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January - February 2026

Cardiology

Genetic testing breakthrough predicts arrhythmia and sudden cardiac death risk

Computed Tomography

GE HealthCare's Deep Silicon detectors power next-generation photon counting CT

Artificial Intelligence

Large language models at pivotal juncture in heart diagnostics

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Prognosis

New frontiers in cardiovascular precision medicine

The convergence of genomics, molecular imaging, and artificial intelligence is transforming cardiovascular medicine with unprecedented precision. Three developments featured in this issue of *Middle East Health* demonstrate how technological innovation is addressing longstanding clinical challenges whilst revealing the complexity of translating discovery into practice.

Northwestern University's combined genomic arrhythmia propensity score represents a significant advance in cardiac risk stratification. By integrating rare coding variants, polygenic risk scores, and regulatory non-coding elements, GAPS achieves remarkable predictive accuracy (AUC 0.87) even in patients lacking identifiable pathogenic variants. This comprehensive approach addresses a critical gap: current gene panels provide definitive diagnoses in only 10-60% of cases. The discovery of interactions between variant classes – particularly how fate specification genes combined with proteostasis defects increase risk – suggests that ventricular arrhythmia emerges from cumulative genetic burden rather than single-gene effects. However, as director of the research team Dr Elizabeth McNally notes, sophisticated risk scores require equally sophisticated clinical interpretation.

The University of British Columbia's structural analysis of statin-induced myopathy provides equally valuable molecular insights. Cryo-electron microscopy reveals how three atorvastatin molecules bind RyR1 sequentially, wedging the calcium channel open and explaining muscle complications affecting up to 25% of patients. The structural differences between RyR1 and cardiac RyR2 binding sites offer a clear pathway for developing statins that preserve cardiovascular benefits whilst eliminating skeletal muscle toxicity – which could benefit millions worldwide.

The AI frontier in cardiovascular imaging, whilst promising, demands measured expectations. Large language models demonstrate impressive capabilities in automated reporting and data extraction, with echocardiography applications achieving expert-level performance. However, persistent limitations in multimodal integration, visual interpretation, and temporal analysis confirm these remain assistive rather than autonomous technologies. The 40% error escalation during complex CCTA interpretation and GPT-4o's tendency to overestimate risk highlight why rigorous validation and clinical oversight remain essential.

These developments collectively illustrate precision medicine's promise and its practical challenges. Genomic risk stratification, molecular understanding of drug effects, and AI-assisted imaging each offer significant clinical value, yet each requires rigorous validation before widespread adoption. Success will depend on developing the necessary infrastructure, training clinicians in interpretation, and maintaining appropriate oversight. The goal remains leveraging molecular and computational advances to improve patient outcomes whilst preserving the irreplaceable role of clinical expertise.

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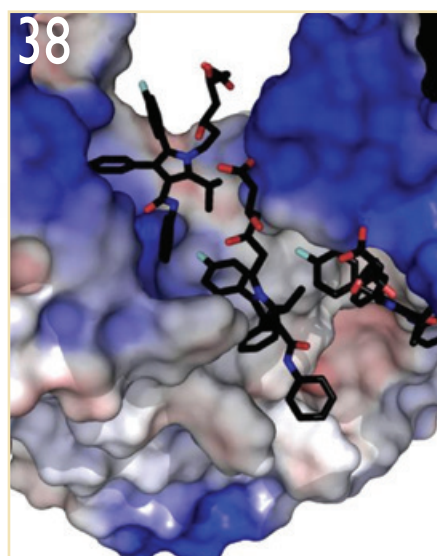


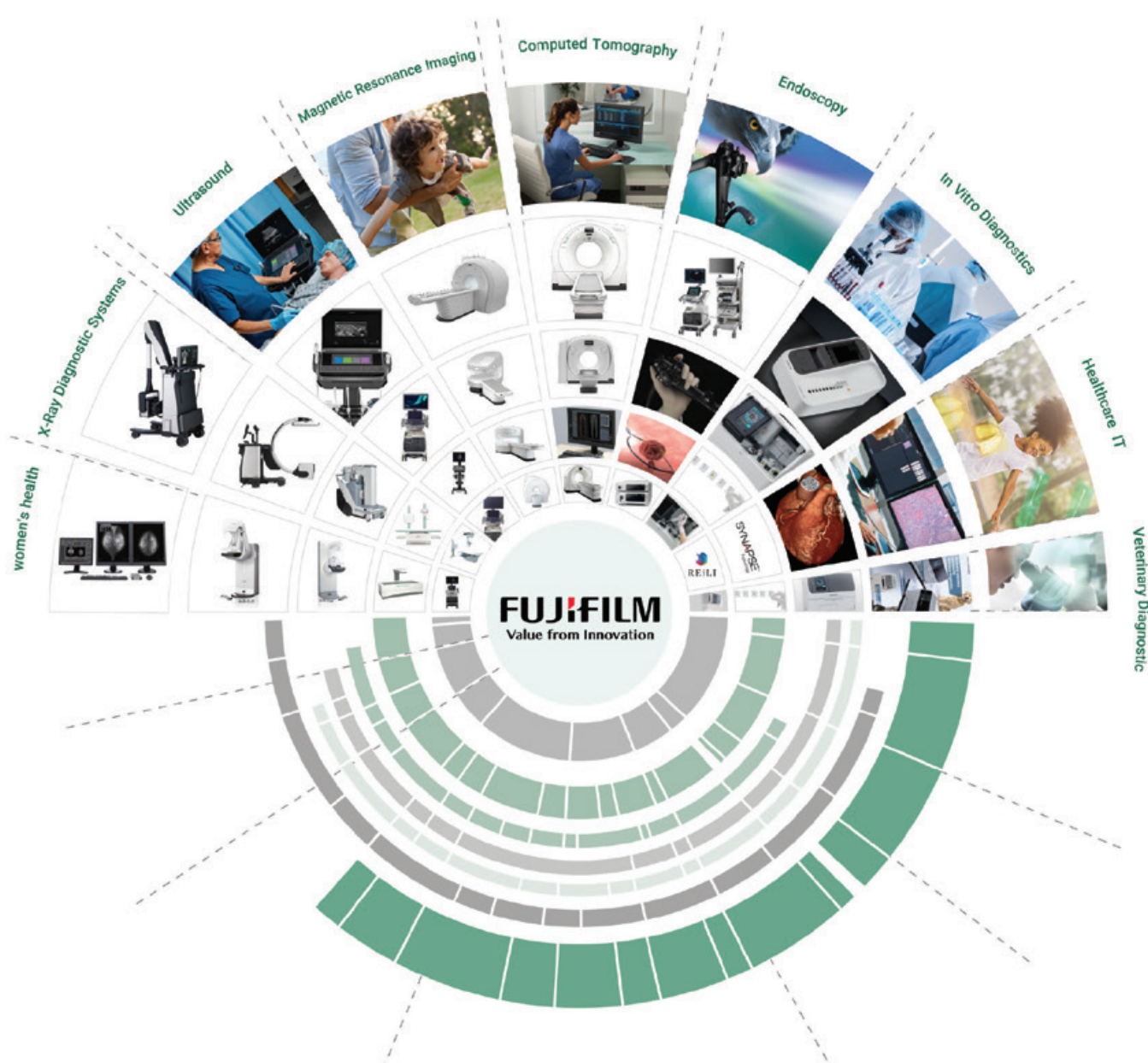
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Update from around the region



PureHealth unveils UAE's largest AI-powered diagnostic laboratory in Abu Dhabi

PureHealth has inaugurated a 70,000-square-foot AI-driven diagnostic facility through its subsidiary PureLab, establishing the UAE's most comprehensive standalone laboratory infrastructure. The seven-storey facility, officially opened on 11 December 2025, integrates artificial intelligence, robotics and advanced automation systems to process more than 30 million samples annually.

Comprehensive diagnostic capabilities

Operating continuously, the laboratory offers over 1,800 test parameters spanning anatomic pathology, molecular genetics, haematopathology, histocompatibility assessment for organ and bone marrow transplantation, infectious disease detection and environmental testing. The facility connects with a network exceeding 140 laboratories holding more than 50 international accreditations, creating an integrated diagnostic infrastructure across the UAE.

The laboratory employs a multidisciplinary team of 1,300 expert consultants specialising in laboratory management and clinical operations. This workforce supports a patient- and clinician-centric operational model emphasising AI-enhanced diagnostic accuracy, data confidentiality and clinical relevance.

Advanced digital pathology platform

Central to the facility's capabilities is an AI-powered digital pathology platform utilising Whole Slide Imaging (WSI) technology. This system converts traditional microscope slides into high-resolution digital images, enabling rapid AI-assisted analysis of disease markers and anomalies. As the hub of the Digital Pathology Initiative, the laboratory connects oncology centres nationwide, facilitating real-time remote slide viewing, virtual consultations and accelerated clinical decision-making.

The facility provides comprehensive services in routine clinical pathology, including chemistry, immunoassay, serology, coagulation and microbiology. This breadth of testing capabilities positions the laboratory as a centralised diagnostic resource for healthcare providers across the UAE.

Her Excellency Dr Fayeza Saif Alyafei, Executive Director of the Healthcare Quality Sector at the Department of Health – Abu Dhabi, stated: "The launch of PureLab's AI-powered Lab represents a significant step forward in advancing Abu Dhabi's vision for a smart, integrated, and patient-centred healthcare system. As the regulator, we are committed to fostering innovation and enabling high-impact investments that en-

hance diagnostic accuracy, accelerate care delivery, and improve health outcomes."

Sustainable infrastructure design

The facility incorporates multiple sustainability features, including a fully hybrid transport fleet, paperless digital reporting systems, energy-efficient window films and rooftop solar panels. These elements align with the UAE's net-zero emissions strategy whilst maintaining operational efficiency.

Arindam Haldar, Chief Executive Officer of PureLab, commented: "The AI-powered Lab marks a new era in diagnostic excellence, integrating automation, artificial intelligence and clinical expertise to deliver faster, more accurate results at scale. Established as the UAE's core facility, it will serve as a national cornerstone for essential health programmes, including newborn screening, infectious disease monitoring, and transplant compatibility."

The laboratory's design allows healthcare providers to submit diverse testing requirements through a unified platform, reducing dependency on multiple laboratory facilities. The infrastructure supports community-based diagnostics, including walk-in services and home-testing pilot programmes, consistent with the UAE's data-driven healthcare development objectives. MEH



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Jeddah faces 4,100 hospital bed deficit as private sector drives healthcare expansion

A comprehensive analysis of Jeddah's healthcare infrastructure has revealed a substantial capacity gap requiring approximately 4,100 additional hospital beds by 2030 to meet international standards, according to a new white paper from Knight Frank. The study, *Healthcare in Saudi Arabia: Opportunities in Jeddah*, highlights the critical mismatch between the city's rapid urban growth and healthcare infrastructure development.

Jeddah currently operates with 1.8 hospital beds per 1,000 residents, excluding quasi-government facilities, placing it below both the national average of 1.9 and the global benchmark of 2.9 beds per 1,000 population. This capacity deficit comes as the city's population, currently 3.8 million, is projected to approach 5 million by 2040.

Geographic disparities in healthcare access

The analysis reveals significant regional variations in healthcare provision across the city. Eastern Jeddah exhibits the most pronounced capacity deficit, with residents primarily dependent on primary care clinics rather than comprehensive hospital services. Conversely, northern districts face a projected oversupply of 620 beds by 2030, though leading facilities in this area maintain approximately 75% occupancy rates, indicating sustained demand despite capacity growth.

Private healthcare operators currently manage 63% of Jeddah's inpatient capacity, representing the highest proportion of private sector involvement in Saudi Arabia. Major hospitals maintain average occupancy rates of 70%, whilst long-term care facilities exceed 90% occupancy, reflecting robust and sustained

demand across service categories.

"Jeddah is experiencing not just growth in numbers but a real shift in how people access and experience healthcare," said Shehzad Jamal, Partner – Real Estate Consultancy, MENA at Knight Frank. "The city is moving beyond the traditional hospital model. There is rising demand for neighbourhood-based services, for long-term and specialist care, and for facilities that blend technology and human connection."

Demographic transition drives service model evolution

The city faces a significant demographic transition that will fundamentally reshape healthcare demand patterns. The population aged 65 and above is projected to increase 2.3-fold by 2040, whilst the 40-64 age cohort is expected to expand by approximately 50% over the same period. This ageing population structure, combined with increasing prevalence of lifestyle-related chronic conditions including cardiovascular disease and diabetes, necessitates a strategic shift from acute care models towards preventative, rehabilitative and community-based services.

Critical gap in long-term care capacity

To accommodate projected demand by 2040, Jeddah requires an additional 2,400 long-term care beds, equivalent to approximately 14 dedicated facilities. Dr Gireesh Kumar, Associate Partner – Healthcare Advisory, MENA at Knight Frank, noted: "This demographic transition is already reshaping healthcare demand. As lifestyle-related and chronic conditions such as cardiovascular disease and diabetes drive most hospital admissions, we expect to see healthcare providers

moving away from acute care models and investing in preventative, rehabilitative and community-based services to meet the city's long-term needs."

The analysis of Al Salama Hospital demonstrates the commercial viability of enhanced patient-centred care models. Following its 2024 relaunch focused on humanising patient care, the 204-bed facility achieved the highest inpatient experience score in Saudi Arabia in an independent survey of more than 400,000 patients, whilst strengthening its commercial performance.

Urban development creates new healthcare catchments

Since 2016, more than US\$134 billion has been invested in Jeddah's real estate and infrastructure, fundamentally altering healthcare service delivery patterns. Major developments including Jeddah Central, Marafy, Al Arous and National Housing Company residential projects are expected to deliver 119,000 homes, 1.5 million square metres each of office and retail space, and nearly 4,700 hotel keys by 2030. The upcoming Jeddah Metro and expansion of Jeddah Islamic Port will further enhance connectivity, enabling new healthcare catchments in previously underserved locations.

"These large-scale developments are creating opportunities for integrated community healthcare that places hospitals, clinics and wellness facilities at the heart of well-connected neighbourhoods," said Dr Kumar. "Aligning healthcare delivery with urban development will be key to ensuring Jeddah's long-term, sustainable growth."

• The full report is available at www.knightfrank.ae/research/reports/healthcare-in-saudi-arabia. 

NMC Healthcare joins global research network to advance clinical studies

NMC Healthcare, the UAE's leading integrated private healthcare provider, has become part of the TriNetX global health research network, marking a significant expansion of the organisation's clinical

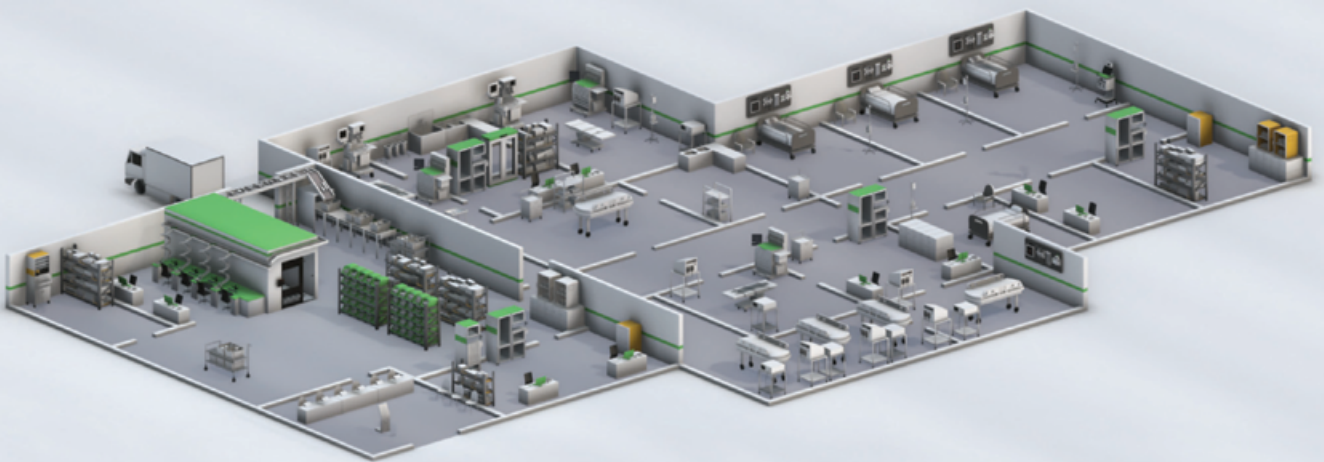
research capabilities. The collaboration will provide NMC's researchers with access to anonymised data from over 318 million patients across more than 200 healthcare organisations worldwide.

Access to extensive patient data infrastructure

The TriNetX platform enables healthcare providers to analyse real-world patient data for identifying disease patterns, developing

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With real-time insights, data-driven decision support, and seamless integration into existing hospital infrastructures, Omnicell empowers healthcare leaders to gain greater control, transparency, and confidence in their operations. As healthcare systems face increasing complexity, workforce pressures, and regulatory demands, Omnicell supports a forward-looking approach, helping organizations address today's operational challenges while building a more resilient, efficient, and sustainable model of care for the future.

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research hypotheses, and conducting multi-centre studies. For NMC, this integration represents a strategic enhancement to its existing research infrastructure, which includes a Centralised Research Platform and Group Academic Council overseen by a Central Institutional Review Board and Research Advisory Group.

The network connection will facilitate collaboration between NMC clinicians and international researchers whilst simultaneously linking the organisation with pharmaceutical companies seeking clinical trial sites. NMC's Abu Dhabi facilities hold authorisation from the Department of Health to conduct human subject research, positioning them to participate in sponsored clinical investigations.

Expanding research output and clinical trials

NMC's research programme has demonstrated substantial growth, with clinicians submitting over 200 research applications and publishing more than 140 articles since 2023. The organisation has completed over 25 clinical trials, includ-

ing late-phase studies spanning oncology, endocrinology, dermatology, cardiology, and neurology.

The TriNetX platform's data security protocols align with NMC's commitment to ethical research practices, adhering to stringent regulatory standards for patient data protection. This infrastructure supports the systematic analysis of treatment outcomes and disease progression patterns whilst maintaining patient confidentiality.

Leveraging population diversity for research

Dr Zaka Ullah Khan, Chief Clinical Officer at NMC, emphasised the strategic value of the partnership: "NMC is proud to join TriNetX's network to further expand and develop our academic and research programmes. The access to data will empower our clinicians and researchers to advance their studies, collaborate globally and advance the pace of innovation across our network, supporting our strategic goals and the UAE's greater vision for advanced healthcare."

The UAE's demographic composition, comprising over 200 nationalities, pres-

ents unique opportunities for conducting research across diverse patient populations. This diversity enables studies examining how genetic backgrounds, environmental factors, and cultural practices influence disease presentation and treatment responses.

Steve Lethbridge, Senior Vice President of Global Healthcare Partnerships at TriNetX, noted: "We are honoured to have NMC join the TriNetX network of healthcare organisations. Clinical research plays a pivotal role in advancing medical knowledge and improving patient outcomes. We look forward to enhancing NMC's research capabilities and securing more sponsored trials, ultimately enabling better healthcare delivery."

The integration positions NMC to contribute to international research efforts whilst strengthening the UAE's role in advancing clinical knowledge. The collaboration between academic medical centres and commercial research networks continues to reshape how healthcare organisations approach evidence generation and clinical trial recruitment. NEW

Digital health platform to support obesity treatment treatment in UAE

Novo Nordisk UAE and Connected Health, an Emirati digital health company, have signed a Memorandum of Understanding to establish a patient-centred care model for obesity management in the UAE. The partnership combines Novo Nordisk's 25-year research foundation in obesity therapeutics with Connected Health's technology platform to address post-prescription adherence barriers.

The collaboration focuses on the critical period following prescription initiation, a phase characterised by documented challenges in treatment adherence and patient support. Connected Health's digital ecosystem encompasses RxNow Pharmacy, RxNow Personalized, and RxNow Technologies, providing integrated services including digital prescription processing, online consultations, teleconsultations, and medication delivery.

Addressing a significant public health burden

Obesity and overweight affect approximately one in three individuals in the UAE, representing a major public health concern. The condition serves as a primary risk factor for multiple chronic diseases, including type 2 diabetes, hypertension, and cardiovascular disease. The partnership aligns with national health priorities aimed at reducing chronic disease burden and improving population health outcomes.

Dr Cecilia Radu, Vice President and General Manager of Novo Nordisk UAE, said: "Novo Nordisk started studying obesity 25 years ago, so we have a deep, long-term commitment to addressing this huge need. Our main objective with our semaglutide portfolio is to address the needs of the population here in the UAE. Connected Health's business model is highly complementary with our own, allowing us



(left to right) Dr Cecilia Radu of Novo Nordisk UAE and Marwan Janahi and Walid Bahri of Connected Health

to offer additional services and create new, essential ways of reaching our patients."

Integration of pharmaceutical and technology sectors

The partnership represents an integration model between pharmaceutical companies ▶



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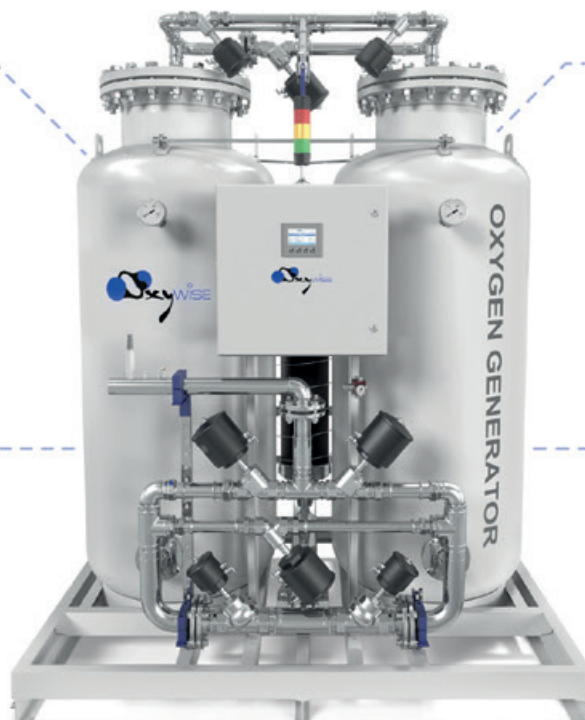
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and health technology platforms. Walid Bahri, Co-founder and CEO of Connected Health, described the collaboration as bringing together organisations with shared objectives but different operational tools: “We are two companies focused on the same objective with different tools, and we both have the patient journey at heart. We want to optimise that journey, especially in the post-prescription phase, and it’s this combination that will

create the meaningful difference.”

Marwan Abdulaziz Janahi, Co-founder of Connected Health, emphasised the partnership’s operational approach: “Despite their scale, they think like a startup, just like us. We share an agile, digital-first mindset. By connecting all the stakeholders – patients, doctors, pharma, and us – we can deliver real-world solutions that change lives and make patients’ lives simpler and more personal.”

Clinical and operational implications

The initiative aims to improve medication adherence through simplified access to prescribed therapies and ongoing clinical support. The digital platform infrastructure enables continuous patient engagement throughout the treatment course, with mechanisms for prescription management, clinical consultation, and logistics coordination. M&H

Siemens Healthineers establishes SHIFT hub in Riyadh to advance healthcare innovation

Siemens Healthineers has partnered with Saudi Arabia’s Ministry of Health to launch the SHIFT Innovation Center Riyadh, expanding its global network of healthcare innovation facilities. The centre represents the sixth facility in the company’s international SHIFT ecosystem, joining existing hubs in Erlangen, Bangalore, Shanghai, Istanbul and Madrid.

Strategic alignment with national health priorities

The Riyadh facility supports Saudi Vision 2030 objectives by focusing on healthcare quality improvement, enhanced access to medical services, and system sustainability through technological integration. The centre will function as a collaborative platform connecting government institutions, academic medical centres, hospitals and emerging healthcare technology companies to develop scalable solutions addressing regional healthcare challenges.

“With the launch of the SHIFT Innovation Center in Riyadh, we are creating an ecosystem where innovation meets collaboration,” said Björn Bodenstein, Managing Director Siemens Healthineers, Saudi Arabia. “Together with the Ministry of Health, we aim to empower healthcare professionals, nurture local talent, and accelerate solutions that address both current and future challenges.”

Operational framework and key functions

The centre operates through three integrated pillars designed to foster healthcare innovation. The innovation infrastructure component provides access to advanced technologies, federated learning models and expert advisory services for data-driven healthcare transformation. The technology accelerator function identifies, validates and scales promising healthcare start-ups and solutions with regional and global impact potential. The capacity build-



ing programmes deliver targeted training through hackathons, bootcamps, workshops and structured educational initiatives focused on digital innovation and clinical excellence.

This structure enables the centre to address practical healthcare challenges ranging from patient outcome improvement to operational efficiency enhancement through collaborative project development.

