

# Transforming Through Data

STRATEGY - IMPLEMENTATION - STANDARDS - AI - CYBERSECURITY

**European Federation for CANcer IMages – Using Technology to Improve Cancer Care**

Luis Martí-Bonmatí

**Healthcare's Digital Transformation with HIMSS: Challenges, Innovations, and the Road Ahead**

Rob Havasy

**Rookie Mistakes in AI Transition for Healthcare**

Hugues Brat

**How Change Management Activates Digital Transformation in Healthcare**

Alan Zetzelmann

José A Cano

**Accelerating Healthcare Innovation: How to Harness the Full Potential of Digital Solutions**

Thierry Godelle

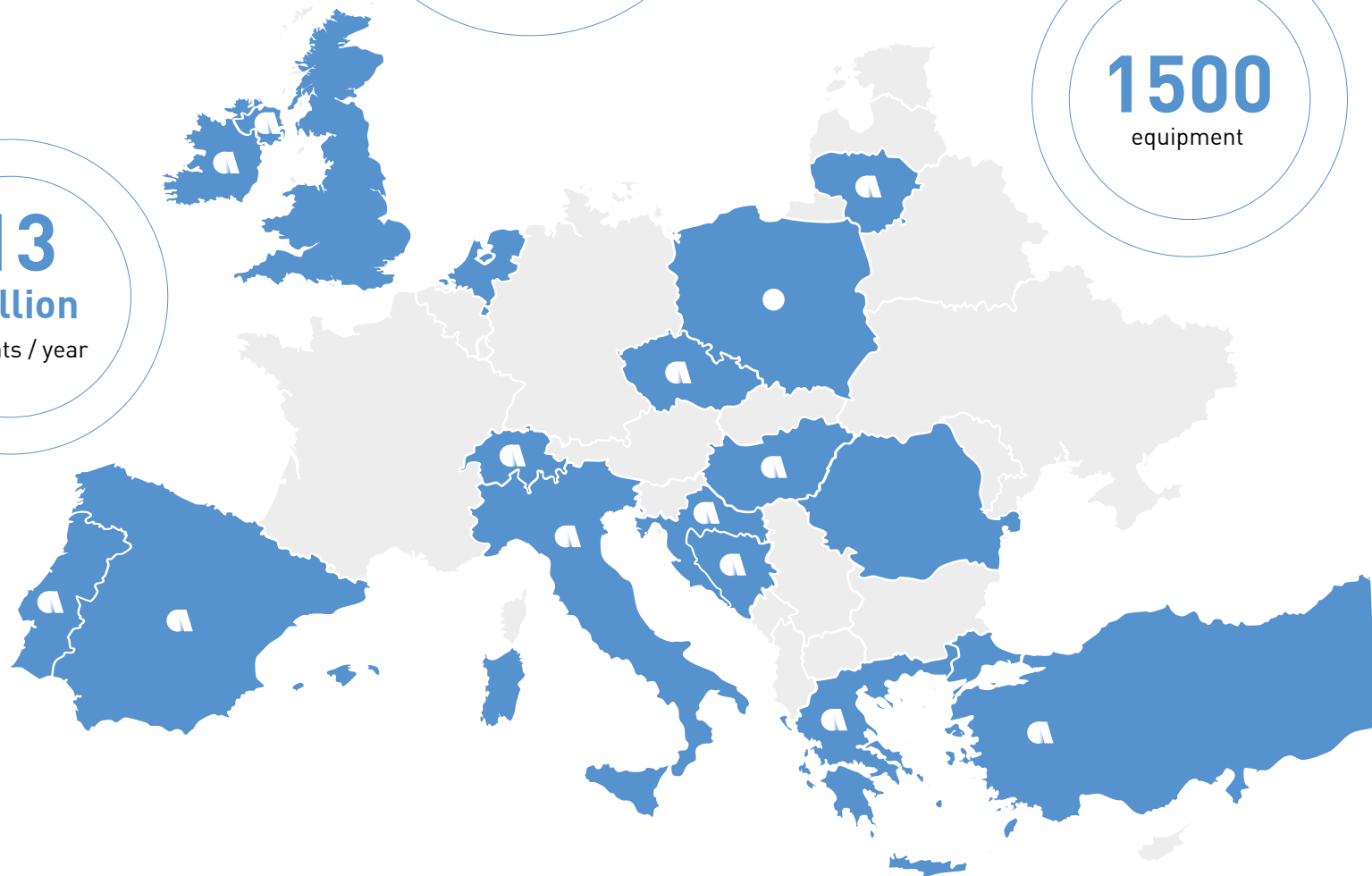
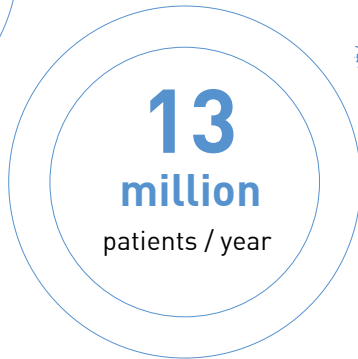
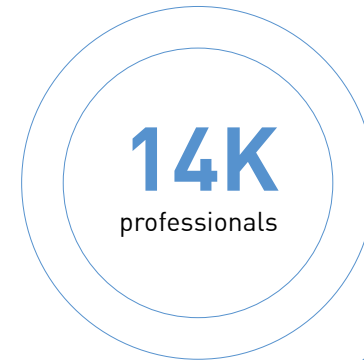
**Unlocking the Potential of AI in the NHS: A Path Forward**

Jenny Lewis





Leading independent provider of  
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Outpatient services in Europe



# Editorial



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LIEBER

Former CEO, HIMSS | USA | HealthManagement.org  
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## Transforming Through Data

Healthcare has recently witnessed a monumental shift propelled by the wide-spread adoption and integration of digital technologies. Digital tools and technologies are transforming care delivery to patients and streamlining processes across all care levels and settings. At its core, digital transformation heralds a new era of efficiency, accessibility, and patient-centricity within the healthcare industry.

