CVI reading services. The CVISL is integrated as part of the overall Cardiovascular Service Line, which improves its efficiency and connection to the main service line. With center specific governance councils, Cardiology imaging physicians, Non-imaging Cardiologists (including but not limited to general, electrophysiologists, interventionists, and heart failure cardiologists) and dyad administrators would be important leaders. Radiologists, where applicable, could also be part of the membership of the CVISL if needed as they are important stakeholders in reading non-cardiac findings and possibly CVI studies as well depending on local operations. However, in newer models where the CVISL is incorporated within the CVSL, the governance council mainly consists of cardiovascular specialists.

Needs for the Future

Needs for the future revolve around attracting trainees to the field, balancing efficiency with quality, and optimizing reimbursement. Attracting new trainees should start in general cardiology fellowship where current exposure is extremely limited. A significant increase in the number of training slots is needed. While newer generation trainees are attracted to the technology and noninvasive aspects of CVI, higher salaries and CVI dedicated practice patterns will be required for retention in the field. Volumes are outpacing the rate of new hiring and resources, and thus improvements in AI to reduce the CVI workload and maintain quality will be additive. Furthermore, efforts legitimize the field as an accredited subspeciality and advocacy work will be needed to improve salaries to reflect the significant extra training and expertise required to produce high quality and accurate results.

References are available at www.americanhhm.com



AUTHOR BIO

Dr. Omar Khalique, MD, FACC, FSCCT, FASE, FSCMR, FSCAI is the Director of the Division of Cardiovascular Imaging at St. Francis Hospital and Catholic Health in Long Island, New York. Dr. Khalique is a recognized international expert in the fields of Multimodality Cardiovascular Imaging and Structural Heart Disease Imaging

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A Clinical Co-pilot receives the First Approval for Class IIb Medical Device

Artificial Intelligence (AI) is transforming healthcare by enabling tools that act as co-pilots in everyday medical practice. This article shares the journey of developing a CE-certified AI-powered solution and reflects on innovation, regulation, and collaboration

In recent years, artificial intelligence (AI) has emerged as a transformative force in healthcare. From diagnostics and personalized medicine to workflow optimization, AI technologies are being embedded into clinical processes with the promise of improving patient outcomes and supporting healthcare professionals in increasingly complex medical environments. One of the most promising applications is an AI-powered assistant developed specifically for medical professionals.

Dr. Vera Roedel
CEO and Co-Founder, Prof. Valmed®

This article explores the journey of creating one of the first CE-certified, AI solutions in Europe. Developed as a speech-based assistant, it supports physicians and medical staff in real-time, offering validated information at the point of care. The innovation process, key challenges, and the critical role of public funding and interdisciplinary networks in bringing this vision to life are explored.

The Origin: Bridging Gaps in Clinical

Knowledge Healthcare professionals today are confronted with a rapidly expanding body of medical knowledge. Scientific discoveries, clinical guidelines, pharmaceutical updates, and new treatment modalities are published at a rate that far exceeds what any individual practitioner can realistically absorb. While evidence-based guidelines and institutional protocols provide structure, the daily clinical routine often demands fast, situation-specific, and accurate decision-making support—especially in time-critical or high-pressure scenarios.

The idea for this AI assistant was born from the urgent need to reduce cognitive overload while enhancing clinical precision. Instead of requiring medical professionals to search databases, consult printed manuals, or navigate complex software systems during patient care, the assistant offers a more natural, intuitive solution. Through commands, clinicians can simply ask a question—whether about drug interactions, diagnostic algorithms, or treatment pathways—and receive immediate, validated answers grounded in current medical knowledge.

From the beginning, the vision was clear: the tool must not only deliver high-quality content, but also integrate seamlessly into clinical workflows. It had to be fast, reliable, easy to use, and designed with a deep understanding of the unique demands of healthcare environments.

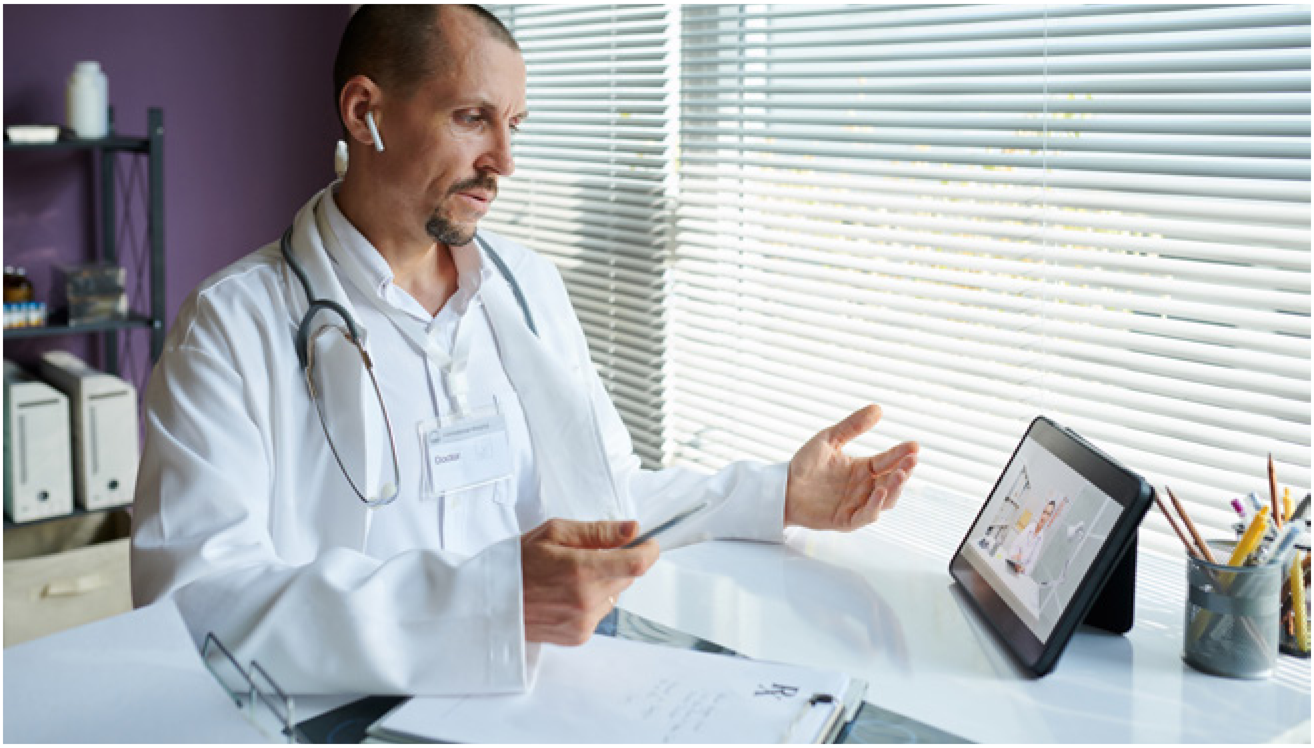
Design Principles: Usability and Trust

These ambitious goals presented a set of interrelated challenges. The assistant had to process natural language input, deliver medically accurate and legally compliant information, and function in noisy, dynamic environments such as emergency rooms and intensive care units. At the same time, it had to gain the trust of its users—physicians and nurses who bear significant responsibility and who are rightly cautious about relying on automated tools for clinical decision-making.

Therefore, usability and trust were not secondary considerations but foundational design principles. The team focused intensively on user experience, designing the interface to be responsive, context-aware, and capable of handling the nuanced phrasing often used in clinical language. Equally important was the establishment of transparent mechanisms for how the AI derives its answers—an aspect critical to building trust among healthcare professionals.

A Regulatory Milestone: CE Certification for AI Software

The development of this assistant went far beyond technological innovation; it involved navigating one of the most demanding regulatory landscapes in the world. The CE certification under the European Medical Device Regulation (MDR) is not just a label but a legally binding assurance that the device meets stringent standards for safety, efficacy, and quality. ▶



For AI application, the path to CE marking required rigorous validation. The team conducted extensive risk assessments, stress tests, usability evaluations, and cybersecurity audits. A central regulatory focus was the explainability of AI outputs. Clinicians and regulatory authorities alike need to understand how conclusions are reached—especially in high-stakes scenarios. As such, the system's architecture was designed to ensure every answer could be traced back to its data source and validated reference, ensuring not only clinical utility but also legal robustness.

Achieving CE certification was a turning point in the development journey. It confirmed not just the technical readiness of the product, but its readiness for real-world clinical use. It also positioned the assistant as a pioneering solution in the European medical AI landscape.

Public Funding and Strategic Collaboration

The realization of this ambitious project would not have been possible without strong institutional support. The State of Hesse in Germany played a central role in the early stages, offering funding, mentorship, and access to regulatory, academic, and clinical networks. Public innovation programs provided the critical breathing room that allowed the team to iterate, refine, and scale their solution responsibly—without compromising on safety or quality.

The project stands as a testament to the power of collaboration between public institutions and private innovators. Through partnerships with hospitals, academic research centers, and medical societies, the assistant was tested, evaluated, and refined in authentic clinical environments. Physicians from multiple disciplines—including neurology, internal medicine, and pharmacology—contributed to shaping the content, functionality, and performance of the assistant. Their feedback enabled real-world testing and adaptation, ensuring that the system was not only clinically accurate but also practically useful.

Moreover, the involvement of specialists in ethics, data governance, and information security helped establish strong frameworks for data protection, algorithmic fairness, and responsible AI deployment—issues that are becoming increasingly central to the adoption of digital tools in medicine.

A Collaborative Ecosystem for Medical

Innovation One of the most powerful lessons from this project is that healthcare innovation cannot succeed in isolation. The complexity of clinical care, regulatory oversight, and data security necessitates collaboration across domains. Engineers, clinicians, policymakers, designers, and legal experts must work together, guided by a shared commitment to improving patient care.

This assistant is a product of such a collaborative ecosystem. Its success reflects not only the brilliance of the core development team, but also the diversity that shaped its evolution. It also highlights how regional initiatives—when properly resourced—can lead to nationally and even internationally significant innovations in digital health.

Female Entrepreneurship and Visionary

Leadership At the heart of this innovation is Dr. Vera Roedel, an advocate whose leadership has been instrumental in transforming the concept into a functioning, CE-certified product. With a background in both clinical practice and medical education, Dr. Roedel brought a uniquely holistic perspective to the project. She understood not only the technical requirements but also the practical realities of day-to-day medical work.

Her vision centered on user-centric, ethically responsible innovation. She championed the integration of clinicians into the development process and insisted on a transparent, trustworthy system that supports rather than replaces medical professionals. As a female founder in a traditionally male-dominated sector, her leadership also underscores the growing importance of diversity in healthcare innovation—particularly in developing technologies intended for wide and varied use.

A Scalable Platform for Medical Support

Since its founding in early 2023, the project has developed into a scalable digital health platform. Its core product—a CE-certified Clinical Decision Support System (CDSS)—is powered by a domain-specific language model (DSLM) and a Medical Data Analysis Architecture Model (MDAAM). These proprietary systems ensure that only peer-reviewed, curated, and medically validated knowledge informs the AI's output. ▶

Unlike general-purpose language models, this one is fine-tuned for the medical domain and constantly updated with new evidence, ensuring its reliability in fast-changing clinical landscapes.

Beyond the assistant itself, the team has launched a CME-accredited educational platform. This offering is designed to help healthcare professionals understand and responsibly adopt AI tools in their practice. It includes training in digital literacy, ethical AI use, and critical evaluation of algorithmic recommendations. In parallel, the team provides consulting services to hospitals and clinics looking to integrate AI into their infrastructure, offering support in interoperability, change management, and clinical pathway adaptation.

A key quality benchmark for medical AI systems is the avoidance of so-called "hallucinations"— that may sound convincing linguistically but are factually incorrect or lack scientific grounding. In the clinical context, where misinformation can have serious or even life-threatening consequences, such inaccuracies are simply unacceptable.

This is why the assistant is built upon an architecture that ensures all content is validated and evidence-based. Every AI-generated response is derived solely from curated medical sources, with clear references and traceable origins. The system is explicitly designed not to speculate or generate assumptions, but to deliver precise, trustworthy information that aligns with current clinical guidelines. This rigorous quality assurance ensures that the assistant operates not creatively, but responsibly and transparently, always in service of patient safety and professional reliability.

Expanding Use and Future Potential

The Assistant has already gained significant traction, especially among neurologists, and its use is expanding across other disciplines. Strong partnerships with pharmaceutical companies and health institutions are enabling new use cases such as AI-assisted rare disease diagnostics, support for complex treatment planning, and multilingual patient communication tools.

Future development will focus on deep integration with electronic health records, enabling personalized, context-aware support based on patient history and lab values. Adaptive learning systems will allow the assistant to learn from user behavior and tailor responses over time, increasing relevance and efficiency. These advancements will remain under ethical oversight and guided by user feedback, preserving the trust the system has earned.

Ethical Compass in the Age of Medical AI

As AI becomes more prevalent in healthcare, ethical responsibility must remain at the forefront. This project exemplifies how responsible innovation is not a constraint, but a foundation for sustainable impact. From data protection and transparency to explainability and equity, the assistant has been built with a clear ethical compass. It prioritizes user autonomy, safeguards patient privacy, and respects the clinician's role as the final decision-maker.

Rather than replacing the judgment of trained professionals, the assistant enhances it. It acts as a co-pilot—offering guidance, expanding awareness, and lightening cognitive load without ever overriding the human capacity for empathy, nuance, and clinical insight.

Conclusion: From Vision to Clinical Impact

The successful development, certification, and deployment of this AI assistant mark a major milestone in the digital transformation of healthcare. It shows that artificial intelligence, when responsibly implemented, can serve as a trusted clinical partner—delivering clarity amid complexity and support when most needed. It also underscores the importance of collaborative ecosystems, visionary leadership, and public investment in bringing meaningful healthcare innovation to life.

As global health systems face rising demand and workforce shortages, AI-powered tools like this will become indispensable. They enable care that is not only more efficient but also more human—helping clinicians focus on the relational and diagnostic aspects of their work while automating cognitive and administrative burdens.

In this future, AI is not an abstract buzzword—it is a practical, ethical, and empowering tool. It's not about replacing doctors, but empowering them to do their best work. The healthcare professional using AI will be more informed, efficient, and present—bridging the gap between data and empathy, science and care.

References are available at www.americanhhm.com

AUTHOR BIO

Dr. Vera Roedel, CEO and Co-Founder of Prof. Valmed®, expresses that her passion for medical technology informs the development of trustworthy, CE-certified medical products. She highlights that her core competencies in medical device regulation and strategic communication strengthen the team. Her work reflects her core values: integrity, excellence, and the motivation to make a meaningful contribution through diverse perspectives.

Bridging the Digital Divide

How Medical Assistants Are Unlocking Telehealth for Seniors

Seniors often struggle with the use of telehealth due to challenges with technology and access. This article reviews effective solutions, including in-home assisted visits by care-team members who manage technology and enhance communication. Combining personal support, education and simplified tools can improve comfort, confidence, and telehealth engagement among older adults

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Telehealth has become a fundamental element in modern healthcare delivery. It provides convenience, improved access, and cost-effective options to traditional in-person visits to healthcare providers' offices. However, while telehealth services have increased in popularity across many demographic groups, older adults, those who most likely stand to gain the most, remain significantly underrepresented in usage metrics. This disproportion originates from a combination of barriers: lack of digital literacy, physical and cognitive impairments, lack of familiarity with technology, and limited access to devices or reliable internet connectivity.

To fully appreciate the today's situation, it is helpful to examine the historical path of telehealth in the United States. While the concept dates back decades, its use was largely limited to rural areas and specific specialties until the early 2010s. Even then, adoption was constrained by regulatory challenges, low reimbursement rates, and limited technological and operational infrastructure.

The pandemic was a major inflection point. Due to the high need of care, and low to no ability to access it, telehealth was transformed from a distant offering to a day-to-day necessity. CMS and other entities had to issue emergency policy waivers which enabled widespread use of video visits and phone calls and temporarily addressed licensure and payment barriers.

Dr. Samuel Lin, a health policy advisor and digital health consultant, notes, "COVID-19 didn't create the demand for telehealth, it exposed how urgent the demand already was. What it also showed is that without a human framework, technology alone can't solve the access problem, especially for seniors." This reflects the growing consensus among healthcare leaders: supporting staff like Medical Assistants (MAs) are the amalgams that make digital care functional and equitable.

According to the CDC's 2021 National Health Interview Survey, only 43.3% of adults aged 65+ had used telemedicine services in the prior 12 months. On the other hand, telehealth was adopted by the younger populations, hitting 60% during the pandemic. This difference demonstrates a need to develop alternative solutions to help bridge the digital gap older adults are facing. The importance of expanding telehealth access to seniors cannot be overstated. As people age there is an increase in medical complexity, mobility limitations, and dependence on frequent medical visits. If utilized effectively, telehealth is excellently appropriate for it.

Interestingly, more than 75% of older Americans express a preference to remain in their homes as they age. To meet this goal, consistent medical oversight is crucial. Telehealth, with the help of in-home support, enables this wish while respecting seniors' independence and preferences.

One of the most cost-effective, innovative and pragmatic solutions to help seniors engage in telehealth is the integration of MAs (or other care team supporters) into the virtual care experience. These professionals can provide hands-on assistance through in-home visits. These care givers can help with setting up devices, navigating telehealth platforms, and even staying with the patient during virtual appointments, providing comfort to those who may be in most need. MAs play a crucial role in eliminating technological friction and ensuring successful visit completion, increasing senior compliance.

By using this approach, not only will it address technological barriers but also improve the emotional experience for seniors. Sharing this important moment with a friendly and trained assistant can significantly reduce anxiety and increase a senior's willingness to participate in telehealth services. Moreover, in many cases, MAs also act as scribes, documenting the interaction, freeing providers to focus on care delivery, and ensuring no important details are missed.

The financial implications of improving telehealth access for seniors are also significant. The National Committee for Quality Assurance (NCQA) reports that telehealth has the potential to replace up to $250 billion of annual U.S. healthcare spending. This substitution stems from reduced hospital admissions, fewer emergency department visits, and more consistent chronic condition management. Adding MA support into this equation enhances efficiency by ensuring that appointments run smoothly, technology works properly, and patients are better prepared.

To analyze the financial gains deeper, we have created a simulation. An average primary care provider's hourly rate is $120 per hour, while an average MA's hourly rate runs around $25 for certified MAs. Assuming that a patient's visit takes 30 minutes and there are another 30 minutes spent commuting from a patient's home to the next, the model proposes having a ratio of 2 MAs per PCP to avoid time wasted from PCP. In this simulation, the PCP stays in a fixed location doing the televisit, while the MAs do the in-home visits. Adopting this model saves close to 30% of the total cost and doubles the number of patients that can be seen per provider. (see table below)

An interesting example of this potential comes from a Texas based group's data during the COVID-19 pandemic. Their analysis showed that Medicare beneficiaries, most of which are 65 and older, accounted for 23.5% of all telehealth users. In regions where patients received technical support, that figure increased markedly.