Workforce development and knowledge transfer

The centre places significant emphasis on human capital development, implementing programmes designed to equip Saudi healthcare professionals with competencies required for technology-enabled care delivery. These initiatives support the Kingdom’s broader strategy of building sustainable domestic capacity in healthcare innovation and digital health technologies.

“Open innovation is about connecting the dots and creating a thriving ecosystem locally and globally. Adding the SHIFT Innovation Center Riyadh to the existing network of innovation centres is an important milestone,” said Amira Romani, SVP Global Innovation & Technology at Siemens Healthineers. M&H

Empowering access to life-saving diagnostics worldwide

Access to reliable diagnostics is a cornerstone of effective healthcare – and for more than five decades, HUMAN has been committed to making this access possible worldwide. Founded in 1972, the company has grown into a global provider of in vitro diagnostics (IVD), guided by a clear vision: equipping laboratories everywhere with life-saving diagnostic solutions.

Today, HUMAN offers a comprehensive portfolio of more than 400 diagnostic products across 13 segments, ranging from classical clinical chemistry and hematology to advanced immunoassays, molecular diagnostics, and point-of-care solutions. This breadth allows the company to address diverse regional healthcare needs, from small laboratories to high-throughput clinical environments. Supported by a long-standing global distribution network, HUMAN solutions are used in medical laboratories in over 160 countries.

Headquartered in Wiesbaden, Germany, HUMAN combines its European roots with a strong international presence.

Regional sales offices in the United Arab Emirates, Singapore, China, India, and Panama – alongside local representatives worldwide – ensure close customer proximity and reliable support. Nearly 300 employees from more than 40 nations contribute their expertise to HUMAN's global operations.

At the company's production site in Magdeburg, Germany, scientists and engineers develop diagnostics according to the highest European quality standards (ISO 13485 and EC IVD Directive). Continuous product and method improvement reflects HUMAN's commitment to precision, reliability, and continuous innovation.

"German values, combined with a global perspective, have always been at the heart of our mission," says Dr. Christine Hettmann-Dreuw, Managing Director of HUMAN. This approach has positioned the company as a trusted partner to healthcare providers, as well as governmental and non-governmental



Christine Hettmann-Dreuw,
Managing Director of HUMAN

organizations – particularly in regions facing limited resources or crisis situations.

HUMAN's product philosophy emphasizes quality, performance, and timely availability, supported by its robust Quality Management System. This includes a commitment to environmental sustainability, reflected in ISO 14001 certified guidelines. MEH

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Update from around the globe

WHO unveils decade-long strategy to integrate traditional medicine into global health systems

The World Health Organisation has launched its Global Traditional Medicine Strategy 2025-2034, establishing a comprehensive framework for integrating traditional, complementary and integrative medicine (TCIM) into national health systems worldwide. The strategy, adopted at the 78th World Health Assembly, marks a significant shift towards recognising traditional medicine as a component of universal health coverage.

The ten-year plan arrives as WHO surveys indicate widespread use of TCIM globally, yet highlight substantial gaps in evidence generation, regulatory oversight and integration into mainstream health-care delivery. According to WHO's third global survey on TCIM, presented through the organisation's new traditional medicine dashboards, an increasing number of member states are requesting technical support for evidence-based integration.

Four strategic pillars guide implementation

The strategy centres on four core objectives: strengthening the evidence base for TCIM, supporting appropriate regulatory mechanisms, integrating safe and effective practices into health systems, and optimising cross-sector collaboration whilst empowering communities. Each objective contains specific directions with proposed actions for member states, partners and WHO itself.

Dr Tedros Adhanom Ghebreyesus, WHO Director-General, stated: "Through the Delhi Commitment, countries have agreed not only on why traditional medicine matters – but on how to act. Traditional medicine can help to address many of the threats to health of our modern world: the growing burden of noncommunicable diseases; inequitable access to health services; and climate change. It can help to support care that is person-centred, culturally grounded, and holistic."

The strategy emphasises that no health-care practices or treatments, whether in biomedicine, public health or TCIM, will be supported by WHO unless they are ev-

idence-based. This principle underscores the framework's commitment to scientific rigour whilst acknowledging the diversity of traditional medical systems.

Protecting indigenous knowledge whilst ensuring safety

A notable feature of the strategy is its formal inclusion of integrative medicine within the broader scope of traditional medicine, including WHO's first definition of this approach. Integrative medicine is defined as "an interdisciplinary and evidence-based approach to health and well-being by using a combination of biomedical and traditional and/or complementary medical knowledge, skills and practices".

The framework responds to concerns raised by indigenous peoples' groups regarding protection of traditional medical knowledge. It aligns with World Health Assembly resolution WHA76.16 on the health of indigenous peoples, reaffirming their right to traditional medicines and health practices, including conservation of vital medicinal plants. The strategy is informed by the United Nations Declaration on the Rights of Indigenous Peoples, considering member states' national contexts and priorities.

Regulatory mechanisms and workforce development

The strategy calls for risk-based regulatory approaches tailored to specific TCIM products and services. For products used for medical purposes, the framework mandates the highest standards of science and stringent regulatory provisions to ensure safety, quality and effectiveness in clinical settings.

Regarding practitioners, the strategy acknowledges that TCIM practitioners cannot be considered as a single group due to diverse modalities, therapeutic approaches, training and practice patterns. It proposes establishing common norms and standards for qualifications, competencies and ethical conduct to ensure practitioners possess necessary knowledge and skills for safe, effective care delivery.

Research priorities and digital innovation

The framework identifies several research priorities, including exploring innovative approaches appropriate to TCIM's unique characteristics. These include complexity science, systems biology, big data and real-world data approaches, as well as interdisciplinary collaboration. The strategy particularly emphasises developing relevant research methodologies for non-codified traditional medicine.

Digital technologies feature prominently, with the strategy encouraging development of mobile health solutions, telehealth services and responsible artificial intelligence tools specific to TCIM. However, it stresses that applications must be developed with TCIM end-user communities and beneficiaries to support people-centred care.

Implementation and monitoring framework

WHO will support member states in implementing and adapting the strategy at country level, including designing national indicators. Progress reports are scheduled for the 83rd World Health Assembly in 2030 and the 87th World Health Assembly in 2034, with a mid-term review to assess whether modifications are needed.

Twenty-six member states have committed to the Delhi Declaration, which focuses on integrating traditional medicine into primary health care, strengthening regulation and safety standards, investing in research, and building interoperable data systems to track outcomes. 

- Download the Global traditional medicine strategy 2025-2034:

<https://www.who.int/publications/item/9789240113176>

- Visit the newly launched WHO Traditional Medicine Global Library: <https://tmgl.org/>



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WHO report exposes global waste crisis as major public health threat

A comprehensive report from the World Health Organization has revealed the severe health consequences of inadequate waste management systems worldwide, calling for urgent action to protect vulnerable populations from preventable disease and environmental harm.

The publication, titled “Throwing away our health: the impacts of solid waste on human health”, examines how municipal solid waste contributes to air, water, and soil pollution when not properly managed. Released on 16 December 2025, the report highlights that many countries still lack the infrastructure and resources needed to safely handle the growing volume of waste generated by modern societies.

Disproportionate impact on vulnerable groups

According to the WHO, communities without adequate waste collection services face the greatest risks, particularly those living near dumpsites, landfills, and incinerators. Children, pregnant women, and informal waste workers are especially vulnerable to the health hazards associated with poorly managed waste, which can release toxic chemicals, contaminate drinking water supplies, and create breeding sites for disease-carrying insects and rodents.

Dr Ruediger Krech, Director a.i. of the Department of Environment, Climate Change, One Health & Migration at WHO, commented: “If we continue to



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treat waste as an afterthought, we will lock in avoidable disease, climate pollution and deep social inequities. This report is a clear call to put health and equity at the centre of how we design, manage and ultimately reduce waste.”

Health sector role emphasised

The report identifies specific actions for health authorities, including ensuring safe management of healthcare waste, developing occupational health programmes for

waste workers, and collaborating with municipalities to close open dumps and burn sites. The WHO emphasises that proper waste management can transform waste into a resource whilst reducing environmental damage and supporting climate-resilient urban development.

• **Download the report** *Throwing away our health: the impact of solid waste on human health – evidence, knowledge gaps, and health sector responses.*

<https://shorturl.at/Xg3Rg>

Global genomics research concentrated in wealthy nations, WHO analysis reveals

A comprehensive WHO analysis spanning 34 years has exposed stark inequalities in human genomics research, with more than 80% of clinical studies conducted in high-income countries whilst low- and middle-income nations account for fewer than 5% of global genomic research activity.

The report, *Human genomics technologies in clinical studies – the research landscape*, examines over 6,500 studies registered between 1990 and 2024 through WHO’s International Clinical Trials Registry Platform. The

analysis provides the most detailed overview to date of how genomic technologies are being applied in clinical research worldwide.

Rapid expansion masks geographic concentration

The data shows substantial growth in genomic clinical studies, particularly after 2010 when next-generation sequencing technologies became more accessible and costs declined. Study registrations increased sharply from around 100 annually

in the early 2000s to over 600 in 2024, reflecting the broader integration of genomics into clinical workflows.

However, this expansion has been geographically uneven. Ten countries account for over 70% of all genomic studies, with 68% conducted in high-income settings and less than 0.5% in low-income countries. Examining WHO regions, the Region of the Americas, Western Pacific Region and European Region each accounted for roughly 30% of total studies, though significant inter- ▶



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nal variations exist within these regions.

When low- and middle-income countries do participate, they typically serve as secondary study sites rather than leading research partners. India appeared in 235 studies, Egypt in 38, South Africa in 17 and Nigeria in 14, whilst many other LMICs featured in fewer than five studies across the entire 34-year period.

Disease focus reflects research priorities in wealthy nations

Cancer and rare diseases together account for more than half of all genomic studies, areas where clinical applications are well established in high-income settings. Over 75% of genomic studies concern noncommunicable conditions such as cancer, rare diseases and metabolic disorders.

Communicable diseases, despite their substantial contribution to global disease burden, particularly in resource-limited settings, represented just 3% of genomic studies. The report identifies only 19 studies addressing infectious diseases in lower middle-income countries and two in low-income countries, despite conditions such as tuberculosis, HIV and malaria remaining major public health priorities in these regions.

“Genomic technologies have extraordinary potential to transform health, however the disparities reflected in the report, unless strategically addressed, could rein-

force existing inequities and limit the benefits of genomic science for populations who could benefit most,” said Dr Meg Doherty, WHO Director of the Department of Science for Health.

Demographic gaps limit generalisability

The analysis reveals significant age-related imbalances in study populations. More than 75% of studies with available eligibility data included adults aged 18–64 years, whilst only 4.6% focused specifically on paediatric populations and 3.3% on adults aged 65 and over. Few studies explicitly included both paediatric and geriatric populations.

Gender inclusion appeared more balanced, with most studies including both males and females. However, data disaggregation and sex-specific outcome reporting remained rare, despite evidence of biological differences in genomic associations and therapeutic response. Studies explicitly addressing sex and gender diversity were virtually absent.

The report notes that genomic studies conducted in lower middle-income countries showed similar patterns, with over 60% focusing on noncommunicable diseases. The most common applications of genomics in these settings were targeted treatment (93 studies), screening and di-

agnosis (74 studies) and pharmacogenomics (46 studies), with very few involving gene therapy or platform validation.

Structural barriers and future directions

These patterns reflect structural constraints including limited access to advanced sequencing technologies, scarce local genomic laboratories and funding limitations for genomic research and development in resource-limited settings.

The report emphasises that addressing current imbalances will require stronger global coordination, investment in genomic infrastructure and broader engagement across underrepresented settings. Recommendations include increased investment in research capacity in underrepresented regions, greater inclusion of systematically excluded demographic groups, stronger leadership by LMIC-based research institutions, and better alignment of genomic research agendas with local disease burdens.

“WHO will support efforts to ensure that genomic research reflects the diversity of global populations and public health needs,” Dr Doherty added.

• **Download** the *Human genomics technologies in clinical studies – the research landscape* report here:

<https://www.who.int/publications/i/item/B09581> 

DP World study reveals healthcare supply chain disruptions cost industry over \$11 billion annually

A comprehensive study by global logistics provider DP World has uncovered the substantial financial and operational burden of supply chain disruptions affecting the healthcare sector, with the industry experiencing more than 18,000 logistics failures each year at a cost exceeding \$11 billion. The research, based on surveys of 680 senior logistics leaders across eight industries, including 75 healthcare decision-makers, provides detailed insights into the challenges facing medical supply chains and identifies strategies that are proving effective in reducing disruption.

Investment in domestic transport yields significant cost reductions

The study found that the annual losses

from logistics disruptions represent more than 15 per cent of the \$66.39 billion global pharmaceutical logistics market recorded in 2024. However, the research also demonstrates that targeted investment can substantially mitigate these costs. Healthcare companies that have invested in domestic transport and last-mile logistics infrastructure have achieved disruption cost reductions of up to 80 per cent, providing evidence that strategic resource allocation can deliver measurable improvements in supply chain reliability.

The human impact of these disruptions extends well beyond financial metrics. According to the data, 85 per cent

of healthcare cargo owners report an increase in customer complaints, whilst 76 per cent indicate they have lost contracts or business as a result of supply chain failures. Additionally, 67 per cent report that their reliability has been questioned by supply chain partners, highlighting the reputational consequences of logistics disruptions in the healthcare sector.

Complexity and visibility remain primary challenges

The research identifies customs complexity and visibility gaps as widespread issues, with nearly nine in ten respondents citing these as significant concerns. These challenges are compounded by the unique re-

quirements of healthcare logistics, which must navigate international borders, varying regulatory frameworks, and stringent temperature-control requirements for sensitive biological materials and pharmaceuticals.

Magrietha Mallinson, Global Vice President, Healthcare at DP World, emphasised the human dimension of supply chain failures: “Every delayed healthcare shipment has a human cost – when medicines and equipment don’t arrive, patients wait, and care is disrupted. Unfortunately, the impact is often greatest in developing regions, where even short delays can halt essential services.”

“What gives me hope is that we know how to make things better. By investing in stronger healthcare transport networks and improving visibility across ev-

ery stage of the journey, we can keep vital supplies moving to the people who need them most,” Mallinson added.

Clinical services face operational disruptions

The study reveals that supply chain failures have direct consequences for clinical operations. When supplies are delayed, clinics are forced to postpone procedures, hospitals must reschedule treatments, and essential goods take longer to reach healthcare facilities and patients who require them. These operational disruptions affect not only routine care but can also impact time-sensitive treatments and emergency services.

Beat Simon, Group Chief Operations Officer, Logistics at DP World, commented on the complexity of healthcare supply chains: “Healthcare supply chains

are both high stakes and complex – spanning borders, varying regulations and temperature-sensitive requirements. Yet the same fundamentals that underpin resilient global trade can also redefine reliability in healthcare logistics. The opportunity is now to apply these principles at scale and create connected systems built to last.”

The findings are published in DP World’s report, *Without Logistics: Healthcare Edition*, which examines the operational, financial and reputational effects of supply-chain disruption across the global healthcare industry. The research methodology combined surveys with correlation modelling to analyse the relationship between investment in specific logistics capabilities and cost reduction, as well as to assess how reputational damage can intensify financial losses. 



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Medical research news from around the world

Comprehensive atlas maps 3D organisation of human chromosomes in unprecedented detail

An international consortium has produced the most detailed map yet of how human chromosomes fold and organise themselves within the cell nucleus, cataloguing more than 140,000 chromatin loops and revealing how genome structure relates to essential processes including gene expression and DNA replication across different cell types.

The 4D Nucleome Project has published a landmark study in *Nature* characterising the three-dimensional architecture of human chromosomes and how this changes over time – the so-called 4D nucleome – in two widely studied cell types: human embryonic stem cells (H1) and immortalised fibroblasts (HFFc6).

Led by Job Dekker and colleagues, the research integrates diverse genomic datasets to provide an encyclopaedic view of chromosome organisation at multiple scales, from megabase compartments down to kilobase-resolution chromatin loops between specific regulatory elements.

Multiple methods reveal complementary insights

The consortium employed and systematically benchmarked numerous chromosome conformation capture techniques, including Hi-C, Micro-C, ChIA-PET, PLAC-seq, GAM and SPRITE. Each method contributed unique observations about genome folding.

“Through extensive benchmarking, we describe the unique strengths of different genomic assays for studying the 4D nucleome, providing guidelines for future studies,” the authors write. The analysis revealed that Hi-C and SPRITE most effectively detect compartmentalisation, whilst Micro-C excels at identifying structural loops and enrichment-based assays like PLAC-seq and ChIA-PET are optimal for detecting gene expression-related loops.

By combining these complementary datasets, the researchers assembled extensive catalogues of more than 140,000 looping

interactions per cell type and generated detailed three-dimensional models of the nuclear environment surrounding all genes, including their long-range interactions with distant regulatory elements.

Chromatin loops classified into distinct functional categories

The union set of chromatin loops was classified into six distinct categories based on the chromatin states at their anchor points. These ranged from loops associated with poised promoters to those involving active transcription-related chromatin states, as well as insulator loops marked by the boundary protein CTCF.

Spatial genome organisation linked to gene regulation

Integration of chromatin looping data with gene expression analysis revealed that genes expressed in many cell types form more interactions with long-range enhancers than cell-type-specific genes. “The resulting encyclopaedia of annotations has revealed a vast richness of coding and regulatory information, leading to an increased understanding of gene regulation,” the authors note.

Housekeeping genes were particularly prone to interacting with multiple distal enhancers, though often with different enhancer sets in different cell types. More than 90% of housekeeping genes exhibited at least one distal enhancer interaction in both cell types studied, with 80.3% of enhancer-promoter pairs being cell-type-specific.

The research also identified nine distinct spatial nuclear compartments (SPIN states)

relative to nuclear structures including speckles, nucleoli and the nuclear lamina, each associated with characteristic patterns of gene expression and DNA replication timing.

Three-dimensional genome models reveal cell-to-cell variation

Using integrative genome modelling, the consortium constructed populations of 1,000 single-cell 3D genome structures at 200-kilobase resolution for both cell types. These models illuminate chromosome folding within nuclear topography and reveal extensive cell-to-cell variability in genome organisation.

“Three-dimensional models of population-based and individual cell-to-cell variation in genome structure showed connections between chromosome folding, nuclear organization, chromatin looping, gene transcription and DNA replication,” the authors write.

The spatial models identified two distinct classes of highly expressed housekeeping genes occupying markedly different nuclear microenvironments: class I genes showing strong nuclear speckle association with interior radial positions, and class II genes more uniformly distributed throughout the nucleus with minimal speckle associations.

Foundation for predicting effects of genetic variants

The comprehensive datasets enabled development of computational methods to predict genome folding from DNA sequence, which the authors suggest “will facilitate the discovery of potential effects of genetic variants, including variants associated with disease, on genome structure and function.” 

Reference:

Dekker, J., Oksuz, B. A., Zhang, Y., et. al. (2025). An integrated view of the structure and function of the human 4D nucleome. *Nature*. <https://doi.org/10.1038/s41586-025-09890-3>



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South Korean scientists develop automated system that detects 16 foodborne pathogens in under one hour

South Korean researchers have developed a fully automated diagnostic platform capable of detecting 16 major foodborne pathogens within one hour, reducing testing time by more than half compared to conventional methods. The single-button system requires no specialist expertise and integrates all steps from pathogen separation to molecular detection, with validation trials demonstrating strong potential for deployment across the food industry.

A research team at the Korea Institute of Machinery and Materials (KIMM) has developed the country's first fully automated rapid diagnostic system for foodborne pathogens, addressing long-standing limitations in field-based microbiological testing. The platform, led by Senior Researcher Chanyong Park, Principal Researcher Dongkyu Lee, and Postdoctoral Researcher Changha Woo, integrates food matrix dissociation, nucleic acid pre-treatment, and molecular diagnostics into a single modular device.

The system represents a significant departure from gold-standard culture-based identification methods, which typically require between two days and one week to yield results. Whilst molecular diagnostic techniques have been available, their deployment in field settings has been constrained by the need for specialised analytical equipment and trained personnel to operate complex workflows.

Technical innovation enables field deployment

The KIMM platform automates the entire diagnostic workflow within a single device, performing pathogen separation, nucleic acid purification, amplification, and detection without manual intervention. The system employs hydrodynamic forces generated by high-speed propeller rotation to selectively isolate foodborne pathogens without

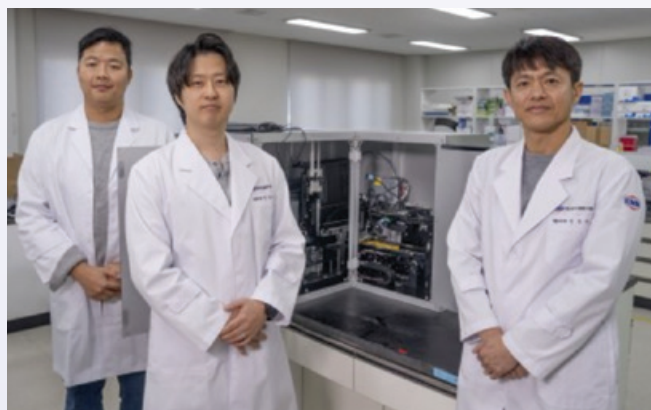
damaging the food matrix. Following isolation, debris are removed through vacuum filtration using multi-layer separation membranes, enabling rapid processing of large-volume samples exceeding 200 mL.

Purified nucleic acids undergo molecular diagnostics based on high-speed mechanical control, with the system completing 40 cycles of thermal amplification within 15 minutes. The platform utilises proprietary reagents capable of detecting two or more fluorescent signals simultaneously within a single well, combined with a low-cost CMOS-based multi-fluorescence sensor. This configuration enables simultaneous detection of all 16 foodborne pathogens specified in guidelines from Korea's Ministry of Food and Drug Safety.

Validation trials demonstrate clinical utility

The system is currently undergoing validation at two demonstration sites across more than four different food product categories. According to the research team, both on-site applicability and analytical accuracy have been successfully verified across all demonstration trials, with significant improvements in processing time compared to existing methods.

"The greatest strength of this system lies in its ability to rapidly and accurately detect foodborne pathogens on site, whilst remaining easy to use even for non-experts," stated Senior Researcher Chanyong Park. "If deployed in school and industrial catering facilities, food manufacturing sites, and local government



From right: Dongkyu Lee, Head of the Diagnostic Sensor Research Laboratory, Chanyong Park, Senior Researcher, and Changha Woo, Postdoctoral Researcher, at the Korea Institute of Machinery and Materials.

food testing centres, the system is expected to play a critical role in preventing foodborne illness incidents in advance and significantly enhancing food safety."

Implications for public health infrastructure

Principal Researcher Dongkyu Lee emphasised the broader significance of the technology: "This technology – automating every step from separation to nucleic acid purification and molecular diagnostics within a single device – represents an innovative achievement that introduces a new paradigm in Korea's food safety management framework."

The platform's single-button operation, supported by integrated data analysis software, ensures high usability and reliability for non-expert users in field environments. This design feature may prove particularly valuable for deployment across distributed testing networks where specialist laboratory infrastructure is unavailable.

The system was developed through the 2023 Customised Public-Demand Living Safety R&D Programme (Phase 2) funded by the Ministry of the Interior and Safety of Korea. With validation trials showing strong potential for practical deployment and commercialisation, the technology is anticipated to strengthen foodborne illness prevention and response systems across Korea's food industry. 

Two world-class paediatric cardiac centres unite under expert leadership

Globally renowned cardiac surgeon Professor David Barron will lead the integration of our paediatric cardiac surgical programmes at Evelina London Children's Hospital and the Royal Brompton Hospital (RBH) to create a single centre of excellence at Evelina London.

Under Professor Barron's leadership, the paediatric cardiology and cardiac teams from RBH and Evelina London will unite to create one of the most comprehensive cardiology and cardiac programmes in the UK and worldwide.

Professor Barron joined Evelina London in January 2025 as Chief of Paediatric and Congenital Cardiac Surgery. As well as bringing his considerable expertise in complex heart defects, he has also steered Toronto's Hospital for Sick Children (SickKids), which is among the top 5 surgical programmes in North America, to the highest quality outcomes in its history.

Over the course of 2026, our two centres of excellence will be on one site at Evelina London, situated next to St Thomas' Hospital in central London. Royal Brompton is ranked consistently among the world's top specialist heart hospitals.

Evelina London has a long history of innovation, world-firsts and the development of cutting-edge technology to transform patient care.

Leading innovation and expertise

Evelina London handles around 6,000 cardiology patients and over 500 congenital heart operations annually. It stands out for pioneering fetal and cardiac MRI (including 3D/VR diagnostics), advanced imaging, and complex neonatal operations. Advances in cardiac imaging can shorten patient waiting times and reduce the need for multiple surgeries, thereby improving patient outcomes.

Evelina London's extensive range of congenital cardiac surgeries, including newer techniques for highly complex congenital heart problems for both single-ventricle palliation and complex biventricular corrective surgery, delivers excellent outcomes.