Digital transformation in healthcare encompasses a myriad of innovations, including electronic health records (EHRs), telemedicine, wearable health devices, ambient sensors, virtual care tools, artificial intelligence (AI), and big data analytics. These technologies collectively empower healthcare providers with real-time access to comprehensive patient data, enabling more accurate diagnosis, personalised treatment plans, and proactive disease management.

Digital transformation is optimising operational workflows, reducing administrative burdens and allowing healthcare professionals to focus more on patient care, enhancing care coordination and collaboration among multidisciplinary teams, enabling predictive analytics and empowering healthcare organisations to anticipate healthcare trends, allocate resources efficiently, and mitigate potential risks. By promoting proactive health management and early intervention, digital technologies contribute to preventive care strategies, ultimately reducing healthcare costs and improving population health outcomes.

In this issue, our contributors explore how healthcare can embrace digital innovations to thrive in an increasingly complex and interconnected world, ultimately leading to better patient care, improved outcomes, and a healthier society.

Prof Luis Marti-Bonmati delivers an overview of the European Federation for CAncer IMages (EUCAIM) initiative to catalyse innovation and adoption of digital technologies in cancer care, and faster and more accurate clinical decision-making, diagnostics, treatment, and predictive medicine for cancer patients.

Rob Havasy from HIMSS delves into how healthcare's transformation hinges on digitalisation, navigating challenges and steps to integrate data, leverage AI, fortify cybersecurity, and enable global data exchange.

Alan Zettelmann and Jose Antonio Cano discuss the need for comprehensive change management, including transparent communication, collaborative culture building, and strategic investments, to realise the full potential of digital transformation and deliver improved patient outcomes and operational efficiencies.

Hugues Brat explores how implementing AI in healthcare must include strategic vision, stakeholder engagement, ROI understanding, regulatory compliance, and scalability planning to fully leverage AI's potential to improve patient care and institutional efficiency.

Thierry Godelle goes into detail on the transformative potential of user-centric digital solutions in healthcare, showcasing how these innovations drive improved patient outcomes, operational efficiency, and accessibility in healthcare delivery and management.

Giovanni Maglio discusses how healthcare innovation in telemedicine in the Apulia Region and how the National Recovery and Resilience Plan (NRRP) implements interventions to strengthen and innovate the technological and digital structure of the Italian NHS.

Jenny Lewis talks of leveraging the full potential of AI and technology at the NHS and setting out an action plan that maximises benefits for patient care and staff satisfaction while harnessing AI to expedite patient access to care and optimise resource allocation can achieve significant improvements in healthcare delivery.

Prof William Wijns discusses the EU-co-funded RESIL-Card project, which aims to develop a toolkit for resilience assessment to improve preparedness and continuity of cardiovascular care during times of crises.

Susana Alvarez Gómez explores the benefits of value-based procurement on patient care, efficiency, and innovation within the framework of European legal directives and Spanish regulations.

Georgios Filiopoulos talks about the misconceptions and risks of medical tourism and how investors, government officials and healthcare executives should be cautious as healthcare is and will remain a primarily local business.

Felicia Hedetoft, Diego Angelino, and Daniel Eriksson present the NCSH model to empower the global healthcare sector with practical sustainability solutions, facilitate swift, impactful change, and offer a shortcut to implementing best practices and tackling urgent environmental challenges.

We hope you enjoy reading this issue and welcome any feedback.

Happy Reading!

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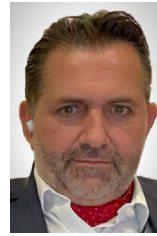
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José Antonio Cano holds a doctorate of Telecommunications Engineering from the University of Valladolid and master's in international relations and foreign trade from INFOREM, he is the Director of Analysis and Consulting at IDC. With over 20 years of experience in multinational and technology companies in strategic consulting, technology, and business, he has been involved in developing policies and projects to promote and implement new technologies and business investment in technology at national and regional levels. He has also advised large corporations to medium-sized enterprises and startups in the process of business transformation, financing, and commercialisation of innovation. José Antonio is also the executive advisor of the Spanish Aeronautical Society and a professor and tutor in organisations and business schools such as CEU, DBS or EOI.

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Daniel, founder and CEO of NCSH, boasts 20+ years of experience in sustainable healthcare, conducting projects, audits, and trainings globally for various sectors, including Medtech, Cleantech, universities, regions, and hospitals. His extensive travels, spanning the US, Canada, UK, India, Nordics, and most EU countries, have provided him with deep insights into healthcare sustainability challenges across diverse contexts. Originally from Gotland Island, Daniel worked in industry and university hospitals before co-founding NCSH. He holds a master's in sustainability and communications from Uppsala University and pursues micro-farming in his spare time.

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Diego is NCSH's international projects coordinator, building cross-sectoral consortiums, preparing applications for international funding and keeping track of project results. His responsibilities further extend to research and strategic planning for the network's future opportunities. A master in International Cooperation for Development, along with specialisations and professional training in Global Governance and International Negotiations, make up Diego's extensive background. He has been working with sustainable development as a project manager, researcher, consultant and input expert for organisations including National Agencies for Aid and Cooperation, UN Agencies and Think Tanks across more than 15 countries.

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## Hugues Brat, Switzerland



Hugues Brat is a radiologist and co-founder of Re: Source Healthcare, a company that provides comprehensive and customised training and support to healthcare leaders for implementing Artificial Intelligence. With over two decades of experience in radiology, medical research, and executive leadership, Dr Hugues Brat has introduced AI at scale to a leading Swiss private medical imaging network since 2017 as CMO and later CEO. He's not just an AI implementer but a change management expert. His collaborative efforts have led to the creation of groundbreaking AI applications that have reshaped real-life radiology through innovation. Dr Brat provides a unique approach by training the trainers to ensure seamless AI integration from preparation to monitoring.