Hospital systems and health plans that have implemented "tele-home-care" models, often incorporating MA-like roles, have seen tangible clinical, financial and emotional improvements for older adults. For example, programs focused

Metric	Old Model	New Model
Patients per day	8	16
Cost per patient	$120	$85
Total cost per day	$960	$1,360
Cost per 8 patients	$960	$680 (85×8)
Patients seen increase	+100% (8 → 16)	✓
Savings per patient	$120 – $85 = $35	✓
Total daily savings (per 8 patients)	$960 – $680 = $280	✓

> Over a 9-month period, the program reported a 12% increase in appointment adherence, a 20% drop in 30-day readmissions, and a net cost savings of $1,100 per patient per year.

on managing chronic diseases like heart failure and diabetes have demonstrated a 65% reduction in avoidable hospital admissions. These outcomes are achievable because there is a more consistent check-in process which allows providers to intervene early, adjust medications, or offer guidance before an acute situation occurs. MA support ensures that these virtual connections actually happen, and seniors don't miss the opportunity to contact their providers when needed due to fear of technology.

A crucial and often underappreciated and undermeasured aspect of MA-supported telehealth is its role in enhancing communication. Seniors often struggle to fully understand or retain complex medical information during visits. With a trained assistant present, instructions can be repeated, notes can be clarified, and follow-up steps can be documented clearly. This added layer of communication reduces confusion and increases adherence to treatment plans and medications.

Another example of the successful implementation of this program is a Midwest-based ACO which piloted an initiative where medical assistants conducted monthly home visits to provide telehealth support to high-risk Medicare patients. Over a 9-month period, the program reported a 12% increase in appointment adherence, a 20% drop in 30-day readmissions, and a net cost savings of $1,100 per patient per year. These results emphasize not only the clinical but also the financial value of incorporating dedicated support staff into the telehealth ecosystem.

In order to scale this model nationally, several strategic operational steps must be considered. First, medical assistants need specialized training in digital health tools, such as EMR (electronic medical records) and others, privacy compliance (HIPAA), and the nuances of senior care. Second, healthcare organizations must allocate resources to allow for in-home MA support for telehealth visits. Third, public and private payers should recognize and reimburse these services as essential components of care delivery.

Policy recommendations from advocacy organizations like the American Hospital Association and NCQA suggest that the reimbursement models for telehealth be updated to include not only provider time but also the support roles that make telehealth successful. This is particularly relevant for seniors on fixed incomes who rely on Medicare or Medicaid. Pilot programs and value-based care contracts ▶

are ideal settings to introduce these expanded service models and evaluate their effectiveness.

From a human perspective, the impact of a supportive MA presence can be profound. Patients report feeling more confident and more connected to their providers, even from the comfort of their own homes. In addition, supporting seniors in telehealth also alleviates caregiver burden and burnout. Many adult children of aging parents serve as informal caregivers and often struggle to balance their own responsibilities. MA-supported telehealth helps ease this tension by ensuring that care can continue without relying solely on family members for logistics or technology setup.

For policy makers and payer organizations, the message should be clear and consistent: investing in care extenders such as medical assistants drive success not just in care delivery but in system-wide efficiency. Incentive structures should be adapted to reimburse collaborative, team-based telehealth models.

Ultimately, the future of telehealth will not be driven solely by AI, apps and algorithms, but by thoughtful integration of human-centered support. As we continue to evolve in our healthcare delivery models, ensuring that no one is left behind (especially our senior population) must remain a golden rule. Medical assistants offer a scalable, effective, and deeply human way to make that into a reality. Their role is not just helpful but necessary.

Looking ahead, incorporating data from MA-assisted telehealth visits into population health management systems could provide even more value. By tracking outcomes, engagement levels, and costs, health systems can optimize care models and identify the most effective interventions. This could pave the way for predictive analytics that tailor outreach to those at highest risk of disengagement, and therefore, worse outcomes.

As we move into a new era of value-based care, the stakes are clear. Health outcomes, patient experience, and financial performance are all interlinked. Solutions like MA-assisted telehealth don't just check one box, they simultaneously improve quality, equity, and efficiency. For this reason, healthcare executives, payers, and policymakers alike should view investment in such models not as a luxury, but as a strategic imperative. ■

References are available at www.americanhhm.com

AUTHOR BIO

Silvana Fischman, DDS(Intl), MHA, CRC brings 20+ years of executive leadership in clinical operations, having built, scaled, and optimized initiatives across primary and specialty care models. As the founder of Chai Class Consulting, Silvana partners with healthcare organizations to deliver data-driven strategies, streamline operations, and improve efficiency, cost, and outcomes

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From Promise to Practice

What's Holding Back AI in Radiology and How to Fix it

AI in radiology is stuck - not from lack of tools, but from fragmented systems and unstructured workflows. Free-text reports, vendor silos, and poor integration block progress. Hospitals can't scale AI without infrastructure reform. The solution: structured reporting, aligned teams, and interoperable systems

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The paradox of progress

More than 1000 AI tools approved. Fewer than 2% used. What went wrong?

At radiology conferences, the future looks bright. Booths are highlighting promises of fully automated diagnostics, intelligent workflows, and seamless clinical decision support. More than 1000 FDA-cleared AI tools - most for radiology - are showcased as if the future has already begun.

However the truth is, that little has changed.Fewer than 2% of U.S. radiology practices use these tools. Most radiologists have never tried one—and even fewer trust them. This isn't due to a lack of innovation, funding, or regulatory approval.The real barrier is more fundamental—and more deeply embedded: the everyday structure of how radiology works.

Radiology's data infrastructure is fundamentally misaligned with the logic behind scalable AI-solutions. Free-text reports, siloed systems, and absent standards create structural barriers that keep even the best algorithms from reaching clinical impact.

This article argues AI isn't failing - our clinical environments are. If we want intelligence to scale, we need to start thinking structurally.

"DIAGNOSIS": Why AI isn't scaling in radiology

If FDA clearance is the finish line, radiology AI would already be a success story. But the real race begins after regulatory approval - and most tools never make it out of the starting blocks.

The gap is striking: over 700 AI tools have been cleared in the U.S., yet clinical use remains rare. Only two—targeting coronary artery disease and diabetic retinopathy—have exceeded 10,000 uses nationwide. In most hospitals, even with advanced imaging systems, these tools remain shelfware: approved, available, and unused.

Why?

The main barriers to AI adoption aren't technological—they're infrastructural and cultural. AI tools often produce structured, high-quality data, yet must operate in workflows still dominated by free-text reporting. This mismatch creates friction: structured outputs require manual reconciliation, turning automation into additional work. In daily clinical practice, AI faces fragmented reporting environments, siloed systems, and incompatible formats—making seamless integration nearly impossible. These structural issues also limit AI's long-term potential: without consistent, longitudinal data, models can't improve over time. Legacy IT infrastructures further compound the problem, blocking scalable integration.

Moreover, trust remains a central issue. Radiologists are rightly skeptical of tools that cannot explain their decisions or that function as black boxes. This is exacerbated when AI tools are injected into workflows without alignment to the way radiologists actually read, report, and communicate findings.

The issue isn't AI's ability to read images - it's its inability to read our clinical reality. Without reengineering the environment, scale will remain impossible.

The anatomy of an invisible barrier

If we look past the surface-level explanations - cost, time, resistance - we find a deeper, more systemic issue: radiology was never built for AI. ▶

Hospital data ecosystems remain deeply fragmented. PACS, RIS, and EMR-systems often operate in silos, limited by proprietary structures and weak adherence to standards like HL7 or FHIR. Even within a single hospital, departments may use separate vendors for imaging, speech recognition, and reporting - each with its own constraints. Vendor lock-ins and missing APIs turn even basic data handoffs into friction points. Trying to insert an AI tool into such an environment is like fitting a jet engine onto a bicycle. The infrastructure can't carry it.

The problem becomes especially acute at the point of reporting. Most radiology reports today are written in free text, using inconsistent phrasing and individual reporting styles. For a human reader, this variability is manageable – even though it is inefficient. For an AI-system, it's chaos. Extracting structured meaning from prose language requires error-prone NLP techniques that often introduce more uncertainty than insight.

Let´s imagine a different setup - one where radiology reports are created using structured templates: clearly labeled, standardized across vendors and sites, and machine-readable. Structured reporting forms the landing zone that enables AI to integrate directly into the diagnostic workflow - actively by inserting findings into predefined fields, and passively by learning from the high-quality data this structure provides.

It's a shift in philosophy. Instead of building smarter AI to overcome noisy environments, we build smarter environments that allow even modest AI to function with precision. The barrier to AI isn't code - it's unstructured habits and disconnected systems.

What structured reporting can actually achieve

Skeptics often ask: if structured reporting is so effective, why isn't it the norm?

The answer is that - quietly, and in select institutions - it already is. At NYU Langone Health, a structured template was introduced for adnexal mass MRI reporting, known as O-RADS MRI. The result? Referring gynecologic oncologists rated the new reports as significantly clearer and more actionable. Patients, too, reported fewer misunderstandings. Structured reporting didn't dilute the nuance of radiology - it amplified its communicative value.

At Cincinnati Children's Hospital, the transition to structured reporting was completed in under two years. A cross-functional team - radiologists, IT, and operations - jointly selected templates and set integration milestones. Initial resistance faded as radiologists joined the design process. Reporting became more consistent, and referring physicians noted clearer communication and fewer follow-ups. Crucially, efficiency improved not by speeding up readings, but by reducing disruptions and delays in downstream care.

Structured reports benefit both human readers and AI training pipelines. Templates

> The barrier to AI isn't code - it's unstructured habits and disconnected systems.

encode findings in a structured, machine-readable format. This provides clean, reliable data for training future models, reducing the reliance on costly and error-prone manual annotation. In short, structured reports enable a virtuous cycle: better data leads to better AI, which in turn improves diagnostic workflows.

The cultural resistance – and how to overcome it

A common concern is that templates reduce radiologists to rigid checklists. Many clinicians worry that nuance and narrative interpretation - essential tools of diagnostic storytelling - will be lost in a sea of drop-downs and pre-filled phrases. These concerns are valid. But they are also based on a false binary.

Structured reporting doesn't have to mean sterile reporting. In fact, modern systems allow for flexible, hybrid designs: standardized data fields for key findings, paired with open commentary sections when needed. The goal isn't to reduce expression it's to reduce ambiguity.

Resistance is also fueled by distrust in AI itself. Radiologists are trained to understand pathology, not probability distributions. Introducing a black-box tool into their diagnostic process without clear explanations or control mechanisms feels like a threat to their expertise. This fear is amplified when AI tools are introduced without context, consultation, or workflow alignment.

Yet scepticism often fades when clinicians are involved early. At Cincinnati Children's Hospital, radiologists were initially reluctant to adopt structured templates. Yet once they helped shape the system, participation turned into advocacy. Adoption followed co-creation.

The lesson is clear: resistance to structure is not a fixed trait. It is often a reaction to being excluded from the process. Invite radiologists to the table, and what once looked like a constraint begins to feel like a tool.

The strategy problem: why hospitals are solving the wrong problem

Faced with the promise of AI, many hospitals pursue the most visible goal: the next algorithm. They pilot stroke detection tools, lung nodule classifiers, or triage systems. Some even launch innovation centers and AI-sandboxes. But while these efforts are well-intentioned, they often skip the first and most essential step: making the clinical environment ready for AI.

Without standardized data formats, connected systems, and workflows that ▶

support integration even the best algorithm becomes a high-maintenance accessory. It won't integrate. It won't scale. It will remain a siloed solution in a fragmented system.

The problem is not the algorithm - it's the architecture.

Leading radiology societies have begun to recognize this. A 2024 multi-society statement from the ACR, RSNA, ESR, and others outlines a framework for responsibly implementing AI in radiology. It doesn't start with choosing a vendor. It starts with governance, data readiness, interoperability standards, and clinician involvement. Similarly, the ESR recommends incentivizing structured reporting as a foundational layer for scalable AI deployment - because without clean data, even the most powerful tool will fail.

Scaling AI requires aligning systems, teams, and data into an ecosystem AI can actually use—built on clean data structures, technical interoperability, and workflows suited for real-world clinical practice. But structural readiness isn't the only barrier. Financial and organizational dynamics play a role, too: reimbursement rarely rewards downstream benefits like fewer clarification calls or faster care escalation, and procurement often prioritizes short-term ROI over foundational investments like structured reporting or interoperability. As a result, hospitals frequently implement the next algorithm without fixing the data layer—trapping innovation in a cycle of underperformance and unrealized potential.

Hospitals that invest in infrastructure before intelligence won't just scale faster. They'll scale smarter.

What hospitals can do now

Scaling AI in radiology doesn't begin with procurement - it begins with preparation. Hospital leaders can take tangible steps today:

- **Conduct a data infrastructure audit** to assess the interoperability and structure of reporting systems.
- **Engage radiologists early** in structured reporting initiatives to reduce cultural resistance and foster ownership.
- **Establish an AI governance board** involving IT, clinical, and operations stakeholders to ensure alignment across departments.
- **Prioritize vendor-neutral structured reporting systems** to maintain flexibility and future-proof integration efforts.
- **Pilot structured reporting in high-volume modalities** (e.g., Head-CT, Knee-MRI) not only to prepare clean data pipelines - but to gain real-world experience, identify workflow obstacles early, and develop local strategies for long-term success.

These actions shift the focus from tool selection to ecosystem readiness - and lay the basis for responsible, scalable AI deployment.

What happens if we ignore the structural problem?

Radiology AI doesn't lack innovation—it

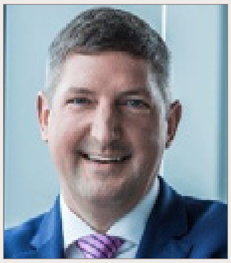
lacks alignment. Hospitals face a flood of vendor pitches and demo tools, but smart algorithms can't thrive in disjointed environments. Every failed pilot reinforces skepticism, feeding the belief that "AI doesn't work." But it does. What fails is how we deploy it. Without standardized data, interoperable systems, and aligned workflows, AI will remain stuck in pilot mode. High-tech centers may advance, but most will fall behind—scaling innovation in isolated pockets rather than system-wide.

There's still time to change course, but it requires a shift in mindset: from chasing algorithms to building clinical infrastructure. Structured reporting isn't a technical detail—it's the foundation for scalable, trustworthy AI. Leaders must decide: implement AI as a superficial add-on to a broken system, or invest in the infrastructure it truly requires. The difference will determine whether AI becomes a cost burden or a catalyst for quality, safety, and efficiency.

Diagnostic intelligence isn't held back by the lack of smarter algorithms—but by the absence of smarter environments. And those begin with structure. ■

References are available at www.americanhhm.com

AUTHOR BIO



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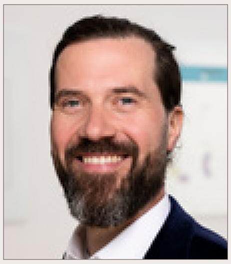

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Insights into Integrating AI in Radiology Practice

The Role of Human Intervention

The integration of AI into radiology enhances diagnostic imaging by identifying, prioritizing, classifying, and quantifying critical, non-critical, and incidental findings. Clear workflows and clinical pathways are needed to manage these findings while considering both FDA clearance and patient consent. Implementing AI requires updated healthcare protocols to address ethical, legal, and clinical concerns. This paper outlines workflow and management pathway categories for AI-generated findings, highlights Human Intervention's (HI) role, discusses procedural requirements, and proposes a systematic approach to these challenges in practice.

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Artificial intelligence (AI) has transformed healthcare, particularly in radiology, enhancing diagnostic accuracy, improving patient care, and reducing errors. AI algorithms are being used not only for

image analysis but also for non-diagnostic tasks such as workflow optimization, scheduling, prioritization, and quality assurance. AI can optimize the radiology workflow by automating triage and refining report generation, rapidly sorting, and prioritizing radiological studies such as CT scans and MRIs according to urgency, drawing attention to critical cases that require immediate attention. This includes automating triage and prioritizing cases, which ensures critical conditions like stroke, hemorrhage, and malignancy are addressed quickly. AI, especially natural language processing (NLP), helps reduce repetitive tasks, alleviating radiologist burnout.

For AI to work optimally in clinical settings, it must be seamlessly integrated into existing radiology systems. This requires clear workflows that dictate how these findings are managed, considering both FDA clearance and patient consent, and local validation of AI models, as the accuracy of algorithms can vary due to differences in imaging equipment, protocols, and patient populations. The American College of Radiology (ACR) emphasizes the importance of local validation and human intervention (HI) to ensure AI algorithms perform effectively in specific clinical environments, maintain accuracy over time, and address any variations, thereby safeguarding patient safety and care quality. Furthermore, ensuring patient confidentiality and informed consent (IC) is crucial as AI's "black box" nature can obscure decision-making processes, requiring transparency and safeguards to protect patient autonomy.

During the rollout of FDA-cleared AI imaging algorithms in a large academic healthcare system, we encountered challenges

Table 1: Definitions of AI Imaging Findings

Definition	Description
Actionable	Findings from imaging that necessitate further clinical or radiological action.
Critical	Findings that require immediate clinical intervention, ideally before the patient departs from the imaging department.
Non-critical	Findings that can be communicated after the patient has left the imaging facility.
Incidental	Findings that are discovered unexpectedly during a routine imaging test.

Table 2: AI Imaging Workflow Categories

Category	Description
Category 1: ANIF-C (Actionable Non-Incidental Findings Critical)	This category includes critical findings such as intracranial hemorrhage or pulmonary embolism identified through FDA-cleared algorithms. These do not require IRB approval or informed consent forms (ICF) due to the immediate nature of the interventions needed.
Category 2: AIF-C (Actionable Incidental Findings Critical)	Findings like incidental pulmonary embolism need rapid communication and intervention facilitated by AI at the point of care (POCAID) with APP navigation but without the need for IC.
Category 3: ANIF-NC (Actionable Non-Incidental Findings Non-critical)	This category involves significant findings that are not immediately life-threatening. FDA-cleared algorithms are used and do not require IRB approval or IC.
Category 4: AIF-NC (Actionable Incidental Findings Non-critical)	This category involves significant incidental findings that are not immediately life-threatening. Although FDA-cleared algorithms are used, IRB approval and IC are required due to the need for patient follow-up.
Category 5: Non-FDA Cleared Algorithms	All actionable findings derived from non-FDA cleared algorithms necessitate IRB approval, IC, and APP navigation to ensure ethical compliance and patient safety.

Table 3: iCAC ROI Calculations: Input to the ROI Calculator based on 300 CT chest exams per month, based on theoretical data provided by our partner vendor (AIDOC).

CAC - Captured Clinical Management		
	Estimate /year	**Source**
Annual volume of Chest CT	3,600	Based on health system total imaging volume and benchmark of patient class breakdown from comparable Aidoc sites
Number of those positive for CAC (mild, moderate and severe)	741	Benchmark of CAC prevalence from comparable Aidoc sites (Rads w/ AI)
Unreported CAC	60%	https://pubmed.ncbi.nlm.nih.gov/23849489/
Quantity of Patients Undergoing Further Medical Workup Per Category of Calcification*	84	https://academic.oup.com/eurheartj/article/33/23/2955/540587
Total additional reimbursement	$198,392	Assuming health system payor mix

that required the creation of new workflows and personnel roles. This paper provides insights into integrating AI in radiology, highlighting the need for human intervention to maintain accuracy and regulatory compliance. We outline workflows for managing AI-generated findings, the need for new roles to improve operational efficiency, and resources required for comprehensive management. Additionally, we explore the regulatory and ethical complexities of AI in medical imaging, emphasizing patient engagement and the importance of clear definitions in AI applications.