As for Royal Brompton, it excels in surgical and catheter interventions and seamless care transition through Europe's largest Adult Congenital Heart Disease (ACHD) unit.

In addition to fetal cardiology, paediatric cardiology, and cardiac surgery, both Royal Brompton and Evelina London have specialised intensive care, cardiac electrophysiology, and inherited heart-disease services, making them internationally renowned centres for diagnosis, innovative procedures, and long-term management of congenital and acquired heart conditions. Evelina London and our academic partner, King's College London, are noted for advanced 3D imaging and printing, which supports complex cardiac surgery planning.

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Breakthrough in stem cell engineering enables mass production of helper T cells

Researchers at the University of British Columbia have developed a method to reliably grow helper T cells from stem cells in laboratory conditions, overcoming a major obstacle in producing affordable, off-the-shelf cell therapies. The discovery could transform treatment options for cancer, autoimmune disorders and infectious diseases by enabling large-scale manufacturing of engineered immune cells.

For the first time, scientists have demonstrated how to consistently produce helper T cells – a crucial component of the immune system – from pluripotent stem cells in a controlled laboratory setting. The research, published in *Cell Stem Cell* on 8 January 2026, addresses a longstanding challenge that has limited the development and accessibility of cell-based therapies.

Overcoming the manufacturing bottleneck

Engineered cell therapies such as CAR-T treatments have delivered dramatic results for patients with previously untreatable cancers. However, these therapies remain prohibitively expensive and difficult to produce because they are typically manufactured from a patient's own immune cells, requiring weeks of customised processing for each individual.

"The long-term goal is to have off-the-shelf cell therapies that are manufactured ahead of time and on a larger scale from a renewable source like stem cells," said co-senior author Dr Megan Levings, professor of surgery and biomedical engineering at UBC. "This would make treatments much more cost-effective and ready when patients need them."

The critical role of helper T cells

Effective cancer immunotherapy requires two types of T cell working in concert: killer T cells, which directly attack malignant cells, and helper T cells, which detect threats, activate other immune cells and sustain immune responses over time. Whilst progress has been made in generating killer T cells from stem cells, producing helper T cells has proven far more difficult.

"Helper T cells are essential for a strong

and lasting immune response," Dr Levings explained. "It's critical that we have both to maximise the efficacy and flexibility of off-the-shelf therapies."

Precise signal control unlocks production

The research team discovered that helper T cell development could be controlled by fine-tuning two biological signals during cell development. They found that a developmental pathway called Notch plays a critical but time-sensitive role. Whilst Notch signalling is necessary early in immune cell development, if it remains active for too long, it prevents helper T cells from forming.

"By precisely tuning when and how much this signal is reduced, we were able to direct stem cells to become either helper or killer T cells," said co-first author Dr Ross Jones, research associate in the Zandstra Laboratory. "We were able to do this in controlled laboratory conditions that are directly applicable in real-world biomanufacturing, which is an essential step toward turning this discovery into a viable therapy."

The team demonstrated that combining Notch pathway modulation with optimised T cell receptor stimulation enabled control over whether stem cells developed into helper or killer T cells. According to the authors: "Notch signalling negatively impacts CD4+ T cell commitment, and its timed removal allows generation of clonally diverse and expandable CD4+ T cells from PSCs."

Functional validation confirms authenticity

Importantly, the laboratory-grown helper T cells didn't merely resemble natural im-

mune cells – they behaved like them. The cells displayed markers of healthy mature cells, carried diverse immune receptors and could specialise into subtypes that play distinct roles in immunity.

"These cells look and act like genuine human helper T cells," said co-first author Kevin Salim, PhD student in the Levings Laboratory. "That's critical for future therapeutic potential."

Implications for clinical application

The ability to generate both helper and killer T cells – and to control the balance between them – represents a significant advance for stem cell-derived immune therapies. Co-senior author Dr Peter Zandstra, professor and director of the UBC School of Biomedical Engineering, emphasised the broader impact: "This is a major step forward in our ability to develop scalable and affordable immune cell therapies. This technology now forms the foundation for testing the role of helper T cells in supporting the elimination of cancer cells and generating new types of helper T cell-derived cells, such as regulatory T cells, for clinical applications."

The feeder-free and serum-free production method developed by the team is particularly significant for manufacturing scalability. The research demonstrates that the ratio of helper to killer T cells can be precisely controlled during production, which is important for optimising CAR-T cell therapy efficacy.

This breakthrough positions stem cell-derived helper T cells as a promising platform for developing low-cost, readily available cell therapies that could significantly expand patient access to these potentially life-saving treatments. 

Reference:

Jones, R. D., Salim, K., Stankiewicz, L. N., et. al. (2026). Tunable differentiation of human CD4+ and CD8+ T cells from pluripotent stem cells. *Cell Stem Cell*, 33, 73–90. <https://doi.org/10.1016/j.stem.2025.12.010>

Strong Malaysian presence at WHX 2026

Tapping into the medical devices and healthcare services in the MENA Region

Malaysia External Trade Development Corporation (MATRADE) continues its strategic mission to expand export opportunities for Malaysian medical devices and healthcare services within the MENA region. This commitment is highlighted by MATRADE's coordination of 11 Malaysian companies at WHX 2026, marking 21 years of consecutive participation in this premier industry event.

Malaysian Pavilion this year showcases a comprehensive range of cutting-edge technologies and healthcare solutions, including surgical products, gloves, syringes, pharmaceuticals, and health supplements.

Global hub for medical manufacturing

With more than 200 manufacturers operating in the country, Malaysia offers a robust ecosystem for medical innovation and high-volume production. Over the years Malaysia has solidified its reputation as a premier manufacturing hub within ASEAN and a trusted outsourcing destination for over 30 global multinationals.

Malaysia is currently the world's top exporter of medical gloves and catheters. Over 90% of medical devices manufactured in Malaysia are exported globally, with more than half of these shipments reaching tier-one markets such as the US, Germany, Japan, and China.

Preferred sourcing point for pharmaceuticals

Malaysia has emerged as a preferred global sourcing partner for pharmaceutical products due to several key factors including stringent quality standards ensuring products meet safety and efficacy benchmarks. Malaysian pharmaceutical companies offer everything from generic drugs and IV solutions to advanced biotechnology and prefilled syringes.

Capitalizing on regional visions

GCC countries are currently undergoing massive healthcare transformations. Mr. Badrul Hisham, Trade Commissioner of Malaysia to the UAE, noted that initiatives like UAE Vi-



Mr. Badrul Hisham, Trade Commissioner of Malaysia to the UAE

sion 2040 and Saudi Vision 2030 are driving an unprecedented rise in healthcare investments.

"These regional plans aim to expand private healthcare sectors and solidify the GCC's status as a medical tourism hub," said Mr. Hisham. "WHX 2026 allows Malaysian companies to tap into this potential by showcasing their capabilities and forging new, long-term partnerships". MEN

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Novel AI tool predicts not just genetic mutations, but the diseases they cause

Scientists at Mount Sinai have developed V2P, an artificial intelligence tool that identifies disease-causing genetic mutations and predicts the specific diseases they may trigger. The method uses advanced machine learning to link genetic variants with likely phenotypic outcomes, potentially accelerating genetic diagnostics and treatment discovery for complex and rare diseases.

Researchers at the Icahn School of Medicine at Mount Sinai have created a novel artificial intelligence system that goes beyond identifying harmful genetic mutations to predict the specific types of diseases these variants may cause. The breakthrough could significantly improve the speed and accuracy of genetic diagnosis whilst aiding drug discovery efforts for rare and complex conditions.

The method, called Variant to Phenotype (V2P), addresses a critical gap in current genetic analysis. Whilst existing tools can estimate whether a mutation is harmful, they cannot determine what type of disease it might trigger. V2P uses advanced machine learning to connect genetic variants with their likely phenotypic outcomes – essentially predicting how a patient's DNA could influence their health across 23 top-level disease categories.

Streamlining variant interpretation

“Our approach allows us to pinpoint the genetic changes that are most relevant to a patient's condition, rather than sifting



through thousands of possible variants,” says first author David Stein, PhD, who recently completed his doctoral training at Mount Sinai. “By determining not only whether a variant is pathogenic but also the type of disease it is likely to cause, we can improve both the speed and accuracy of genetic interpretation and diagnostics.”

The research team trained V2P on a large database containing both harmful and benign genetic variants, incorporating disease information to improve prediction accuracy. When tested using real, de-identified patient data, V2P consistently ranked the true disease-causing variant amongst the top 10 candidates, demonstrating its potential to streamline genetic diagnostics.

The tool's applications extend beyond clinical diagnosis. According to co-senior and co-corresponding author Avner Schlessinger, PhD, Professor of Pharmacological Sciences and Director of the AI Small Molecule Drug Discovery Centre at Mount Sinai, “V2P could help researchers and drug developers identify the genes and pathways most closely linked to specific diseases. This can guide the development of therapies that are genetically tailored to the mechanisms of disease, particularly in rare and complex conditions.”

Performance validation

The authors report in their *Nature Communications* paper that V2P demonstrated superior performance compared to existing variant effect predictors across multiple evaluation datasets. For 21 of 22 phenotypes examined, V2P's phenotype-specific predictions surpassed both its own general pathogenicity predictions and all compared methods. The tool achieved average

precision scores of 0.86, 0.93, and 0.94 for separating pathogenic and benign variants across three distinct evaluation datasets.

Importantly, V2P showed strong concordance with experimental data from deep mutational scanning assays of 52 proteins, achieving correlation coefficients comparable to top-performing methods. In practical applications using patient sequencing data, V2P ranked causal variants significantly lower (median rank of two) compared to other genome-wide prediction methods.

Towards precision medicine

Whilst V2P currently classifies mutations into broad categories such as nervous system disorders or cancers, the research team aims to refine the tool to predict more specific disease outcomes and integrate it with additional data sources to support drug discovery.

“V2P gives us a clearer window into how genetic changes translate into disease, which has important implications for both research and patient care,” explains co-senior and co-corresponding author Yuval Itan, PhD, Associate Professor of Artificial Intelligence and Human Health, and Genetics and Genomic Sciences at Mount Sinai. “By connecting specific variants to the types of diseases they are most likely to cause, we can better prioritise which genes and pathways warrant deeper investigation.”

This innovation represents a step towards precision medicine, in which treatments can be matched to a patient's genetic profile. The tool has been made available to the research community at www.v2p.ai, where scientists can access precomputed V2P scores for every possible single nucleotide variant in the human genome. 

Reference:

Stein, D., Kars, M. E., Milisavljevic, B., et. al. (2025). Expanding the utility of variant effect predictions with phenotype-specific models. *Nature Communications*, 16(1), 11113. <https://doi.org/10.1038/s41467-025-66607-w>

Leading minimally invasive VAD surgery

Harefield hospital, part of Guy's and St Thomas' NHS Foundation Trust, is internationally recognised for treating some of the most complex cases of advanced heart failure. It is home to one of the world's most established ventricular assist device (VAD) programmes and is the only UK centre offering a pioneering minimally invasive approach to VAD implantation.

Advancing an established VAD service

With 30 years of VAD expertise, specialists at Harefield have refined a minimally invasive technique using just three small incisions. These advances have reduced operating times and enabled faster recovery, even in highly complex cases. Harefield's strong clinical outcomes and commitment to innovation continue to attract international medical teams seeking advanced VAD training.

A bridge to transplantation

For patients with severe heart failure awaiting a heart transplant, VAD implantation is often used as a life-saving

bridge to transplantation. Harefield's first-year survival rate following VAD implantation is 85%, reflecting the centre's expertise and rigorous standards of care.

Minimally invasive VAD surgery is particularly beneficial for patients who have previously undergone open-heart surgery. By avoiding repeat sternotomy, surgeons reduce the risks associated with scar tissue and adhesions from earlier procedures, helping to improve recovery.

A multidisciplinary team approach

"Our VAD programme comprises of advanced heart failure cardiologists, senior fellows, and VAD surgeons," explains Mrs Maria Monteagudo-Vela, consultant cardiothoracic and transplant surgeon at Harefield. "Surgeons collaborate with physicians, nurses, allied health professionals and psychologists, alongside nutrition and pharmacy teams, to deliver world-class care. Our specialist heart failure nurses, support patients throughout every stage of their heart failure journey."



Maria Monteagudo-Vela, consultant cardiothoracic and transplant surgeon at Harefield Hospital

When to refer a patient

Referral for VAD assessment should be considered for patients with advanced heart failure, experiencing persistent severe symptoms or requiring continuous inotropic support. Patients who are not stable on medical therapy alone while awaiting transplantation may be referred the specialist team for assessment of suitability for minimally invasive VAD surgery.

- Find out more at gstspecialistcare.co.uk



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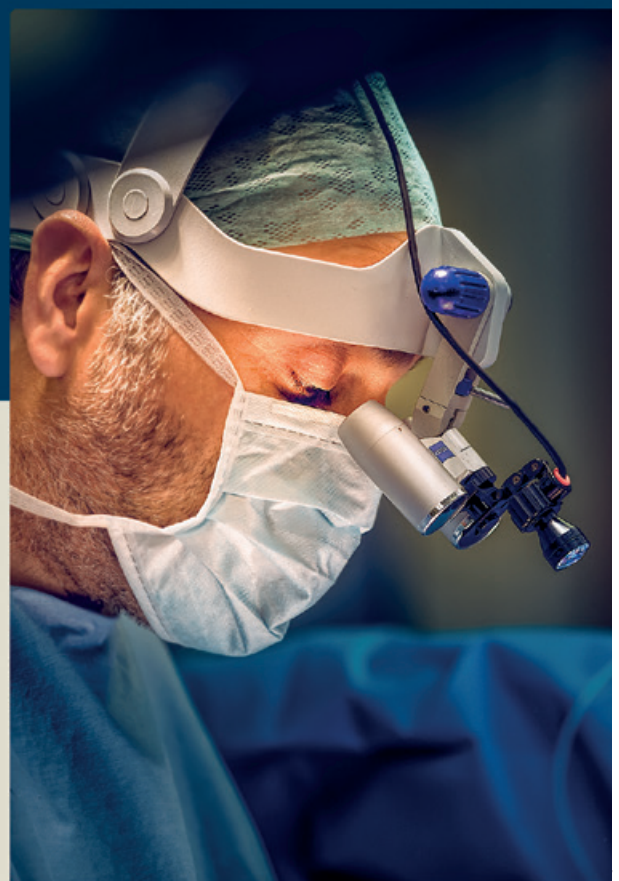
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Shaping the future of complex pediatric care: The Center for Global Health at Children's Hospital Los Angeles



At Children's Hospital Los Angeles, complex care is our everyday routine.

As a leader in pediatric medicine for nearly 125 years and one of the world's premier destinations for leading-edge specialty care and treatment, CHLA is proud to extend its expertise to families and health care partners across the Middle East and beyond through the Center for Global Health.

Each year, thousands of families from around the world turn to CHLA for hope and healing. From rare cancers and congenital heart defects to advanced gene therapies and neurosurgical interventions, CHLA's multidisciplinary teams deliver world-class care for the most challenging pediatric conditions.

Our internationally renowned centers of expertise offer treatments in:

- Pediatric oncology, including CAR T-cell therapy and bone marrow transplantation
- Neurology and epilepsy surgery
- Orthopedic and spinal deformities
- Congenital heart disease and cardiac surgery
- Cell and gene therapy for rare genetic disorders

A trailblazer in complex pediatric care

CHLA is consistently ranked one of the top five pediatric centers globally and has been distinguished among the top 10 pediatric hospitals in the United States for 17 years in a row by U.S. News & World Report.

Additionally, six individual subspecialties earned top 10 recognition, including orthopedics, cancer, gastroenterology and GI surgery, urology, diabetes and endocrinology, and neurology and neurosurgery.

These specialized programs unite world-renowned clinical leaders dedicated to advancing pediatric care through groundbreaking research, next-generation technologies, and innovative treatments. Our Center for Global Health serves as the gateway for international patients, offering



seamless access to CHLA's most advanced services and specialists.

Comprehensive support for international families

Navigating complex medical care in a foreign country can be overwhelming. That's why CHLA's Center for Global Health offers a full suite of concierge services for international families, helping to alleviate stress and streamline processes for both medical and non-medical needs, every step of the way.

When patients arrive at CHLA, they receive a personalized treatment plan developed by a multidisciplinary team of experts, ensuring the highest standard of care tailored to their unique needs.

CHLA's concierge team ensures families feel supported and empowered, from coordinating appointments and managing travel logistics to providing language interpretation and cultural guidance. Families also receive psychosocial support, financial counseling, and educational resources so they can focus on what matters most: their child's health and recovery.

Guiding global pediatric care standards

CHLA's impact extends far beyond Los Angeles. Through strategic partnerships,

training programs, and knowledge exchange, we collaborate with health care institutions across the Middle East to elevate standards of pediatric care. Our clinicians provide education and mentorship worldwide, helping to build sustainable health care capacity in local communities.

Your partner in pediatric excellence

At Children's Hospital Los Angeles, we don't just treat patients – we transform lives and shape the global future of complex pediatric health care. The Center for Global Health represents the pinnacle of this mission, combining compassion, expertise, and innovation to improve the health of children worldwide. 

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- For more information on our Center for Global Health, visit us at: CHLA.org/GlobalHealth

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Complex care is our everyday routine



Children's Hospital
LOS ANGELES®



Siemens Healthineers introduces a patient-centric, AI-powered experience at World Health Expo Dubai 2026

From February 9 to 12, 2026, the inaugural World Health Expo (WHX) Dubai will welcome the global healthcare community to the Dubai Exhibition Centre. Formerly known as Arab Health, this landmark event takes on a renewed mission: "Shaping global healthcare, together." In line with this call for collaborative and sustainable innovation, Siemens Healthineers will present their portfolio of breakthrough innovations designed to meet the industry's most pressing challenges, guided by their purpose to pioneer breakthroughs in healthcare for everyone, everywhere, sustainably.

Focused on clinical pathways and core innovations

The exhibits will feature the latest advancements designed to improve outcomes and operational efficiency and will allow visitors to explore integrated clinical pathways, demonstrating a connected approach from early detection through treatment. The experience centres around key focus areas:

- AI-powered pathways in radiology, supporting faster, more precise, and more personalized decision-making.
- Radiology ready for tomorrow, helping imaging departments adapt to rising demand, workforce challenges, and increasing complexity.
- Intelligence across the cancer care continuum, enabling connected care from screening through therapy and follow-up.

Vivek Kanade, Managing Director Siemens Healthineers, Middle East and Africa, comments: "Our presence at WHX this year is a statement of our commitment to elevating healthcare across the region. We are showcasing how our portfolio of AI-powered medical imaging and digital solutions addresses the most pressing clinical priorities in oncology, cardiology, neurology and neurodegenerative diseases. Guided by our purpose as a company, we are focusing on enhancing accessibility and building sustainable healthcare systems. We partner with healthcare providers across the region to bring advanced technology and build a more

capable, connected, and enduring future in healthcare for all."

Computed Tomography

Siemens Healthineers will feature the NAEOTOM Alpha class, three systems equipped with groundbreaking photon-counting CT technology. The fleet delivers high diagnostic confidence through enhanced image quality, spectral information, and AI-supported productivity, setting a new benchmark for clinical insight.

Magnetic Resonance

The spotlight will be on the MAGNETOM Flow platform, a next-generation 1.5T MRI designed to support a more sustainable future. Its DryCool technology enables helium-independent design, which helps reduce infrastructure requirements, while AI-assisted imaging supports consistent image quality, faster scan times, and improved operational reliability.

Angiography & image-guided therapy

For procedural care, Siemens Healthineers will showcase the new AI-powered ARTIS angiography portfolio alongside CIARTIC Move, the autonomous robotic C-arm. These solutions demonstrate how AI-driven imaging and intelligent automation can support procedural precision, improve reproducibility, and optimize workflow efficiency in interventional suites and operating rooms.

Molecular imaging

The highlight will be the transformative Biograph Triniton.X PET/CT. This system is engineered to expand diagnostic possibilities, offering exceptional sensitivity and scalable coverage, with a field of view extendable up to 48 cm in the same gantry. This allows clinicians to see more, with greater clarity, in less time. Its advanced, adaptable design supports a more efficient workflow and dose-conscious protocols, turning complex data into confident, actionable insights for precision care in oncology and neurology.

X-ray imaging

The MAMMOMAT B.brilliant with

ClearCEM will be featured, highlighting its advanced technology designed to enhance diagnostic certainty in breast imaging and help clinicians "exclude the maybes". The versatile LUMINOS Q.namix R and T systems will also be highlighted representing the latest in multifunctional X-ray technology, designed for both remote and tableside operational excellence.

Ultrasound

From the ultrasound portfolio, the ACUSON Sequoia and ACUSON Origin systems will be presented, offering flagship level imaging supported by Artificial Intelligence workflow tools. These systems are designed to support the highest imaging quality expectations in both General Imaging and Cardiology.

Intelligence that empowers clinical teams

Beyond imaging, Siemens Healthineers will highlight digital solutions that address operational challenges. AI-powered tools like syngo.CT Coronary Cockpit and syngo Carbon assist with reading and reporting, helping manage clinical workloads. The ActExcell Operational Twin uses predictive simulation for data-driven department planning and optimization. RadEnablement Services provide a new model of digital support, offloading routine tasks to allow clinical teams to focus more time on direct patient care.

The experience will also highlight Value Partnerships, reflecting Siemens Healthineers' long-term commitment to supporting healthcare providers through collaboration, digitalization, and continuous performance improvement.

As World Health Expo Dubai continues to evolve, Siemens Healthineers continues to work towards not only innovation, but also on intelligent integration, trusted partnerships, and a relentless focus on patients. 

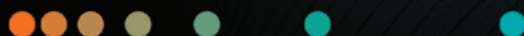
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Siemens Healthineers at WHX Dubai 2026

At Siemens Healthineers, we are striving to overcome the most threatening diseases by pioneering breakthroughs in healthcare. Designed to empower healthcare professionals to provide the highest level of care to their patients, our transformative solutions are born from our unwavering commitment to advance the field of healthcare. Discover groundbreaking innovations, meet our team of experts and be part of this transformative journey – together, we're shaping the future of healthcare.

Learn how these technologies can impact your work.

Visit us at World Health Expo Dubai to experience breakthrough innovations in healthcare!

Date: 09 – 12 February, 2026

Venue: Dubai Exhibition Center, UAE

Booth Location: North Halls, N23.D10

We look forward to welcoming you at our booth!

SIEMENS
Healthineers 

Saudi Arabia sees a bright future with Medi-Span drug decision support solution

Facing surprisingly high medication error rates, leaders in Saudi Arabia's healthcare transformation create change with decision support technology.

The Kingdom of Saudi Arabia (KSA) has launched an ambitious program to restructure healthcare in the country. The Health Sector Transformation Program ^[1] under Vision 2030 aims to create an integrated and effective healthcare system for the entire country. One of the key areas of opportunity for improvement is evidence-based drug and medication information.

KSA is navigating a problematic level of pharmaceutical errors – as high as 56 per 100 medication orders. ^[2] This statistic represents a significant opportunity for improvement in outcomes, the patient experience, and population health results, especially with the application of medical decision support technology.

Eng. Ibrahim Al Ammar, Chief Information and Technology Officer, National Medical Care Company, has overseen a 40% reduction in medication errors with the implementation of EHR-integrated technologies. He envisions a future where evidence-based research powers improvements and enhances system-wide clinical decision-making.

Saudi Arabia's medication decision support challenges persist

Saudi Arabia faces an urgent need for improvement in their medication decision support. ^[2] The country has formed the Saudi Food and Drug Authority (SFDA)

and the National Pharmacovigilance and Drug Safety Centre, but is still working to counter issues including poor understanding of precision medication decision support among healthcare providers and a lack of effective reporting methods. The country has deep needs for ongoing education, incorporation of skills in assessment methods, and standardized error reporting protocols. Experts in the field have proposed solutions including:

- Structured competency-based training.
- Promoting a reporting culture that encourages transparency and learning from errors.
- Simulation exercises for periodic skill assessments.

Crucially, technology including electronic health records and computerized physician order input systems will be fundamental to improving medication decision support. ^[3]

Technology can play a significant role

A scholarly article out of King Abdulaziz University ^[2] recommends that technologies that enhance medication decision-making procedures should be leveraged to reduce medical errors as part of the promotion of national patient care outcomes projects. Failure to use this type of technology can contribute to errors such as underdosing and overdosing—a significant

threat to vulnerable populations like geriatrics and pediatrics.

These technologies, when integrated with EHRs, can help reduce administration errors. Features like alerts and automatic reminders improve medication management and reduce timing mistakes. Realizing these results requires improved medication management systems that identify trends and patterns. This type of identification guides the kind of clinical decision-making that is required for customized treatment regimens that align with the needs of individual patients.