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## Georgios Filiopoulos, Greece



Georgios Filiopoulos has held management positions in healthcare facilities in Greece and the US. He has been following the development of the medical tourism sector since 1999 when he started facilitating the travel of US dental patients to Greece. In addition, he was the CEO of the official investment and trade promotion agency of the Greek State and served as senior advisor to the Minister of Development and Economy of Greece and to the Hellenic Federation of Enterprises.

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Thierry Godelle is a seasoned professional with 27+ years in strategic consulting and technological product development. Armed with an engineering background and an MBA from INSEAD, he honed his skills at KPMG and the Mitchell Madison Group before a significant tenure at GE Healthcare as MRI General Manager for Emerging Markets and Europe Chief Strategy and Marketing Officer. Since 2018, as an independent consultant, he specialises in MedTech and e-health, passionately guiding startups, SMEs, and large corporations through market journeys. Thierry excels in setting up or redefining go-to-market strategies, structuring teams, and driving business growth, offering advice and operational expertise for tangible results.

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Felicia is the communications coordinator for NCSH's projects, website, newsletter, and LinkedIn and is in charge of member administration. Since joining the organisation in February 2022, she has been an acclaimed speaker and moderator at healthcare conferences in Britain, Italy, Poland, Mexico, Switzerland, and Sweden and a co-organiser of the 5th Nordic Conference on Sustainable Healthcare in 2023. With a master's degree from the University of Oxford, Felicia's background is in environmental governance and decision-making processes.

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Giovanni is a lawyer who focuses his practice on digital transformation, data protection, and cybersecurity in the healthcare sector. He is the Lead Auditor for ISO/IEC 27001/2013 and teaches at the university level. He is also the author of several publications and participates in research projects on the above-mentioned topics.

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Rob Havasy, a seasoned professional with over a decade of experience, is a key figure in the healthcare industry. As a subject matter expert in connected health for HIMSS, he spearheads research and educational initiatives. His role as a liaison for the Connected Health Committee involves fostering collaboration and addressing challenges, from data overload to patient empowerment. Since October 2018, he has also been the Managing Director of the Personal Connected Health Alliance, overseeing business operations and strategy. His tech background and expertise in software deployment have been instrumental in innovating healthcare solutions. He is a frequent presenter on mHealth and is currently exploring FDA regulation in connected health.

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Luis Martí-Bonmatí is the Director of the Medical Imaging Department and Chairman of Radiology at La Fe University and Polytechnic Hospital in Valencia, Spain. He is also the founder and director of the Biomedical Imaging Research Group and Experimental Radiology and Imaging Biomarkers Platform at La Fe Health Research Institute. His main interests are computational imaging, radiomics and biomarkers, image processing, imaging biobanks and clinical innovations in medical imaging and artificial intelligence. He has authored over 600 publications and has numerous research collaborations.

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Charles Niehaus serves as Executive Director of Affidea Group since September 2022. A seasoned medical professional with 27+ years of global healthcare expertise, Charles combines clinical, operational, and management skills. He has driven excellence in healthcare across Sub-Saharan Africa, the UK, and Europe, focusing on continuous improvement. With 18+ years in public-private partnerships, he has transformed surgical and diagnostic businesses, aligning strategies and enhancing performance.

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Vito has extensive experience in planning and developing data warehouse and business intelligence systems for healthcare. He is currently the Chief Digital Officer and Digital and Privacy Office Manager at the Health and Social Care Agency of Apulia (AReSS) and the project manager of the “Telemedicine Operations Center for Chronic Conditions and Clinical Networks” (COReHealth) of the Apulia Region.

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Pasquale has collaborated on various IT projects in both the public and private sectors and has gained many years of experience in the design and development of management, web, mobile, and desktop applications. He is currently an official at AReSS Puglia, where he is involved in various project activities in the fields of digital health, innovation, and research. He also performs the role of Director of Contract Execution.

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Alan Zettelmann, an innovation expert and partner at Innovation 360 Group AB in UAE, boasts over 17 years of experience in technology and entrepreneurship. With a Master’s degree in Business Innovation and Administration from the University of Deusto, he’s earned recognition for his corporate innovation, including winning an Innovation Award in Austria in 2017. Based in Dubai, he’s renowned for his strategic innovation consulting, measuring organisations’ ‘Innovation IQ’ to uncover blockers and foster radical pockets of innovation. Zettelmann’s influence extends beyond consultancy; he’s a professor at CEU, Deusto Business School, and EOI Business School, sharing his expertise with future business leaders. Additionally, he’s the founder of INNOCONSULT, a boutique consultancy impacting areas like Space travel, Immortality, New gold, and ESG projects.

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# Spotlight

# Cutting-Edge Technology: Cobellis Clinic and the World's First Ultra-Wide-Bore 3T MRI

Cobellis Clinic has partnered with United Imaging Healthcare to install the world's first ultra-wide-bore 3T MRI, the uMR Omega™. This cutting-edge technology, powered by advanced AI, enhances diagnostic accuracy, speeds up MRI exams, and significantly improves patient comfort. The collaboration promises to elevate healthcare standards and improve treatment outcomes for patients in the southern region of Campania, Italy.



uMR Omega™ installed in Cobellis Clinic, Campania, Italy

We are delighted to extend a warm welcome to Cobellis Clinic, the latest state-of-the-art treatment centre to join the global family of United Imaging. With an unwavering commitment to providing the highest level of healthcare services, the clinic has made a strategic decision to rely on our state-of-the-art imaging technology. We are excited to partner with Cobellis Clinic on this journey towards advanced healthcare excellence.