Impact of AI Initiatives on Radiology Practice

AI enhances diagnostic precision, reduces workload, and enables radiologists to focus on complex cases. New roles, such as advanced practice providers (APPs) imaging specialists and clinical care coordinators (CCCs), improve result communication and patient management, advancing healthcare delivery.

Overall Strategy

We employed a phased approach, beginning with IRB-approved pilot projects. We analyzed infrastructure, staffing, and finances to ensure feasibility, adjusting strategies based on real-world feedback.

Definitions and Workflow Categories

Clear definitions and workflow categories streamline AI integration (Tables 1 and 2). Categorizing findings as "actionable," "critical," "non-critical," or "incidental" ensures appropriate clinical responses while addressing regulatory and ethical complexities.

Institutional Review Board and Informed Consent Form Justifications

Strict oversight is required, especially for non-FDA-cleared algorithms. The IRB ensures compliance, while informed consent (IC) ensures patients understand AI's role in their care, particularly for findings requiring further medical intervention.

APP Imaging Navigation and the Role of Clinical Coordinators

In Florida, APPs, including ARNPs, PAs, and physicians, are required to deliver imaging results instead of nurses. APPs manage AI-generated findings, stabilizing patients and providing critical care in emergencies (i.e., point-of-care AI deployment (POCAID) Category 2). For non-critical findings (i.e.,

AI-Generated Imaging Findings Workflow Categories

1) ANIF-C: Actionable Non-Incidental Findings, Critical	2) AIF-C: Actionable Incidental Findings, Critical	3) ANIF-NC: Actionable Non-Incidental Findings, Noncritical	4) AIF-NC: Actionable Incidental Findings, Noncritical	5) All Actionable Critical and Noncritical Findings
Examples: • ICH in Brain CT • PE in CT Pulm Angio • Pneumothorax in Chest CT/X- ray • Fracture detection **Condition:** • FDA cleared algorithm **Requirements:** • NO IRB • NO ICF • NO ARNP navigation	**Examples:** • iPE in Contrast CT chest **Condition:** • • FDA cleared algorithm **Requirements**: • Need ARNP navigation (i.e. POC AI) • Need IRB approval • No ICF (dealing with finding immediately before patient leaves department)	**Examples:** • BA in CTA studies **Condition**: • FDA cleared algorithm **Requirements:** • No IRB • No ICF • No ARNP navigation	**Examples**: • iCAC in routine CT chest • BA in Contrast NON-CTA • studies iBAC in screeningmammograms **Condition**: • FDA cleared algorithm **Requirements**: • Need IRB approval • Need ICF • Need imaging advanced provider (ARNP navigation) to relay findings to patient and document handoff to consulting clinical system.	**Condition**: • Not FDA cleared algo **Requirements**: • Need IRB approval • Need ICF • Need ARNP navigation

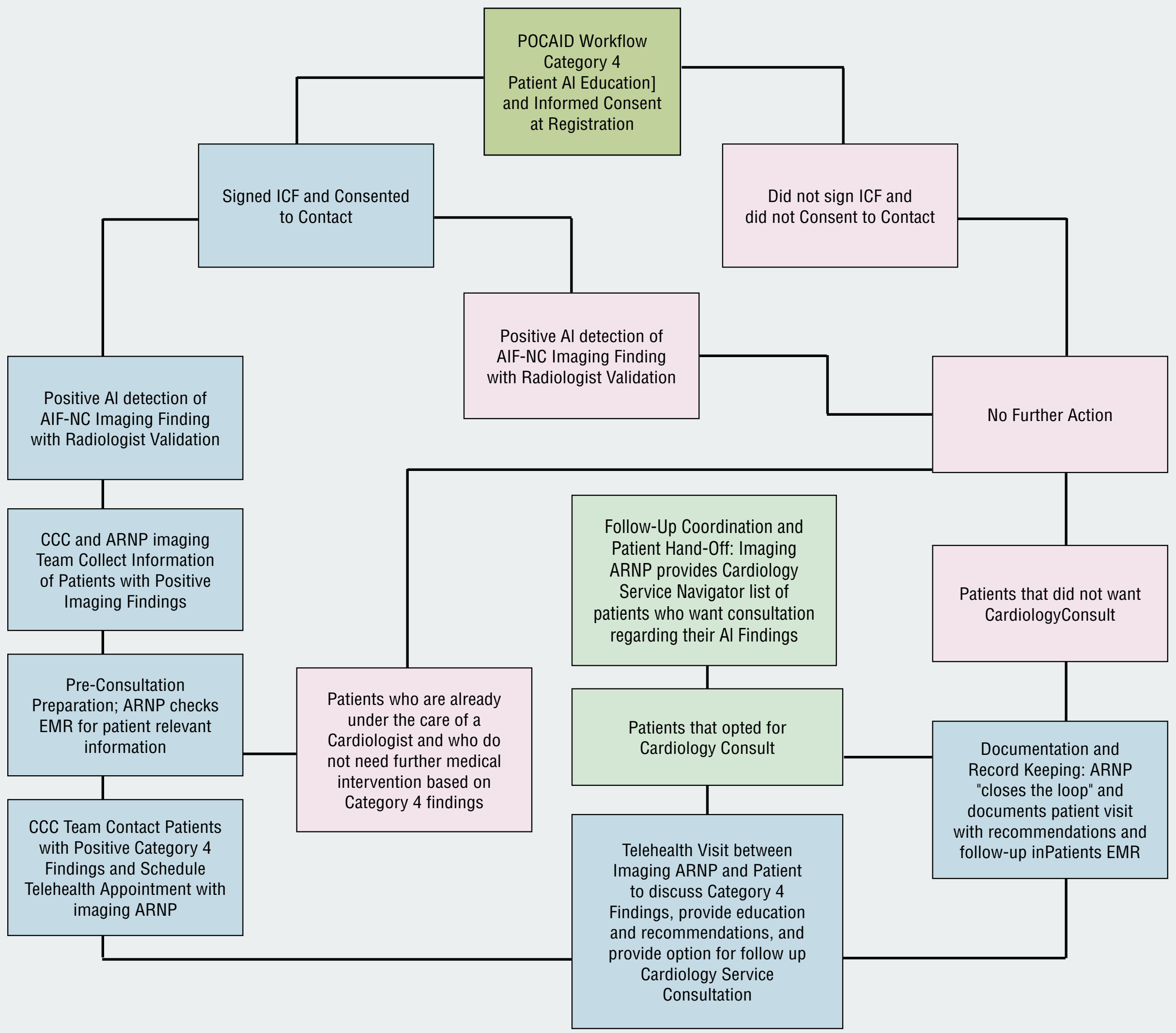


Figure 1. AI-Generated Imaging Findings Workflow Categories

POCAID Category 4), APPs coordinate patient engagement and follow-up.

Imaging APPs are needed to convey findings in Categories 2, 4, and 5. Category 2 involves critical incidental findings needing immediate action, Category 4 involves actionable incidental findings that are non-critical but require patient follow-up, and Category 5 involves findings from non-FDA cleared algorithms, requiring careful navigation for compliance and safety.

For Categories 1 and 3, nurse practitioners are not required to convey findings. Category 1 includes critical actionable non-incidental findings requiring immediate clinical intervention, typically managed directly by the attending radiologist or emergency medical personnel. Category 3 includes non-critical findings that can be communicated later through follow-up, without requiring direct involvement of APPs.

In these categories, the primary focus is on timely response rather than extended patient engagement.

In Categories 1 and 3, non-incidental findings require different medical responses than incidental findings, reducing the need for APP involvement. For Categories 1 and 3, APPs are not required to convey findings to patients due to their nature. Category 1 includes critical actionable non-incidental findings, requiring immediate clinical intervention typically by the attending radiologist or emergency personnel, eliminating the need for APPs. These findings also don't require informed consent due to their urgency.

Conversely, Category 3 consists of non-critical non-incidental findings, which can be communicated after the patient leaves the facility the non-urgent nature allows follow-up by various clinical staff, not requiring APPs. Informed consent is typically unnecessary, as these findings are addressed within standard care procedures without the introduction of experimental or unapproved diagnostic tools.

The role of CCCs has expanded to serve as a liaison between APPs, physicians, patients, and other healthcare providers, ensuring efficient care management. At our institution, CCCs monitor patient dashboards for timely alerts, focusing on the POCAID pilot to ensure provider communication and patient safety. When a positive alert occurs, the technologist, CCC, and onsite APP coordinate with the radiologist to confirm findings, communicate with providers, and plan dispositions. CCCs supervise dashboard alerts to ensure no alerts are missed and true positives are reconciled. We track alerts for quality monitoring and are reassessing workflows based on radiologist feedback on alert intervals.

> ...importance of local validation and human intervention (HI) to ensure AI algorithms perform effectively in specific clinical environments..

Web-based patient follow-up manager platforms are key tools for integrating HI and AI-enhanced radiology workflows. They streamline care by coordinating between providers, APPs, CCCs, and patients, ensuring proper management of AI findings. These platforms enable timely follow-up on both critical and non-critical findings, reducing missed diagnoses and improving care quality. They also help maintain ethical compliance and patient autonomy by tracking consent for AI technology use. ▶

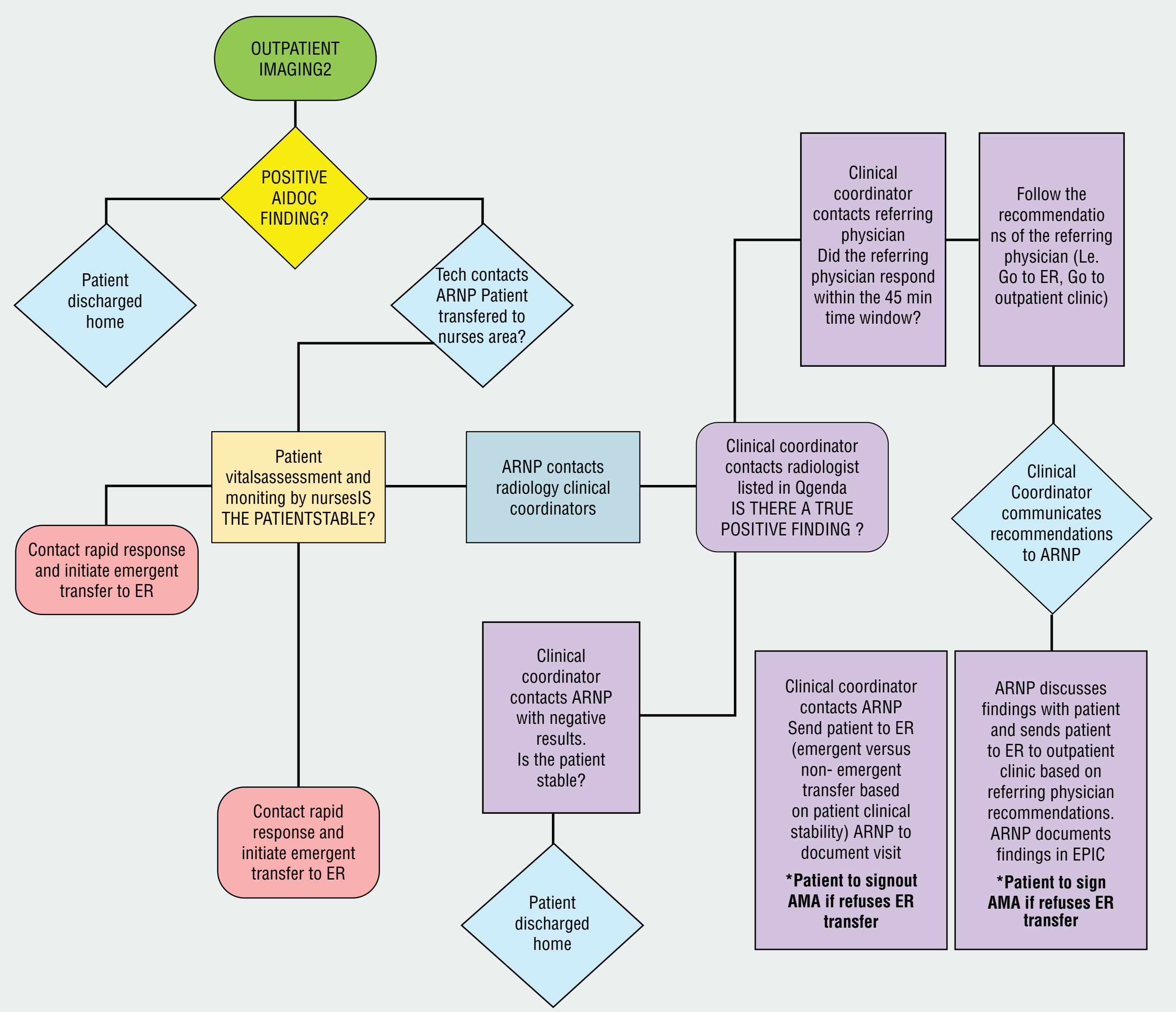


Figure 2. POCAID Category 2 Workflow (e.g. iPE)

Consent and Notification in AI-Enhanced Imaging

The incorporation of AI into medical imaging necessitates a robust process for notifying patients about AI's role in their imaging evaluations. For FDA-cleared AI, written consent is not mandatory, but patients must be informed. In IRB-approved pilot studies, consent is encouraged for Category 4 findings and required for Category 5 findings due to experimental AI technology use.

Implementation of the AI Algorithm and New Workflow Initiatives

AI-enhanced radiology workflows categorize findings to ensure appropriate patient management and safety (Tables 1 and 2). Categories differentiate between actionable, critical, non-critical, and incidental findings, tailoring responses based on urgency and regulatory requirements (Figure 1). Actionable findings necessitate further action, while critical findings demand immediate intervention, and non-critical and incidental findings, which can be communicated after the patient leaves.

For Category 2 critical incidental findings (i.e., incidental pulmonary embolism (iPE)), AI alerts trigger a coordinated emergency response via POCAID (Figure 2). Patients remain in the imaging center under APP supervision while radiologists validate AI findings. Confirmed cases are managed promptly, stabilizing patients before ER transfer.

For Category 4 actionable incidental but non-critical imaging findings (i.e., incidental coronary artery calcification scores (iCAC), APPs and CCCs use AI-driven tracking tools to coordinate follow-ups (Figure 3). Patients with high-risk scores receive consultations, ensuring timely interventions.

Routine AI vendor meeting facilitated the deployment of an FDA-cleared coronary calcium scoring algorithm, forming the basis for a preventive care workflow. This initiative is expected to expand into additional areas like breast calcifications.

POCAID Category 2 Workflow for Incidental Pulmonary Embolism (iPE)

The POCAID Category 2 workflow addresses critical incidental findings, specifically specifically PEs detected during CT scans not primarily targeting PE. When AI identifies an iPE, an emergency response is triggered (Figure 2). A radiologist verifies the finding while the patient remains in the imaging facility for continuous care.

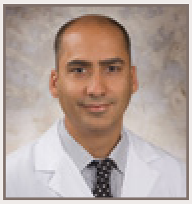
Imaging APPs stabilize unstable patients and coordinate necessary interventions, from anticoagulation therapy to invasive procedures. CCCs facilitate communication between the patient's provider and ER teams for immediate response alignment. If ER transfer is needed, stabilized patients are transported by ambulance, ensuring the receiving team is fully informed for prompt care. This streamlined approach minimizes time from detection to treatment, enhancing patient outcomes.

POCAID Category 4 Workflow Example for Incidental Coronary Artery Calcification Score (iCAC)

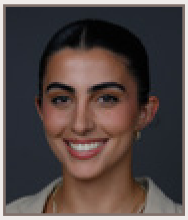
We plan to initiate an IRB-approved pilot program at an outpatient imaging center to track AI-generated iCAC scores. After radiologists finalize reports, ARNP imaging teams use an AI-based management tool to monitor patients with moderate- to high-risk scores (Figure 3). APPs and CCCs collaborate to contact patients, discuss results, and arrange follow-ups.

CCCs manage logistics and facilitate patient-provider interactions, while APPs oversee clinical interpretation and direct communication. This ensures timely, high-quality care. The AI-based tracking tool queries the Epic system to determine if patients are already receiving cardiac care. Those meeting criteria—such as

AUTHOR BIO



Dr. Jean Jose is a professor of radiology and Associate Vice Chair of IT at the University of Miami Miller School of Medicine, specializing in musculoskeletal radiology. He has published extensively on interventional and diagnostic MSK imaging techniques and AI applications, focusing on improving diagnostic accuracy, AI-driven workflows, and patient outcomes.



Dr. Chloe Issa is a resident physician pursuing her residency in Diagnostic and Interventional Radiology. She contributes to research on the ethical implications of AI in healthcare, advocating for patient-centered approaches in technology integration.

Dr. Thiago Braga is an assistant professor and Vice Chair of IT in the Department of Radiology at the University of Miami, specializing in ER radiology. With a background in IT and AI, he contributes to projects aimed at enhancing workflow efficiency and diagnostic precision through AI in medical imaging.

Dr. Jose Net is an associate professor of radiology, division director breast imaging, and Vice Chair of Clinical Operations at the University of Miami. He is at the forefront of integrating AI tools to improve diagnostic accuracy in breast imaging, particularly for the early detection of breast cancer.

Dr. Fernando Collado Mesa is a professor of radiology and Associate Vice Chair of AI Ethics and Research at the University of Miami, specializing in breast imaging. He leads initiatives to incorporate AI into mammography and AI governance, technologies.

Steven Falcone, MD is a professor of radiology, neuroradiologist and Associate Chair of the Department of Radiology at the University of Miami. He has been instrumental in implementing AI technologies in clinical workflows, improving efficiency and patient care in radiology practice.

Ioannis Chatzizisis, MD, PhD is a professor of cardiovascular medicine and radiology, and Division Director of Cardiology Services at the University of Miami. With expertise in computational and interventional cardiology, he develops AI-driven models to predict and manage cardiovascular diseases,

Alexander McKinney, MD is a professor of radiology and Chair of the Department of Radiology at the University of Miami. With extensive experience in neuroradiology, IT, AI, and informatics, he advocates for the integration of AI in preparing the next generation of radiologists.

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being on statins or under cardiology care—are removed from the workflow, allowing APPs to focus on new cases.

We selected all moderate to high iCAC patients not on statins to be entered into the worklist as "Identified." APPs offers these patients a cardiology consultation, which is recorded in our electronic medical record (EMR), and the patient is moved to "Scheduled." The tool auto-closes when a cardiologist's report is generated, automatically moving the patient to "closed" once the report is available.

Following legal advice, it was crucial to clearly communication clinically significant AI-generated findings (specifically the iCAC score) to patients after radiologists completed their reports, with documentation of the patient's understanding. This underscored the need for an APP follow-up visit. We aim to expand this workflow system-wide, starting with this pilot.

Funding and Staffing for AI-Enhanced Radiological Workflows:

AI integration requires investment in technology, training, and staffing. APPs and CCCs play critical roles in managing AI findings, necessitating specialized training.

For our IRB workflow pilot, we presented a theoretical business plan based on published data, estimating downstream revenue from increased specialist referrals. For instance, POCAID Category 4 iCAC workflow estimates an average of 148 wRVUs per month, generating substantial revenue (Table 3). Vendor ROI projections suggest AI could identify 84 missed coronary interventions annually, adding $198,000 in revenue.

These financial models justify funding for IT infrastructure, compliance measures, and personnel required for sustainable AI implementation.

Conclusion

Integrating AI into radiology requires structured workflows to manage AI findings while ensuring regulatory compliance and patient safety. Clear definitions, protocols, and transparent patient communication facilitate successful implementation.