However, implementing clinical decision support systems in Saudi Arabia presents various hurdles, including the need for training and support, high costs, and opposition to change from healthcare workers. Meaningful long-term improvements will require:

- A culture of transparency
- Commitment to lifelong learning and continuing medical education
- Non-punitive error reporting
- Aligned patient education
- Continuing medical education

Regular training can help encourage acceptance of more sophisticated technology, including EHRs and medical decision support systems that simplify drug management and enhance communication within healthcare teams.

Eng. Al Ammar leads medication decision-making transformation at National Medical Care Company

Eng. Ibrahim Al Ammar, Chief Information & Technology Officer at National Medical Care Company, has been at the leading edge of systemic healthcare change in Saudi Arabia. He has driven large-scale projects focused on improving patient care and operational excellence across the enterprise. A key element of this success has been the implementation of Wolters Kluwer's Medi-Span®. [4] This EHR-integrated solution has been key to transforming prescribing practices, reducing clinician burnout, and preventing medication errors—setting a new benchmark for medication decision support across the country.

Eng. Al Ammar envisions a future of evidence-based medication decision-making in Saudi Arabia that builds on its past of printed formularies and pharmacists' knowledge—identifying limitations of human memory and augmenting those gaps with EHR integrations that incorporate real-time proactive decision support at the point of care. The next generation of these systems moves beyond simple rule-based alerts to solutions that improve patient outcomes through intelligent, actionable insights. Older rule-based systems brought with them the challenge of alert fatigue and poor workflow integration, burdening clinicians with non-critical notifications and overly complex interfaces. Medi-Span gets in front of these hurdles with patient-specific and context-aware alerts that consider factors including lab results, age, and renal function. It supports a positive clinician experience and improved patient care outcomes by suppressing low-value alerts and allowing for customization.



Implemented at National Medical Care Company in 2019, Medi-Span has provided rich drug interaction data covering:

- Contraindications
- Allergies
- Duplicate therapies

The result has been a 40% reduction in medication errors across the hospital network. Since implementation, National Medical Care Company has also enjoyed streamlined workflows, improved decision-making at the point of prescription, and reduced time spent on manual checks. These results exemplify a vision of healthcare transformation grounded in personalized and predictive care that aligns with healthcare transformation goals across Saudi Arabia.

Applying the potential of EMR-integrated technology

As Saudi Arabia's Healthcare Transformation Program evolves, many more opportunities to improve technology with medical decision support systems are sure to emerge across the region. [5]

Eng. Al Ammar provides advice for any leaders who want to see similar results at their organizations: "Choose a system that integrates seamlessly with your EMR, offers customizable alerts, updates regularly, and scales

Medi-Span is transforming medication decision support by delivering patient-specific alerts that cut through the noise, helping clinicians make more efficient prescribing decisions. By reducing alert fatigue, we empower healthcare providers to focus on what truly matters – improving patient outcomes.

– Eng. Ibrahim Al Ammar, Chief Information & Technology Officer, National Medical Care Company

with your organisation's needs. Most importantly, involve your clinical teams early and work with a vendor that provides strong implementation support – like Wolters Kluwer."

- Get more information about how Medi-Span supports informed medication-related decisions. Learn more:

<https://www.wolterskluwer.com/en/solutions/medi-span> 

Reference:

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5. <https://www.wolterskluwer.com/en/news/wolters-kluwer-new-uae-teamcloud-hosting-data-center>

Outstanding expertise in cardiovascular diseases

Heidelberg University Hospital, 14th among the World's Best Hospitals according to the Newsweek 2025 ranking, is renowned for its specialized clinical care across all fields of medicine. Its world-class research and teaching activities ensure continuous progress and most up-to-date patient care.



Heidelberg University Hospital

The Department of Cardiology, Angiology and Pulmonology has been regarded as a centre of innovation for cardiological research for decades. In its inpatient and outpatient clinic it offers all the latest diagnostic and therapeutic procedures for patient care. The department has 3 intensive care units including a heart failure unit, 6 wards with 155 beds and 7 operating theatres and catheterization facilities for coronary, valvular and peripheral vascular interventions.

Areas of expertise

- Cardiac catheterization procedures
- Heart muscle diseases (at Institute for Cardiomyopathies ICH.)



Cardiac MRI

- Heart valve diseases and TAVI / transcatheter aortic valve implantation
- Cardiac MRI /magnetic resonance imaging
- Cardiac CT / computed tomography

- Heart failure and heart transplantation
- Arrhythmias and pacemaker systems (HCR / Hybrid Coronary Revascularisation)
- Angiology and venous thrombosis
- Lung diseases and shortness of breath
- Cardio-oncology
- Amyloidosis

The team, led by medical director Professor Dr. med. Norbert Frey, performs more than 3,000 PCI (Percutaneous Coronary Intervention) procedures, 600 TAVI, 200 mitral and tricuspid TEER (Transcatheter Edge-to-Edge Repair), 20,000 echocardiograms and approximately 3,000 cardiac MRI scans each year.



Professor Norbert Frey, MD

- Medical Director of the Department of Cardiology, Angiology and Pulmonology at Heidelberg University Hospital
- Future president of the German Society of Cardiology
- Member of the Research Coordinating Committee of the German Center for Cardiovascular Research
- Main areas of research: Cardiomyopathies, heart failure, intensive care medicine arch.

“At our hospital, there is a close collaboration between Cardiology and Cardiovascular surgery as well as all other surgical and internal medicine departments to ensure the best personalized medical service,” explains Professor Frey.



In 2026, the Department of Cardiology, Angiology and Pulmonology, ranks 25th among the World's Best Specialized Hospitals in Cardiology.

The special significance of cMRI

Cardiovascular magnetic resonance imaging (cMRI) has undergone rapid development in recent years and plays an increasingly important role in the diagnosis, treatment planning, and risk assessment of patients with heart diseases. Due to its high spatial and temporal resolution as well as excellent tissue depiction,

cMRI allows for the excellent and accurate visualization and characterization of the composition and function of all heart and vascular components. As a non-invasive procedure that does not involve ionizing radiation (X-rays), cMRI is also an extremely safe method, allowing for multiple follow-up examinations, such as in the case of coronary heart disease. Furthermore, it offers the advantage of being able to non-invasively characterize the tissue of the heart, which would otherwise only be possible through histological analysis after biopsy.

The Department of Cardiology, Angiology and Pulmonology has been conducting cMRI examinations in Heidelberg since 2006, having performed over 40,000 examinations to date. The team has currently two modern MR devices at its disposal, dedicated exclusively to the performance of cMRIs in specially adapted facilities.

Latest expansion of services: Outpatient clinic and cardiac MRI centre

The new outpatient clinic and cardiac MRI imaging centre of Heidelberg University Hospital provides a wide range of health services and covers the diagnostics and treatment for all types of cardiovascular diseases. It brings together the expertise of all cardiology subdisciplines in order to provide the best treatment for patients. Comprehensive expertise is available for coronary heart disease, heart failure, cardio-reno-metabolic syndrome, dyslipidemias, hypertension, cardiomyopathies, arrhythmias, pacemaker and devices, angiology, pneumology, cardiac amyloidosis and sarcoidosis, myopericardial inflammatory disease, cardio-oncology and monitoring of cardiotoxicity during and after cancer therapies.

The cardiac imaging specialists provide a high level of expertise in cardiac MRI covering the entire spectrum of cardiovascular applications such as stress testing, MR angiography for aortic disease, quantitation of valvular pathologies and congenital heart defects.

Prospects: construction of a new interdisciplinary heart centre

Heidelberg University Hospital is currently expanding its capacity and building a new heart centre that will bring together interdisciplinary treatment of patients with heart disease under one roof: from emergency and intensive care medicine to imaging and joint treatment strategies for congenital heart defects, heart valve disease, arrhythmias, and the implantation of electrical support systems, as well as heart transplants.

“Cardiology is a proven medical and scientific focus at Heidelberg University Hospital. By bringing together all of our cardiology expertise in a technically outstanding “smart hospital”, we will continue to expand this focus,” elaborates Professor Dr. Dr. Jürgen Debus, Chief Medical Director and Chairman of the Board.



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Genetic testing breakthrough predicts arrhythmia and sudden cardiac death risk with unprecedented accuracy

Researchers at Northwestern University have developed a comprehensive genetic risk score that combines rare variants, common variants and non-coding DNA to predict ventricular arrhythmia and sudden cardiac death with far greater precision than current methods. The novel approach could transform clinical decision-making for implantable cardiac defibrillator placement and enable earlier intervention for at-risk individuals.

Scientists have created what they describe as a “roadmap” for genetic risk prediction in cardiac disease – a combined genomic arrhythmia propensity score (GAPS) that integrates three distinct types of genetic information to identify individuals at high risk of life-threatening heart rhythm disorders. The research, published in 18 November 2025 in *Cell Reports Medicine*, represents a significant advance in our understanding of how different genetic factors work together to influence sudden cardiac death risk.

Integrating the genetic spectrum

The study analysed whole genome sequencing data from 1,119 participants, comprising 523 cases with non-ischaemic ventricular arrhythmias and 596 controls without cardiac diagnoses. The research team, led by Dr Elizabeth McNally, director of the Centre for Genetic Medicine at Northwestern University Feinberg School of Medicine, examined genetic variation across the entire spectrum – from rare single-gene mutations to common variants identified through genome-wide association studies, and including previously overlooked regulatory regions in non-coding DNA.

“It’s a very cool approach in which we are combining rare gene variants with common gene variants and then adding in non-coding genome information,” Dr McNally explained. “To our knowledge, no one has used this comprehensive approach before, so it’s really a roadmap of how to do that.”

Current genetic testing for cardiac arrhythmias typically employs gene panels that detect pathogenic variants in known disease-causing genes. However, these panels identify

a genetic diagnosis in only 10% to 60% of cases, leaving many patients without a clear genetic explanation for their condition. The Northwestern team hypothesised that a more comprehensive approach incorporating multiple types of genetic variation could improve risk stratification.

Three complementary genetic layers

The GAPS model combines three distinct categories of genetic information. For common genetic variation, the researchers computed polygenic risk scores for 18 cardiac traits and diagnoses associated with sudden cardiac death risk, including QT interval duration, QRS duration, blood pressure, left ventricular dimensions and genetic epilepsy syndromes. These scores explained 42.5% of the variance in the final model.

The second component analysed rare coding variants in 377 genes from cardiomyopathy, arrhythmia and epilepsy gene panels. The team identified significant enrichment of protein-disrupting variants in cases, with stop-gain variants showing 7.4-fold enrichment and start-loss variants 7.5-fold enrichment compared to controls. Pathogenic or likely pathogenic variants in these genes were present in 24.1% of cases versus 6.3% of controls. This coding variant component contributed 31.1% of the model’s explanatory power.

The third and most novel element examined ultrarare variants in regulatory regions of the genome. Using heart and brain chromatin accessibility data combined with three-dimensional genome topology information, the researchers identified 4.8 million base pairs of regulatory DNA linked to the 377 target genes. Ultrarare

variants in these regions – defined as absent from the gnomAD database with cohort allele frequency below 1% – showed 1.8-fold enrichment in cases for cardiomyopathy genes and 1.7-fold enrichment for epilepsy genes.

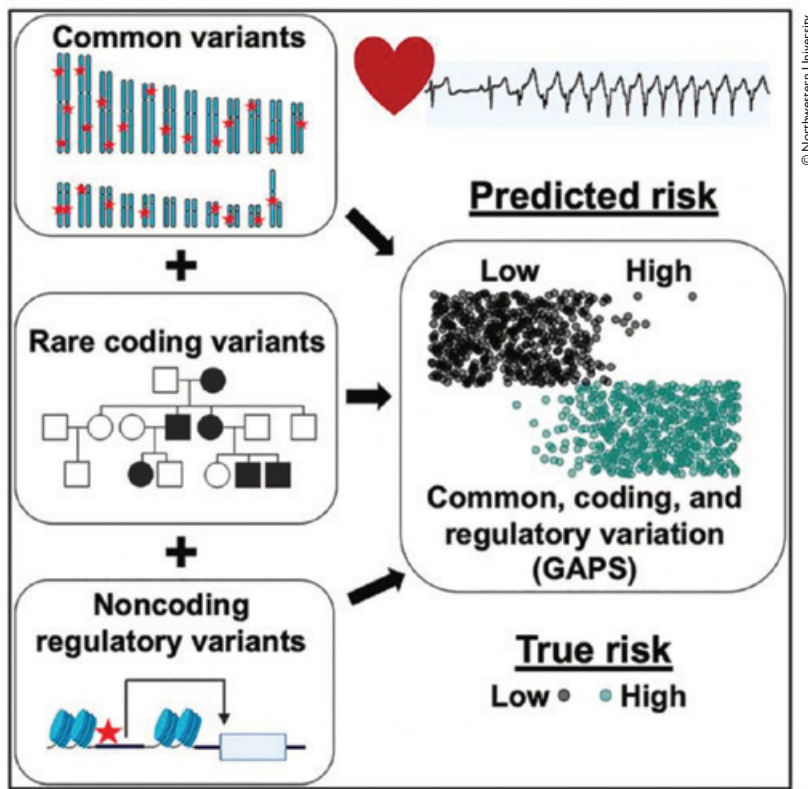
Superior predictive performance

When combined into the GAPS model, these three genetic layers demonstrated substantially improved predictive accuracy compared to any single component alone. The model achieved an area under the receiver operating characteristic curve of 0.76 in the discovery cohort and 0.87 in an independent replication cohort. Individuals in the highest GAPS quintile showed an odds ratio of 23.5 for being a case compared to the lowest quintile.

Importantly, GAPS maintained predictive value even in individuals without identified pathogenic variants. Among the 75.9% of cases lacking pathogenic or likely pathogenic variants in cardiomyopathy genes, GAPS identified high-risk individuals with 89.6% accuracy when applying a probability threshold above 70%, and 100% accuracy at thresholds above 83%.

“The biggest challenge is a workforce that isn’t trained in how to use genetic testing,” Dr McNally noted. “As polygenic risk scores become more common, our approach will become even more valuable.”

The research revealed intriguing interactions between different types of genetic variation. Cases with high coding variant scores showed significantly higher polygenic and epilepsy variant scores compared to controls with similarly high coding variant burdens. The authors wrote: “Individuals carrying high CMAR load appear at



A graphical abstract from the paper.

most risk when also carrying high PGS or epilepsy variant load.”

Identifying genetic interactions

Analysis of protein-disrupting variants across functional gene modules revealed specific high-risk combinations. Co-occurrence of variants affecting fate specification genes alongside proteostasis or cytoskeletal membrane attachment genes showed particularly strong enrichment in cases. The fate specification-proteostasis-cytoskeletal membrane attachments network demonstrated the strongest overrepresentation, suggesting these modules sensitise the heart to additional genetic insults.

The regulatory variant analysis uncovered enrichment of transcription factor binding sites related to cardiac development and fibrosis. Motifs for oestrogen-related receptor alpha, previously identified as conferring ventricular cardiomyocyte identity, showed particular enrichment. The researchers validated several regulatory regions experimentally using luciferase reporter assays in human induced pluripotent stem cell-derived cardiomyocytes. One variant in an LDB3 enhancer demonstrated seven-fold increased activity compared to the reference sequence.

Ancestry considerations

The study cohort included individuals

of diverse ancestral backgrounds: 45.5% White, 9.2% Black, 4.0% Hispanic and 1.5% Asian among cases, with controls drawn from a population biobank. The researchers performed extensive validation to assess GAPS performance across ancestries. Principal component analysis identified distinct ancestry clusters, and cross-validation using ancestry-matched subsets demonstrated robust performance.

To address potential ancestry-related biases, the team developed two correction approaches. Post-integration correction, which adjusted GAPS for the top 10 ancestry principal components after model creation, reduced the area under the curve from 0.76 to 0.68 in the discovery cohort. However, pre-integration correction – adjusting each variant class score separately before combining them – maintained superior performance with an area under the curve of 0.76 in discovery and 0.87 in replication cohorts.

Importantly, GAPS maintained significant differences between cases and controls within each ancestry cluster even after correction, with p values below 0.001 for all clusters. The highest GAPS quintile showed positive predictive odds ratios of at least 2.1 across all ancestry groups.

Clinical implications and future directions

The findings have important implications

for clinical practice. Current guidelines for implantable cardiac defibrillator placement rely primarily on clinical criteria including ejection fraction, symptom history and family history. Genetic testing plays a supporting role but identifies actionable variants in fewer than 25% of patients. GAPS could provide an additional risk stratification tool to improve patient selection for these life-saving but costly devices.

“It helps me manage that patient better, know who’s at greatest risk, and if we think the risk is really high, we’ll recommend defibrillators for patients like that,” Dr McNally explained. “Knowledge is power.”

The comprehensive approach could extend beyond cardiac arrhythmias. The authors suggest their framework “serves as a model for other complex traits” including cancer, Parkinson’s disease and autism spectrum disorder. The methodology of combining rare coding variants, common polygenic variation and regulatory non-coding variants could improve genetic risk prediction across numerous complex diseases.

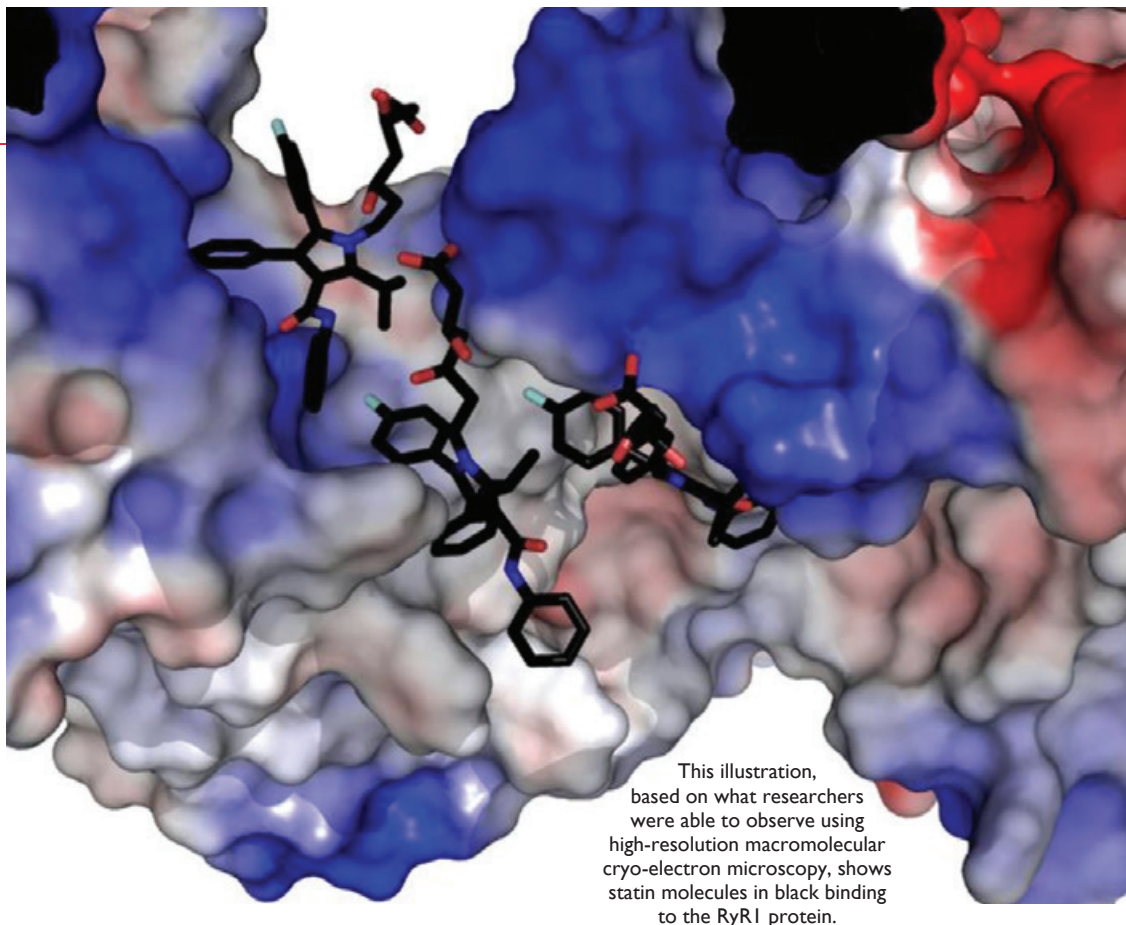
Implementation of GAPS would not necessarily require deep whole genome sequencing. The researchers note that panel sequencing could be expanded to include the approximately 5,000 kilobases of relevant regulatory regions, whilst polygenic scores can be determined using microarrays or low-coverage sequencing with imputation.

Future research should validate GAPS in larger, more diverse cohorts and in older populations. The current study focused on individuals with early-onset disease (median age 33 years in cases), which may represent an extreme phenotype enriched for genetic contributors. Whether GAPS performs similarly in older individuals with ventricular arrhythmias remains to be determined.

The study demonstrates that ventricular arrhythmia risk emerges from the cumulative burden of genetic variation across multiple genomic compartments. As the authors conclude: “This combined genomic arrhythmia propensity score (GAPS) identifies high-risk individuals even among those who lack known primary pathogenic variants.” MEH

Reference:

Monroe, T. O., Puckelwartz, M. J., Pesce, L. L., et. al. (2025). A combined genomic arrhythmia propensity score delineates cumulative risk. *Cell Reports Medicine*, 6(11), 102455. <https://doi.org/10.1016/j.xcrm.2025.102455>



Molecular mechanism revealed: How statins trigger muscle damage through calcium channel disruption

University of British Columbia researchers have used cryo-electron microscopy to demonstrate how statins directly bind to skeletal muscle calcium channels, forcing them open and causing calcium leakage. The findings explain why some patients experience muscle pain or life-threatening complications and provide a roadmap for designing safer cholesterol-lowering drugs.

Statins represent one of modern medicine's most remarkable success stories, with more than 200 million users worldwide benefiting from their cholesterol-lowering effects that reduce cardiovascular disease and stroke risk. However, a persistent clinical challenge has shadowed these widely prescribed drugs: muscle-related adverse effects ranging from mild discomfort to potentially fatal rhabdomyolysis.

Now, researchers at the University of British Columbia, collaborating with colleagues at the University of Wisconsin-Madison, have resolved a longstanding mystery about statin-induced myopathy by directly visualising how these drugs interact with skeletal muscle at the molecular level. Their findings, published on 20 November 2025 in *Nature Communications*, establish the ryanodine receptor (RyR1) as an

unintended off-target of statins and reveal an unprecedented binding mechanism that triggers calcium leakage from muscle cells.

Direct visualisation at near-atomic resolution

The research team employed cryo-electron microscopy, a powerful structural biology technique that can reveal protein structures at near-atomic detail, to capture how atorvastatin – one of the most widely prescribed statins – interacts with RyR1. This calcium channel protein acts as a gatekeeper within muscle cells, controlling the release of calcium from intracellular stores to drive muscle contraction.

"We were able to see, almost atom by atom, how statins latch onto this channel," said lead author Dr Steven Molinarolo, a postdoctoral researcher in

UBC's department of biochemistry and molecular biology. "That leak of calcium explains why some patients experience muscle pain or, in extreme cases, life-threatening complications."

The structures revealed an unusual binding pattern: three atorvastatin molecules cluster together within a cleft formed by the pseudo-voltage sensing domain of RyR1, making extensive interactions both with the protein and with each other. This represents a fundamentally different binding mode compared to the drug's intended target, the enzyme HMG-CoA reductase.

Sequential activation mechanism

The research revealed that statin binding to RyR1 proceeds through a sequential mechanism. Initially, a single atorvastatin ►

molecule can bind to the closed channel at an interface between the transmembrane domains. This binding causes subtle structural rearrangements that prime the channel for opening.

Subsequently, two additional atorvastatin molecules bind to the pseudo-voltage sensing domain, but only when the channel adopts an open conformation. These additional molecules cannot fit into the closed-state structure due to steric clashes with critical transmembrane helices. Their binding effectively wedges the channel open by pushing the S4 helix and S4-S5 linker away from neighbouring structural elements, thereby widening the pore and allowing continuous calcium leakage.

“This is the first time we’ve had a clear picture of how statins activate this channel,” said Dr Filip Van Petegem, senior author and professor at UBC’s Life Sciences Institute. “It’s a big step forward because it gives us a roadmap for designing statins that don’t interact with muscle tissue.”

The authors noted in their discussion that “multiple molecules of atorvastatin can only engage RyR1 in the open state, thus shifting the equilibrium from closed to open channels. It highlights the pVSD and adjacent area as a key region that is allosterically coupled to gating of the pore.”

Isoform selectivity provides cardiac safety

A critical finding concerns the selectivity of atorvastatin for skeletal muscle RyR1 over the cardiac isoform RyR2. Despite 66-70% sequence identity between the three human ryanodine receptor isoforms, key amino acid differences in the binding site appear to protect RyR2 from statin activation.