Located in the picturesque heart of the Cilento and Vallo di Diano National Park, Cobellis Clinic provides comprehensive medical services to the vast southern region of Campania. Situated in the village of Badia di Vallo della Lucania, the clinic covers an area of approximately 30,000 square metres and is surrounded by extensive parkland, providing a tranquil setting for patients and visitors alike. This well-established treatment centre has 110 beds across various specialist departments, including Surgery, Gynaecology, Urology, Orthopaedics, Ophthalmology, General Medicine, and Nephrology.

Its highly experienced specialists in various fields of medicine provide first-class medical services. Recent extensions to the main building have introduced new pavilions with three state-of-the-art operating theatres.

With a strong focus on providing world-class diagnostic care, Cobellis Clinic decided to enhance its radiology department by introducing the state-of-the-art uMR Omega™, the world's first ultra-wide bore 3T MRI. From facilitating the diagnostic process by delivering unparalleled image quality to enabling intraoperative use and precision radiotherapy planning, the uMR Omega™ enables healthcare professionals to optimise treatment strategies and ultimately improve clinical outcomes.

Powered by the groundbreaking uAIFI technology platform, the uMR Omega™ redefines medical imaging with superior imaging capabilities and an exceptional user experience. Recognising the unmatched potential of the evolving field of artificial intelligence, the uMR Omega™ features ACS (AI-assisted Compressed Sensing), United Imaging's exclusive MR acceleration solution, to provide the best balance between speed and image quality. This revolutionary feature allows users to either improve

image quality without increasing acquisition time or reduce acquisition time without compromising image quality. The result is outstanding – the uMR Omega™ can scan any part of the body in less than 100 seconds, reducing MR examination time by up to 70% and significantly increasing patient throughput. Importantly, its CT-like scanning speed is of significant benefit to the elderly, paediatric and other special patient populations who may find lengthy MRI examinations challenging.

The uMR Omega™ offers a new level of diagnostic accuracy. Thanks to the development of higher-density coils, our system provides hyper-resolution MR imaging of the musculoskeletal system or ultra-short echo time (UTE) MR imaging of lung metastases from liver cancer. In addition, using the revolutionary ACS 3D technology, the uMR Omega™ offers a new standard in high-resolution 3D MRI, delivering unmatched sharpness and accuracy.

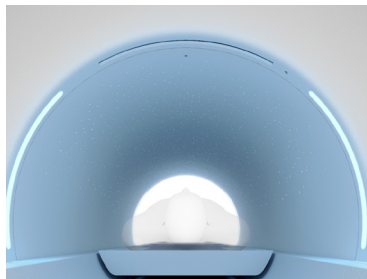
The design of the system fully reflects United Imaging's commitment to ensuring exceptional patient comfort. With an ultra-wide 75cm bore, patients benefit from an extra 25% of space, enhanced by a unique starlight ambience, which not only improves overall comfort but also reduces the potential risk

of panic attacks in claustrophobic patients. With meticulous attention to detail, United Imaging has created the next generation of ultra-flexible soft RF coils to provide patients with a blanket-like sensation. The groundbreaking uAIFI EasySense is the industry's first dual-source phased-array millimetre-wave radar solution for contactless sensing of patient respiratory movement. Finally, uAIFI QScan is a highly innovative feature that enables quiet scanning without compromising overall diagnostic accuracy.

The seamless integration of all these innovative features makes the uMR Omega™ an exceptionally versatile and powerful tool, capable of meeting diverse clinical needs while setting a new standard in patient comfort.

We would like to thank FORA S.p.A., a renowned provider of outsourced diagnostic and therapeutic services to hospitals, for facilitating the partnership between United Imaging and Cobellis Clinic. This collaboration promises to increase access to advanced imaging modalities at Cobellis Clinic, thereby improving diagnostic processes and ultimately leading to better treatment outcomes.

For more information about the uMR Omega™, please visit [United Imaging Healthcare](https://www.unitedimaging.com/healthcare).



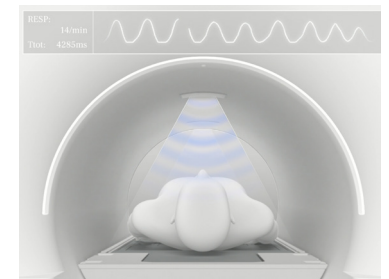
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# Cover Story

# EUropean Federation for CAncer IMages – Using Technology to Improve Cancer Care

An overview of the EUropean Federation for CAncer IMages (EUCAIM) initiative to catalyse innovation and adoption of digital technologies in cancer care, and faster and more accurate clinical decision-making, diagnostics, treatment, and predictive medicine for cancer patients.



PROF LUIS MARTÍ-BONMATÍ

Director of the Medical Imaging Department | Chairman of Radiology | La Fe University and Polytechnic Hospital | Valencia, Spain

## key points

- The EUropean Federation for CAncer IMages (EUCAIM) is the main activity of the European Cancer Imaging Initiative, which is spearheaded by the European Commission as part of the ambitious European Beating Cancer Plan.
- It is a four-year endeavour involving 76 partners to establish a comprehensive pan-European image-centric digital federated infrastructure.
- EUCAIM aims to tackle the fragmentation prevalent in existing cancer image repositories.
- The main goal is to foster innovation in medical imaging for the benefit of cancer patients, by allowing researchers to perform reproducible research with medical images, empower clinicians to construct research projects with a clinical impact, and allow companies to develop and validate new Medical Device Software (MDSW) based on AI that improve European competitiveness and leadership in the space.



## Powering Up Imaging and AI for Precision Medicine in Cancer Treatment

EUCAIM is the cornerstone of the European Commission initiated European Cancer Imaging Initiative, a flagship of Europe's Beating Cancer Plan (EBCP).