Our framework can be refined with technical AI descriptions, case studies, economic impact analyses, and a stronger focus on patient experience. Long-term monitoring strategies are needed to address AI biases and reliance on technology.

This paper establishes foundational AI-enhanced workflow strategies. Future research will explore challenges, advancements, and ethical considerations in AI-integrated radiology.

Acknowledgments:

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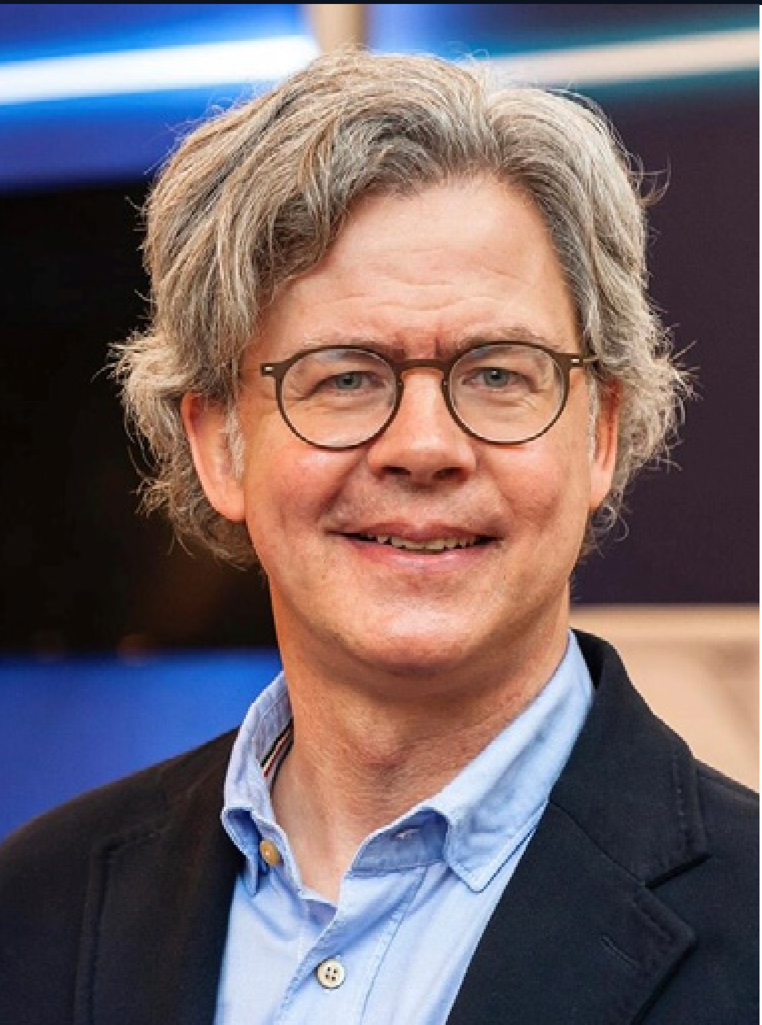
References are available at www.americanhhm.com

How Artificial Intelligence is Transforming Healthcare Delivery, Particularly in Radiology

Artificial Intelligence (AI) is reshaping the future of radiology - enhancing diagnostic accuracy, reducing variability, and easing clinician workload. In this exclusive interview, Prof. Dr. med. Mathias Goyen, Chief Medical Officer of GE HealthCare, shares how AI is transforming healthcare delivery by complementing radiologists, streamlining workflows, and driving global health equity.



Prof. Dr. med. Mathias Goyen
Chief Medical Officer for Imaging and Advanced Visualization Solutions, GE HealthCare

1. How do you view AI's role in complementing, rather than replacing, the expertise of radiologists in clinical decision-making?

AI in radiology is not a replacement for the radiologist, it's a powerful partner. The goal is to augment human intelligence, not substitute it. AI algorithms can sift through vast datasets rapidly, flag abnormalities, and prioritize cases, allowing radiologists to focus their expertise on complex inter-

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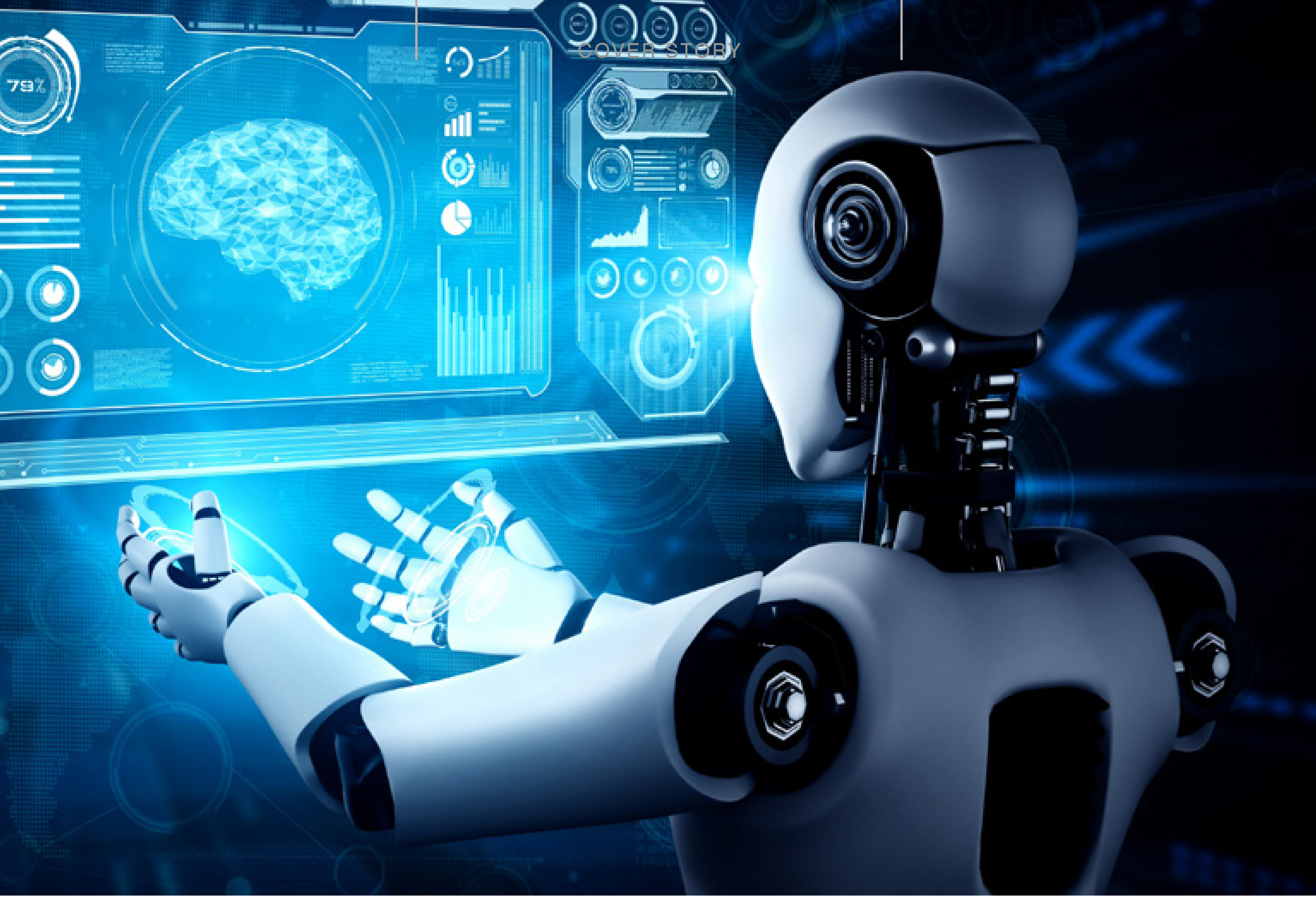


pretations and patient-centric decisions. It's a symbiosis: machines bring speed and consistency, while radiologists bring context, clinical reasoning, and empathy. Together, they form a more powerful diagnostic team.

2. What are the most transformative ways AI is currently enhancing diagnostic accuracy and efficiency in radiology?

AI is improving both the "how" and the "how fast" of diagnosis. For instance, research shows that algorithms can now detect early-stage cancers, such as breast, lung, or prostate, with remarkable precision, sometimes even before they're visible to the human eye. AI can also automate time-consuming tasks like segmentation, measurements, and report generation. One of the most transformative developments is research in triage in emergency settings. Research is underway for AI to automatically flag critical findings such as intracranial hemorrhages or pulmonary embolisms, expediting care for the patients who need it most.

3. Can you share a real-world example where AI significantly improved patient outcomes or streamlined radiology workflows?

A powerful example comes from an AI tool integrated into chest X-ray workflows that automatically flags potential pneumothorax. In one hospital, this led to a significant reduction in time-to-treatment for patients with collapsed lungs cutting delays by over 50%. On the workflow side, AI-driven ultrasound guidance is under development to democratize access to this highly operator-dependent modality, which will enable less-experienced users to perform accurate scans, especially in rural or underserved areas.

4. Radiologists often face high workloads and burnout. How is AI helping to alleviate these pressures?

Burnout in radiology is a growing concern, driven by rising imaging volumes and administrative tasks. AI can help reduce this burden in multiple ways: automating repetitive tasks, prioritizing urgent cases, and ensuring high-quality image acquisition at the point of care. Radiologists can then focus on what they do best: clinical reasoning and patient interaction. AI can also help support better work-life balance by streamlining workflows and reducing the cognitive load of decision-making.

> Radiology's future lies in the fusion of human expertise and intelligent technology - empowering clinicians to deliver care that's not only smarter, but also more compassionate.

5. How does GE HealthCare ensure that its AI tools remain clinically relevant, safe, and explainable in diverse healthcare environments?

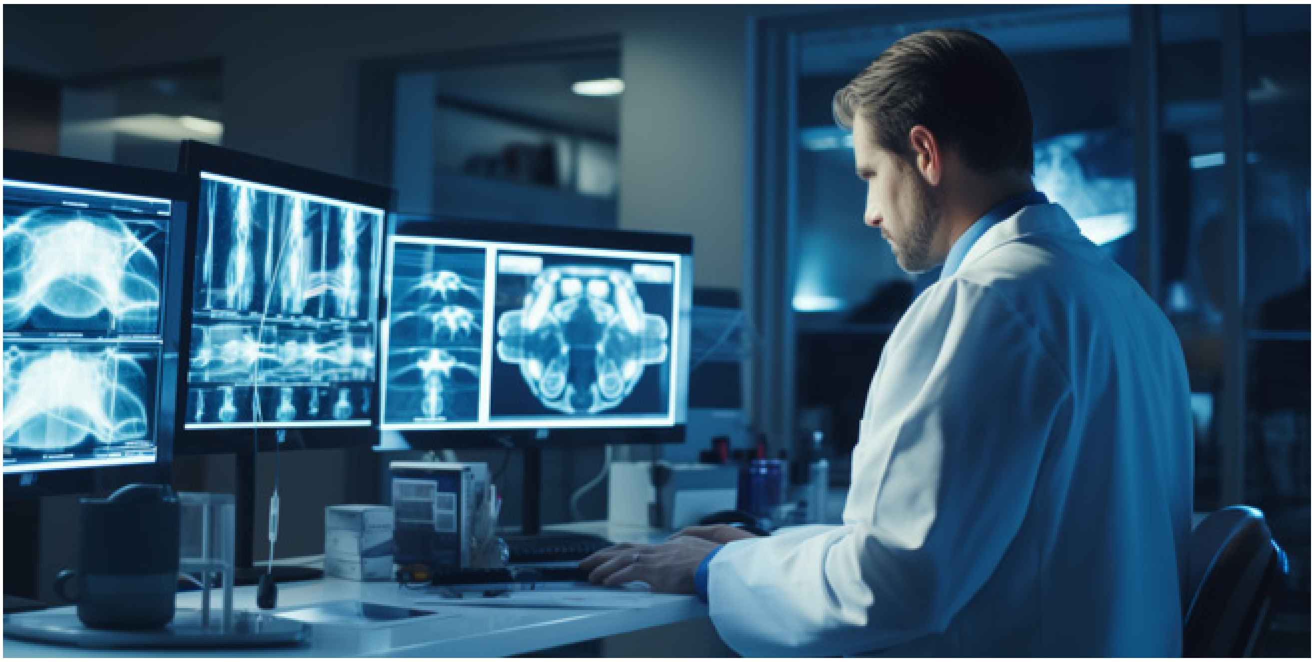
We build AI solutions with and for clinicians. That means clinical co-development, robust validation in real-world environments, and continuous feedback loops. Our tools are FDA 510(k) cleared or CE-marked. Increasingly we are emphasizing explainability by designing our systems to provide visual overlays or confidence scores. We pay particular attention to testing across datasets that are representative of the intended population ensuring performance are maintained in various clinical contexts or across relevant population subgroups. AI must earn trust and that starts with transparency and clinical rigor.

6. In what ways is AI helping to reduce diagnostic variability across radiologists and healthcare institutions?

One of AI's most important contributions is standardization. It can help bring consistency to image interpretation, measurements, and reporting - independent of a radiologist's experience or location. The goal is to reduce inter-reader variability, potentially minimize diagnostic errors, and ensure every patient receives a high standard of care.

7. With ongoing concerns around job displacement, how are you fostering clinician trust in AI-enabled systems?

Trust is earned, not assumed. That's why we engage deeply with clinicians from the earliest



stages of development. We prioritize education through programs like HelloAI and we ensure that our tools are integrated seamlessly into existing workflows, and designed to support, not supplant, clinical judgment. AI will not replace radiologists, but radiologists who use AI will be empowered to work smarter, faster, and with greater confidence. It's about collaboration, not competition.

8. How do you see the future of radiology evolving as digital technologies and AI become more deeply integrated?

Radiology will become increasingly intelligent, interconnected, and patient-centered. AI will be embedded in every step of the imaging chain from acquisition to interpretation to reporting and follow-up. We'll see more point-of-care diagnostics, real-time clinical decision support, and personalized imaging protocols. Radiologists will evolve into data-driven consultants who guide therapy and monitor outcomes, not just detect disease. The role is expanding, not diminishing, and AI is the catalyst for that transformation.

9. What ethical or regulatory challenges must be addressed to scale AI adoption responsibly in radiology?

We must ensure fairness, safety, transparency, and accountability. That means addressing bias in training data, securing patient privacy, ensuring clinicians understand how decisions are made, and maintaining human oversight. Regulators are adapting, but the pace of innovation must be matched by thoughtful governance. We support global harmonization of standards and advocate for robust post-market surveillance to ensure continued safety and efficacy in clinical use.

10. What excites you most about the next phase of AI development in medical imaging and healthcare delivery? ▶

What excites me most is the democratizing power of AI. We're moving toward a world where high-quality diagnostics are no longer limited by geography or specialist availability. AI-enabled tools will help bring expert-level care to remote villages, mobile units, and even patients' homes. Combined with cloud connectivity and digital ecosystems, this is not science fiction, it's happening now. The potential to improve equity, access, and outcomes at scale is truly revolutionary.

11. How is GE HealthCare addressing the challenge of algorithm bias to ensure AI solutions deliver equitable outcomes across different patient populations?

Bias detection and mitigation are priorities. We source datasets from a variety of countries and clinical settings during training and validation to ensure representativeness of the device intended population. Our models are tested to confirm that accuracy is maintained across relevant subpopulations. Equity is essential to our mission of delivering better outcomes for all, not just some.

12. In the context of global health, how can AI help bridge the radiology resource gap in underserved or low-infrastructure regions?

AI can extend the reach of radiology in places where specialists are scarce. For example, AI-guided portable ultrasound devices are enabling midwives and community health workers to perform basic exams and connect with remote experts. Cloud-based image-sharing and decision support are also bringing care closer to patients. It's about shifting from centralized expertise to distributed intelligence and that's a game-changer for global health equity.

13. If you had to summarize the future of radiology in one sentence, in light of AI's growing role, what would it be - and what message would you share with the next generation of radiologists?

Radiology will become a dynamic fusion of human expertise and intelligent technology - more proactive, precise, and personalized than ever before.

To the next generation of radiologists: embrace AI not as a threat, but as a tool that empowers you to be more impactful, more efficient, and more human in your care.

AUTHOR BIO

Prof. Dr. med. Mathias Goyen is the Chief Medical Officer for Imaging and Advanced Visualization Solutions at GE HealthCare. A radiologist by training and a passionate advocate for innovation, he focuses on bridging clinical insight with digital technology to advance global health equity and improve outcomes across healthcare systems.

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ExpertTalk

Driving Health Equity and Chronic Disease Prevention through Strategic Leadership in Population Health

Preet Kukreja
Director, Population Health Initiatives
St. John's Episcopal Hospital

1. How do you define strategic leadership in the context of advancing population health, and what differentiates it from traditional healthcare leadership approaches?

Strategic leadership in population health focuses on aligning innovation, data, and partnerships to address health inequities at scale. It differs from traditional healthcare leadership by moving beyond direct care delivery to designing systems-level solutions rooted in evidence and community context. This approach emphasizes prevention, resilience, and cross-sector coordination. Through this lens, I've led initiatives that improved outcomes in underserved communities—proving that strategic leadership is about anticipating challenges, aligning with national priorities, and building sustainable, equitable health systems.

2. Can you elaborate on the theoretical and practical foundations that informed the development of the Emotional Resilience and Motivation Quotient (ERQM) tool, and how its application has influenced chronic disease outcomes?

The ERMQ tool was built on interdisciplinary theory—combining behavioral psychology, emotional intelligence, and systems design—applied through advanced analytics and validated psychometric frameworks. Practically, it quantifies emotional resilience and motivation in high-pressure healthcare settings, addressing a critical gap in public health preparedness. Its implementation has reduced burnout by 30%, enhanced team cohesion, and led to improved patient engagement. This emotional readiness translated into better chronic disease outcomes, including improved adherence, fewer missed visits, and measurable gains in recovery times within vulnerable populations.

3. What are the most critical system-level barriers to achieving health equity today, and how have your initiatives navigated or dismantled those barriers?

One of the greatest system-level challenges to achieving health equity is fragmentation—across care delivery, data systems, and community resources. I've addressed this through integrated models that blend predictive analytics, community partnerships, and culturally responsive engagement. By aligning health services with local needs and social realities—especially in under-resourced areas—we've increased preventive care uptake and reduced avoidable hospitalizations. These initiatives are rooted in trust-building, actionable data, and systems-thinking, allowing us to navigate entrenched inequities with measurable, community-centered outcomes.

4. How does interdisciplinary collaboration enhance the efficacy of population health interventions, and what governance models have proven most successful under your leadership?

Interdisciplinary collaboration ensures that population health interventions are not siloed but informed by diverse expertise—clinical, behavioral, technological, and community-based. This breadth enables nuanced, effective solutions. Under my leadership, shared governance models that prioritize stakeholder co-design and cross-sector accountability have proven most successful. These models foster aligned goals, rapid problem-solving, and scalable innovation. By integrating insights across disciplines, we've delivered measurable outcomes in chronic disease prevention and health equity, particularly in high-need communities, where collaboration drives both relevance and sustainability.

5. In implementing Expanded Access to Care programs, what metrics have you used to evaluate their long-term impact on underserved populations?