Specifically, RyR2 contains a phenylalanine residue at position 4820 (valine in RyR1) that would create steric clashes with bound atorvastatin, and a methionine replaces a phenylalanine at position 4564, eliminating favourable aromatic stacking interactions. These differences likely explain why cardiac arrhythmias are not commonly reported as statin side effects, despite RyR2’s critical role in cardiac muscle function.

Genetic susceptibility validated

The study provides molecular validation for clinical observations linking RyR1 mutations to statin intolerance. Several case studies have identified gain-of-function RyR1 variants in patients with statin-induced myopathy, and approximately 16% of patients with this condition carry likely pathogenic variants in *RYR1* or the related *CACNA1S* gene.

The researchers directly tested this hypothesis by examining the R615C mutation in pig RyR1, equivalent to the human R614C variant associated with malignant hyperthermia susceptibility. Cryo-electron microscopy analysis revealed that this mutant showed markedly increased sensitivity to atorvastatin, with 81% of particles adopting the open conformation compared to 64% for wild-type RyR1 under identical conditions.

This gain-of-function mutation appears to destabilise the closed state relative to the open state by disrupting interactions between structural domains, thereby enhancing sensitivity to all activating ligands, including atorvastatin.

Implications for drug design

The structural insights provide concrete guidance for developing next-generation statins with improved safety profiles. The comparison between atorvastatin binding to RyR1 and its intended target HMG-CoA reductase reveals a crucial distinction: the dihydroxy heptanoic acid moiety – essential for cholesterol-lowering activity – binds deep within the enzyme’s active site but makes minimal contacts with RyR1.

Conversely, the hydrophobic aromatic substituents of atorvastatin mediate most interactions with RyR1 through aromatic stacking and hydrophobic contacts. The fluorophenyl, phenyl and phenyl-carbamoyl groups bury substantially more surface area when bound to the muscle channel than to the enzyme.

“By adjusting only those parts of the statin molecule that are responsible for the negative effects, scientists could

preserve the part that lowers cholesterol while reducing the risk,” the researchers explained. Adding steric bulk to these aromatic moieties through chemical modification could abolish RyR1 binding through steric hindrance whilst retaining HMG-CoA reductase inhibition.

Clinical context and broader implications

Whilst severe rhabdomyolysis affects only 0.1-0.5% of statin users, observational studies suggest that 10-25% of patients report muscle-related symptoms, although this higher figure remains debated. These milder symptoms frequently lead to treatment discontinuation, undermining the cardiovascular benefits that make statins so valuable.

The research also highlights the pseudo-voltage sensing domain as an important allosteric regulatory site, reminiscent of voltage-sensing domains in voltage-gated ion channels. Previous work from the same laboratory identified diamide insecticides as also engaging this region, suggesting it represents a druggable pocket that influences channel gating through mechanisms analogous to voltage sensing.

“Statins have been a cornerstone of cardiovascular care for decades,” Dr Van Petegem said. “Our goal is to make them even safer, so patients can benefit without fear of serious side effects.”

The findings exemplify how advanced structural biology techniques can shed light on mechanisms underlying drug side effects and guide rational drug design. By revealing the molecular basis of statin-induced myopathy, this work opens pathways toward modified statins that could benefit millions of patients worldwide who currently experience muscle complications or avoid these life-saving medications altogether.

For the estimated millions who rely on statins for cardiovascular protection, such developments could mean maintaining therapeutic benefits whilst eliminating the muscle-related complications that have limited these drugs since their introduction. 

Reference:

Molinariolo, S., Valdivia, C. R., Valdivia, H. H., et al. (2025). Cryo-electron microscopy reveals sequential binding and activation of Ryanodine Receptors by statin triplets. *Nature Communications*. <https://doi.org/10.1038/s41467-025-66522-0>



Monitors all vital parameters: 12-lead ECG with ETM interpretation, SpO₂, SpMet, SpCO, SpHb, SpOC, PI, PVI, RRp, NIBP, 4 x IBP, EtCO₂ (mainstream/sidestream), 2 x temperature (oesophageal, rectal, cutaneous).

ARGUS PRO LifeCare 3 defibrillator / monitor

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To ensure its readiness for use, the device runs a self-test to check the unit and battery. This allows to keep the defibrillator always working and ready for any emergency.

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Feedback for efficient CPR

Besides the metronome feature and the FreeCPR software option, the ARGUS LifePoint 2 (optional) provides feedback on the frequency, depth, and recoil of chest compressions.

The feedback is displayed on the screen: press faster, press slower, press deeper, press shallower, CPR OK. CPR quality data may be exported for user training.

Empowering remote access

SentioWeb Live Streaming allows experienced healthcare professionals to remotely provide the team on the scene with immediate feedback. Easily view the ARGUS PRO LifeCare 3's display from a distance on a tablet thanks to the Mirroring Screen App. LifeDataNet G2 enables remote fleet management, updates, and maintenance.

Cutting-edge hardware

The ARGUS PRO LifeCare 3 features advanced ruggedness and durability. The 8"



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capacitive touch screen with high contrast can switch from colour to black and white for high sunlight conditions. The ARGUS PRO LifeCare 3 has the same connector for pads and paddles and features a 4-channel built-in printer. MED

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The spirit of excellence – Richard Wolf GmbH at WHX 2026



Richard Wolf GmbH has long been recognized for innovation, precision, and uncompromising quality in medical technology. With more than 1,800 employees, 20 international subsidiaries, and around 130 global representatives, the company combines strong local roots with a worldwide presence. Guided by its principle “the spirit of excellence,” Richard Wolf is committed to continuously setting new standards in medical technology and patient care.

At WHX 2026 in Dubai, the company will showcase cutting edge advancements in endoscopy and extracorporeal shockwave therapy. These innovations are complemented by integrated OR systems designed to enhance efficiency, safety, and reliability in the surgical environment. For Richard Wolf, innovation is not a singular achievement, but an ongoing process

shaped by close collaboration with medical professionals and decades of experience. Whether in minimally invasive procedures or complex surgeries, the company’s solutions empower healthcare providers to achieve superior outcomes.

Digital transformation plays a key role in this development. Richard Wolf’s smart networking solutions enable seamless communication between systems and teams, laying the foundation for tomorrow’s fully connected operating room. These technologies improve workflow, increase precision, support clinical teams, and optimize resource usage – key factors in meeting the demands of modern healthcare.

At booth S15.A15, visitors will also experience the strengths of the company’s specialized brands. **RIWOspine** is a pioneer in endoscopic spine surgery and minimally

invasive orthopaedics. **RIWolink** offers advanced digital workflow solutions and sets new standards for the connected OR. **Elvation Medical**, a global leader in shockwave therapy, delivers non invasive treatment systems that combine clinical effectiveness with patient comfort. Together, these brands reflect the company’s broad expertise and its role in shaping the future of medical technology.

WHX 2026 serves as a global stage for innovation, dialogue, and the exchange of ideas. Richard Wolf invites visitors to explore its latest technologies, discover future driven solutions, and engage in meaningful discussions that advance medical care worldwide. **MEH**

- For more information, visit www.richard-wolf.com.
- Visit Richard Wolf at WHX Dubai 2026, booth S15.A15.

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The Richard Wolf team welcomes you at Booth S15.A15 together with our colleagues from RIWolink, RIWOspine, and Elvation



www.richard-wolf.com



www.rivolink.com



www.rivospine.com



www.elvation.de



Transforming lives, one transplant at a time

For patients across the UAE and the wider region, the transplant waiting list represents a critical threshold between their disease and recovery. Cleveland Clinic Abu Dhabi was the UAE's first and only multi-organ transplant facility, and since its inception in 2017, the program completed 1000+ transplants performed, playing a pivotal part in transforming of lives.

In 2025 alone, Cleveland Clinic Abu Dhabi completed 242 transplants – a figure that nearly matches the total number of transplant surgeries performed over the program's first five years – highlighting an extraordinary acceleration in capacity, proficiency, and clinical experience.

With an evolving capability in tackling cases of increased complexity and leveraging robotic-assisted surgeries, the hospital made history with the Middle East's first-ever robotic lung transplant, being one of five centres globally to perform this complex lifesaving, minimally invasive procedure.

Reflecting on the achievement, **Dr. Usman Ahmad, Division Chair, Thoracic Surgery at Cleveland Clinic Abu Dhabi**, said: "Lung transplant in general and robotic lung transplant in particular requires team expertise, an ecosystem of advanced technology, and expert multidisciplinary support. The minimally invasive robotic approach helped accelerate recovery. These are complex but highly rewarding surgeries and is a proud achievement for the hospital, the UAE and the region as a whole."

In early 2025, Cleveland Clinic Abu

Dhabi also successfully performed a groundbreaking UAE-first robotic bilateral kidney transplant from a deceased donor, for a patient who had been on haemodialysis for three years prior to the surgery.

Dr. Bashir Sankari, Director of Transplant, Urology at Cleveland Clinic Abu Dhabi, said: "The bilateral kidney transplantation is a significant milestone for those with compromised organ function, improving outcomes and the patient's quality of life. Complexity for us is not a barrier, but a call for collaboration from multiple specialties to prove what is eventually possible, pushing the boundaries of medical excellence."

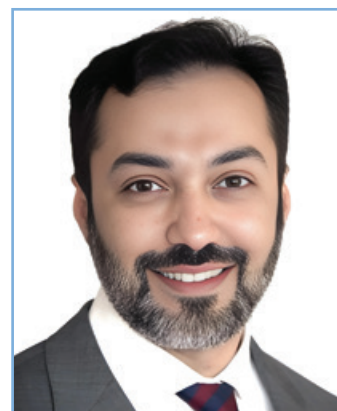
The success of all these transplant procedures is attributed to seamless coordination and multidisciplinary efforts that go beyond the operating theatre – be it pre-surgical planning, post-transplant recovery and care, surgical teams, anaesthesia, critical care – all to deliver the best possible outcomes for patients.

Most importantly, none of these life-saving transplants would be possible without the extraordinary generosity of organ donors and their families. In moments of unimaginable grief, they choose hope, turning personal loss into a second chance at life for someone else. Their selfless decisions shorten waitlists, raise survival rates, and make the impossible possible, offering families renewed futures and patients the precious gift of time.

• For more information, visit: www.clevelandclinicabudhabi.ae

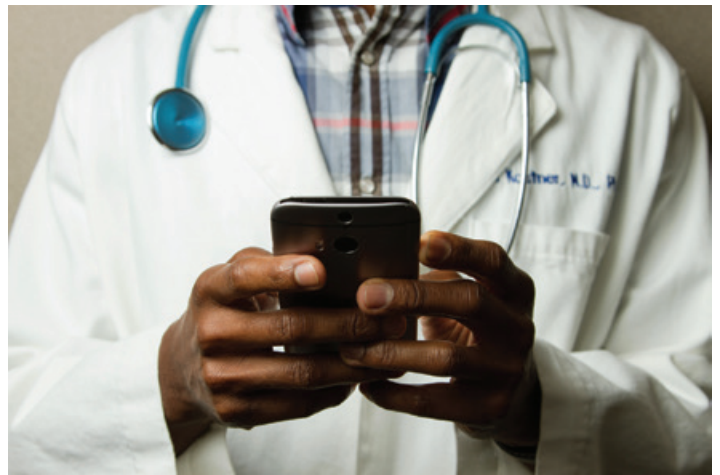


Dr. Bashir Sankari, Director of Transplant, Urology at Cleveland Clinic Abu Dhabi



Dr. Usman Ahmad, Division Chair, Thoracic Surgery at Cleveland Clinic Abu Dhabi

Synbiotix: Digitising the backbone of modern healthcare



As healthcare systems across the Middle East continue to expand and modernise, attention is increasingly turning to an often under-recognised driver of clinical excellence: facilities management. Efficient, intelligent and digitally enabled non-clinical operations are essential to patient safety, staff productivity and overall quality of care. This is where Synbiotix is making a meaningful impact.

Synbiotix is a healthcare technology company specialising in digital Total Facilities Management (TFM). Its integrated platform brings together helpdesk, task management, cleaning, maintenance, catering and audit functions into a single, real-time system designed specifically for healthcare environments. By providing operational visibility and control, Synbiotix enables hospitals to run more efficiently while supporting clinical

teams to focus on patient care.

At the core of the platform is live task management, linking every activity to defined service-level agreements. This creates measurable, auditable outcomes—an increasingly important requirement for regulators and accreditation bodies across the region. Synbiotix also incorporates real-time location systems (RTLS), enabling intelligent deployment of staff and assets, faster response times and reduced downtime.

The platform is future-ready, supporting IoT integration for monitoring environmental data such as occupancy, air quality, temperature and asset usage. These insights allow hospitals to move from reactive to proactive operations, automating routine tasks and improving infection control, sustainability and patient flow. Importantly, Synbiotix integrates seamlessly with existing hospital

systems, and finance platforms, protecting prior digital investments.

Synbiotix is already trusted by leading public and private healthcare providers, with use cases ranging from QR-code-enabled cleaning audits to bedside meal ordering and HACCP-compliant catering management. Such capabilities align closely with the Middle East's focus on smart hospitals, patient experience and operational excellence.

As Synbiotix prepares to exhibit on the UK Pavilion at WHX Dubai, its message is clear: world-class healthcare is built not only on clinical innovation, but on intelligent, data-driven operations. By reimagining facilities management, Synbiotix is helping healthcare organisations across the globe realise more – today and into the future. 

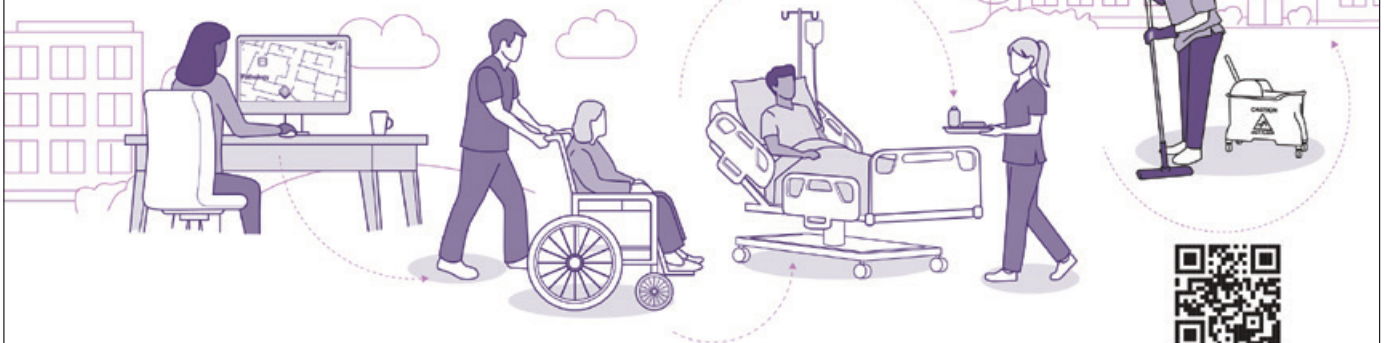
• To learn more, visit: <https://synbiotix.com/>

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The governance gap: Why world-class facilities need world-class systems

Healthcare systems worldwide are investing billions in state-of-the-art medical facilities. Gleaming towers rise. Advanced equipment arrives. Operating theatres rival anything in North America or Europe. Yet many of these facilities struggle to deliver on their promise.

The challenge is not infrastructure – it is what happens inside it. Without robust governance structures, leadership development, and quality systems to match the physical investment, a gap emerges between potential and performance. This governance gap is where diagnostic inconsistencies take root, operational inefficiencies multiply costs, and patient outcomes fall short of expectations.

Bridging the gap: From blueprint to bedside

Mayo Clinic Global Consulting works with healthcare organizations worldwide to embed operational excellence from the earliest planning stages through to clinical operations. Drawing on over 150 years of advancing medicine, we deliver actionable strategies informed by deep operational experience and a collaborative model of care.

Consider a Gulf-based health system that recently opened a new tertiary facility. Leadership recognized that world-class infrastructure required equally sophisticated governance. Through a multi-year engagement, Mayo Clinic facilitated strategic planning, delivered governance assessments, and hosted immersive visits where leaders engaged with approximately 80 Mayo Clinic experts. The results: a 2030 strategic plan finalized, new governance models implemented, and 100 staff achieving Mayo Bronze Quality Fellow certification. The institution subsequently joined the Mayo Clinic Care Network.

In Asia, a 400-bed oncology centre engaged Mayo Clinic for a model of care that could be embedded from the earliest



design phases. Sixty Mayo Clinic experts participated across two immersive visits, delivering 12 capability-building sessions. The engagement produced a phased physician workforce model aligned with the Mayo Model of Care – ensuring that when doors opened, systems were ready to match the facility.

A leading South American hospital sought differentiation through clinical excellence. Through structured assessments and a one-year visiting scholar program, the institution launched the continent's first subspecialized multiple myeloma centre – establishing a new regional benchmark and advancing research collaboration through jointly authored publications.

The integrated approach

These examples illustrate a consistent principle: complex problems require sophisticated solutions, but those solutions should ultimately simplify care and improve outcomes. For healthcare systems facing growing populations, increasing chronic disease prevalence, and the imperative to provide world-

class care while managing costs, this approach offers a pathway to sustainable transformation.

Connect with us at World Health Expo Dubai

Mayo Clinic Global Consulting will be present at the World Health Expo Dubai, where our team is ready to discuss how Mayo Clinic's proven methodologies can address your specific challenges. Whether you are planning a new facility, seeking to strengthen governance and quality programs, or building sustainable workforce capabilities, we have solutions tailored to your needs.

Take the first step today:

- Email: InternationalCollaborate@mayo.edu
- Call Mayo Clinic International: +1 507-422-5292
- Join the growing number of global healthcare leaders who have discovered that with Mayo Clinic by your side, exceptional patient care and operational excellence are complementary achievements. 

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Baxter: Redefining Healthcare Delivery with Integrated Connected Solutions

As the healthcare landscape evolves at an unprecedented pace, the need for meaningful, scalable, and patient-centric innovation has never been greater – particularly across the Middle East and Africa, where rapidly growing populations, increasing chronic disease burden, and expanding healthcare access are reshaping care delivery. At World Health Expo (WHX) 2026 in Dubai, Baxter joins global and regional healthcare leaders, clinicians, policymakers, and innovators with a shared purpose: advancing care for patients worldwide and across our region.

For Baxter, participation in WHX 2026 goes beyond presenting technologies: it reflects our legacy, long-standing commitment to this region, and our mission to save and sustain lives.

“At Baxter, innovation is not about technology alone – it is about enabling better care for patients and better experiences for clinicians every day,” said Beata Karasinska, General Manager for Central Eastern Europe, Middle East & Africa at Baxter. “Our presence at WHX underscores our commitment to partnering with the healthcare community to co-create solutions that improve outcomes, strengthen health systems, and advance our mission.”

Driven by a vision to redefine how healthcare is delivered, Baxter is present wherever healthcare happens – today and into the future – offering essential solutions

Baxter: Redefining healthcare delivery with integrated connected solutions across hospitals, physician offices, and other care sites. The company’s innovation strategy is anchored in the realities of patient care within diverse health systems in the Middle East, Africa, and beyond. Baxter’s comprehensive portfolio spans the entire continuum of care, including critical care, nutrition, anesthesia, and surgery. These offerings support clinicians in enhancing outcomes, improving efficiency, and reducing complexity, especially in demanding healthcare environments.

From advanced infusion and patient monitoring technologies to parenteral nutrition solutions and digital platforms, our offerings are designed as integrated solutions that fit seamlessly into real clinical workflows. Increasingly, this means moving beyond stand-alone devices toward a more connected, intelligent ecosystem that unifies devices, systems, and data.

Through this Connected Care approach, Baxter helps enable seamless information flow from the bedside to care teams and hospital systems – supporting clinical decision-making, reducing manual processes, and improving visibility across therapies and patient data. This is especially critical in high-acuity environments such as intensive care units and operating rooms, where timely information and coordinated action can directly influence patient outcomes.

At WHX 2026, Baxter highlights how this holistic approach supports the region’s shift from episodic interventions toward more continuous, outcome-driven models of care – aligned with digital health and healthcare transformation strategies, and the growing emphasis on quality, efficiency, and patient experience.

Healthcare transformation in this region requires partnership. These partnerships are essential not only for technological adoption, but for building sustainable healthcare ecosystems that can meet the needs of growing populations. Across the Middle East and Africa, Baxter works closely with ministries of health, healthcare providers, partners, and societies to co-develop solutions that reflect local priorities – from expanding critical care capacity and strengthening clinical education to supporting digitization and system resilience.

As we engage with healthcare leaders in WHX this year, we do so with a firm commitment: to continue innovating responsibly, partnering meaningfully, and advancing our mission to save and sustain lives – for today’s patients and for generations to come. 

Visit the Baxter booth at WHX Dubai: N21 F30.

For more information, visit:
www.baxter.com

From diagnostics to digital transformation: How FUJIFILM is redefining healthcare innovation



In this exclusive interview, *Middle East Health* talks to **Shin Tagawa**, Managing Director of FUJIFILM Middle East & Africa, about value-driven innovation, digital transformation and FUJIFILM's expanding role in shaping healthcare across the MEA region.

Middle East Health: FUJIFILM is participating once again in WHX Dubai 2026. What is the key message you will be delivering at your booth?

■ **Shin Tagawa:** Our core message is clear and simple: FUJIFILM is a one-stop healthcare solutions partner supporting the entire patient journey.

From screening and diagnostics to treatment support, workflow optimization and digital transformation powered by AI, we bring together innovation to improve clinical outcomes, operational efficiency and sustainability. WHX Dubai provides the ideal platform to demonstrate how our broad portfolio works as a connected ecosystem rather than isolated technologies.

MEH: Can you highlight some of the new products being launched during WHX Dubai 2026?

■ **Shin Tagawa:** At WHX Dubai, we are showcasing several new and upgraded solutions across our portfolio.

One key highlight is the **Echelon Synergy Zero Helium MRI**. This groundbreaking 1.5T MRI uses direct cooling technology to eliminate the need for liquid helium – a costly and scarce resource – making MRI more sustainable, affordable and easier to install while delivering high-quality imaging with AI enhancement.

Another addition to our portfolio is the **FDR Go iQ**, a compact, quiet and highly manoeuvrable mobile X-ray system that delivers high-quality bedside imaging, combining a retractable column and smooth handling for easy navigation in tight clinical spaces with FUJIFILM's proven image quality and dose efficiency.

We are also expanding on the success of our **Ultrasound ARIETTA** series with the all-new AI-Enabled “**DeepInsight X**” series which features improved B-mode image quality of the heart, abdomen and vascular applications, newly added high quality and high frequency probes, upgraded user interface and bigger size high resolution monitor with high-contrast image quality.

Furthermore, we are debuting our cardiovascular imaging business line for the first time globally, engineered to elevate precision, safety and clinical performance for cardiac, neuro and peripheral interventions.

MEH: How does FUJIFILM differentiate itself from other healthcare technology companies?

■ **Shin Tagawa:** Our differentiation is built on three pillars: breadth of portfolio, depth of expertise and human-centric innovation.

Few companies offer such a comprehensive range of diagnostic, imaging and healthcare IT solutions under

one umbrella. Combined with our strong R&D heritage, Japanese engineering excellence and close collaboration with clinicians, we deliver solutions that are clinically relevant, operationally efficient and future ready.

For us, innovation goes beyond products. Our guiding principle “Value from Innovation” means end-to-end support, from pre-sales clinical education and solution design to training, service and long-term lifecycle partnership.

MEH: What are FUJIFILM's plans for the MEA region?

■ **Shin Tagawa:** Our MEA strategy is driven by sustainable growth and meaningful healthcare impact.

Saudi Arabia is a key growth market, where our direct presence enables closer collaboration with healthcare authorities and hospital groups, aligned with Saudi Vision 2030.

In Africa, we continue to expand our footprint with a strong focus on access to quality diagnostics and early detection, including our ongoing commitment to fighting tuberculosis through early screening programs.

The UAE remains a strategic hub and centre of excellence. A key part of our UAE strategy is the expansion of our Nura centres, including an upcoming facility in Jumeirah scheduled to open in the first half of 2026. These centres leverage our latest AI-powered screening technology to provide comprehensive cancer and lifestyle-based health screenings in under 120 minutes, reinforcing our mission to improve quality of life through the power of early detection and preventive care.

To experience the full breadth of our innovation, we invite healthcare professionals to visit the **FUJIFILM Technology Center in Dubai** for hands-on engagement with our integrated solutions. MEH

GE HealthCare's Deep Silicon detectors power next-generation photon counting CT

GE HealthCare has unveiled Photonova Spectra, a photon counting computed tomography system that harnesses GE HealthCare's proprietary Deep Silicon detector technology to deliver 8-bin energy resolution and ultra-high-definition imaging capabilities across multiple clinical specialties.

Particle physics meets clinical imaging

The technology represents a fundamental shift in CT detection methodology. Rather than converting X-rays into light before measurement, photon counting CT directly detects individual X-ray photons and measures their energy. This direct detection approach enables significantly higher spectral and spatial resolution whilst improving tissue characterisation, providing clinicians with richer diagnostic information from each scan.