Cancer Image Europe provides a robust, trustworthy platform for researchers, clinicians, and innovators to access diverse cancer images, enabling the benchmarking, testing, and piloting of AI-driven technologies.

Cancer Image Europe facilitates collaboration and accelerates the development of cutting-edge solutions for cancer diagnosis and treatment.

Our platform preview currently includes a public catalogue of cancer image datasets and a federated searching tool to understand the information available at the federated providers.

## What is EUCAIM?

The EUropean Federation for CAncer IMages (EUCAIM) is the cornerstone of the European Cancer Imaging Initiative, which is spearheaded by the European Commission as part of the ambitious European Beating Cancer Plan (EBCP). The primary objective is to catalyse innovation and the adoption of digital technologies in cancer care, aiming for faster and more accurate clinical decision-making, diagnostics, treatment, and predictive medicine for cancer patients.

Kicking off in January 2023, this 4-year endeavour brings together a consortium of 76 partners dedicated to establishing a comprehensive pan-European digital federated infrastructure. This infrastructure has two main axes. As a central

repository, EUCAIM will house FAIR (Findable, Accessible, Interoperable and Reusable) cancer-related images, all de-identified and sourced from real-world cases. The project design aims to maintain data sovereignty for providers while offering a robust platform, including an Atlas of Cancer Images, for developing and accessing Artificial Intelligence (AI) tools tailored for precision medicine.

EUCAIM endeavours to address the fragmentation evident in existing cancer image repositories. Leveraging the foundations laid by the AI for Health Imaging (AI4HI) initiative, alongside European research infrastructures and national/regional repositories, it aspires to harmonise and integrate disparate datasets. This comprehensive strategy embraces diverse data modalities, spanning from clinical images to pathology, molecular, and laboratory data.

EUCAIM is also creating a federated hospital-based Data Spaces approach, based on common data model interoperability, for deploying fast observational studies that will later populate the centralised Image Repository. The main goal of EUCAIM is to allow AI researchers to perform research on high-quality large datasets, empower clinicians and researchers to construct prognostic/predictive models with a potential clinical impact, and allow companies to productise them or to develop and validate new AI solutions as Medical Devices that will help cancer patients by an improved patient stratification in successful treatment indication, minimising undesired situations such as non-responders to treatment, or hyperprogressors in immunotherapy.

The European Commission funds half of the project, and the other half is funded by the project partners. This risk-sharing co-funding is key for all the partners to put their knowledge, personal skills, and resources into it. The pharmaceutical industry is also welcome to join this initiative, so that everyone is working towards the overall benefit and improved patient outcomes.

The project design aims to maintain data sovereignty for providers while offering a robust large platform for developing and accessing AI tools tailored to precision medicine

### Key Patient Benefits

The key benefits of EUCAIM will be a better understanding of personalised medicine, integrating radiomics and imaging biomarkers with the relevant clinical and molecular data that will provide the ability to offer precise treatment at the right time. That's

the main achievement that AI, medical imaging, and interoperability with clinical, molecular, laboratory, and genetic data will be able to provide in so many different clinical scenarios of patients with cancer and medical images at diagnosis and follow-up, using the infrastructure that is being developed.

### Challenges and Obstacles

In research, accessing data at the origin within hospitals, poses a main challenge. Institutions, academies, and researchers are often reluctant to transfer data and even to allow their data to be shared. There are also legal issues in different countries and communities, issues related to data provision, AI developments, and the moving landscape at the European level with new regulations. Slowly and gradually, EUCAIM is solving these obstacles working on safe data transfers, developing a federated and distributed approach to data, and linking different research projects, programmes and grants while fostering screening programmes and engaging hospitals with a structured database to construct fast observational studies.

The project partners are involved in three work packages dealing with data interoperability aspects. As one of the most important goals is to ensure image and related data quality, quality control tools are being developed within the infrastructure. Our objective is not just to provide millions of cases to the research community, but to also ensure that those cases have been checked for quality and that the able to generate the adequate information.

### Our goals and objectives

<p><b>Experience</b> Based on the achievements of five large EU-funded projects</p>	<p><b>Atlas of Cancer Images</b> Anonymized images and annotations of common and rare cancers</p>
<p><b>Big Data</b> Including more than 100,000 cancer cases by 2025</p>	<p><b>Artificial Intelligence</b> Deploying at least 50 AI algorithms, tools and clinical prediction models</p>
<p><b>Real-World Data</b> Building a network to connect hospitals and screening programs</p>	<p><b>Pan-European Collaboration</b> Connecting at least 30 data providers from 15 countries by 2026</p>

## Use and Implementation of Artificial Intelligence

EUCAIM is deeply engaged in AI developments and is part of the AI for Health Imaging Initiative, a flagship of Europe Beating Cancer Plan. This platform is based on the previous work of five important European research projects on AI and medical imaging, paving the way for AI to generate meaningful and appropriate clinical decision support systems. EUCAIM is an infrastructure where data, tools and research communities will develop their research projects.

One of the main limitations of AI in Medicine is access to the huge amount of data needed to train models. There is a large variability in the medical images obtained from the different vendors and technical acquisition protocols. If AI is exposed to a huge number of medical images, the reproducibility of the AI solutions will be much higher. Transferring those solutions from research to reality will be a large step towards the implementation of precision and personalised medicine, which remains our most important goal.

AI is changing radiology with exponential developments. The solutions being developed today are becoming much faster, more accurate, and more precise. It is important to realise that the workload for radiologists will be lower if AI solutions are used. Since there is already a problem with shortages of radiologists, it is becoming increasingly evident the help that AI could provide, giving radiologists more time to focus on other issues such as discussing at multidisciplinary meetings, evaluating innovation projects or improving guidelines at the hospital, and not just reading conventional exams.