In implementing the Expanded Access to Care grant, I applied a robust evaluation framework to measure long-term impact on underserved populations. Metrics included improvements in COVID-19 vaccination rates, pre-diabetes risk assessments, blood pressure screenings, and patient education on the importance of routine immunizations. The program demonstrated measurable outcomes such as increased vaccine uptake, improved chronic disease monitoring,

enhanced care continuity, and reduced preventable hospitalizations—collectively advancing health equity and strengthening population health infrastructure in high-need communities.

6. How do you ensure that federally aligned chronic disease prevention strategies remain adaptable to hyperlocal community needs without losing alignment with national priorities?

I ensure federally aligned chronic disease prevention strategies remain adaptable to hyperlocal needs by integrating national frameworks—such as the CDC's DSMES program and the U.S. Health Equity Strategy—with community-specific data and cross-sector collaboration. Using predictive analytics and stakeholder engagement, I tailor interventions to reflect local health profiles while aligning with federal benchmarks. This dual-focus approach has allowed my programs to remain scalable, evidence-based, and deeply responsive to the unique needs of medically underserved populations, without compromising on national priorities.

7. Can you describe a high-impact case study from your portfolio where data-driven innovation directly influenced policy or funding decisions at the federal or state level?

One high-impact case from my portfolio is the Expanded Access to Care and Continued

Access to Vaccination initiative, funded by a $2.75 million New York City DOHMH grant. We implemented a hybrid model that combined mobile clinics with traditional clinic infrastructure to expand reach in low-uptake ZIP codes. This approach increased COVID-19 vaccination rates, enabled continued access to care, and integrated screenings for chronic diseases. Real-time data guided deployment, and outcomes directly influenced state-level funding and policy decisions supporting sustained investment in equitable, community-centered public health models.

> Strategic leadership in population health involves forecasting systemic barriers, integrating federal benchmarks, and engineering scalable frameworks that drive equity and long-term resilience across underserved communities.

8. What role does community engagement play in the co-design of your programs, and how do you operationalize this involvement beyond stakeholder consultation?

Community engagement is central to my program design. In my Monkeypox prevention initiative, I operationalized involvement by training community ambassadors from high-risk neighborhoods to lead targeted outreach, education, and vaccine navigation. These ambassadors co-developed materials, shared real-time feedback, and built trust with underserved groups, enabling culturally relevant interventions. Their deep local ties helped identify barriers, increase vaccine uptake, and shape ongoing strategies. This model ensured that community voices directly informed program delivery, making it more responsive, equitable, and sustainable.

9. In your experience, how has the integration of behavioral health into chronic disease prevention reshaped patient outcomes and system performance?

In my experience, integrating behavioral health into chronic disease prevention has significantly reshaped both patient outcomes and system performance. We incorporated behavioral health screenings and referrals within chronic disease programs, addressing the underlying stress, trauma, and emotional factors that often impact disease progression and treatment adherence. This approach resulted in higher engagement, reduced emergency care utilization, and improved self-management among patients. It also fostered a more cohesive care model, where physical and mental health were addressed together, leading to more sustainable health improvements. ▶

10. How do you reconcile the tension between short-term measurable outcomes and the need for sustained, long-term transformation in public health?

I reconcile short-term outcome pressures with long-term transformation by embedding sustainability into every stage of program design. For example, in our CDC-funded Expanded Access to Care initiative, we launched immediate services like mobile units and health education to drive measurable improvements in screening and vaccination rates. At the same time, we integrated community ambassadors, local data systems, and emotional resilience tools to build lasting engagement and system adaptability. This dual-track model ensures both impact today and structural change over time.

11. With increasing focus on resilience post-pandemic, how does your framework for public health emergency preparedness intersect with chronic disease prevention?

My framework integrates public health emergency preparedness and chronic disease prevention by addressing both immediate crises and long-term vulnerabilities. During the Monkeypox response, we deployed rapid community outreach, testing, and vaccination while simultaneously identifying individuals at risk for unmanaged chronic conditions. We used this touchpoint to connect them to hypertension and diabetes services. By embedding resilience tools and care navigation into emergency protocols, we not only mitigate outbreaks but also strengthen chronic disease systems—ensuring preparedness leads to sustainable population health improvement.

12. What are some of the most overlooked dimensions of workforce resiliency in the population health context, and how does leadership need to evolve to support them?

One often overlooked dimension of workforce resiliency in population health is emotional exhaustion stemming from prolonged exposure to community trauma and systemic barriers. Traditional models focus on productivity and burnout mitigation, but few address the deeper psychological toll on frontline staff. Through my Emotional Resilience and Motivation Quotient (ERMQ) tool, I've shown how data-driven assessments of staff well-being can guide interventions.

Leadership must evolve from transactional management to emotionally intelligent, trauma-informed guidance that fosters psychological safety, meaning, and long-term motivation.

13. How do you anticipate artificial intelligence, machine learning, or advanced analytics transforming the future of equitable chronic disease prevention?

Artificial intelligence and advanced analytics hold transformative potential for equitable chronic disease prevention by enabling hyperlocal, real-time insights into population health needs. I've used predictive modeling to identify disparities in screening and intervention uptake, allowing us to target underserved populations more precisely. AI can personalize outreach, optimize resource allocation, and detect emerging trends before they escalate. However, its power lies in equitable design—ensuring datasets reflect diverse populations and outputs are interpreted through a health equity lens to avoid algorithmic bias.

14. Reflecting on your journey, what leadership principles have consistently driven success in scaling equitable, evidence-based population health initiatives?

Three core leadership principles have consistently shaped my success: equity-centered design, systems thinking, and participatory leadership. I prioritize listening to community voices early, ensuring interventions address root causes, not just symptoms. Systems thinking allows me to design scalable models that align with both hyperlocal needs and national priorities. Lastly, I foster cross-sector collaboration and shared ownership—mobilizing stakeholders, community ambassadors, and frontline teams to co-create and implement sustainable solutions rooted in data, empathy, and measurable impact. ■

AUTHOR BIO

Preet Kukreja is a nationally recognized expert in population health, health equity, and public health innovation. She has led impactful initiatives addressing chronic disease prevention, social determinants of health, and emergency preparedness in underserved communities. Her work integrates federal frameworks with local implementation, producing measurable outcomes in health access, resilience, and system transformation. She is the pioneer of the Emotional Resilience and Motivation Quotient tool, adopted to reduce burnout and improve patient outcomes. Ms. Kukreja is a Fellow of the New York Academy of Medicine and the Association for Project Management. She serves on the Action Board of the American Public Health Association and the Community Advisory Board of the Johns Hopkins Center for Health Equity.

Artificial Intelligence in Nephrology

Clinical Applications and Challenges

Artificial intelligence is increasingly being utilized in multiple domains of nephrology which ranges from acute renal failure, chronic kidney disease dialysis as well as detecting rare diseases such as Fabry disease. It is being positioned to play a significant role in addressing healthy inequities specially in the field of organ transplantation Artificial intelligence can also act as a force multiplier in transition to value based care

1.How has the integration of artificial intelligence (AI) evolved in nephrology over the past decade, and what pivotal moments or breakthroughs have significantly influenced its adoption?

The term artificial intelligence was first used at a Conference in 1956 in Dartmouth, NH, USA. Since then, there has been slow progress, partly limited by cloud storage and computing capability, until the development of large learning models in 1992 and subsequent introduction of generative machine learning in 2014. One of the historic events was the defeat of chess champion Gary Kasparov in 1997 by an IBM supercomputer named Deep Blue.

Prabhat Singh

Medical Director, MD, FASN, Nephrology, Kidney Specialists of South Texas Panoramic Health

Eventually, the introduction of ChatGPT by OpenAI in 2017 sparked a big public interest in this field, although slowly and steadily, this technology has been refined over the years.

In the last 2 decades, AI has undergone tremendous transformations with the introduction of deep learning and natural language processing (NLP).

Deep learning is increasingly being utilized in kidney imaging, to differentiate between malignant and benign kidney lesions. Additionally, it can also read kidney biopsy images and is used for the diagnosis of kidney transplant rejection.

Natural language processing allows for extracting patient characteristics from clinical notes and has significantly improved in recent years. This has improved the ability to gather relevant data from the vast pool of healthcare notes, which would otherwise have been very time-consuming and labor-intensive.

2. Could you elaborate on the role of AI in predicting and managing acute renal failure? How reliable are these technologies in clinical practice?

The diagnosis of acute kidney injury is based on rising serum creatinine and decreased urine output. Both are lagging indicators of renal failure. This gap in care has opened opportunities for utilizing artificial intelligence-based clinical decision support systems for early detection of acute renal failure.

One such example is Deep Mind, which is a Google GI subsidiary. In 2019, Deep Mind developed a machine-learning model that could detect acute kidney injury up to 48 hours in advance. This model utilized a data set of 700,000 individuals from the Veterans Health Administration over 5 years. Machine learning-based dynamic models are more accurate in predicting acute kidney injury than traditional static risk models. This has improved the ability to detect AKI in hospitalized patients, although it still has to be proven that implementing these models leads to clinically meaningful outcomes.

Recently, a machine learning model for predicting hospital-acquired acute kidney injury was deployed at Brigham and Women's Hospital for external validation. This model was able to predict AKI around 22 hours in advance.

3. Chronic kidney disease (CKD) often requires longitudinal care. In what ways is AI improving early diagnosis, progression tracking, and individualized treatment plans for CKD patients?

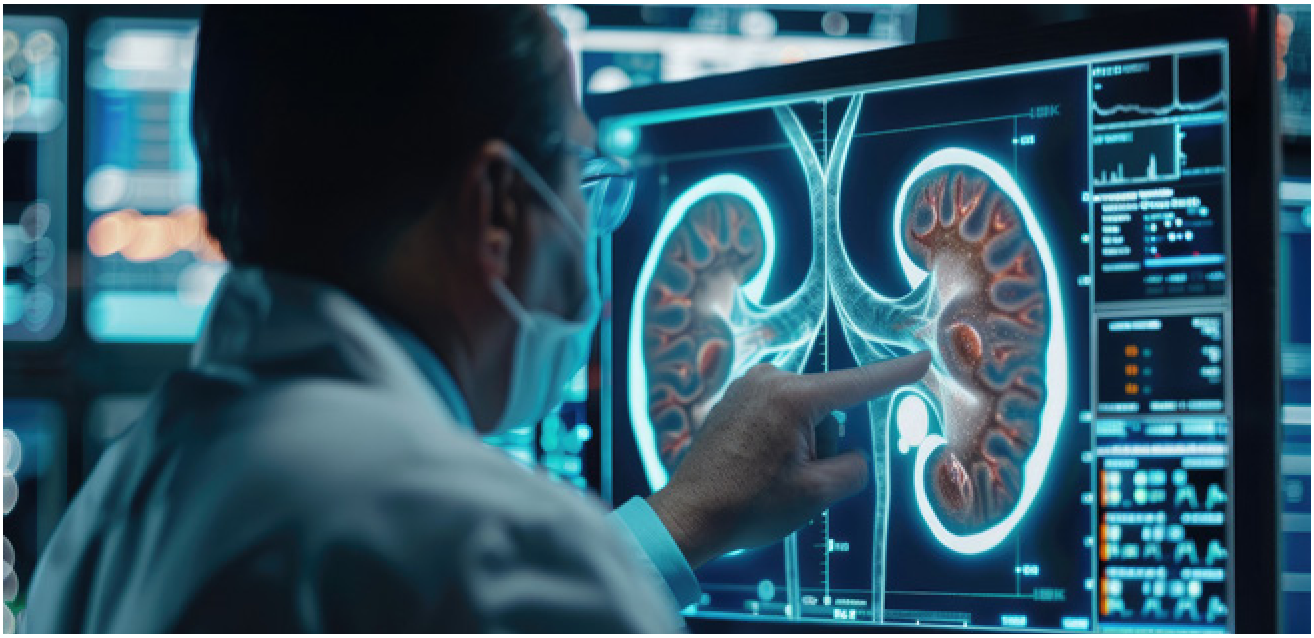
Chronic kidney disease is often underrecognized and underreported, partly due to lack of effective screening measures. There is a big unmet need for early and accurate diagnosis of CKD. There is wide variation in referral patterns to nephrology and it ranges across a spectrum of eGFR values. One quality study showed that only 56% of Primary care physicians routinely check kidney function in their patients with Diabetes mellitus. AI/ML driven algorithm integrated with EHR specially in primary care setting can help address these issues, triggering early nephrology referral and improve outcomes in patients with diabetic kidney disease (DKD).

4. AI algorithms rely heavily on data quality. What are the challenges in acquiring and standardizing nephrology data, particularly in diverse healthcare systems, and how do they impact AI applications?

Healthcare data is generally heterogenous and comprises of clinical notes and other patient related details which can be highly variable. In nephrology to some extent some of the data is structured due to the mathematical nature of this specialty, still suffers from inaccuracies and missing entries. If such data is used to train an algorithm, then there may be issues with generalizability as well as interpretability of these results.

Without addressing these issues, these algorithms tend to be limited to a specialized area or hospital, certain demographic rather than a large set of patients. Deep learning has shown remarkable accuracy in image analysis particularly in interpreting kidney biopsy images. It has demonstrated that it is as good as an experience nephrologist in reading kidney biopsy samples. This accuracy could be achieved by training such algorithms with a large set of images which is relatively easier to do in biopsy images due to whole slide image (WSI) technology.

5. With healthcare disparities being a significant issue in organ transplantation, how can AI address inequities in donor-recipient matching and post-transplant outcomes?



Currently, organ allocation is managed by the United Network for Organ Sharing (UNOS), which is a tier-based system with different priority tiers. These tiers are based on several characteristics such as age, blood type, disease severity, and many others. There is increasing concern that the current organ allocation system has led to inequitable access to transplants for some patients. For example, race-based eGFR calculation has impacted African American patients. AI based allocation system can improve organ allocation, address organ scarcity as well as mismatch issues and it can also predict long-term organ survival. For example, recently, in 2023, an AI-based organ allocation framework has been introduced, named "Continuous distribution". It is currently being done for only lung transplants, but it may act as a primer for other organ transplants such as kidneys, pancreas, and other organs.

6. Value-based care is a key focus in modern healthcare. How do AI tools act as a force multiplier in facilitating the transition to this model within nephrology?

There is a big push towards value-based care model in healthcare. Value-based care models incentivize quality over quantity and focus on improving patient outcomes. Artificial intelligence can act as a force multiplier in value-based care. Predictive artificial intelligence can be used to identify high-risk patients who can be monitored more closely after posthospital discharge and prevent readmissions, leading to lower healthcare costs and improved outcomes.

Recently a large dialysis care organization (LDO) developed a predictive model which could identify dialysis patient for high risk for hospitalization 1 week prior. Through this intervention they were able to reduce

> AI will not replace nephrologists, but those who effectively incorporate AI into their practice will provide superior care

hospitalization rate due to " all cause" for their patients. Similarly, predictive AI can be used to detect disease outbreaks, drug dosing, imaging, and much more.

7. Machine learning models in nephrology often require rigorous validation. What are some best practices for ensuring that AI systems are both clinically accurate and ethically sound?

Before clinical implementation, AI algorithms need to undergo a rigorous peer review process and assessment of technology readiness like standards used by NASA

Such algorithms need to undergo trials similar to a randomized control trial which is considered to be the gold standard of generating evidence. However, it is practically not possible to conduct randomized control trials for every clinical scenario. Artificial intelligence can be useful in such scenarios as it can be used to process real-world data to generate real-world evidence. Machine learning models can be used to conduct simulated trials using big data obtained from electronic health records and such simulated trials are much less time-consuming as well as require lower cost.

8. In dialysis management, what advancements has AI brought to optimizing treatment protocols and predicting complications? Are there any notable case studies or success stories you could share

Majority of hemodialysis in this country is provided in the form of intermittent hemodialysis at freestanding dialysis clinics. It generates a wealth of standardized health data making it an attractive choice for deploying such machine learning models. Artificial intelligence has been used in drug dosing in dialysis. Machine learning models have been shown to decrease darbepoetin alfa as well as intravenous iron consumption.

Intradialytic hypotension can cause muscle cramps, which are uncomfortable for dialysis patients. It is difficult to predict accurately whether a patient will experience intradialytic hypotension. Machine learning models have been used in hemodialysis to predict intradialytic hypotension with higher accuracy as compared to other models

During COVID-19 pandemic a large dialysis organization utilized a predictive model which looked at 80 variables to successfully identify undetectable COVID-19 infection 3 days prior to onset of symptoms

9. Privacy and data security are critical in patient care. How are AI systems in nephrology addressing these concerns while ensuring compliance with regulations such as HIPAA?

Artificial intelligence is not immune to data privacy laws such as HIPAA. Data protection is one of the key concerns in clinical applications of AI in nephrology.

It is important to ensure that patient data is entered securely and informed consent is Obtained from the patients. Anonymizing the data prior to doing analysis or processing is one of the ways to ensure data privacy. Patients should be informed as to how their data is being used and stored, which in turn will bring more transparency and build trust in such systems.

10. Can you discuss the challenges nephrologists face when integrating AI tools into their workflow? What kind of training or adaptation is required for effective utilization?

Despite significant advancements in research on artificial intelligence, its integration in clinical setting remains low. This is due to multiple reasons including data privacy issues, black box nature of algorithms and bias concerns.

One of the challenges is the lack of standards for sharing data between different health systems, which makes it challenging to integrate artificial intelligence algorithms into the routine workflow for nephrologists. Another key factor is that there is a lack of trust among clinicians/healthcare professionals for artificial intelligence which goes back to black box nature of these algorithms. One way of addressing this is to generate high-quality evidence and rigorous validation of these algorithms.

11. Bias in AI algorithms can perpetuate systemic inequities. How can nephrology practitioners ensure that AI systems are inclusive and do not reinforce existing biases in healthcare?

Artificial intelligence-based models can amplify biases and discrimination, particularly if the training data set reflects the healthcare disparities.

One such example is a race-based eGFR calculation, which has been a topic of debate recently, and the growing consensus is that the inclusion of race in these equations has contributed to disparities in kidney transplants among African-American individuals. This led to the development of alternative eGFR measurements that do not include race, such as Cystatin C-based equations. If the AI model incorporates the old race based GFR then the results may be biased.

To minimize bias, several fair practices have been recommended which include selection of representative patients in the model development, careful consideration on incorporating social determinants of health (SDOH), validation of models prior to deployment with tools such as Prediction model Risk Of Bias Assessment Tool

(PROBAST). For example, if an AI model learns that low socioeconomic status is associated with poor outcomes even with an effective treatment, then that model may recommend against providing an effective treatment for patients with low socioeconomic status.

12. How do you envision AI shaping the future of nephrology research? Are there specific areas where its impact could lead to transformative discoveries or innovations?

Artificial intelligence holds significant promise in transforming the landscape of managing kidney disease in the coming times. It has applications in each and every domain of nephrology, including acute kidney injury, chronic kidney disease progression dialysis kidney transplant as well as kidney pathology.

In this era of precision medicine, incorporating artificial intelligence will allow us to deliver individualized medical care. For example, in the case of dialysis, I envision a future where artificial intelligence models are integrated into routine dialysis delivery, including dialysis machines. A patient comes into the dialysis clinic with slight volume overload and the machine learning model has already alerted the dialysis nurse and physicians with the optimal approach to ultrafiltration by continuous monitoring of blood volume and bioimpedance data as well as lung ultrasonography so as to minimize major hemodynamic shifts during dialysis. This can improve patient experience as well as reduce adverse outcomes.

13. As a nephrologist with extensive experience, what advice would you offer to practitioners who are skeptical about incorporating AI into their clinical practice?