"Photon counting CT is a fundamentally different approach to imaging. It can be thought of as particle physics in action," said Giuseppe Toia, MD, Assistant Professor of Radiology, Associate Section Chief of Abdominal Imaging and Intervention and Programme Director of Abdominal Imaging and Intervention Fellowship with the Department of Radiology at the University of Wisconsin School of Medicine and Public Health. "Being involved in developing and testing the Deep Silicon detector has allowed us to assess how the technology can be applied to address common issues such as improving spatial resolution and attaining accurate CT numbers."

Silicon's semiconductor properties enable precision energy measurement

The Deep Silicon detector technology exploits silicon's inherent properties as a high-performing semiconductor material. Its purity and structural consistency enable precise measurement of photon energy when X-ray photons interact with the detector material, delivering high levels of energy resolution critical for advanced image reconstruction.

The detector design reduces signal overload whilst improving energy separation, enabling the system to clearly distinguish between different materials including iodine, calcium and



fat with notable precision. This material differentiation capability supports enhanced lesion characterisation and tissue analysis across clinical applications.

The system's wide detector coverage combines with a rapid 0.23-second rotation speed to support fast acquisition and motion-free imaging, even in challenging patient scenarios where movement can compromise image quality.

Universal scanning protocol streamlines workflow

Photonova Spectra ^[1] introduces an Effortless Workflow approach with universal full fidelity scanning, enabling a single-scan protocol to replace multiple exam-specific sequences. The system provides on-demand spectral imaging for every scan, allowing clinicians to retrospectively access spectral data without requiring additional acquisitions or protocol planning.

This universal scanning approach aims to reduce protocol complexity whilst maintaining diagnostic confidence across

diverse examination types. The CT ONE operator environment incorporates automated features including Auto Positioning to standardise image acquisition across different operators and clinical settings.

Processing 50-fold data increases with accelerated computing

The photon counting architecture generates substantially more data than conventional CT systems – up to 50 times the volume compared to traditional systems.^[2] To process these expanded datasets, GE HealthCare has integrated NVIDIA's accelerated computing technology, enabling advanced reconstruction techniques that convert raw photon data into clinically actionable images.

"Accelerated computing and AI are the essential engines driving the transformation of medical imaging today, moving us from passive data capture to active, intelligent clinical workflows," said Kimberly Powell, Vice President of Healthcare at NVIDIA. "By working on the technology's development and pursuing opportunities to pair GE HealthCare's

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Deep Silicon architecture with NVIDIA's Blackwell platform in the future, we aim to unlock the full potential of spectral imaging – turning massive volumes of data into actionable insights.”

The computational infrastructure supports automated reconstruction of ultra-high-resolution spectral images on demand, eliminating the need for technologists to predict which spectral reconstructions might be clinically useful during scan acquisition.

Multi-specialty clinical capabilities

The system's design targets specific clinical challenges across medical specialties. In neurology, the technology enables visualisation of tiny anatomical structures including the inner ear whilst simultaneously differentiating between the brain's grey and white matter. For oncology applications, the Deep Silicon detectors support precise lesion quantification, with iodine mapping capabilities designed to distinguish oncological findings and monitor treatment response.

Musculoskeletal imaging benefits from

enhanced visualisation of small fractures and bone marrow oedema, supporting detailed orthopaedic assessments. In thoracic imaging, the ultra-high-definition capabilities reveal fine anatomical details with exceptional clarity. Cardiac applications leverage one-second acquisition times for rapid scanning, enabling in-stent lumen assessment, plaque characterisation and myocardial tissue evaluation.

Research applications

Beyond immediate clinical applications, the photon counting architecture and Deep Silicon detector design open research possibilities in quantitative imaging, tissue characterisation and spectral biomarker discovery. Researchers may explore clinical applications and imaging protocols that were previously constrained by conventional CT technology limitations.

References:

^[1] Photonova Spectra is 510(k)-pending with the U.S. FDA. Not CE Marked.

Not available for sale in the United States, Europe, Canada, or any other region.

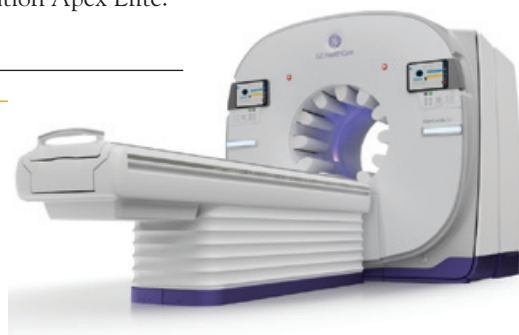
^[2] When compared to Revolution Apex Elite.

“Engineered with purpose to tackle some of healthcare's most complex challenges – Photonova Spectra represents the next generation of CT innovation,” said Roland Rott, President and CEO, Imaging, GE HealthCare. “As pioneers in AI and medical devices, we have harnessed advanced algorithms to materially enable this product – combining photon counting CT with our proprietary Deep Silicon detector.”

The technology addresses increasing patient volumes and diagnostic complexity in contemporary healthcare, where clinicians require comprehensive diagnostic information for confident decision-making whilst managing workflow efficiency.

- For more information, visit: <https://research.gehealthcare.com/in-the-device/photon-counting-ct-the-deep-silicon-revolution/>

GE HealthCare secures CE mark for StarGuide GX digital SPECT/CT system



GE HealthCare has obtained CE mark approval for its StarGuide GX system, a digital 4D SPECT/CT platform designed to expand nuclear medicine capabilities through enhanced imaging versatility and sensitivity. The technology sits at the intersection of a growing demand for precision diagnostics and theranostics applications.

Dual-sided detector technology doubles sensitivity

The system employs dual-sided cadmium zinc telluride (CZT) detector technology, achieving up to 2.67 times greater volume sensitivity compared with the NM/CT 870 DR with LEHRS collimator, as measured per NEMA NU1 2023 standards. This enhanced sensitivity operates alongside high-resolution imaging capabilities, enabling faster scan protocols whilst preserving diagnostic clarity.

“Our mission is to advance precision health by delivering technologies that meet the evolving needs of clinicians

and patients,” said Jean-Luc Procaccini, president and CEO of molecular imaging and computed tomography at GE HealthCare. “As nuclear medicine evolves to meet the demands of precision health, StarGuide GX is designed to help researchers and clinicians stay ahead, offering a whole new range of possibilities with one scanner.”

Broad energy range supports alpha emitter acquisition

A key technical feature distinguishes StarGuide GX from conventional SPECT systems: its capacity to image across virtually all energy levels, including investigational alpha emitters such as actinium-225. This capability addresses the expanding field of theranostic applications, where accurate quantitation proves essential for treatment planning and monitoring.

The system's patented dual collimator detector design eliminates manual or automated external exchanges, streamlining workflow processes. Additionally, NVIDIA RTX accelerated computing optimises

reconstruction processes, reducing image generation time.

Operational efficiency and sustainability considerations

StarGuide GX features a lead-free laser-printed collimator that supports sustainability objectives whilst contributing to image quality. The design reduces traditional collimator exchange workflows from minutes to seconds, helping departments manage increasing patient volumes with limited resources.

“Its ability to image alpha emitters and deliver accurate quantitation in short scan times could create new opportunities for clinicians to personalize treatment with great confidence,” said Erez Levy, executive director of molecular imaging at GE HealthCare.

StarGuide GX is not approved by the US FDA.

- For more information, visit: <https://www.gehealthcare.com/products/molecular-imaging/starguide>

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Oxywise: Building oxygen independence for healthcare facilities across the Middle East



In healthcare, oxygen is not a commodity – it is critical infrastructure. Every emergency admission, surgical procedure, ICU bed, and recovery ward depends on a stable, uninterrupted supply of medical-grade oxygen. Yet across the Middle East, many healthcare facilities still rely on delivered liquid oxygen or cylinders – systems that expose hospitals to cost volatility, logistical risk, and avoidable safety challenges.

Oxywise medical oxygen generators are designed to eliminate those vulnerabilities by giving hospitals full control over their oxygen supply. By producing medical-grade oxygen on site, directly from ambient air, Oxywise enables healthcare providers to move from dependence to resilience.

The reality of oxygen supply challenges in the Middle East

Healthcare facility managers in the Middle East operate in demanding conditions. High ambient temperatures increase storage losses and pressure fluctuations in liquid oxygen systems. Long or cross-border supply routes introduce delivery risks. Rapidly growing healthcare networks must accommodate fluctuating oxygen demand without compromising patient safety.

Traditional oxygen supply models struggle under these realities. Costs are unpredictable, deliveries can be delayed, and large volumes of oxygen must be stored under strict safety regulations. In some facilities, up to 15% of stored oxygen is lost due to pressure relief caused by temperature changes – wasted oxygen, wasted money, and unnecessary risk.

A strategic shift: On-site oxygen generation

Oxywise medical oxygen generators replace external dependency with on-site production. Using proven PSA (Pressure Swing Adsorption) technology, Oxywise systems deliver 93–95% medical-grade

oxygen continuously, 24/7, without reliance on third-party deliveries.

For hospital management, this translates into predictable operating costs and long-term financial control. Facilities can reduce oxygen-related expenses by up to 70%, with a standard return on investment of less than two years. Instead of recurring delivery contracts, hospitals invest in infrastructure that works every day, year after year.

What this means for hospital management

For COOs, CFOs, and facility directors, oxygen supply is a risk management issue as much as a clinical one. Oxywise systems offer:

- **Cost stability** by eliminating price fluctuations tied to delivered oxygen
- **Operational resilience** during supply disruptions or demand surges
- **Reduced storage and safety risks** by minimizing high-pressure cylinders and cryogenic tanks
- **Audit-ready compliance** through built-in monitoring and documentation

Oxygen becomes a managed utility – not a logistical headache.

What this means for clinical and biomedical teams

For clinicians and technical teams, reliability and patient safety come first. Oxywise generators are engineered specifically for hospital environments where downtime is not an option.

Built-in oxygen purity controllers continuously monitor gas quality at the outlet. If purity drifts, off-spec oxygen is automatically diverted, alarms are triggered locally and remotely, and pipelines are protected before patients are affected. This eliminates constant manual sampling and supports easier audits and preventive maintenance.

Dynamic load pressure vessels are designed to withstand millions of pressure

cycles, dramatically extending service life compared to standard vessels. Molecular sieve protection systems detect moisture early and automatically protect the generator, preventing costly damage and unplanned shutdowns.

The result: fewer emergencies, fewer late-night callouts, and more predictable maintenance planning.

Engineered for Middle East conditions

Oxywise offers medical oxygen generators in multiple configurations, including skid-mounted units, containerized oxygen plants, and integrated filling stations. Containerized systems can be specified for desert heat, humidity, or coastal environments, making them ideal for hospitals, medical cities, and remote healthcare facilities.

SIEMENS-powered control systems provide intuitive operation, automated oxygen management, and remote monitoring. Corrosion-resistant stainless steel piping ensures long-term purity and durability – critical in harsh operating conditions.

Oxygen you control, reliability you can trust

Oxywise does not position on-site oxygen generation as a backup solution, but as a smarter baseline for modern healthcare infrastructure. Supported by global service networks, certified medical compliance, and long-term maintenance programs, Oxywise systems are built for facilities that cannot afford uncertainty.

In healthcare, oxygen is the one utility you cannot outsource and hope for the best. For hospitals across the Middle East seeking cost control, resilience, and uncompromising patient safety, Oxywise delivers oxygen independence – by design.

- For more information, visit:

www.oxywise.com

Who Cares? We Do!

By supporting you, your workflows, and hygiene in the sluice room

In healthcare, caring is not a slogan – it is a daily reality. Doctors, nurses, and hygiene teams go above and beyond every day to protect patients, colleagues, and themselves. At MEIKO, we believe technology should do the same. That is why our promise is simple and clear: we care about people, about processes, and about hygiene – especially in areas that are often overlooked, yet absolutely critical: the sluice room.



Planning with MEIKO – for optimised processes in the sluice room

That's why MEIKO not only offers cleaning and disinfecting devices for care utensils, but a holistic, future-proof approach to infection control: the Clean Solution Circle. It combines innovative technology, planning expertise, effective chemicals, reliable servicing, useful instructions, and trainings into an all-round carefree package – designed to support healthcare professionals in their everyday reality.

We care where it truly counts: planning the perfect sluice room

A well-designed sluice room is the backbone of safe and efficient hygiene processes. MEIKO demonstrates how planning and technology work hand in hand. From the clear separation of clean and unclean sides to smart storage options, ergonomic workspaces, and intuitive workflows – every detail is aligned with hygienic requirements, staff needs, and future demands. The MEIKO distinctives include:

- Clean solutions, made to measure.
For refits, renovations, or new builds
- Sealed surfaces to perfectly connect the individual components
- Robust, all stainless-steel construction

We care for critical tasks: making everyday challenges safer and easier

In busy wards, every step, every movement and every second counts. That is why MEIKO develops intelligent solutions that reduce workload while minimizing exposure to contamination risks.

TopLine M2, the latest generation of MEIKO bedpan washer-disinfectors, introduces important enhancements to the market. Whether urine bottles, bedpans, or commode buckets, with the option load detection, TopLine M2 suggests the right program and starts it automatically. This saves time and reduces the risk of operator errors. In combination with the automatic door, it enables fully contactless use – a decisive advantage in preventing cross-contamination. A clear signal concept, changing from blue (ready for operation) to green (cleaning and disinfecting), further improves safety and efficiency.

MEIKO also offers solutions for isolation wards, ICUs, and private patient rooms: compact cleaning and disinfection appliances that can be wall-mounted directly above toilets, almost completely concealed within the tiled wall. This eliminates transport through corridors – and with it the risk of spillage. Instead, care utensils can be cleaned immediately after use, directly in the patient room.

We care for hygiene – wherever necessary

With the quick-change system TopCut B flexibility reaches a new level: One moment the MEIKO bedpan washer-disinfecter is cleaning and disinfecting care utensils – the next, it is cutting, emptying, and disinfecting bags of thin secretions. Switching between these tasks is easy: Simply insert the TopCut B and place the urine or secretion bag in the



TopLine M2, the first MEIKO bedpan washer-disinfecter with an assistant system

rack. The cutting starts automatically as soon as you close the door.

But: reliable hygiene goes beyond bedpans, urine bottles, and secretion bags. The TopClean 60 multi-washer ensures hygienic safety for a wide range of everyday items like surgical shoes, wash bowls, trays, vases, children's toys, and more. Whether integrated directly into wards or installed in the sluice room, TopClean 60 is a truly universal solution for both patient and staff safety.

Experience the MEIKO solutions live

- Visit us at the WHX in Dubai (booth N27.B59) and discover how MEIKO's Clean Solution Circle brings hygiene, efficiency, and safety together – exactly where it matters most. 



The power of Technogym's AI

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Technogym, the global leader in connected fitness, wellness, health, and design innovation, introduces a new era of intelligent, data-driven wellness. At the heart of this evolution lies **Technogym Checkup®**, the revolutionary assessment station that blends design, **artificial intelligence** and life science to evaluate your physical, functional and cognitive parameters.

In just a few minutes, Technogym Checkup® analyzes key personal parameters, including **strength, balance, mobility, body composition**, and **cardio performance**, calculates your **Wellness Age** – the real measure of your body's physical

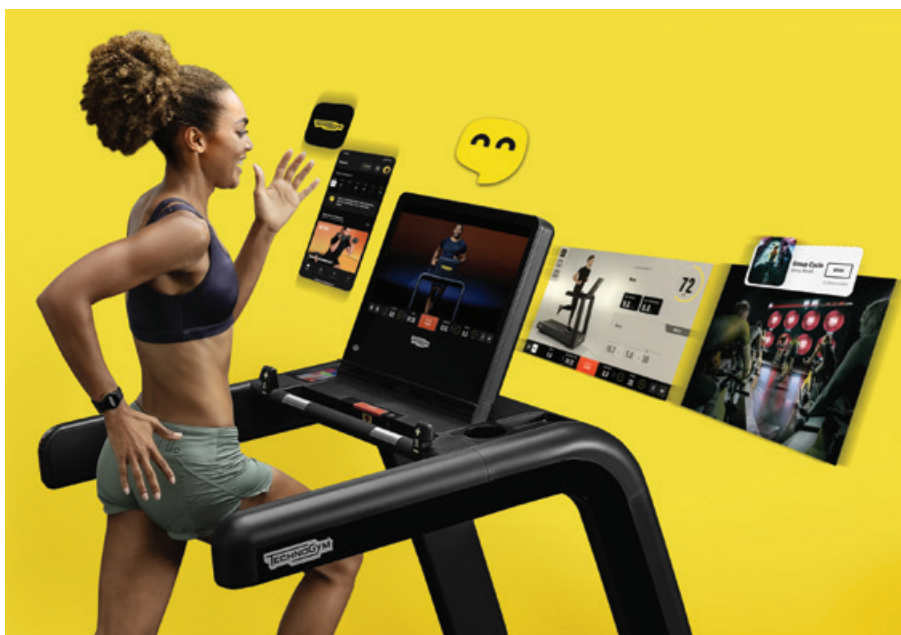
and functional health – and translate data into valuable insights about your body's true condition and capabilities.

This data flows seamlessly into the fully connected **Technogym Ecosystem**, where it becomes the foundation for your **Precision Program** – a fully personalized training plan powered by **Technogym's App AI Coach**. Based on real, measurable data and your personal goals, the program continuously adapts in real time, adjusting loads, intensity, and content as you evolve.

Through the **Technogym App**, your digital wellness companion, you can define your objectives – from losing weight to building muscle, improving performance,

or simply enhancing overall wellness. The AI integrates this input with your Checkup data to deliver the ideal combination of exercises and progressions, ensuring a unique, dynamic, and effective training experience.

Whether you're training **at the gym, at home, at the office, at the doctor or travelling**, your Technogym experience follows you everywhere, maintaining perfect consistency thanks to the seamless connectivity of the Technogym Ecosystem. Within fitness and wellness clubs, Technogym Checkup data can also be integrated into **Mywellness CRM**, empowering trainers and professionals



to monitor progress, refine programs, and coach with scientific precision – strengthening the human connection through digital intelligence.

With Technogym's connected equipment – from **Biostrength intelligent strength machines** to the brand's connected cardio solutions like Artis, Excite or Skill – every workout becomes smarter, safer, and more engaging. This smart equipment automatically adapts

resistance, guides movement, and offers real-time feedback, ensuring you train with optimal efficiency and you obtain superior **results faster**.

Discover how young your body really is – and start turning back the clock! **MEH**

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With Technogym's connected equipment – from Biostrength intelligent strength machines to the brand's connected cardio solutions like Artis, Excite or Skill – every workout becomes smarter, safer, and more engaging.

Large language models at pivotal juncture in heart diagnostics

Large language models are making significant inroads into cardiovascular imaging, demonstrating promise across cardiac magnetic resonance, coronary computed tomography angiography, echocardiography and nuclear medicine. However, researchers emphasise that whilst these AI systems show impressive capabilities in automated reporting and data extraction, critical challenges remain in multimodal integration, visual feature interpretation and clinical validation before widespread adoption becomes feasible.

The integration of artificial intelligence into cardiovascular medicine has reached a pivotal juncture, with large language models demonstrating substantial potential across the four core imaging modalities used in cardiac diagnosis. A comprehensive editorial published in *Med Research* on 3 November 2025 examines the current state and future trajectory of LLM applications in cardiovascular imaging, highlighting both promising developments and persistent limitations.

The research team, led by Weifeng Yuan and colleagues from Sichuan University and Sichuan Provincial People's Hospital, provides a systematic evaluation of how LLMs are being deployed across cardiac magnetic resonance, coronary computed tomography angiography, echocardiography and nuclear medicine imaging. Each modality presents distinct advantages and challenges for AI integration, creating differentiated application scenarios that reflect the unique technical requirements of cardiovascular diagnostics.

Cardiac magnetic resonance: precision with caveats

In cardiac magnetic resonance imaging, LLMs such as GPT-4 have demonstrated diagnostic capabilities comparable to junior radiologists in myocarditis diagnosis, though a significant performance gap persists when compared with senior experts. "The persistent gap with senior experts underscores the irreplaceable value of clinical expertise," the authors note in their analysis.

For hypertrophic cardiomyopathy specifically, specialised natural language processing systems have achieved remarkable accuracy in extracting phenotypic features from imaging reports. These systems can

identify 21 distinct characteristics, including mitral regurgitation and left atrial enlargement, with categorical accuracy exceeding 93 percent. Numerical parameters such as left ventricular ejection fraction demonstrate even higher reliability at 99 percent, surpassing manual annotation consistency.

Recent advances in visual language models have shown particular promise for risk prediction. By fusing CMR imaging data with clinical text, these systems have achieved area under the curve values of 0.89 for internal validation and 0.81 for external validation in predicting arrhythmia risk amongst hypertrophic cardiomyopathy patients. "It enables synergistic visual-text understanding whilst maintaining generalisability, fairness and explainability, serving as an effective multimodal clinical aid," the authors observe.

However, significant limitations remain. GPT-4's attempts to simplify technical terminology for patient communication have raised concerns about potential oversimplification. The translation of complex findings such as "transmural late gadolinium enhancement" to "heart scar" risks losing crucial diagnostic nuance. Furthermore, performance remains highly data-dependent, with missing imaging sequences such as T1 or T2 mapping reducing diagnostic accuracy by 7 to 21 percent.

Coronary computed tomography angiography: accuracy versus safety

In coronary computed tomography angiography, LLMs have achieved high accuracy in automated CAD-RADS scoring, with custom natural language processing pipelines processing over 30,000 reports and identifying plaques at 95 percent ac-

curacy. However, the authors highlight a critical clinical safety concern: "GPT-4o's tendency to overestimate risk could lead to unnecessary interventions, underscoring a critical clinical safety concern."

Current systems demonstrate notable weaknesses in recognising stent or coronary artery bypass grafting modifiers, failing to identify these crucial elements in 67 percent of cases. Errors escalate by 40 percent during complex report interpretation. The authors emphasise that "the absence of visual feature interpretation remains the pivotal gap, particularly regarding lipid-core plaques under 30 Hounsfield units which limits personalised risk assessment."

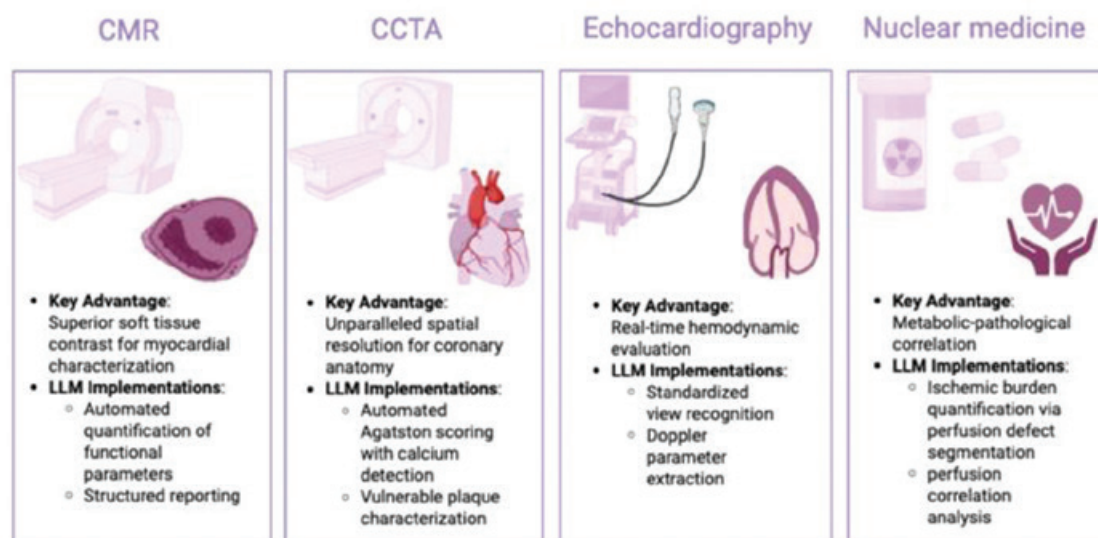
Echocardiography: workflow transformation

The echocardiography domain has witnessed perhaps the most mature LLM integration, with systems such as EchoGPT demonstrating expert-level performance in automated report generation. These specialised models leverage fine-tuned open-source architectures, including Llama-2-7B with quantised low-rank adaptation, to transform detailed "Findings" sections into concise "Impressions" with accuracy matching cardiologist-level conciseness.

Beyond summarisation, LLMs excel at structured data extraction from unstructured reports. HeartDX-LM successfully transforms free-text echocardiograms into tabular datasets suitable for clinical variables analysis. Privacy concerns have been addressed through local deployment of open-source models, eliminating cloud-based risks whilst maintaining expert-level performance in long-term temporal analysis and severity assessment.