## EUCAIM and the Cancer Pathway

EUCAIM is designed to help researchers improve the disease pathway for cancer diagnoses and treatment. There are many different types of cancers that are diagnosed late in their progression. By using AI solutions and computer performance capabilities, it is possible to depict really small lesions before they grow or generate distant disease. Once it is known that a lesion is there, its characterisation, definition of phenotypic expression, aggressiveness based on

radiomic signatures, and this knowledge integration with available pathological, molecular or genetic data will provide a more precise treatment for this individual patient.

There is also a need for better screening programmes and fast and high-quality exams. There is a need to recognise that low-dose CT with AI reconstruction can pick up lesions much better. MR with AI reconstruction is much faster. With the right technology, a full MR exam can be performed in five minutes. Being faster, being able to study and evaluate many more patients, and being able to read and pick up lesions with the help of AI, screening with images will be deployed in most countries to fight against cancer, picking up tumours so they can be treated earlier.

The goal is not just to pick up lesions but to identify those that are relevant and clinically significant. In prostate screening, we should detect not just cancerous lesions but tumours that are clinically significant. It's quite important to identify relevant tumours to avoid performing biopsies and prostatectomies on patients who should not be exposed to them. AI solutions that will automatically annotate lesions as non-significant and non-relevant are needed to prevent unnecessary procedures and treatments.

## Impact of Healthcare Regulations

Regulations for AI are being continuously defined at the European level. EUCAIM is, in some way, helping define how medical images should be part of this health data space, how organisations and infrastructures can be the door to improve data



access facilities for researchers, and how AI tools can be properly tuned, trained, and tested and validated in our infrastructure. A European health data space and AI regulations are needed to allow data to be used for the best of the patients. These tools can help improve access to data and facilitate the use of data within the ethical requirements for research. EUCAIM fully recognises the importance of these regulatory issues. In recognising the need for a robust European Union capable of conducting critical medical research, policymakers are increasingly committed to participating in the unified European regulatory framework and the European health data space. This framework supports both primary functions, such as clinical assistance and cross-border medication, and secondary uses, including research and innovation. The most important regulations influencing the impact of EUCAIM in clinical innovation are the Medical Device Regulation (MDR) and the AI Act. Both need to be combined and considered by companies filing for the CE mark of new AI tools implemented. EUCAIM will allow to have a common data registry, avoiding the need for companies to establish parallel agreements with different hospitals to create their products. EUCAIM will accelerate the way AI Medical Devices are created in Europe.

### Accelerating Integrated Care

Healthcare organisations and radiology departments are likely to achieve a significant impact with “Integrated Care”, looking forward to decreased time to precise diagnosis, decreased time to the right treatment, decreased adverse events due to toxicities, and decreased time to curation. Integrated

care is related to healthcare digitalisation, and EUCAIM is fostering the digital transformation of hospitals. EUCAIM is helping hospitals to better define their health records and also helping researchers to easily obtain quality data from those records in a fast, reproducible and standard way using common data models, common data elements, and the interoperability between the different tools.

EUCAIM is an infrastructure where data, tools, and research communities will develop their potential through research projects and the creation of new medical devices

In this way, the project is helping and pushing the digital standardisation and transformation of the healthcare system, helping researchers to access the high-quality datasets they need for their research and innovation. That means when a healthcare organisation follows the path of a digital transformation, EUCAIM can collaborate and guide

it in the right direction. The project is also shaping the organisation of Data Spaces within hospitals, guiding governments in establishing standards for data storage and the presentation of catalogues to researchers. These efforts are crucial for the success of EUCAIM.

### Focus and Future Outlook

There is still a long way to go when it comes to the proper implementation of personalised medicine. This is mainly because there is a limitation on the translation from research to real practice environments. This can be solved through medical imaging harmonisation, integration of radiomics with molecular and genetic data, datasets interoperability and data selection strategies, including only those variables that will make accurate predictions to facilitate early diagnosis and detection of lesions even before they appear, and knowing the aggressiveness of the tumours even if there is no possibility to obtain biopsies every two months or three months. Our ultimate goal is to provide the best treatment options to the right patients at the right time.

EUCAIM has 76 partners and 21 hospitals already engaged, plus 40 new hospitals on the waiting list willing to be engaged. There are more than 160 stakeholders, including institutions, universities, SMEs, and companies, that are willing to be engaged. There are several companies in the AI software market that are involved with the project and want to train, test, and validate their results. Many professional societies, like oncologists, urologists, and neurologists, are willing to explore how medical

imaging and AI can be used in those prediction models to improve their patients' stratification, diagnosis and grading and pharmaceutical companies are willing to use these AI tools for more effective clinical trials. That means intra-trial cohort stratification and clearly defining which patients will benefit from the evaluated drugs and which ones will most probably fail before the trial starts. Academia is also engaged with the project, as are patient associations and policymakers. This entire network

is dedicated to enhancing the use of images for the optimal benefit of patients.

In the near future, EUCAIM will include new partners through Open Calls to enlarge datasets, the ability to access data, the capability to develop the AI tools that are really needed and to solve problems within the domain of medical imaging and AI. EUCAIM is a four-year project, and the goal is to have many more institutions, programmes, and projects involved and engaged within the platform

by the end of the development of the infrastructure for EUCAIM. This will be the real success - exposing AI to the huge amount of data that the project will be able to collect, either central or federated. Please visit the EUCAIM website to stay updated on all these opportunities: <https://cancerimage.eu/>

### **Conflict of Interest**

None.



**Let's join forces, for a healthier, stronger Europe!**

For more information and a first preview of our platform scan the QR code or visit

**cancerimage.eu**



# Innovative Diagnostics at Varese Hospital With the uCT 780 CT Scanner

A United Imaging Healthcare uCT 780 CT scanner installed at the Ospedale di Circolo e Fondazione Macchi di Varese in the small town of Varese in the far north-western province of Lombardy.