Artificial intelligence is here to stay, and we will see increasing integration in clinical nephrology in the future.

AI in its current form is neither intended to nor can it replace nephrologist. In coming times, nephrologists who embrace artificial intelligence will not only have a significant advantage, but also will set themselves apart as leaders in their field. We need to familiarize nephrologist with basics of artificial intelligence and need to invest more resources to develop AI competent workforce. ■

AUTHOR BIO

Dr. Prabhat Singh is a Board-certified nephrologist with over 11 years of clinical experience and is currently a Physician Partner at Kidney Specialists of South Texas. He serves as Medical Director for two DaVita hemodialysis units and a home dialysis clinic. He is an Editorial Board Member for BMC Nephrology and the Journal of Medical Case Reports, and also actively teaches at Corpus Christi Commumity, and is Technology Medical Director at Missions of Mercy Charity Clinic.

ExpertTalk

Strengthening the Healthcare Workforce to Achieve Digital Maturity at Scale

Angela Ahrendt
Senior Director, FTI Consulting

Georgi Chaltikyan
Professor and Head of the Digital Health, Deggendorf Institute of Technology

Fara Fernandes
Research Associate, Deggendorf Institute of Technology

1. From a consulting perspective, how can healthcare organizations balance the imperative of digital investment with pressing resource constraints while still advancing digital maturity among their workforce?

Angela Ahrendt

To balance digital investment with limited resources, healthcare organizations must view digital transformation as a strategic commitment rather than a financial burden. As emphasized in our article, technological adoption must go hand in hand with workforce upskilling—without it, digital tools risk being underused and ultimately costly. Adoption strategies should focus on phased implementation, prioritizing high-impact technologies while simultaneously building digital competencies across the workforce. This dual investment in tools and people is essential for advancing digital maturity in the hospital and healthcare settings. Finally, as advisors, we advocate for inclusive collaboration. Engaging healthcare professionals, citizens, and digital experts alike will ensure solutions that are not only practical and user-friendly but also, in the long term, scalable and sustainable.

2. How does academic training in digital health need to evolve to adequately equip future professionals to lead and adapt within increasingly digitized healthcare ecosystems?

Georgi Chaltikyan

Academic training in digital health must transition from traditional, siloed education to a dynamic, competency-based model that reflects the realities of digital healthcare ecosystems. It should focus on developing interdisciplinary fluency, integrating clinical knowledge with data science, health informatics, AI, ethics, cyber security, and system design. Future professionals need not only (even, not so much) technical skills but leadership capabilities, critical thinking, and adaptability. Programs like the Master of Digital Health (MDH) at DIT-ECRI are designed precisely with this vision—blending theory with hands-on experience, industry engagement, and exposure to global best practices to cultivate leaders who can drive digital transformation. Furthermore, in order to streamline and harmonize master-degree digital health education, we have started a movement we call "MDH Alliance", calling all interested parties and major players to work collaboratively towards establishing a globally recognized and accredited own degree "MDH" – in the same manner as MPH transformed public health education and training.

3. Your research touches on workforce capacity building - what are some evidence-based strategies that can simultaneously address digital skill gaps and organizational resistance to change?

Fara Aninha Fernandes

Workforce capacity building depends on several interconnected factors. Addressing both digital skill gaps and organizational resistance to change requires a combination of leadership, supportive organizational and digital infrastructure and particularly well-designed digital learning ecosystems. These digital learning ecosystems bring together micro learning, blended learning and other designs into one organized framework. This is key to building and fostering culture change, and technology adoption practices, training and leadership. For example, a study showed that 'learn management systems' are essential in coordinating digital health courses, delivering education on web-based environments and connecting traditional teaching with modern technology.1 Therefore it is imperative that digital learning ecosystems are introduced and utilized to support the digital transformation of healthcare. Other strategies include the assessment of skills to determine where change resistance occurs and the co-creation of digital transformation roadmaps. There should be involvement of all staff to create an atmosphere of ownership that fosters engagement, accountability and smooth adoption of new digital health practices.

4. In your experience advising health systems, what strategic approaches have proven most effective in cultivating trust among healthcare professionals toward adopting AI-powered tools in their clinical and administrative workflows?

Angela Ahrendt

One of the most effective strategies for building trust among healthcare professionals in adopting AI is to begin with awareness workshops grounded in clinical realities. These sessions address the significant administrative burden clinicians face daily, i.e., tasks that often divert time and energy away from direct patient care. Equally critical is investing in foundational education on data privacy, security, and AI

regulation. When clinicians understand how AI tools function, how patient data is handled, and the safeguards in place, their confidence in these technologies increases. Clinicians often express concern about large-scale use of patient data due to growing cybersecurity risks. Acknowledging that IT is not their primary focus, we also engage hospital IT and security teams to strengthen the organization's cyber readiness and s cyber readiness and ensure continuous protection of sensitive data. This informed perspective helps bridge the gap between innovation and everyday practice, allowing AI to be seen as a supportive extension of clinical work, rather than a disruption to it.

5. What role do interdisciplinary collaborations play in ensuring the curriculum remains relevant for addressing the technological and cultural shifts required by a digitally mature health workforce?

Georgi Chaltikyan

Interdisciplinary collaboration is fundamental. The digital transformation of healthcare is not a technical or clinical endeavor alone – it is a cultural shift. To address this, academic curricula must be co-developed with input from health professionals, technologists, ethicists, policy-makers, and patients. At our WHO Collaborating Centre for Digital Health Education, Research and Development at DIT, we actively partner with international organizations, industry stakeholders, and public institutions to ensure that our training programs remain relevant and forward-looking. Such collaborations help us embed real-world complexity into education, ensuring graduates are equipped to navigate both technological advances and the human factors critical to their implementation.

6. How can scenario planning and predictive modeling be utilized to design responsive training frameworks that align with different digital maturity levels of healthcare organizations?

Fara Aninha Fernandes

Scenario planning and predictive modeling are essential for designing responsive training frameworks and developing tailored training strategies to align with varying digital maturity levels in healthcare organizations. Scenario planning enables institutions to anticipate different future contexts such as incremental upgrades, integration of artificial intelligence-based tools, as well as system wide digital transformation of healthcare. In planning the integration, design, implementation, and scaling of digitally enabled interventions in healthcare settings, Cresswell and Williams outline seven principles including the planning of the integration of digital health tools with wider health and care pathways and a clear strategy for how their product will evolve over time.2 Without such scenario planning and predictive modeling, there is a risk of the introduced digital health tool being abandoned.2 The benefits of using scenario planning and predictive modeling therefore enable the workforce to be prepared for evolving technologies

AUTHOR BIO

Angela Ahrendt is Senior Director, Healthcare and Lifesciences at FTI Consulting. With over a decade of experience in the public and private sectors, Angela has built her expertise at the intersection of EU and national healthcare policies, with a particular focus on advancing innovation and the digital transformation of health systems.

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and workflows and allowing for strategic foresight and tactical personalization.

7. How do you foresee regulatory and governance frameworks influencing or hindering the seamless integration of digital technologies across various healthcare user groups in the coming years?

Angela Ahrendt

In Europe we see a growing trend of overregulation in the health sector, with fragmented and overlapping legislative requirements making compliance increasingly difficult. As holders of large amounts of health data, healthcare providers will also need to become familiar with the responsibilities under the European Health Data Space (EHDS) Regulation. On the side of the regulator, there is chronic shortage of notified bodies to certify technologies under frameworks such as the Medical Device Regulation, the AI Act, and the EHDS. These gaps are already causing deployment delays, raising concerns among clinicians about the safety and reliability of new digital tools.

Importantly, efforts to address these challenges are gaining traction. The European Commission has acknowledged these issues through simplification efforts such as the announced digital omnibus package aimed at streamlining and aligning regulatory processes. Policymaking is becoming more agile, and there is growing awareness across the healthcare ecosystem of the need to embrace new rules and support smoother national implementation for the ultimate benefit of the patient and the clinical workforce.

AUTHOR BIO

Georgi Chaltikyan, MD, PhD, serves as Professor and Head of the of Digital Health (MDH) program at Deggendorf Institute of Technology (DIT-ECRI) in Germany and at Russian-Armenian University (RAU) in Armenia. He is the Founder and Head of the WHO Collaborating Center for Digital Health Education, Research, and Development at DIT-ECRI.

8. With your academic insights, how do you interpret the interplay between technological literacy and clinical expertise in enhancing the quality and safety of patient care?

Georgi Chaltikyan

Such interplay is no longer optional – it is foundational to safe, efficient, and person-centered care. Clinicians equipped with digital competencies are better able to interpret data, use decision-support tools, engage with telemedicine, and safeguard patient privacy. However, digital tools must augment – not replace – clinical judgment. Our role in academia is to ensure this balance: we prepare health professionals to critically engage with technology while upholding the core principles of clinical excellence. When used responsibly, digital tools enhance diagnostics, treatment precision, and patient safety – and contribute to a more equitable, responsive health system.

9. From your research findings, what challenges emerge when aligning digital health tools with the real-world workflows of clinical staff, and how might these be overcome?

Fara Aninha Fernandes

Integrating digital health tools into the real-world workflows of clinical staff is a persistent challenge in healthcare innovation. It involves an understanding of human behavior, clinical routines, institutional culture, and system complexity rather than just integrating the software into the workflows of the clinic. Digital health tools will only succeed if they align with the mundane, time-pressured, and human-centered realities of clinical work and commitment to adaptation. One of the foremost issues is the design of digital health tools that are often introduced without fully understanding the clinical reality. Another challenge is the variability in digital competencies among staff that makes uniform adoption of digital health tools difficult. Resistance to change that is often rooted in concerns about added workload, loss of autonomy, or distrust in technology also acts as a barrier.

These challenges can be overcome by co-designing digital tools with clinicians in order to ensure relevance and reduce friction. In-service programs, embedding digital health education into professional development and promoting champions can ease the transition and build confidence.

AUTHOR BIO

Fara Aninha Fernandes, BDS, MDS, MSc (Medical Informatics), is a Research Associate and PhD candidate at the Deggendorf Institute of Technology (DIT-ECRI) in Germany. Her PhD research focuses on improving the explainability of artificial intelligence-based solutions in radiology, aiming to enhance transparency, trust, and clinical integration of AI tools.

10. In the context of empowering citizens as one of the key user groups, how can digital health education be extended beyond professionals to support active and informed patient participation?

Georgi Chaltikyan

Digital health education must extend to citizens if we are to build inclusive, resilient health systems. Empowered Citizens are not passive recipients – they are co-creators of their health journeys. Education for citizens should focus on digital health literacy, data rights, navigation of digital tools (like patient portals or apps), and understanding digital risks and benefits. Community-based programs, accessible e-learning, and public awareness campaigns –developed in co-design with citizens and patients – are essential. The Chapter, where we emphasize the role of Empowered Citizens as a primary user group, reinforces this paradigm: citizens must be at the center of digital health strategies.

11. How critical is the personalization of upskilling programs in advancing the digital competencies of distinct healthcare worker segments, and what methodologies best support this personalization?

Fara Aninha Fernandes

The healthcare environment is stratified with varying levels of digital fluency, roles, responsibilities and learning preferences. As we explain in the chapter, there are three different user groups, each with varying knowledge, skills, and competences. Therefore, each group interacts with digital health tools differently and the consequent personalization of upskilling programs is critical in advancing digital competencies across health worker segments. Efforts must be directed towards avoiding a 'one-size-fits-all' training design and instead opt for advancing digital competencies among the three user groups. For example, digital health administrators require systems-level expertise in governance and informatics, while clinicians need hands-on digital skills in electronic health records, clinical decision support, and telemedicine platforms. Without personalization efforts, upskilling of the workforce can lead to disengagement, knowledge gaps, and underutilization of digital health tools, ultimately undermining the digital health transformation efforts.

Some of the methodologies of personalization include competency-based assessments to identify skill gaps, requirements of indicators to assess institutional readiness, blended and adaptive learning environments that offer role-specific education modules, and continuous in-service training. When co-developed with staff, these personalized programs enhance relevance, engagement, and effectiveness by aligning content with learners' roles, digital literacy levels, and workflow contexts. ▶

THROUGH THE HOURGLASS

Bringing Diagnostics to the Doorstep

How AI and Point-of-Care Tools Are Revolutionizing Rural Health Care

As the global population grows older, healthcare systems, we must embrace artificial intelligence, machine learning, and remote diagnostics and treatment, to provide patients – regardless of geography – with access to high-quality medical expertise. Remote supervision and diagnostic platforms offer a powerful solution – bridging that gap and opening new possibilities for global health equity.

Eirik Tjønnfjord

Senior Hematology Consultant at Kalnes Hospital and Rikshospitalet

As the world advances, new technologies are transforming healthcare – enabling faster, more efficient care and helping meet the demands of an aging population. Artificial intelligence (AI) and machine learning (ML) are becoming vital tools, allowing healthcare providers to diagnose and treat more effectively and with greater speed.

Yet in many rural and underserved areas, these innovations remain out of reach. Limited access to electricity, education, and medical infrastructure means that tools and services must be adapted to local conditions. Healthcare solutions in these settings need to be simple, reliable, and resilient.

Remote diagnostics and expert supervision offer a powerful way to bridge this gap. They can provide patients with access to high-quality care – regardless of location – even when specialists are not physically present. This is crucial not only in rural communities and low-resource countries, but also in conflict zones and remote environments such as offshore platforms.

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In this article, I share a real-world experience from a visit to Ghana, where we are working to establish a remote ultrasound supervision platform. This system is designed to be used anywhere – from isolated villages and urban clinics without ultrasound experts, to extreme settings like the Arctic or oil rigs – bringing expert care closer to the patient, wherever they are.

A Global Divide in Diagnostics

Health care diagnostics and treatment options are advancing rapidly. Each day brings new opportunities to detect and treat illnesses earlier and more effectively. But while this progress is celebrated in urban hospitals and well-funded health systems, many people in rural and low-resource areas are still being left behind.

In large parts of the world, even basic diagnostic tools – like CT scanners, MRIs, or standard blood testing – are either unavailable or unusable due to lack of infrastructure or trained personnel. The result is a troubling gap in early detection and access to treatment.

AUTHOR BIO

Eirik Tjønnfjord is a senior hematology consultant at Kalnes Hospital and Rikshospitalet, specializing in thrombosis and rare disorders. He leads research initiatives, teaches ultrasound diagnostics, and advocates for the integration of AI in rural healthcare. Currently a PhD candidate studying ITP, he also advises the Rural Health Foundation and is deeply engaged in medical innovation

But with the rise of point-of-care technology, artificial intelligence (AI), and remote diagnostics, that gap can be closed – bringing life-saving capabilities directly to communities that need them most. (Figure 1)

Field Experience: Training and Technology in Ghana

I recently traveled to Ghana with the Rural Health Foundation, a private non-profit health organization focused on improving rural health care through Point-of-Care Ultrasound (POCUS). Our mission was not just to provide care temporarily, but to train local physicians in using ultrasound technology as part of their regular practice.

By equipping and educating local doctors, the impact of our work extends far beyond our visit. One of our ultrasound specialists is even pursuing a PhD exploring how remote supervision and training can further support providers using POCUS in rural settings – adding another layer of sustainability to the approach.

Listening to Local Voices

In Ghana, we met many enthusiastic doctors eager to learn and improve their diagnostic skills. They welcomed donations of equipment and medicines from abroad but shared how these generous contributions can sometimes miss the mark when disconnected from local realities.

Figure 1: In many rural areas, X-rays are still viewed the traditional way – holding the film up to the light – highlighting the need for modern, accessible imaging solutions.

At one hospital, a state-of-the-art CT scanner was donated – but when plugged into the local power grid, it shut down the entire hospital. Without the proper infrastructure to support it, the machine now sits idle and rusting. Meanwhile, the hospital still relies on a decades-old X-ray machine that works reliably within their power limitations.

In contrast, the handheld ultrasound devices we used were easily charged, highly portable, and practical for bedside or even outdoor use. They proved to be a far more effective tool in this context. (Figure 2)

Rural Health Foundation

An Oregon registered and a global non-profit established with the goal to provide access to quality healthcare for people from low-income communities who have little or no access to good medical facilities.

The goal is to provide access to quality healthcare for poor communities who have little or no access to good medical facilities.

Figure 2: Patients waiting for evaluation under makeshift tents – an example of thinking outside the box to bring care closer to those who need it. When clinics aren't available, we build our own.

Safe, Accessible, and Empowering

One of the greatest strengths of POCUS and remote diagnostic tools is their simplicity and safety. They're non-invasive, can be used anywhere, and – when properly taught – can be operated by a wide range of healthcare workers. But responsible use is essential.

POCUS should not be used indiscriminately or as a general screening tool. It should be guided by symptoms and clinical findings, and the user must understand basic anatomy to differentiate between normal variations and pathology. Every patient is unique, and what looks unusual on a scan might be completely harmless in a healthy person.

During our visit, a Norwegian team member introduced Ghanaian doctors to a remote supervision platform, enabling local physicians to perform scans with real-time expert support. These doctors – who know the culture, language, and communities – are now equipped to carry on the work, supported when needed by international expertise.

This is the only sustainable way to build up health systems in rural areas: by empowering local providers with knowledge, tools, and confidence. (Figure 3)

The Simplicity of the Setup

The technology required is surprisingly basic. All it takes is a handheld ultrasound scanner,

Figure 3: Examination of a patient with a wireless ultrasound.

internet access, and a two-way audio-video communication link. That's it. With these, expertise can be extended to the most remote locations on Earth – opening the door to more equitable health care for all.

As global populations grow, health systems everywhere are feeling the strain. In many places, patients must travel long distances to reach specialists or hospitals. But with point-of-care devices and remote supervision, more patients can be diagnosed and treated locally – reducing travel costs, speeding up care, and avoiding unnecessary hospitalizations.

This is not just for rural Africa or Asia. Even in developed countries like Norway and the United States, local care providers – such as general practitioners, elderly care homes, or ambulance teams – could use these tools to perform diagnostics at the point of need. In emergencies, paramedics could conduct ultrasounds en route to the hospital, transmitting images to specialists for immediate decision-making.

Beyond Ultrasound: A Broader Transformation

While our fieldwork focused on POCUS, similar remote approaches are being adopted in other areas of medicine. ECGs taken in ambulances are now routinely transmitted to hospitals for cardiologists to assess in real time, enabling faster triage for heart attack patients.

However, these tools must be used wisely. The quality of diagnostics depends on the equipment, the user's training, and the clinical context. Technology should enhance – not replace – clinical judgment. For instance, the rise of full-body scans, genome analysis, and broad-spectrum blood tests can overwhelm both patients and providers with irrelevant or misleading data. Statistically, even healthy individuals will have out-of-range test results that may not indicate illness.

Machines and AI are valuable aids, but they can't interpret the emotional nuance of a patient's story or substitute for clinical reasoning. They are only as good as the people who design and use them. (Figure 4)

Figure 4: A team of doctors comes together, using cutting-edge tools like wireless ultrasound and AI ECG, to plan compassionate and effective humanitarian care.

Looking Ahead: Smart Systems, Not Just More Staff

With aging populations and increasing pressure on health systems, the need for more healthcare professionals is clear – but equally urgent is the need for smarter, more efficient tools. It's not enough to simply scale up staffing. We must scale up capability, deploying high-quality diagnostic devices beyond urban hospitals and into rural clinics, health posts, disaster zones, and resource-limited environments.