Ensemble frameworks that unify mul-

Large Language Models in Cardiovascular Imaging



tiple LLMs through supermajority voting have demonstrated high accuracy in automating intraoperative reporting. However, temporal analysis capabilities remain underdeveloped, with models achieving only 8.2 RadGraph F1 scores for longitudinal comparisons, indicating substantial room for improvement in tracking disease progression over time.

Nuclear medicine: protocol optimisation potential

In cardiovascular nuclear medicine, LLMs such as GPT-4o have shown strong performance in protocol selection and risk stratification tasks. When evaluated using board-style examination materials, GPT-4o outperformed competing models and approached human-level diagnostic accuracy, demonstrating potential as a decision-support tool.

However, all models exhibited notable limitations in image-based interpretation, struggling with tasks requiring correlation of nuclear medicine imaging findings with clinical features. This indicates persistent challenges in multimodal understanding that must be addressed before clinical deployment. Time-stability testing revealed consistent performance across most domains, though isolated degradation in image-intensive sections underscores vulnerabilities in visual data handling.

Critical limitations and validation challenges

The authors identify three interconnect-

ed frontiers that currently limit clinical integration. Stringent data dependency degrades performance with incomplete inputs, modality isolation prevents synthesis of imaging biomarkers such as plaque vulnerability features, and the absence of standardised benchmarks perpetuates implementation uncertainties.

“Current limitations centre on three interconnected frontiers: stringent data dependency that degrades performance with incomplete inputs exemplified by missing T1/T2 mapping sequences reducing diagnostic accuracy by 7–21 percent, modality isolation preventing synthesis of imaging biomarkers such as plaque vulnerability features,” the authors state.

Their paper emphasises that evaluation reliability, interoperability and error management remain significant hurdles. Ethical risks associated with patient data privacy, algorithmic bias and lack of transparency require rigorous frameworks incorporating advanced de-identification techniques with data provenance tracking, real-time uncertainty quantification to manage diagnostic errors, and algorithmic transparency standards.

Future directions: integration and standardisation

Looking forward, the authors outline a roadmap for advancing LLM integration across cardiovascular imaging. “The integration of LLMs across cardiovascular imaging modalities promises transformative advancements, contingent upon over-

coming significant technical and ethical hurdles,” they write.

Key developments include evolution of LLMs in nuclear medicine to provide comprehensive interpretation of quantitative perfusion data by synergising with deep learning systems, application in cardiac magnetic resonance for automated tissue characterisation correlating fibrosis patterns with functional parameters, and fusion of anatomical plaque assessment with clinical risk prediction in coronary computed tomography angiography to enable personalised protocol optimisation.

For echocardiography, future implementations will leverage LLMs for real-time procedural guidance through dynamic interpretation of Doppler flow patterns, utilising federated learning to ensure data privacy. “Realising this potential mandates the creation of harmonised multimodal datasets and robust validation pathways incorporating clinician-in-the-loop benchmarking,” the authors emphasise.

The pace of adoption ultimately depends on resolving technical barriers in multimodal data fusion and interoperability whilst simultaneously addressing ethical considerations through collaborative efforts to establish standardised clinically-grounded validation protocols. The authors conclude that whilst LLMs represent powerful tools for enhancing cardiovascular imaging workflows, their successful integration requires careful attention to validation, safety and clinical oversight. MEH

Reference:

Yuan, W., Xu, R., Peng, S., et. al. (2025). Large Language Models in Cardiovascular Imaging: Current Applications and Future Prospects. *Med Research*, 00, 1-4. <https://doi.org/10.1002/mdr2.70042>

Interview

How Dataflow Group is revolutionizing healthcare growth through trusted credentials and secure talent movement

In conversation with Rafi Hattar, Chief Commercial Officer at Dataflow Group

As healthcare systems across the Globe continue their rapid evolution, ensuring that medical professionals possess legitimate, verified credentials has become paramount. **Rafi Hattar**, Chief Commercial Officer at Dataflow Group, shares insights into how his organization is transforming trust and mobility in healthcare across the region.

Middle East Health: Rafi, can you tell us about Dataflow Group's role in the healthcare sector?

■ **Rafi Hattar:** Dataflow Group serves as a trusted Government partner, delivering verification solutions across borders with the Latest Technology Available that grants the best experience to practitioners and regulators. Healthcare operates on trust – trust that demands rigorous credential verification. As global healthcare professional mobility surges to address talent shortages, it also opens doors to credential fraud. We empower governments, regulators, healthcare enterprises, and individual professionals to navigate cross-border workforce migration with confidence. As the world's trusted verification provider, we guide healthcare professionals through their entire career journey. Our accessible, practitioner centric ecosystem transforms credentials into universally recognized, verified professional assets across more than 195 countries. A single unqualified practitioner can jeopardize patient safety and institutional reputation – our verification processes eliminate these risks, ensuring seamless global talent movement and enabling healthcare professionals to pursue opportunities worldwide.

MEH: What makes Dataflow Group unique in today's healthcare landscape?

■ We position ourselves as the perfect government partner, providing digital, tech-driven solutions that span cross-geographies. The healthcare industry operates on trust, but that trust must be backed by rigorous verification. We're witnessing unprecedented mobility of healthcare professionals globally, which addresses talent shortages but also creates opportunities for credential fraud. As the world's trusted verification solutions provider, we deliver solutions that empower governments, businesses, and individual healthcare professionals to navigate cross-border workforce migration with confidence. A single unqualified practitioner can compromise patient safety and damage institutional reputation – our verification processes eliminate these risks across more than 195 countries.

MEH: How does Dataflow Group's verification ecosystem work?

■ We've developed a comprehensive approach that goes directly to the source through primary source verification – the gold standard in credential authentication. Rather than accepting documents at face value, we verify credentials di-



Rafi Hattar, Chief Commercial Officer at Dataflow Group

rectly with issuing institutions including universities, medical boards, licensing authorities, and previous employers. Our platform integrates seamlessly with regulatory authorities across the GCC and Middle East, including health ministries and medical councils. What sets us apart is our practitioner centric approach – we're not just processing documents, we're supporting healthcare professionals' career journeys while providing governments and regulatory bodies with the confidence

they need to attract global medical talent and helping healthcare businesses solidify their confidence in their workforce.

MEH: What solutions does Dataflow Group offer specifically for healthcare organizations?

■ We provide tech-driven solutions purpose-built end-to-end for healthcare organizations. Our core services include educational qualification verification, professional license validation, employment history verification, as well as many layers of rigorous verifications, all through primary source verification, the gold standard. We verify credentials directly with issuing institutions including universities, medical boards, licensing authorities, and previous employers, with seamless integration across regulatory authorities in the GCC and Middle East. For regulatory bodies and ministries of health, we serve as their trusted collaborator in processing applications efficiently while maintaining the highest verification standards. For large healthcare groups, our proprietary platform delivers real-time tracking, comprehensive reporting, full audit trails, and continuous monitoring that alerts institutions to any changes in license status or disciplinary actions. What sets us apart is our practitioner centric approach – we're supporting healthcare professionals' career journeys and providing governments confidence to attract global medical talent and helping healthcare businesses build workforce trust.

MEH: How is technology shaping Dataflow Group's solutions?

■ We remain committed to embracing emerging technologies and staying ahead of current technology trends, continuously enhancing the experience for both our corporate clients and individual healthcare professionals throughout their journey. As Technology enhances our core strength – the trusted relationships we've built with institutions, universities, and hospitals worldwide. Our digital platforms provide transparency, speed, and real-time updates, designed to amplify efficiency while preserving human expertise. We leverage secure data exchange protocols,

blockchain-ready infrastructure, and AI-powered document analysis to streamline routine tasks, allowing our team to focus on working on in-depth analysis and information exchange with issuing bodies.

Our verification process is underpinned by long-established relationships with the issuing authorities – a network that complements our technological tools. While healthcare institutions and professionals benefit from intuitive digital portals and certificates, the precision and confidence in our service are rooted in our global institutional partnerships. We function as a critical link, leveraging technology to streamline processes while ensuring that proven talent is connected with meaningful opportunities through trusted collaboration.

MEH: What impact has Dataflow Group made on healthcare quality in the region?

■ Over two decades, we've verified credentials for millions of healthcare professionals across the Middle East and globally. By ensuring only qualified, legitimate professionals enter the healthcare workforce, we've contributed to maintaining and elevating clinical standards region-wide. Our partnerships with governments, ministries of health, and medical councils have positioned us as their trusted partner in attracting global medical talent while establishing verification best practices that protect patients. We serve as a trusted Destination to healthcare professionals, supporting their career mobility, while equipping governments and official bodies with the confidence they need in their healthcare workforce. Beyond being a service provider, we're a catalyst for building trusted healthcare systems that facilitate talent movement the right way.

MEH: What's the vision for Dataflow Group moving forward?

■ Our focus remains on leveraging digital, tech, and AI-driven innovations to make verification faster, more secure, and more accessible globally. We're expanding our network of verification sources and strengthening our ecosystem to better serve healthcare professionals, regulatory bodies, and healthcare enterprises. As

We're witnessing unprecedented mobility of healthcare professionals globally, which addresses talent shortages but also creates opportunities for credential fraud. As the world's trusted verification solutions provider, we deliver solutions that empower governments, businesses, and individual healthcare professionals to navigate cross-border workforce migration with confidence.

– Rafi Hattar

the Middle East positions itself as a global healthcare destination, Dataflow Group will continue as the right-hand partner to governments and regulators, ensuring that excellence in credentials matches excellence in care delivery. 

For Every Question, Every Fear, and Every Hope: A Commitment to Women's Breast Health at NMC Royal Hospital, DIP



A breast health concern can change how a woman sees her world in an instant. In those moments, access to timely care, clear guidance, and genuine compassion becomes essential. At NMC Royal Hospital, Dubai Investment Park, the Breast Care Clinic extends beyond diagnosis and treatment, it is about creating a supportive space where women feel heard, reassured, and confidently guided through each stage of care.

At NMC Royal Hospital, Dubai Investment Park (DIP), the Breast Care Clinic is dedicated to supporting women at every stage of their breast health journey, from routine screening and early detection to diagnosis, treatment, and ongoing care all under one roof.

The Breast Care Clinic follows a multidisciplinary model, bringing together experienced breast surgeons, breast radiologists, oncologists, plastic surgeons, and specialised nursing teams. This collaborative approach ensures that each patient benefits from collective clinical expertise and well-coordinated care planning. By streamlining services under one roof, the clinic enables timely decision-making while maintaining continuity of care throughout the patient journey.

Early detection remains a key priority of the clinic. Regular screening and prompt evaluation are encouraged, particularly for women with risk factors or a family history of breast conditions. With access to advanced diagnostic imaging and assessment services, the clinic supports accurate identification of breast abnormalities at an early stage, helping

to improve clinical outcomes and reduce uncertainty for patients.

For individuals requiring further investigation, the clinic offers structured diagnostic pathways that combine precision with patient comfort. Detailed imaging assessments and minimally invasive diagnostic procedures are conducted with careful attention to accuracy, efficiency, and clear communication. Patients are supported at every step, ensuring they fully understand their diagnosis and the available care options.

When treatment is required, personalised care plans are developed through multidisciplinary discussions. Treatment strategies are tailored to each patient's clinical needs and personal circumstances, with an emphasis on both medical effectiveness and quality of life. Surgical and non-surgical options are considered thoughtfully, ensuring care decisions are aligned with long-term wellbeing.

Beyond clinical treatment, the Breast Care Clinic places strong emphasis on compassionate patient engagement. Breast health concerns can be emotionally challenging, and the clinic prioritises empathy, education, and reassurance as part of the care process. Patients and their families receive clear guidance and ongoing support, helping them navigate each phase of care with confidence and trust.

Commenting on the hospital's approach, Dr. Nihas Salins, Hospital Director of NMC DIP Cluster, said: "Our focus is on delivering coordinated, compassionate care that supports early detection and personalised treatment. By bringing



Dr Afaf Sahraoui – Consultant Breast, Thyroid & Parathyroid Surgeon (left) and Dr Shaista Meraj – Consultant Breast Radiologist, Breast Care Clinic, NMC Royal Hospital, DIP.

multidisciplinary expertise together, we aim to provide clarity, confidence, and continuity for every patient who entrusts us with their care."

Located within a modern healthcare environment, NMC Royal Hospital, DIP supports the Breast Care Clinic with advanced infrastructure, internationally aligned clinical standards, and a strong commitment to patient safety and quality. Convenient access and a supportive care setting further enhance the patient experience.

Through a combination of early detection, integrated expertise, and patient-centred care, the Breast Care Clinic at NMC Royal Hospital, DIP continues to strengthen its role in supporting women's breast health across the community. NMC

Breaking the medication silos: Why visibility is the new currency in hospital pharmacy

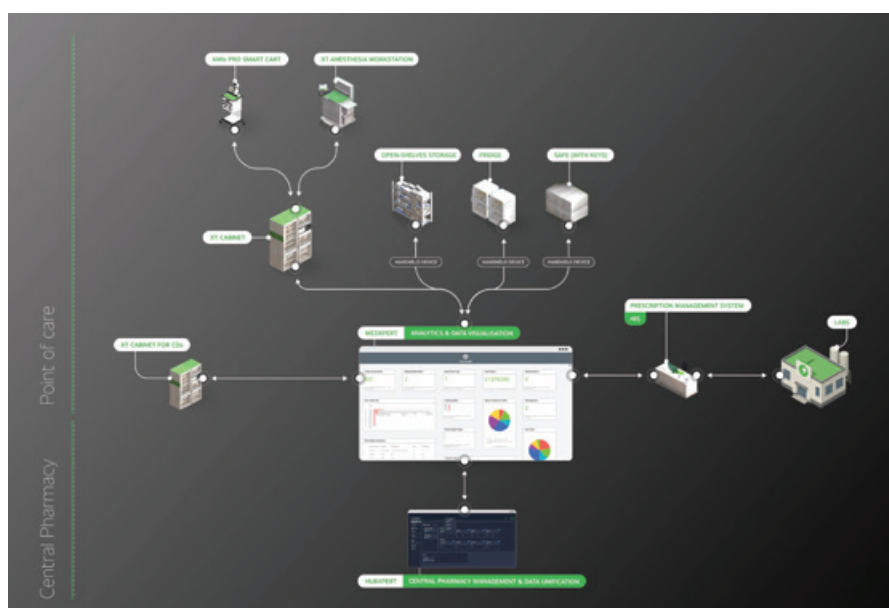
Across today's hospitals, medication workflows are more complex than ever. Medications and controlled drugs move continuously between central pharmacies, wards, cabinets, open shelving, and bedside administration. Yet in many organisations, visibility into this journey remains fragmented, spread across disconnected systems, manual registers, and delayed reports. The result is familiar, excess stock, expired medications, last-minute stock-outs, administrative burden on clinical teams, and limited confidence in data.

True transformation begins with visibility, and this is precisely where MedXpert from Omnicell is redefining medication management across the Middle East.

Healthcare systems in the Middle East are expanding rapidly, often across multiple sites and care settings, while operating under increasing expectations for governance, compliance, and efficiency. In this environment, medication management can no longer rely on isolated systems or retrospective reporting. It must evolve into a connected, intelligence-driven capability that provides real-time insight into inventory, usage, and risk across the entire hospital ecosystem.

MedXpert was designed to meet this challenge. By centralising medication and Controlled Drug data into a single analytics platform, MedXpert delivers end-to-end visibility across central pharmacy, wards, and points of care. Data from automated cabinets, open shelving, and hybrid environments is unified and presented through clear, actionable dashboards. This enables pharmacy leaders to anticipate demand, optimise stock levels, and reduce waste, while clinical teams gain confidence that medications are available when and where they are needed. For hospital leadership, MedXpert provides transparency that supports informed decision-making and consistent governance.

Controlled Drug management is one of the most critical areas where MedXpert delivers immediate impact. Traditional



paper-based registers and manual reconciliation processes are difficult to sustain, particularly across large or multi-site hospitals. MedXpert enables fully digital audit trails that capture the what, who, when, and where of every Controlled Drug transaction. This strengthens compliance, accelerates investigations, and reinforces chain of custody from central pharmacy through to ward level, without increasing the administrative workload for frontline staff.

Beyond visibility and compliance, MedXpert is built to turn data into sustained operational improvement. The platform combines digital intelligence with access to clinical expertise, supporting hospitals in interpreting their data rather than simply reviewing reports. By establishing clear baselines and identifying optimisation opportunities, organisations can prioritise high-impact areas such as excess inventory, stock-outs, expired medications, and Controlled Drug dispensing practices. This ensures that insight leads to measurable outcomes rather than static dashboards.

Flexibility is a defining strength of MedXpert, particularly in the Middle East context. Medication inventory does not exist solely within automated

environments. Open shelving, shared devices, and hybrid workflows remain part of daily operations across many hospitals. MedXpert is designed to adapt to these realities, delivering consistent visibility across both automated and non-automated areas while aligning with local workflows and regulatory requirements.

When medication and supply data are unified through MedXpert into a single analytics command centre, hospitals move beyond reactive firefighting. Inventory optimisation becomes continuous rather than episodic. Governance becomes embedded rather than enforced. Clinical teams regain valuable time to focus on patient care, supported by systems that operate quietly in the background to ensure safety, traceability, and efficiency.

As healthcare systems across the Middle East continue their transformation journeys, MedXpert is setting a new standard for medication management. Visibility drives accountability. Traceability builds trust. And when digital intelligence is combined with human expertise, healthcare leaders are empowered to move confidently from data to decisions, and from decisions to better outcomes, supported by Omnicell. MHE

Pharmaceutical Press shares the most common types of medication errors



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What are medication errors?

A medication error is defined as: Any preventable event that causes or leads to inappropriate medication use or patient harm while the medication is under the control of a health professional, patient or consumer.

Medication errors occur frequently in health systems around the world, and according to the World Health Organization (WHO), nearly 50% of preventable harm to patients globally is due to inappropriate use of medicines and other treatments. A quarter of this preventable harm can be severe or even life-threatening.

Fortunately, with greater awareness of the scale of the problem, there is now a focus on ensuring a culture of safety in health systems. With the right education, policies, prescribing tools, and reporting and learning systems, errors can be minimised and patients protected.

What are the most common types of medication errors?

Medication errors can occur at any stage in the medicines use process. It is challenging to identify and quantify the most common types of medication errors, as research evidence is limited, and many go unnoticed or unreported. However, the literature suggests that prescribing, administration, and monitoring errors are the most frequent.

Administration errors

Administration errors may include using the incorrect route of administration, giving the drug to the wrong patient, or using the wrong dose or administration rate. The worldwide prevalence of these is around 22%, according to a WHO systematic review.

Prescribing errors

Prescribing errors account for a high proportion of all medication errors, with the WHO suggesting the error rate may be as high as 53%.

These errors can happen at any part of the prescribing process and include irrational, inappropriate or ineffective prescribing, under and over-prescribing, and medicines that are omitted or delayed.

Preventing medication errors

Preventable errors can occur for any number of reasons, from illegible prescriptions, incomplete patient records with regard to information on co-prescribed medications, previous response to therapy, and allergy status, to incorrect drug or dose selection and drugs with similar looking or sounding names. With so many contributing factors, there is no one size fits all solution. Rather, tailored approaches to understanding and mitigating the risks are required. Improved systems can help reduce error rates, such as electronic prescribing and automated dispensing.

Reporting all drug errors and near misses, regardless of whether the patient came to

harm, and having processes to investigate and analyse the data is crucial. It is only by building the baseline evidence that health systems can better understand how errors occur, and how to prevent them.

“Use of medicines has increased because of increased adherence to disease-based guidance. The increase in use also results, however, in increased hazards, errors, and adverse events associated with medicines, which can be reduced or even prevented by improving the systems and practice of medication,” according to WHO, Medication Without Harm, 2023.

A culture of safety in the health system is necessary to ensure medication safety. With the necessary education, support, and tools, individual health professionals can do much to ensure safe practice.

MedicinesComplete

MedicinesComplete brings regularly updated medicines information, and expert guidance on the use and administration of drugs together in one place, helping health professionals to use medicines safely and avoid medication errors. 

Discover how MedicinesComplete supports health professionals in confident decision-making at the point of need here at PharmaceuticalPress.com or meet Matt Orzlowski on the ABHI pavilion at WHX Dubai.

Simplicity, reliability and transformation:

How CONSIS automation supports the GCC's pharmacy future

Across the Gulf Cooperation Council (GCC), pharmacy practice is entering a decisive stage of transformation. As national healthcare systems expand and digitalise under long-term strategies such as Saudi Arabia's Vision 2030 and related initiatives in the UAE, Oman, Kuwait and Bahrain, pharmacies are under pressure to deliver safer, faster and more consistent services. The challenge is clear: how to meet rising demand without adding operational complexity.

In this evolving landscape, automation plays a central role. Yet not all automation is equal. The most successful technologies are those that simplify work rather than complicate it. This principle defines the CONSIS family of automated dispensing solutions from Gebr. Willach GmbH. Designed for speed, reliability and ease of use, CONSIS systems provide an alternative to large, highly complex robotic platforms that require significant technical support. They deliver the same benefits—accuracy, efficiency and workflow optimisation—while remaining straightforward to operate and maintain.

A modular family designed for real-world pharmacy needs

The CONSIS portfolio consists of three modular product lines—CONSIS B, D and H—each tailored to specific pharmacy requirements:

- “CONSIS B”: A compact entry-level system ideal for community pharmacies or low-to-mid volume outpatient departments.
- “CONSIS D”: Higher-volume dispensing for pharmacies ready to scale and keeping the simplicity in forefront.
- “CONSIS H”: Designed for hospital outpatient environments requiring high-volume, continuous dispensing and simultaneously loading performance.

Despite their differences, all CONSIS modules share key qualities: fast stocking, minimal training requirements, seamless integration into existing workflows, and a simple, user-friendly interface. Pharmacists often highlight that they can begin working with CONSIS systems almost immediately—without the lengthy learning curve typical of more complex automation.

A decade of proven success in GCC hospitals

What truly distinguishes CONSIS systems in the Middle East is their long-term reliability. Several of the region's leading



Automatic dispensing with a CONSIS H robot with automated product loading from Willach Pharmacy Solutions

healthcare institutions have trusted CONSIS automation for many years.

For example: reference projects include installations at Johns Hopkins Aramco Healthcare (JHAH) in Dhahran/Al-Khobar, Saudi Arabia; Jaber Al Ahmad Hospital in Kuwait; American Mission Hospital in Bahrain; Al Dawaa Pharmacy at King Saud Medical City in Riyadh, Saudi Arabia; Medical City for Military and Security Services in Muscat, Oman and other institutions across the GCC.

These installations operate under the toughest real-world conditions: high prescription volumes, diverse patient populations, multilingual staff, and the need for uninterrupted service. Their continued operation demonstrates both the scalability and long-term dependability of the CONSIS family.

Supporting GCC vision strategies and healthcare growth

The pharmacy sector in the GCC is expanding rapidly. Urbanisation, ageing populations, and increased chronic disease prevalence are driving demand for efficient medication management. At the same time, national transformation programmes emphasise digital health, operational excellence and patient experience.

CONSIS systems support these goals by:

- Reducing dispensing errors and increasing accuracy



Pharmacy automation should simplify operations—not replace them with new layers of complexity.

- Accelerating prescription turnaround
- Optimising inventory and reducing wastage
- Allowing pharmacists to shift from manual tasks to clinical roles
- Enabling scalable service expansion without proportional staffing increases

For healthcare leaders, the value of automation lies not only in technical features but in the ability to build a more resilient, patient-focused pharmacy service model.

Enhancing the pharmacist's role

In a region aiming to deliver world-class healthcare, simplicity becomes an advantage. Automation should empower staff, not burden them with additional layers of technology. The CONSIS B, C, D and H systems embody this philosophy, combining proven performance with user-friendly design and long-term regional trust. 

- To learn more, visit:

www.willach-pharmacy-solutions.com/ME

One Ecosystem. Three Exhibitions.

A connected value chain shaping the future of care, medical manufacturing, and rehabilitation in Southeast Asia.



Singapore will take centre stage as the region's healthcare and MedTech community comes together at Marina Bay Sands from 9–11 September 2026, where Medical Fair Asia (MFA), Medical Manufacturing Asia (MMA), and Rehacare Asia unite to form a powerful, integrated platform spanning the full healthcare value chain. From product development and manufacturing, to clinical application, rehabilitation, and long-term care, this co-located showcase brings the industry's most critical conversations and business opportunities into one destination.

Medical Fair Asia returns as Southeast Asia's leading international exhibition for medical and healthcare technologies, serving as a trusted sourcing and networking platform for hospitals, clinics, distributors, and healthcare providers. The show presents a comprehensive view of clinical equipment, diagnostics, digital health solutions, and hospital infrastructure, enabling decision-makers to explore innovations that strengthen patient care, operational efficiency, and system-wide resilience.