## key points

- The uCT 780 CT scanner from United Imaging Healthcare is a state-of-the-art medical device used primarily for diagnostic imaging.
- It offers a high image resolution and fast scanning, allowing doctors to obtain accurate results in a short time.
- It is designed for maximum patient comfort during the examination, with an ergonomic table and quiet operation.
- The uCT 780 is equipped with advanced features to automate the scanning process, saving time and minimising errors.



The uCT 780 CT scanner from United Imaging Healthcare installed at the Ospedale di Circolo e Fondazione Macchi di Varese

A United Imaging Healthcare uCT 780 CT scanner has been installed at the Ospedale di Circolo e Fondazione Macchi di Varese in the small town of Varese in the far north-western province of Lombardy.

The hospital itself dates back more than 800 years - in 1173, the first hospital settlement was established in the hills of Bosto by a religious community dedicated to helping the poor and sick. Since 1995, the Circolo Hospital and Macchi Foundation has been a highly specialised hospital of national importance. Since 1975 it has been the seat of the Second Faculty of Medicine and Surgery of the University of Pavia, which was later recognised as an autonomous faculty following the creation of the University of Insubria. The main hospital building houses all clinical specialities except obstetrics and paediatrics (which are located in the nearby Del Ponte Hospital), making it a multidisciplinary treatment centre.

The uCT 780 CT scanner from United Imaging Healthcare is a state-of-the-art medical device used primarily for diagnostic imaging. It offers a high image resolution and fast scanning, allowing doctors to

obtain accurate results in a short time. The system is designed for maximum patient comfort during the examination, with an ergonomic table and quiet operation. In addition, the uCT 780 is equipped with advanced features to automate the scanning process, saving time and minimising errors.

Special imaging algorithms enable the scanner to capture detailed anatomical images from different perspectives, allowing doctors to perform precise analysis and diagnosis. In addition, the uCT 780 can be used in a wide range of clinical applications, making it ideal for diagnosing a variety of conditions.

It is a modern and versatile device that provides precise and rapid imaging examinations, contributing to effective patient care.

Project realised in collaboration with the distributor FORA SPA.

Read more about the uCT 780 at: <https://eu.united-imaging.com/en/product-service/products/ct/uct-780>

# Healthcare's Digital Transformation with HIMSS: Challenges, Innovations, and the Road Ahead

Healthcare's transformation hinges on digitalisation, navigating challenges and steps to integrate data, leverage AI, fortify cybersecurity, and enable global data exchange. Strategic planning, collaboration, and innovation are needed to navigate this journey towards excellence in patient care.



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## key points

- Digitalisation is driving healthcare's transformation. To fully realise its benefits, organisations must prioritise digitalising healthcare data, integrating systems, leveraging AI technologies, fortifying cybersecurity measures, and working collaboratively to achieve interoperability and real-time data exchange across borders.
- Through strategic planning, collaboration and innovation, healthcare can evolve into a sector defined by efficiency, security and excellence in patient care.
- Integration of digital systems and the use of AI, particularly large language models (LLMs), are crucial for unlocking the full potential of digital health transformation.
- The ultimate goal of healthcare digitalisation is the real-time exchange of patient data across organisations and borders, which requires robust interoperability standards, harmonisation of privacy laws and stringent cybersecurity measures.
- Collaboration between organisations and governments is essential to overcome technical, policy and legal barriers and fully realise the benefits of digital transformation in healthcare.

Healthcare stands on the cusp of a monumental transformation driven by the digital revolution. At the heart of this transformation is the digitalisation of healthcare data, a foundational step for the sector's evolution.

However, it is crucial to acknowledge that the path to obtaining the full benefit of digitalisation is fraught with challenges and requires perseverance long beyond the initial digitalisation of existing data.

Insights from HIMSS (Healthcare Information and Management Systems Society) and others delve into the current landscape of healthcare digitalisation, the pivotal role of artificial intelligence (AI) and big data, the looming spectre of cybersecurity threats, and the vision of a future where healthcare transcends borders in real-time delivering efficiency and excellence.

Regardless of the scale observed, whether from the perspective of an individual healthcare organisation or an entire nation, the digitalisation journey involves three steps:

1. Implement systems to digitise existing information and capture future information digitally.
2. Assemble these capture systems into an integrated platform within individual institutions.
3. Exchange health data between institutions across regional and national borders.

Each step requires meticulous planning and must overcome various technical, behavioural, and legal challenges.

## Digitisation is the Bedrock of Transformation

The transformative journey begins with the digitisation of healthcare data.

This process is not merely about converting analogue records into digital formats but involves capturing the nuanced, rich depth currently buried in unstructured notes and narratives.

Most organisations base this effort around an electronic health record or EHR, which serves as the capture method and data repository for digitised data. The ideal digitisation endeavour should be comprehensive, ensuring every piece of data, regardless of its format, is accessible and interpretable. The challenge, however, is that most organisations will begin this journey with a varied infrastructure comprising a mix of legacy applications and systems.

Unable to replace the entire environment wholesale, they usually opt to deploy an electronic health records system as the new central application. They must then spend months or years completing internal process and workflow changes alongside application integrations to extract maximum value from the new platform. The transition from paper to digital is monumental, requiring technological upgrades and a cultural shift within organisations. It is at this point that many journeys stall.

## Unlocking Unstructured Data: The Promise of AI and LLMs

Enter AI and Large Language Models (LLMs). Through natural language processing and machine learning, AI can delve into the depths of unstructured notes, extracting valuable insights that were previously inaccessible. The promise of AI and LLMs is not just in data interpretation but in transforming this data into actionable knowledge, enhancing patient care and operational efficiency. However, as healthcare professionals harness the power of AI, they must tread carefully. The increasing digitalisation and exchange of data present significant challenges for privacy. The very tools that unlock the potential of unstructured data

also empower cybercriminals, enabling them to launch sophisticated attacks. The healthcare sector, rich in sensitive personal data, becomes an attractive target for these nefarious actors.