These tools must be intelligent, accessible, and designed for the realities of frontline care. That means integrating AI, ML and remote connectivity to support decision-making, enable real-time supervision, and reduce diagnostic delays – regardless of geography.

AI will not replace good doctors. But healthcare professionals who learn to work with AI will become more efficient, more consistent, and more capable. By combining the clinical intuition of humans with the data-driven precision of machines, we can offer more accurate, timely, and equitable care – not just for some, but for everyone, everywhere.

This isn't a distant vision. Around the world, pioneering teams are already implementing remote ultrasound platforms, smart triage tools, and AI-assisted diagnostic systems. We are not just imagining the future of healthcare—we are actively building it.

One scan, one connection, and one empowered provider at a time. And this is just the start, there are many other diagnostic tools that could be remote, so that local healthworkers that know the culture and the people can do the work they know best, and experts can help with special diagnostics.

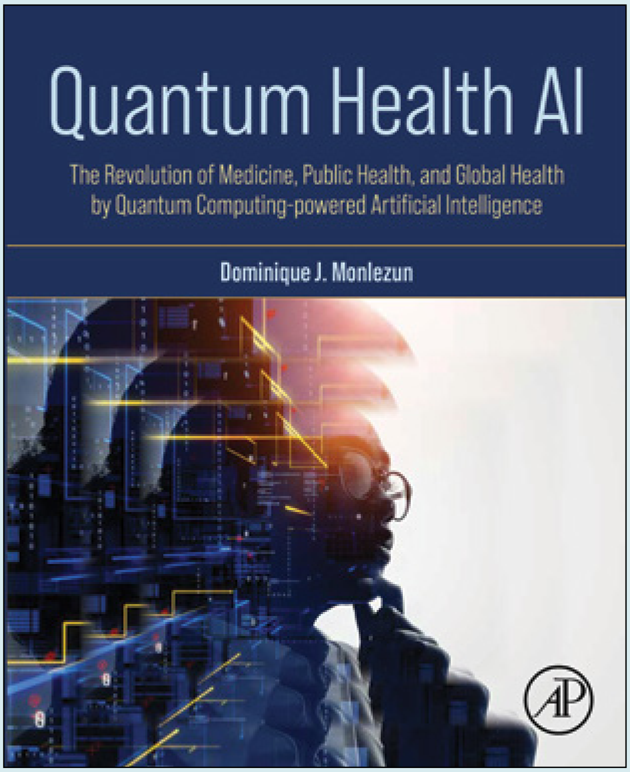
The future is made together.

Quantum Health AI

The Revolution of Medicine, Public Health, and Global Health by Quantum Computing-Powered Artificial Intelligence

Dominique J Monlezun

Triple-doctorate trained physician-data scientist and AI ethicist, Assistant Professor of Medicine, Mayo Clinic.



Book Description:

Quantum Health AI: The Revolution of Medicine, Public Health, and Global Health is the first comprehensive book defining the transformation of the global health ecosystem by the fusion of our most powerful technologies—quantum computing and artificial intelligence—while defending an actionable human-centred approach to doing so responsibly, equitably, and sustainably.

We can continue to watch wars, diseases, poverty, polarization, cyber-crime, and climate change only worsen. Our strongest technologies can remain centralized in a small number of companies and countries for their profit and power. Or we can cooperatively put quantum AI to work for the health of all of us, by managing the technology's overarching competition between democracies and autocracies, along with the public and private sectors (balancing human security with national security, economic growth with household livelihoods, and individual rights with the common good). This book draws on the decade plus of original research and first-hand perspective of the world's first triple doctorate-trained physician-data scientist and AI ethicist.

It unpacks the history, science, values, and political economics framing and driving quantum AI (including its physics, metaphysics, ethics, governance, computing, sensing, communication, materials, and security), the global health ecosystem (healthcare systems, public health agencies, biotechnology companies, and development institutions), and their growing integration, wins, and challenges. This one-stop book provides a global, inclusive, and practical guide for understanding and shaping these societal and technological trends. It thus empowers health, technology, and policy students, practitioners, professionals, researchers, and leaders in organizations, universities, companies, and governments—ultimately to make and maintain the human-centred quantum AI that can safeguard and advance humanity's common health, home, and future.

1. In Quantum Health AI, you explore the fusion of quantum computing and artificial intelligence in global health. How do you see this integration reshaping medicine and public health in the next decade?

Quantum-powered AI will either be the greatest technological boost—or threat—to medicine and public health, as they apply our most disruptive hardware and software to humanity's most critical strategic asset: our health. Health workers, policymakers, and leaders are therefore indispensable for advocating for our patients by helping steer the responsible design and deployment of these technologies. Healthcare is far too expensive and inaccessible for most people globally, while fielding too few health workers. But quantum AI may allow us to scale efficient and effective innovations to reverse these trends.

2. Quantum AI presents unprecedented opportunities, but also risks of centralization and inequity. How can policymakers and global institutions ensure these technologies are developed and deployed ethically and equitably?

We cannot ensure they will be (since a small group of countries and companies are advancing these technologies faster than any regulation or legislation). But what we can do is be the force multipliers for equitable value-based care, by working with policymakers and institutions crafting and enforcing global AI governance for health, and so the guardrails for this global tech race maximizing mutual benefit and minimizing societal harms. We can also co-design the local governance frameworks synced with our existing clinical workflows and research portfolios that already are showing promise and widescale adoption (i.e., the TRAIN consortium and the World Health Organization's responsible health AI).

3. Your book emphasizes a "human-centered approach" to Quantum AI in healthcare. What core principles should guide the responsible integration of these technologies into medical practice?

Instead of just another list of principles we put up on walls, this approach is about rediscovering the essential principle: each patient loved as a unique person in community. When we recover our shared understanding across cultures, belief systems, and health systems that we belong to each other, and that the individual good and common good cannot be achieved without each other, then we can re-earn trust in each other through productive cooperation toward the full flourishing—aka integral wellbeing or health—of all. Like in human-centered economics, household living standards, not just GDP, are needed. So too in quantum health AI, human security and data security are both critical.

4. You discuss the strategic competition between democracies and autocracies in the race for Quantum AI. How do geopolitical factors shape the development and application of these technologies in global health?

Political economics are the meta-determinants of health, shaping and constraining to a large extent the biological, social, commercial, and digital determinants of health. And the leading powers globally have both defined quantum and AI as critical national security assets that will determine our future. Health workers and leaders with our technology partners can therefore reinforce positive pressure on them to collectively manage this strategic competition so patients worldwide benefit from the resultant innovation (i.e. ChatGPT and DeepSeek making each other better), while minimizing its weaponization and conflict. Cooperate where we can, compete where we must.

5. The ethical challenges of AI in medicine are already complex. How does the addition of quantum computing further complicate the landscape of AI ethics in healthcare?

Quantum simplifies and complicates the ethical challenges AI poses for healthcare. Quantum simplifies them by limiting the number of powerful actors driving this computing revolution forward (currently among a handful primarily of American and Chinese companies), so it facilitates the traditional institutional checks on their competition. But it also complicates the challenges by enabling decentralized breakthroughs that can fundamentally and unpredictably redefine the global digital ecosystem on which health innovations depend (such as by quantum increasingly threatening standard digital encryption on which our health data exchanges depend).

> This is the first book to unite the science, economics, and ethics for responsibly leading the quantum AI defining health's future.

6. You highlight the need for a balance between human security and national security in Quantum AI governance. How can governments foster innovation while preventing misuse or unintended consequences?

Human security ethically and pragmatically reinforces guardrails in the strategic competition for national security, in which there is an intensifying global technology race to dominate quantum AI. Consider how a healthcare system may want to expand its reach and profit margin through greater organizational efficiencies (but this also invites the financial risks of over-expansion and increased regulatory scrutiny). Similarly, it is in the interests of all governments to foster collaborative innovation according to a globally shared minimum set of fair rules that benefits all of humanity (while minimizing risks from rogue or irresponsible actors).

7. Your research spans multiple disciplines, from physics to bioethics. How do you envision interdisciplinary collaboration playing a role in advancing Quantum AI for global health?

Quantum AI for global health is an inescapably inter-disciplinary enterprise. And the winners are those who leverage more comprehensive insights to drive faster innovation, not just technically with more efficient performance, but also institutionally with greater public trust and so use. Science, economics, and ethics must work together. More free, open, and collaborative ecosystems outcompete their more controlled, closed, and divisive counterparts in the quantum health AI R&D, governance, and thus market share.

8. The book discusses the role of biotechnology companies in shaping the Quantum AI revolution. What responsibilities should these companies have in ensuring their technologies benefit all populations, not just high-income countries?

The demographic decline (and even collapse) in many high-income countries means the producers and consumers of quantum AI must increasingly come from—or at least partner with—low- and middle-income countries. China and the United States are currently competing not just technically for quantum AI but also politically for preferential partnerships with these emergent powers. Whoever's companies deliver greater value (higher quality for lower cost), defined as more transparently and equitably safe, efficient, and effective, ultimately wins. ▶

9. Quantum AI has the potential to revolutionize disease prevention, diagnostics, and treatment. What are some of the most promising real-world applications already emerging in healthcare?

Like washing hands as one of our most powerful anti-infection tools in hospitals, many of the most promising quantum AI advances are simple but fill key gaps. Leading use cases include digital platforms (more quickly and affordably expanding health systems' AI and computing capacities especially in lower resource communities), federated data architectures (accelerating precision medicine and precision public health,, swarm intelligence, AI agents, cloud and edge computing, quantum safe cryptography, digital twins, in-silico (digital) trials, translational meta-multi-omics, micro-nanorobots, and clean or green AI.

10. Public trust in AI-driven healthcare remains fragile, especially in marginalized communities. What strategies can be used to build transparency and trust in Quantum AI-powered health systems?

Fair and transparent 'co-design' is gaining traction in responsible AI creation and deployment, especially through public-private partnerships such as with large technology companies working with trusted non-government organizations and local health systems to ensure patients and providers can inform every step of the quantum AI cycle. Then health wins beget new wins and can strengthen trust, deepen collaboration, and scale applications through more of the health ecosystem.

11. You mention that Quantum AI could transform global health governance. What institutional changes would be necessary to integrate this technology into existing healthcare systems without exacerbating disparities?

Many health organizations worldwide are making the right changes (because they have no other choice if they want to stay open). The World Health Organization and others are doing important work on top-down governance. Meanwhile, bottom-up governance is happening much more rapidly and probably more influentially as health systems are having to show greater transparency, responsiveness, and efficiency delivering on local health demands (especially as more disruptive technology companies such as through smartphone apps can leapfrog brick-and-motor traditional health players if they fall too far behind delivering patient value).

12. As Quantum AI progresses, concerns about data privacy and security become more pressing. How can healthcare institutions safeguard patient data while leveraging the power of these technologies?

Federated data architectures like with Mayo Clinic's Platform and TriNetX in America and the Ayushman Bharat Digital Mission in India provide powerful examples of advancing innovation without jeopardizing security. Swarm

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learning and globally scalable quantum safe cryptography, such as with IBM's z16 quantum-safe mainframe with on-chip AI, in addition to Nvidia's health platforms, also show what 'Data-Behind-Glass' models can do in this area trying to keep data as secure and local as possible, while sharing quantum AI-generated insights across network partners.

13. Many fear that AI will replace human decision-making in medicine. How do you see the role of physicians evolving in a Quantum AI-powered healthcare landscape?

The need for physicians has only increased as medicine becomes more technologically advanced: better science means more data in which patients can get more easily lost. Healthcare systems upskilling physicians with responsible AI will replace systems and physicians without such AI. Our role as healers stays constant, but our toolbox expands with this technology to better serve patients (especially with the accelerating trend of quantum AI democratization as with digital platforms and AI embedded in clinical workflows).

14. Your book presents a call to action for using Quantum AI to advance humanity's health and future. What immediate steps should researchers, policymakers, and healthcare professionals take to move towards this vision?

Go hold the hand of your closest patient and listen to their story. They will help us prioritize which quantum AI applications, capacities, and infrastructures are the greatest value-add for them, while keeping us rooted in why we are doing all this in the first place. And weekly meet one new person outside your discipline and background. They help us translate old insights into new breakthroughs in our niche, while improving the scale, scope, speed, and sustainability of a shared actionable strategic plan toward a healthier, fairer, more human future.

AUTHOR BIO

Dominique J. Monlezun, MD, PhD, PhD, MPH, is the world's first known triple-doctorate-trained physician-data scientist and AI ethicist. He serves as a physician at the Mayo Clinic, a Professor of Cardiology at two American academic medical institutions, and a Professor of Bioethics at two United Nations-affiliated universities. He is also the Principal Investigator, Senior Data Scientist, and Biostatistician for over 100 research studies in collaboration with Harvard University, the National Institutes of Health, and institutions across dozens of low- and middle-income countries.

Regulation and Compliance in Digital Health Innovations

Welcome to this panel discussion presented by American Hospital & Healthcare Management (AmericanHHM). Today, we focus on a key pillar of digital health regulation and compliance. As innovation accelerates, aligning new technologies with safety, ethics, and regulatory standards is more important than ever.

OUR PANELISTS INCLUDE

We're pleased to welcome two leading voices in this space:

Lauren Harkins
Associate Director of Strategy, NHS

Philippe Gerwill
Digital Health Humanist and Futurist, Founder at PGEA Ltd

Q1. In today's digital-first healthcare world, how can regulatory bodies maintain a balance between rigorous compliance protocols and the need for rapid innovation, especially during public health emergencies or tech surges?

Lauren Harkins: The challenge is to build regulatory systems that can flex under pressure without losing trust. Public health emergencies have shown it is possible to move quickly with exceptional authorisations or supported rapid access - embedding real world evidence models and time bound approvals can support innovation proceed safely. Regulators need to be ahead of the game, staying close to emerging and predicting future trends and setting clear expectations for new technologies early.

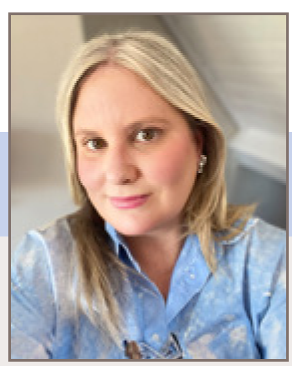
Q2. With AI models being adopted in diagnostics, triage, and monitoring, how can we design robust regulatory frameworks that ensure clinical safety and algorithmic fairness - while still enabling learning algorithms to evolve with real-world data?

Lauren Harkins: AI models need room to learn but not at the cost of trust and safety. The key is structure: set clear rules upfront, monitor performance in real time, and ensure transparency. Adaptive systems can still meet high standards for clinical safety and fairness. But AI is evolving fast. Recent comparisons of AI and clinicians solving complex diagnostic cases highlight that. We need regulation that is agile and forward-looking so it guides the market rather than constantly trying to catch up.

Philippe Gerwill: To regulate AI effectively, we need a quantum leap in mindset. Traditional frameworks are not designed for learning systems. Regulators must unlearn linear models and embrace evolving, real-world feedback loops. We need dynamic, ethically grounded frameworks that promote safety, equity, and agility, not delay. Co-designing with clinicians and patients will ensure fairness isn't an afterthought but a foundational principle.

Q3. The idea of international regulatory harmonization is frequently discussed, but rarely implemented. What are the practical barriers you see in aligning digital health compliance standards globally, especially for cross-border AI, wearables, and mobile health apps?

Philippe Gerwill: The true barrier is not legal, it's mental. We're trying to standardize exponential innovation with analog-era thinking. Harmonization requires a new breed of regulator, fluent in data science, ethics, and cross-cultural agility. Let's move beyond compliance silos toward interoperable, values-based frameworks that enable global trust in AI, wearables, and mobile health while respecting local realities.



AUTHOR BIO

Lauren Harkins is an Associate Director of Strategy, NHS. A visionary digital health leader, working across policy and delivery in England and, most recently, Wales. She co-created England's digital health standards, had a leadership role on the Covid Pass, and advises internationally on digital health acceleration. Expert in clinical safety, Lauren has a special interest in innovation in digital therapeutics.

Q4. Digital health tools are increasingly embedded into hospital systems. Are frontline healthcare providers and clinicians adequately trained to assess and respond to the digital safety risks that may arise? Should compliance education be a part of clinical training?

Lauren Harkins: We can't keep treating digital as optional knowledge in healthcare so training that normalises this from the start is essential. Clinical teams need practical, real-world preparation in digital risk: what to look for and how to raise it. This is more than education; it's about building a culture where digital safety is owned. As with medicines, patients look to clinicians for confidence and support with digital health tools and clinicians need to be equipped to meet that expectation.

Q5. The rise of AR/VR and metaverse applications in training, therapy, and rehabilitation raises new questions. How do regulators begin to frame compliance parameters for experiential, gamified, or immersive medical environments?

Philippe Gerwill: Immersive tech can't be governed with yesterday's rulebooks. We need to reimagine evidence beyond clinical endpoints while integrating emotional impact, empathy, and patient engagement. Regulators must retrain, retool, and rethink their role in this new frontier. Only through multidisciplinary foresight and experimentation can we build credible guardrails for virtual care.

Q6. What role does digital ethics play in shaping future regulation? Do you believe ethical frameworks can co-evolve with compliance structures, or will ethics always remain a step ahead, challenging regulators to catch up?

Lauren Harkins: Ethics should lead regulation and shape policy, but we need to stop treating it as 'thing over there'. In health, if fairness, transparency, and accountability are innately the way that we operate, aka 'ethics by design' then compliance becomes a byproduct of just doing the right thing, with regulation not siting above that as a separate or higher threshold.

Philippe Gerwill: Ethics must no longer lag behind compliance, it must lead. But this demands unlearning traditional regulatory inertia and welcoming agile, participatory ethics boards as part of the ecosystem. We need an evolving moral compass that helps regulators anticipate dilemmas and fosters inclusive, cross-sector collaboration from the design stage onward.

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Q7. Transparency in AI-based decision-making is key. How should healthcare systems ensure explainability of algorithms to patients and practitioners? And who is responsible - regulators, developers, or providers - when a black-box algorithm leads to a critical failure?

Lauren Harkins: We can only progress at the speed of trust. Clinicians need confidence that AI augments their expertise so we need both transparent validation processes, accessible and tailored explanations for both clinicians and patients. Regulators need to provide the guardrails with proactive frameworks, developers must embed explainability and transparency and health organisations must be intelligent buyers and partners in development.

Philippe Gerwill: The idea that explainability is a tech problem is outdated. It's a human problem. Responsibility is collective: regulators must set clear mandates, developers must design for clarity, and providers must ensure meaningful oversight. Most of all, we must stop tolerating black-box care. Trust requires transparency, not just legally, but emotionally.

Q8. Is there a viable model for establishing "living compliance frameworks" that can evolve continuously, much like the technologies they're designed to govern? Or will regulation always remain reactive to innovation?

Lauren Harkins: I do think we can build living frameworks, moving away from blanket re-certification towards a proportionate, continuous assurance model that evolves alongside technology. But only if we are clear about the why and the boundaries and the likely increased resource burden on regulators globally. Not everything regulatory element can or should change constantly and so frameworks need to be designed to adapt intelligently based on risk, evidence and need.

Q9. Many digital health startups focus on speed-to-market, often bypassing deep regulatory knowledge. How can we create stronger bridges between tech innovators and compliance leaders, especially in the early product design stages?