Running alongside, Medical Manufacturing Asia focuses on the upstream and midstream engine of the MedTech industry. The exhibition highlights materials, components, automation, precision engineering, quality systems, and production technologies that power the development and scaling of medical devices. For OEMs, engineers, and manufacturing leaders, MMA offers a dedicated environment to evaluate suppliers, compare technical capabilities, and build partnerships that support compliant, efficient, and future-ready production.

A key highlight of the 2026 edition is Rehacare Asia, a specialised platform dedicated to rehabilitation, assistive technologies, and care solutions for ageing populations and people with disabilities. Evolving from a featured segment into a full exhibition, Rehacare Asia responds to the region's growing demand for mobil-

ity solutions, digital rehabilitation tools, therapy equipment, inclusive design, and community-based care models. The platform brings together clinicians, therapists, care providers, solution developers, and policymakers focused on improving independence, access, and quality of life.

Together, the three exhibitions create an end-to-end view of the healthcare ecosystem. Visitors can move seamlessly from manufacturing technologies and components, to clinical and hospital solutions, and into rehabilitation and long-term care innovations, all within one venue. This integrated format encourages deeper engagement, more informed conversations, and stronger partnerships across traditionally separate segments of the industry.

Across the three days, participants can engage in a curated programme of conferences, forums, and education sessions led by regional and international experts. Topics will explore digital health adoption, regulatory and compliance trends, smart manufacturing, workforce development, patient-centred care, and emerging approaches to rehabilitation and assistive technologies. The programme is designed to deliver practical insights that support real-world implementation, not just high-level discussion.

For exhibitors, the co-located platform offers access to a highly targeted and di-

verse audience, including hospital leaders, procurement teams, distributors, OEMs, system integrators, therapists, care providers, and industry influencers. This creates meaningful opportunities to launch innovations, expand regional reach, and engage with decision-makers who shape purchasing strategies and long-term partnerships across Southeast Asia.

As healthcare systems across the region face rising demand, rapid technological change, and demographic shifts, this combined platform provides a timely space to explore solutions that improve outcomes, efficiency, and accessibility. Whether your focus is on advancing manufacturing capability, upgrading clinical infrastructure, or redefining rehabilitation and care, this is where the region's healthcare community connects to shape what comes next. MFA

Join Medical Fair Asia, Medical Manufacturing Asia, and Rehacare Asia at Marina Bay Sands, Singapore, from 9–11 September 2026, and be part of a regional platform that brings innovation, manufacturing, care, and recovery together in one integrated experience.

<https://www.medicalfair-asia.com/>

What's new at WHX in Dubai

The event you know has evolved. World Health Expo now represents the full scale of global healthcare in Dubai - with everything you expect from Arab Health, plus expanded stages, conferences, and networking.



Dubai Exhibition Centre

More space, better layout, easier navigation at our new purpose-built venue in Dubai.



Three new stages

Future X, Frontiers, and Visionary stages hosting the world's leading healthcare experts.



Six CME-accredited conferences

Continuing Medical Education (CME) points at medical conferences led by renowned specialists.



Deep Dive Series

Exclusive masterclasses and bootcamps for focused, high-impact learning.



Explore new sectors

Dive into the new Life Sciences and Wellness & Prevention sectors to explore new market opportunities.



More networking opportunities

The world of healthcare meets in Dubai. Build your network with global brands and leaders.

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Content agenda

Dyne Medical Group Inc.



Forward with standards. This is our essence and approach towards life.

At Dyne Medical Group, we provide products and solutions that consider all aspects of the medical environment based on the mission and responsibility that medical professionals have towards patients. Our unwavering standard ultimately serves the goal of saving more lives and contributing to a happy life for all people everywhere.

URUS™ Ureteroscope: Designed with precision with a pioneering 6 o'clock working channel

Our flagship product, the URUS™ Ureteroscope, is a single-use, flexible ureteroscope system developed with a focus on patient safety and operational efficiency. Each device is pre-sterilized, helping to reduce the risk of cross-contamination and optimize workflow in healthcare settings.

(Certified US FDA 510(k) and Korea MFDS)

A key innovation of the URUS™ is its 6 o'clock working channel, a distinctive feature in ureteroscope design. Unlike traditional 3 o'clock or 9 o'clock channels, the 6 o'clock channel offers an improved balance of view, instrument control, and user ergonomics. This configuration enhances visibility and facilitates precise navigation, during the urological procedures.

In addition, we are introducing Port-C™, an innovative endoscope connector designed for accessory ports. Port-C™ features an adjustable range of 0 to 6 mm, allowing precise alignment of laser and basket instruments without adjusting irrigation seals. This patented product, already available in Korea, is drawing interest from surgeons and industry experts for its potential to improve procedural efficiency.



Expanding the future of urology

Leveraging our expertise, Dyne Medical Group collaborates with globally recognized partners such as EMS and Wellead to provide comprehensive solutions for kidney stone treatment. These partnerships enable us to integrate advanced technologies that support both patient outcomes and clinical workflows. MED

- For more information, visit: www.dynemedical.co.kr

MEDMIX



MEDMIX is a Korean medical & beauty technology company fully dedicated to LED Therapy research and development, expanding its expertise from medical-grade devices to advanced beauty and home-care solutions. With global regulatory approvals and a strong LED-focused technology pipeline, MEDMIX continues to innovate across both B2B and B2C markets.

treatment including skin recovery, redness reduction, inflammation relief, and wound regeneration

- Cooling-stabilized LED performance, maintaining up to 80% output even after long-term use
- Clinically supported results for erythema reduction and accelerated recovery after dermatologic procedures

SMARTLUX – Global-standard LED medical device

Backed by CE and U.S. FDA approvals, SMARTLUX is immediately eligible for distribution across all European markets and the United States, enabling clinics worldwide to adopt proven PBMT (Photobiomodulation Therapy) technology.

Key features

- Medical-grade SLD LED output with optimized optical concentration for higher therapeutic efficiency
- 4-wavelength system (Blue, Yellow, Red, NIR) supporting multi-indication

CAREVRIGHT – Intimate-area whitening & wellness LED pad

CAREVRIGHT applies MEDMIX's medical LED technology to women's daily intimate wellness. Clinical evaluation confirms its effect in improving skin brightness (whitening) in the Y-zone, along with odour reduction and itch-soothing benefits.

Key features

- Daily 20-minute routine designed for intimate-area comfort and brightening
- Verified RED + IR wavelength output for cellular activation and whitening performance



- Gentle 38-40°C thermal therapy helping ease menstrual discomfort and promote abdominal comfort
- 128 medical-grade LEDs with precise wavelength validation
- Touch-control wearable design, operable discreetly under clothing
- UV sterilizing charging dock for hygienic storage and continuous safe use

CAREVRIGHT brings medical LED expertise into everyday life, empowering women with a science-backed whitening and wellness routine. MED

- For more information, visit: www.medmix.co.kr

Medicell Healthcare



Medicell Healthcare specializes in innovative laser therapy devices designed to support the management of foot-related conditions and overall skin health. Leveraging CE-certified technology and clinical evaluation data, the company focuses on delivering non-invasive, effective, and user-friendly solutions for medical professionals and clinical environments. Its flagship laser platform is applied in the management of nail mycosis, warts, and a range of dermatological indications through precise and controlled laser application.

Mycosis Laser is a non-invasive laser system developed for the clinical management of nail mycosis. The device employs dual wavelengths (405 nm and 635 nm) to support targeted care while promoting tissue response and recovery. Treatment sessions are designed to be comfortable, typically requiring no anaesthesia and allowing minimal downtime. A built-in camera enables real-time visualization of the treatment area, assisting clinicians in accurate targeting and ongoing progress monitoring throughout the procedure.

Engineered to enhance clinical workflow efficiency, Mycosis Laser enables simultaneous treatment of both hands and feet, supporting multi-site care within a single session. Automatic light calibration stabilizes output for consistent energy delivery, while symptom- and site-based time presets help standardize clinical protocols and simplify operation. These features contribute to reproducible outcomes and a smooth learning curve for clinical staff.

The device's compact, clinic-ready design allows easy integration into dermatology, podiatry, and aesthetic practices. Intuitive controls and clear imaging enable practitioners to focus on precision and patient comfort rather than complex setup. For patients, the experience is designed to be convenient and generally well-tolerated, supporting a quick return to daily activities and encouraging adherence to the recommended course of care.



Key benefits at a glance

1. Dual-wavelength synergy (405 / 635 nm): supports targeted care and tissue response.
2. Real-time imaging: built-in camera for precise targeting and monitoring.
3. Bilateral and multi-site treatment: hands and feet addressed in a single session.
4. Automatic light calibration and timed presets: consistent delivery and streamlined operation.
5. Non-invasive, patient-centric design: comfort, safety, and practical integration into busy clinical workflows. **MEH**

• For more information, visit: <https://medicell-healthcare.com/>

CHOISTECHNOLOGY



CHOISTECHNOLOGY, a pioneering Internet of Medical Things (IoMT) company from South Korea, has been redefining innovation since 2001.

From the world's first wireless presenter X-Pointer to advanced IoMT solutions, we transform the way people connect, monitor, and care.

Today, our ThermoSafer and CMS systems bring real-time wireless monitoring to hospitals and homes – leading the future of smart healthcare with precision sensing and human-centred design.

Key product: ThermoSafer

Non-invasive wireless Core Body Temperature monitoring solution

- Continuous real-time monitoring for hospitals and home care.
- Advanced heat-flux sensing technology for medical-grade accuracy.
- Suitable for both home and hospital use.
- Compact and lightweight for comfortable long-term wear.
- Reusable main unit with disposable patch for safety and hygiene.

ThermoSafer XST600 pioneers a new era in non-invasive core temperature sensing, using proprietary heat flux modelling to deliver continuous, accurate, and stable CBT readings via wearable technology. As Core Body Temperature (CBT) gains recognition as a key diagnostic metric, most



current solutions remain limited to specialized settings due to their invasiveness, cost, and complexity. ThermoSafer offers mobile app integration and BLE 5.0 connectivity to hospital monitors, with a reusable body and disposable probe ensuring hygiene and scalability. It is suited for hospital wards, operating rooms, home monitoring of infants and elderly, and remote care of chronically ill patients. It also supports public health screening in transit hubs and large venues, and clinical research in thermoregulation. By delivering clinical-grade accuracy with affordability and ease of use, ThermoSafer democratizes CBT monitoring – empowering broader populations with vital health data and contributing to resilient, equitable healthcare systems.

- For more information, visit: <https://www.thermosafer.com>



Curaco: Redefining dignity and safety in long-term care

1. Curaco, pioneer in healthcare technology

Curaco, Inc. is a pioneering healthcare technology company from South Korea, dedicated to elevating dignity, comfort, and efficiency in long-term care environments. With a strong foundation in innovation and compassionate care, Curaco develops intelligent robotic solutions that address the rapidly growing needs of aging populations worldwide. Over the years, the company has built a solid reputation for engineering excellence and clinically verified reliability, working closely with hospitals and research institutions to advance its technologies.

2. Carebidet: Automated excretion care innovation

At the centre of Curaco's portfolio is Carebidet, an advanced excretion-care robot designed for bedridden individuals or patients unable to use the toilet independently. Carebidet provides a fully automated hygiene solution that activates immediately when urination or defecation is detected. The system delivers high-performance yet gentle suction, followed by temperature-controlled washing and warm-air drying – ensuring complete hands-free hygiene. By preventing prolonged skin contact with



waste, Carebidet significantly reduces the risks of infection, dermatitis, and pressure-related complications.

3. A revolutionary shift for caregivers

For caregivers, Carebidet introduces a transformative shift in workflow. It dramatically reduces the physical strain of repeated diaper changes and manual hygiene tasks, allowing caregivers to focus on personalized, higher-value care. Its modular design, intuitive user interface, and gender-specific modules support a customized and comfortable fit for every user. Durable engineering and real-time monitoring further ensure long-term reliability in both clinical and home-care settings.

As global demographic changes accelerate, Carebidet is increasingly recognized as a breakthrough solution – one that replaces traditional adult diapers and establishes a new standard for smart hygiene care. By restoring patient dignity and enhancing safety, Curaco is setting a powerful benchmark for the future of caregiving across North America, Europe, Asia-Pacific, and the Middle East.

- For more information, visit: www.curaco.co.kr

2L Bio

Company overview

Founded in South Korea, 2L Bio Co., Ltd. is a global manufacturer specializing in absorbable lifting threads and aesthetic medical solutions that support minimally invasive procedures. With more than a decade of production expertise and established exports to over 20 countries, the company has built a strong reputation for reliable quality and consistent clinical performance. Today, 2L Bio is recognized as a trusted partner for clinics and distributors seeking dependable manufacturing capabilities and long-term product support.

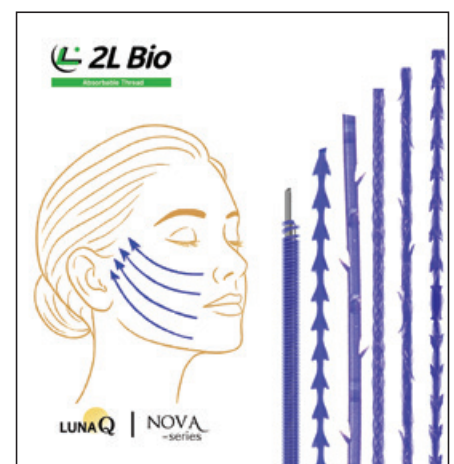
Key strengths

2L Bio's core strengths centre on its proprietary technology, certified manufacturing system, and flexible customization options. All lifting threads are produced with in-house, patent-based machinery that ensures precise fabrication and stable performance. The company complies with leading international standards – ISO 13485, GMP, CE – and

holds nine major country approvals, including certifications in India, Indonesia, and Brazil, among others. With more than 100 configurable options across PDO, PLCL, PCL, and PLLA materials, gauges, lengths, and thread structures, 2L Bio provides one of the most versatile customization ranges in the industry.

Product portfolio

2L Bio's portfolio includes a comprehensive selection of absorbable threads developed for rejuvenation, contouring, and tissue support. The LUNAQ Series features LUNAQ Mono, which promotes collagen regeneration and soft-tissue reinforcement, while LUNAQ Filling Cog and LUNAQ Mold deliver directional lifting with enhanced anchoring strength. The expanded NOVA Series introduces advanced volumizing and hybrid systems. NovaCave provides structural support, NovaMesh offers mesh-type reinforcement, and hybrid designs such as NovaCogMesh and NovaMoldMesh enhance tissue integration and contour refinement.



Global outlook

As global demand for minimally invasive aesthetic treatments grows, 2L Bio is strengthening its position as a leading innovator in Korea's medical-beauty industry through ongoing R&D investment and expanding international partnerships.

- For more information: <https://www.2lbio.com/twolbio>

2L Bio exports its products to: Indonesia, Brazil, France, Germany, Iran, Uzbekistan, Vietnam, Colombia, Malaysia, India, and more.

pixelRo Co., Ltd.

“For a Better Future”



pixelRo is a leading innovator in AI-driven health technology, developing intelligent diagnostic platforms that enhance accessibility and strengthen preventive care. With expertise in eye-health analytics, biometric sensing, and cloud-connected kiosks, pixelRo delivers reliable, user-friendly solutions for medical, public, and commercial environments. Our mission is to make advanced health screening faster, safer, and more accessible for all.

AI AgeGuard Vital+ KIOSK

The AI AgeGuard Vital+ KIOSK is an integrated self-diagnostic platform that measures blood pressure, grip strength, and real-time eye-health indicators. Equipped with distance-based vision testing, eye-tracking, face recognition, and cloud reporting, the system enables rapid, contactless screening with high accuracy.

The device is fully certified with ISO 13485 and GMP, ensuring internationally recognized standards of safety and quality. It is ideal for public health centres, schools, workplaces, retail clinics, and smart-care environments.

Mr. Hades air sterilizer

Mr. Hades is an advanced air-sterilizing system powered by a Zeus-ion module that eliminates airborne viruses, bacteria, and odours with high efficiency. Certified with CE, the device meets internationally recognized safety and performance standards. Designed for continuous and safe operation in occupied spaces, it provides powerful purification without harmful by-products. Its compact design and strong sterilization capability make it suitable for hospitals, offices, classrooms, clinics, and high-traffic public areas.



- For more information, visit: <https://pixelro.com/en/>

Healcerion Co., Ltd.

Going to meet you, wherever you are



Healcerion is a global healthcare technology innovator dedicated to advancing medical imaging through cutting-edge mobile ultrasound and next-generation AI solutions. Since our founding, we have pursued a mission to deliver high-quality, accessible diagnostics anytime and anywhere. The SONON series – lightweight, wireless devices that connect seamlessly to smartphones and tablets – has redefined mobility and usability in ultrasound imaging, enabling clinicians across hospitals, clinics, emergency departments, and remote-care environments to make faster and more confident decisions.

Continuing our commitment to innovation, Healcerion has introduced the SONON 500L, a high-performance linear probe designed for versatile point-of-care ultrasound (POCUS). The 500L provides enhanced penetration, improved image resolution, and optimized ergonomics for MSK, vascular, emergency, and primary-

care applications. It can also support supplementary uses such as cosmetic and aesthetic assessments, offering clinicians practical flexibility across a range of clinical and non-clinical scenarios. With strong wireless connectivity and multi-platform compatibility, the 500L delivers consistent performance in both advanced healthcare systems and resource-limited environments.

Looking ahead, Healcerion is preparing for the next evolution of medical AI – transitioning from server-based analysis to Physical AI, where intelligence is embedded directly into clinical workflows. As part of this vision, we are developing Dr. Sonon, an upcoming generative AI-powered ultrasound assistant designed to reduce operator dependency and enhance diagnostic accuracy. Dr. Sonon aims to provide interactive voice control for hands-free operation, real-time AI guidance, access to an integrated ultrasound



knowledge database, and automated report generation. Once introduced, it is expected to drive meaningful AI transformation in POCUS devices and expand access to high-quality diagnostics worldwide.

With a presence in more than 60 countries and a strong commitment to patient-centred innovation, Healcerion continues to elevate the standards of mobile imaging. We remain dedicated to shaping a future where every clinician can access reliable, AI-enhanced diagnostic imaging – anytime, anywhere.

- For more information, visit: www.healcerion.com



Running mate for a healthier tomorrow in Korea

The Korea Health Industry Development Institute (KHIDI) is a government-affiliated organization, under the Ministry of Health and Welfare of Korea. KHIDI carries out national affairs on the goals of fostering the domestic health industry, strengthening its international competitiveness, and consequently improving people's quality of life in order to contribute to the advancement of Korea as a global bio and digital health hub.

A consensus on the importance of the health industry has formed to build a safe and healthy society against the health risks derived from emerging infectious diseases and a super-aged society. To foster the health industry for the healthy future of our families and neighbors – this is the role and calling of KHIDI.

Turning innovation into experience, experience into trust

The Korean Medical Device Training & Education Support Centers are national platforms designed to enhance the clinical adoption and global competitiveness of Korean medical devices by providing hands-on training in real clinical environments. Through hospital-based and regional centers, healthcare professionals including residents, fellows, nurses, practicing clinicians, and international medical staff gain direct experience and practical proficiency using domestically developed medical devices in operating rooms, simulation labs, and structured training programs.

By bridging the gap between technological innovation and real-world clinical practice, the Centers play a vital role in building medical professionals' trust, improving clinical familiarity, and accelerating the market entry and utilization of Korean medical devices. The program also supports participating companies by delivering direct clinical feedback and expanding global outreach through international training initiatives.

Showcasing Korea's cutting-edge Medtech at the K-Medtech Experience Pavilion

KHIDI will participate in WHX 2026, continuing its mission to promote the global

competitiveness of Korea's advanced medical technologies. At the K-Medtech Experience Pavilion, selected Korean companies will showcase their latest innovative medical devices through live demonstrations, offering visitors hands-on access to cutting-edge solutions.

Attendees will have the opportunity to engage directly with company experts and medical professionals, gain valuable insights into product performance and clinical value, and explore how Korean medtech is shaping the future of healthcare.

We invite you to visit the KHIDI booth and experience how Korea's innovation is driving the next generation of global medical technology. 



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Engineered ‘living skin’ implant glows to signal inflammation in breakthrough biosensor study

Researchers from Tokyo City University, the University of Tokyo, RIKEN, and Canon Medical Systems have created what they term a “living sensor display” – engineered skin that acts as both a biological sensor and visual readout of internal health states. Published in *Nature Communications* on 12 January 2026, the study demonstrates a novel approach to continuous biomarker monitoring that leverages the body’s own regenerative processes.

Genetic modification enables biological sensing

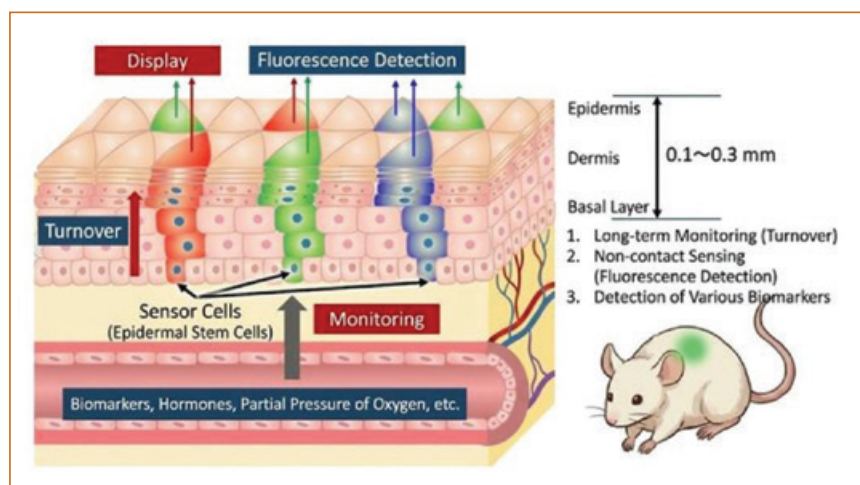
The team genetically engineered human epidermal keratinocytes, including stem cells, to express enhanced green fluorescent protein (EGFP) when exposed to tumour necrosis factor- α (TNF- α), a key inflammatory cytokine. These modified cells were used to construct tissue-engineered skin, which was then transplanted onto immunodeficient mice.

“Conventional approaches are often invasive or provide only snapshots in time,” said Distinguished Professor Hiroyuki Fujita of Tokyo City University. “Our goal was to explore a biologically integrated system that enables continuous sensing and intuitive interpretation, even at home.”

The engineered skin responded to inflammatory signals by activating the nuclear factor- κ B (NF- κ B) pathway, a critical mechanism in immune response. When TNF- α binds to cellular receptors, it triggers a cascade that ultimately leads to EGFP production, making the implanted tissue glow green under appropriate lighting.

Long-term integration mimics natural skin structure

Following transplantation, the engineered skin successfully integrated with host tissue and matured to resemble human skin architecture. Remarkably, the grafted tissue developed papillary structures characteristic of human epidermis – features absent in mouse skin. The



Japanese researchers have developed a living sensor display that turns engineered skin into a biological monitor, visually indicating internal inflammation without requiring blood sampling.

implants maintained their position and size for over 200 days, with the transgenic stem cells continuing to regenerate the epidermis through natural turnover.

“Unlike conventional devices that require power sources or periodic replacement, this system is biologically maintained by the body itself,” said Professor Shoji Takeuchi of the University of Tokyo. “In our experiments, the sensor functionality was preserved for over 200 days, as the engineered stem cells continuously regenerated the epidermis.”

Detecting inflammation through cellular responses

The researchers tested the system’s responsiveness by administering TNF- α directly and by inducing inflammation through lipopolysaccharide (LPS) injection. Direct TNF- α administration produced visible fluorescence within 24 hours, with intensity correlating to cytokine concentration. The tissue could repeatedly detect inflammatory responses, with fluorescence subsiding as inflammation resolved.

Interestingly, whilst the engineered cells did not respond directly to LPS in culture, they fluoresced when LPS was administered

to mice. This suggests the system can detect inflammation indirectly through immune cells such as macrophages, which produce TNF- α and other cytokines in response to bacterial components.

The authors noted in the paper that “this living sensor could repeatedly detect inflammatory responses induced by TNF- α and lipopolysaccharides, highlighting its potential for monitoring various physiological and pathological processes over extended periods.”

Future applications and challenges

The technology’s adaptability represents a significant advantage. By modifying the molecular targets, similar constructs could potentially respond to other physiological cues beyond inflammation, including hormones or metabolic markers.

However, several challenges remain before clinical translation. The study used immunodeficient mice, and immune responses to the engineered tissue and fluorescent proteins require evaluation in fully immunocompetent models. Questions about long-term safety, potential immunogenicity of EGFP, and societal acceptance of genetically modified implants need addressing. MEH

Reference:

Sawayama, J., Takeo, M., Takayama, Y., et. al. (2026). Living sensor display implanted on skin for long-term biomarker monitoring. *Nature Communications*, 17, 56. <https://doi.org/10.1038/s41467-025-67384-2>



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