Lauren Harkins: Too many startups still see regulation as something for later down the line once the product is built. We need to flip that. As with any regulated industry there is a requirement for those who wish to play in the space to follow regulation and to sensibly factor ▶

in and recognise the cost of market entry. Yes, that means more support and accessible guidance but this responsibility doesn't sit with regulators alone. Governments, health systems, academia, investors, and life sciences ecosystems all have a role in creating the conditions for responsible innovation.

Philippe Gerwill: Let's replace the false binary of speed versus safety. The real challenge is mindset. Compliance must be embedded from day one, not as friction, but as a force for trust and scale. That requires a new skillset among both innovators and regulators and shared spaces like co-creation hubs, regulatory liaisons, and anticipatory design labs.

Q10. Sandbox models are emerging globally as testbeds for digital health innovation. How effective are these regulatory sandboxes in fostering trust between startups and authorities, and should they become a global best practice for innovation oversight?

Philippe Gerwill: Sandboxes are promising but only if they go beyond compliance checklists. We need living labs of trust, where regulators, developers, and patients co-experiment in real time. Let's upgrade sandboxes into strategic foresight engines, cultivating not only safety but confidence in innovation. This could become a global norm if we dare to break the mold.

AUTHOR BIO

Philippe Gerwill is a Digital Health Humanist and Futurist at at PGEA Ltd, and a global innovation advisor with over 30 years' experience in pharma and chemicals. A TEDx speaker and Adjunct Professor, he champions ethical AI, healthcare transformation, and human-centric digitalization. Today, Philippe mentors young talents and consults across five continents to drive impactful, inclusive, and interdisciplinary innovation.

Q11. As digital diagnostics become more consumer-facing (e.g., at-home tests, app-based assessments), how should compliance and liability be managed when the end-user is not a trained clinician but a patient or caregiver?

Lauren Harkins: We want to keep people out of hospitals the to do that we need to empower our patients and support them in a different way as we put more into their hands. Collectively, we need to rethink how we approach safety, accountability, and trust as we redesign these models of care. We need to communicate risk transparently and in plain language to patients and really stress test usability, accessibility, and comprehension with real patients, caregivers, and communities across a spectrum of health and digital literacy.

Philippe Gerwill: When diagnostics reach patients directly, we need radical simplification and trust-building. This means not just readable instructions, but culturally adapted, digitally inclusive tools. Liability frameworks must evolve, but so must our expectations: informed citizens are not passive users, they are empowered participants. Regulation must unlearn paternalism and embrace shared accountability.

Q12. What are your views on the post-market surveillance of digital health tools? With real-time usage data available, should regulators shift toward a continuous oversight model rather than traditional re-certification cycles?

Lauren Harkins: Yes, regulatory models need to modernise to reflect the dynamic nature of digital health and post market surveillance is a core part of the continuous oversight model. Now and in the future, we need to ensure that healthcare organisations and patients are actively reporting in a way that isn't seen as yellow carding a problem but ensuring any performance issues are caught early, unintended consequences are captured thus enabling companies to respond on a more real time basis to emerging evidence.

Q13. You've both emphasized human-centered design and patient empowerment. How can regulation encourage inclusive innovation that reflects the needs of diverse populations without becoming a bottleneck for developers?

Lauren Harkins: Inclusion is a conscious choice and if we want innovation to meet the needs of diverse populations, those needs and differences need to be well understood. I think regulators can help by setting expectations, whether that's around representative data, accessible design, or who is involved in testing. The real challenge is making this truly part of the process and being clear on what is expected in terms of evidencing this. Buyers have a key role in this too.

Philippe Gerwill: Diversity must be built into the design and not patched in later. We need a new regulatory consciousness that values lived experience, not just technical validation. By requiring **inclusivity metrics and co-design with** underrepresented users, regulation can become a driver of equity. It's time to relearn what evidence looks like.

Q14. What's one policy-level shift or regulatory reform you believe is crucial today to prepare for the digital healthcare landscape of 2030?

Lauren Harkins: I talked earlier about future trends and how we need to be enabling markets. By 2030, next-gen wearables will be far further into the diagnostics space. I think healthcare organisations have found it tricky to navigate what can be done and how to make best use of clinically relevant, patient generated data. As device capability increases we need to be really clear and supportive in this space and ahead of the game.

Philippe Gerwill: We must take a quantum leap from reactive control to proactive enablement. That begins with creating agile, interdisciplinary foresight units inside every regulatory body. But more importantly, we need to rebuild trust through co-creation, inclusion, and transparent learning cycles. In the end, regulation isn't just about risk but it's about shared responsibility for the future.

Q15. Finally, if you could redesign a regulatory framework from scratch for digital health, what would be your top three principles?

Lauren Harkins: Equitable, accessible, and user-centric. However, I think there is a need now more than ever to bring redesign up a level to an ecosystem one and really bring together regulation with access and value whilst recognising the independent role regulatory authorities intentionally play. Ultimately, we all want to get the best products into the hands of patients that deliver value and improve outcomes.

Philippe Gerwill: Human-Centricity: Serve people, not processes.

- Agility with Accountability: Build adaptive systems, with embedded safeguards.
- Trust by Design: Design transparency, diversity, and ethics into every layer. Above all, we need regulators willing to think differently, to unlearn, relearn, and co-evolve with innovation.

On behalf of AmericanHHM Magazine, thank you to Lauren Harkins and Philippe Gerwill for sharing your insights on the challenges and opportunities in digital health regulation. Your perspectives help us better understand how to innovate responsibly in a rapidly evolving healthcare landscape.

Thank you to our audience for joining us in this important conversation.

PhilMedical 2025

13-15 August 2025 | MX Convention Center Manila, Philippines

https://philmedical.com/

About Event: The 8th Edition of PhilMedical Expo 2025, co-located with the Infectious Disease Control Expo (INDEC) Philippines 2025, Philippines Dental Expo 2025, and Philippines Medical Technology Expo 2025, is the premier specialized event in the Philippines for the medical, dental, pharmaceutical, and laboratory sectors. This international congregation brings together professionals from healthcare, dental, pharmaceutical, and laboratory industries in Manila to showcase the latest technologies, services, and innovations driving these fields forward.
Listed Under: Medical Sciences

17th Annual Next Generation Dx Summit 2025

18 - 20 August, 2025 | Capital Hilton in Washington, D.C, USA

https://www.nextgenerationdx.com/

About Event: This event focuses on a valuable window on the state-of-the-art, forecasting and future trends in point-of-care and decentralized testing, infectious disease, liquid biopsy, multi-cancer early detection, reimbursement, regulation, and companion diagnostics to improve standard of care in medicine.
Listed Under: Diagnostics

3rd International Conference on Surgery and Anesthesia 2025

2 - 3 September, 2025 | Philadelphia, USA

https://www.scitechseries.com/surgery

About Event: This conference is focusing on the theme “Explore multidisciplinary approaches, advancements in Surgery and Anesthesia”. Surgery2025 aims to elevate surgery and anesthesia to new heights. Engage in cutting-edge methodologies, refine your skills in effective communication, and explore collaborative opportunities that bridge disciplines.
Listed Under: Surgical Speciality

4th International Conference on Primary Health Care

September 15-16, 2025 | Rome, Italy

https://www.scitechseries.com/primary-health-care

About Event: The primary focus of the conference is on the theme "Elevating Healthcare Standards through Global Collaboration." PHC 2025 is an annual event that brings together global public health experts to facilitate the exchange of the latest insights on factors influencing the emergence, transmission, and control of Primary Health Care. This international conference, occurring at a critical juncture, will primarily focus on recent notable clinical cases.
Listed Under: Healthcare Management

6th Edition of Global Conference on Surgery and Anaesthesia

September 15 -17, 2025 | London, UK

https://surgery-conferences.magnusgroup.org/

About Event: This prestigious event will be an excellent platform for exploring the latest innovations and trends in the field, with the theme "Global Perspectives on Surgical and Anaesthetic Advances ". GCSA 2025 will bring together a diverse group of experts, including surgical specialists, anaesthetists, clinical researchers, and medical practitioners. This gathering will foster an environment of collaboration and knowledge exchange among professionals dedicated to advancing surgical and anaesthetic practices.
Listed Under: Surgical Speciality

2nd International Conference on Advanced Healthcare, and Patient Safety

September 22-23, 2025 | Paris, France

https://healthcare.novelticsconferences.com/

About Event: This event focuses not merely on an assembly of professionals; it is a convergence of minds dedicated to advancing healthcare, optimizing hospital management, and ensuring the utmost safety and well-being of patients. This platform serves as a nexus for sharing innovative ideas, cutting-edge research, and best practices that will shape the future of healthcare delivery.
Listed Under: Healthcare Management

2nd World Congress on COPD and Pulmonary Diseases

October 09-10, 2025 | Philadelphia, USA

https://www.scitechseries.com/pulmonary-lungdiseases

About Event: The COPD 2025 serves as a dynamic platform to explore the latest advancements in diagnosing, managing, and treating chronic obstructive pulmonary disease (COPD), asthma, pulmonary fibrosis, and other respiratory disorders. With a focus on innovation and global health impact, the congress will feature a blend of keynote addresses, interactive sessions, workshops, and poster presentations.
Listed Under: Medical Sciences

12th Annual American Medical Device Summit

October 27-28, 2025 |Chicago, IL

https://amdsummit.com/

About Event: The American Medical Device Summit is a platform where medical device innovation meets opportunity. Designed to unite over 250 medical device executives from top medical device companies and solution providers to exchange ideas and insights on industry trends such as wearable medical device trends, R&D, robotics, and artificial intelligence.
Listed Under: Technology, Equipment & Devices

Precision in Medical Devices Summit Boston

November 17-18, 2025 | Revere Hotel Boston Common, Boston, MA

https://events.precision-globe.com/single-event/

About Event: This event will be a unique platform for the largest Biotech/Medical Devices hub in the region to network and discuss collaboration to achieve their design and operational strategies. The summit is tailor-made to address the concerns of medical device companies who are conducting clinical trials, medical device design, and development at a local and global level for all device classes.

Listed Under: Technology, Equipment, & Devices

International Conference on Pulmonology and Respiratory Medicine

November 17-19, 2025 | Rome, Italy

https://mindspaceconferences.com/pulmonology/

About Event: This event will bring together experts in the field of pulmonology and respiratory medicine to discuss the latest advances, breakthroughs, and challenges in the field. With the theme of "Novel Approaches in Pulmonology and Respiratory Medicine," the conference aims to highlight emerging technologies, novel therapies, and innovative approaches to patient care that are transforming the field.

Listed Under: Medical Sciences

3rd International Conference on Pediatrics & Neonatology

November 27-28, 2025 | Philadelphia, USA

https://www.scitechseries.com/pediatrics

About Event: This event will spotlight the latest and ground-breaking innovations in Pediatrics and Neonatology research, providing a unique opportunity for global investigators to convene, connect, and explore new scientific advancements. This year's conference is themed "Children's Health in a Changing World: Responding to New Challenges," reflecting the pioneering progress in Pediatrics and Neonatology research.

Listed Under: Medical Sciences

2nd International Conference Cancer & Radiology

December 1-3, 2025 | Rome, Italy

https://cognitionconferences.com/cancer/

About Event: The Conference stands as the premier annual gathering of global oncology professionals committed to enhancing patient outcomes under the overarching theme of "Advancements in Cancer Treatment through Radiology and Imaging". This event convenes Physicians, Medical Oncologists, Radiation Oncologists, Pathologists, Hepatologists, Gastroenterologists, Surgeons, Clinical Researchers, as well as Trainees, Residents, and Students, providing them with invaluable opportunities to engage in learning, debate, discussion, and networking within this dynamic scientific domain.

Listed Under: Medical Sciences

Driving Innovation
Latest Appointments You Need to Know

David Bernstein
Appointed as Chief Revenue Officer at CheckedUp

Krista Hatley
Appointed as Chief Nursing Officer at HCA Florida Lake City Hospital

Todd Van Horn
Appointed as Chief Financial Officer at Imperative Care

LaVerne
Appointed to the Board of Directors at CONMED Corporation

Slawek Kierner
Appointed as Chief Digital Officer to Lead Smart Connected Care Strategy at Olympusi

Khush F. Mehta
Appointed as Chair to Steer Global Expansion and Commercial Strategy at Brainomix

Robert Eno
Appointed as CEO & Board of Directors at HeartBeam

Jay Roberts
Appointed as Chief Development Officer to Accelerate Strategic Growth at Life365

Tomer Gabay
Appointed as Chief Executive Officer at Spectrum Dynamics Medical

Bob White

Appointed as Chief Executive Officer at Olympus

Kim Crooks

Appointed as Chief Operating Officer and Board of Directors at Covalon Technologies

Åsa Runnäs

Appointed as CEO to Lead Commercialization of Ground breaking Breast Tumor Excision Device at Resitu

Eric Gibbs

Appointed as President and General Manager at ulrich Medical USA®

Carmen Pla

Appointed as Chief Revenue Officer at Envision Healthcare

Tyler Binney

Appointed to the Board of Directors to Support Strategic Growth and Innovation at Imperative Care

Matt Wilson

Appointed as CEO at PrepMD

Jeannette Bankes

Appointed as President and CEO of Patient Care Solutions at GE HealthCare

Indra Nooyi

Appointed to the Supervisory Board at Philips

Affidea Partners with b-rayZ to Advance AI-Driven Breast Imaging across Europe

Affidea, one of Europe's leading providers of diagnostic and outpatient services, has named b-rayZ as its preferred artificial intelligence (AI) partner for breast imaging.

This strategic collaboration is set to significantly enhance the accuracy, speed, and consistency of breast cancer diagnostics across Affidea's network in Europe.

The initiative directly addresses the ongoing challenges in breast cancer diagnosis, particularly the fragmentation of clinical data across different imaging modalities and among various medical professionals.

By integrating b-rayZ's advanced AI-driven platform, Affidea aims to streamline diagnostic workflows, ensuring more consistent and efficient outcomes tailored to each patient's unique clinical profile.

Currently, b-rayZ's AI solutions are already operational at several Affidea facilities, including the prestigious Breast Cancer Centre of Excellence in Zurich, Switzerland, and at Affidea Givision, Site Hôpital Daler. The technology has also been successfully deployed in Lithuania and Spain, with broader rollouts planned across additional Affidea breast imaging centres throughout Europe.

Further cementing the partnership, Affidea has made a strategic investment in b-rayZ as part of its Series A funding round. This funding will fuel the development of innovative AI tools, support expansion into new markets, and enhance the diagnostic capabilities of b-rayZ's platform.

This collaboration reinforces Affidea's commitment to leveraging cutting-edge technology to deliver personalized and standardized breast cancer screening. By embedding AI into its clinical infrastructure, Affidea aims to empower radiologists, reduce diagnostic variability, and significantly improve patient care across its pan-European network.

READ THE COMPLETE POST

Attoplex, KAISH to Build AI-Powered PCR Primer Design Platform for Pandemic Preparedness

Attoplex Inc., a leader in in vitro diagnostic (IVD) medical devices, has made a strategic partnership with the School of Computing at KAIST (Korea Advanced Institute of Science and Technology) to co-develop an advanced AI-based platform for PCR primer design.

This collaboration aims to enhance global pandemic preparedness by accelerating the development of accurate diagnostic tests for high-risk pathogens.

The partnership focuses on further advancing "VPrimer," an AI-powered, automated primer-probe design algorithm developed by Professor Minsu Kim's research team at KAIST. VPrimer analyzes vast viral genome datasets - including SARS-CoV-2, MERS, Zika, and Ebola - to generate highly specific primer-probe sets. Notably, it has demonstrated over 95% mutation coverage and has outperformed global standards in specificity and detection range.

Under the memorandum of understanding (MOU), KAIST will enhance the core algorithm and software infrastructure, while Attoplex will apply its expertise in diagnostic reagent development, regulatory pathways, scalable production, and global commercialization. The goal is to enable rapid deployment of reliable molecular diagnostics, especially for fast-mutating RNA viruses.

Attoplex, already providing diagnostic kits for influenza, COVID-19, and STIs, sees this partnership as a major step toward creating next-generation viral detection tools. By uniting KAIST's algorithmic innovation with Attoplex's IVD capabilities, the collaboration aims to redefine the speed, accuracy, and resilience of diagnostic test development.

Together, Attoplex and KAIST seek to transform infectious disease diagnostics worldwide - prioritizing speed, adaptability, and scientific excellence in readiness for future global health emergencies.

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CardioOne Partners with CardioNow to Expand Access to Cardiovascular Care

CardioOne has partnered with CardioNow, a newly launched independent cardiology practice in Lynnwood, Washington, to expand access to advanced, patient-focused cardiovascular care across the greater Seattle area, including King and Snohomish counties.

Founded by experienced cardiologists, CardioNow delivers comprehensive services - from heart disease prevention and early diagnostics to advanced imaging, vein care, and minimally invasive procedures - tailored to each patient's needs.

The practice emphasizes education, prevention, and modern medical technology to help patients better understand and manage their cardiovascular health.

CardioOne played a crucial role in launching CardioNow by providing the necessary infrastructure, operational systems, administrative support, and staffing. This backing allows CardioNow's clinical team to concentrate fully on delivering high-quality care, free from the challenges of managing backend operations.

The partnership reflects CardioOne's broader mission to create sustainable, scalable models for independent cardiology practices. By easing the complexities of practice management, CardioOne enables cardiologists to focus on what matters most - patient care.

CardioNow's patient-first philosophy is closely aligned with CardioOne's vision of transforming community cardiology. The collaboration has already accelerated CardioNow's growth and operational efficiency, bringing essential heart health services to underserved communities in the Pacific Northwest.

Together, CardioOne and CardioNow are redefining collaborative care - empowering physicians, supporting innovation, and elevating patient outcomes. This partnership represents a key milestone in CardioOne's journey to modernize and strengthen independent cardiology nationwide.

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Symplr Acquires Smart Square from AMN Healthcare to Strengthen AI-Powered Workforce Management Solutions

Symplr®, a leader in enterprise healthcare operations software backed by Clearlake Capital Group and Charlesbank Capital Partners, has acquired Smart Square®, a cloud-based scheduling platform from AMN Healthcare.

This strategic acquisition significantly strengthens symplr's capabilities in workforce and operations management, enhancing its position as a top provider of intelligent staffing solutions in healthcare.

Smart Square adds AI-driven tools like predictive scheduling, real-time staffing adjustments, open-shift management, and nurse competency tracking to the symplr Operations Platform. These features enable healthcare organizations to automate scheduling, reduce administrative workload, and optimize staff efficiency - ultimately supporting better patient care.

Recognized as Best in KLAS for Nurse and Staff Scheduling in 2025, Smart Square's excellence aligns with symplr's highly regarded Time and Attendance solutions. The integration creates a robust, unified suite for workforce management, including provider credentialing, timekeeping, and quality control.

In parallel, symplr and AMN Healthcare have launched a commercial partnership to ensure a smooth transition and continued collaboration. While Smart Square becomes part of symplr's offerings, AMN Healthcare will focus on advancing its WorkWise platform, which delivers strategic workforce planning and analytics.

This move reflects symplr's broader mission to deliver data-driven, AI-enabled tools that reduce inefficiencies and improve operational agility across the healthcare system. With rising workforce shortages and increasing complexity in hospital staffing, the acquisition empowers healthcare leaders to meet evolving challenges with confidence - offering smarter scheduling, resource optimization, and scalable care delivery solutions.

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