We can navigate this terrain through strategic planning, collaboration and innovation, transforming healthcare into a sector defined by efficiency, security and, most importantly, excellence in patient care

## Integration: Unlocking Maximum Value

The next step is to weave the data capture system with other clinical applications into a well-integrated platform. There was a time when many organisations thought a comprehensive electronic health record system would form the bulk and the core of their information management platform. However, over the last several years, particularly after the lessons learned during

the COVID-19 pandemic, some organisations have been begging to rethink the role of the EHR. Whether because of the slower pace of feature additions to large EHR platforms or simply a need to solve operational problems in particular ways, organisations are beginning to see the EHR as a part of a larger platform.

Writing in *Forbes* in late 2021, author Katie Jennings quoted former tech executive and venture investor Missy Krasner saying, “I have never in the history of health care in the United States seen this kind of supernova of innovation with a flurry of investment activity into digital health. Covid has made interoperability sexy again” (Jennings 2021).

The interoperability of platform components is perhaps the most critical factor in controlling the speed and cost of building a highly digitally integrated enterprise to prepare for the future of healthcare. Achieving the goal of an integrated, high-performing platform is the key to unlocking the next level of healthcare digitalisation’s benefits. However, it also requires organisations to manage new threats.

## Cybersecurity: Fortifying the Data Fortress

As the digitalisation journey progresses, cybersecurity must be a cornerstone of the strategy. The future of healthcare relies on the secure, efficient exchange of data across organisations and borders. However, as capabilities grow, so too do cybercriminals’ capabilities. The industry must unite and share knowledge and resources to counteract this evolving threat.



Healthcare organisations have a special responsibility because compromised IT systems can directly impact patient care. As systems become more interconnected, they open new vectors for attacks and data theft. If an organisation considers building a platform that augments its core EHR system, cybersecurity must become ingrained in its culture and inform the overall system architecture. Simply bolting a platform together without a holistic view of hardening it against threats will not do.

### Data Exchange: Real-Time Data Across Borders

The ultimate goal of this transformation journey is the real-time availability of patient data across organisations and borders. Imagine a future where, regardless of where a patient is in the world, their medical history, allergies and treatment plans are accessible to healthcare providers. This interoperability and data

fluidity level would supercharge care delivery, increase quality and ensure optimal patient outcomes globally.

However, achieving this vision requires overcoming significant hurdles. Interoperability standards must be robust and universally adopted, privacy laws need harmonisation, and cybersecurity measures must be unassailable. Few of the individual barriers to achieving this final stage are technical. Most are related to policy and legal differences and require organisations to work collaboratively and alongside governments to overcome these challenges.

Much of the interoperability work promoted by governments worldwide aims to enable this widespread exchange of information. Yet, much work remains to bring healthcare up to the necessary level of internal digital integration to fully enable the large-scale data exchange we all strive for.

### Conclusion: A Call to Action

As we stand today, the healthcare transformation journey is well underway, but there is a long road ahead. Organisations must prioritise digitalising their data, harnessing the power of AI and big data while remaining ever-vigilant against the rising tide of cybersecurity threats. The path is complex, with many challenges, but the potential rewards are immense. Together, we can navigate this terrain through strategic planning, collaboration and innovation, transforming healthcare into a sector defined by efficiency, security and, most importantly, excellence in patient care.

The future of healthcare is not just a dream; it is a destination we can reach through collective effort and unwavering commitment.

### Conflict of Interest

None.

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# Rookie Mistakes in AI Transition for Healthcare

Implementing AI in healthcare must include strategic vision, stakeholder engagement, ROI understanding, regulatory compliance, and scalability planning to fully leverage AI's potential to improve patient care and institutional efficiency.



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## key points

- AI offers solutions to healthcare challenges by enhancing diagnostic precision, operational efficiency, and patient care through the merging of human insight and machine accuracy.
- Successful AI implementation requires a clear strategic vision aligned with long-term goals and robust governance frameworks ensuring ethical use, compliance, and alignment with healthcare standards.
- Implementing AI involves a cultural shift impacting all organisational layers, necessitating engagement of stakeholders at all levels to ensure practical, well-received integration into daily operations.
- A comprehensive understanding of AI's economic implications and alignment of AI goals with organisational objectives is crucial for gaining broad support and ensuring successful implementation.
- Pre-implementation evaluation, proper user training, and continuous feedback mechanisms are essential for seamless integration, effective utilisation, and continuous improvement of AI solutions in healthcare.

The healthcare sector, burdened with diminishing reimbursements, a critical shortage of radiologists, increased workloads, and significant burnout among professionals, stands at a crossroads. Simultaneously, the shift towards personalised and preventive medicine places additional demands on our strained systems. AI offers a promising solution to these issues by merging human insight with machine accuracy, enhancing diagnostic precision, operational efficiency, and patient care.

## Navigating AI Implementation in Healthcare Needs Insights from Experience

Many talk about innovation and change, but only some put these ideas into practice. Dr Hugues Brat, founder of Re:Source Healthcare and former CMO and CEO of a leading Swiss private medical imaging network, is one of the pioneers to have navigated the complexities of

AI implementation in radiology. Through Re:Source Healthcare, this experience is translated into insights on the common errors to avoid and a comprehensive curriculum to meet all levels of AI familiarity and needs, ensuring a comprehensive understanding of AI in healthcare—from governance to implementation and beyond. Through programmes like Zero to Hero Basics and Advanced and Intensive workshops, Re:Source provides a holistic view of AI's potential within healthcare, supported by case studies that illustrate transformative impacts. The following aims to break down all the typical mistakes encountered when integrating AI into healthcare environments. The goal is not only to avoid implementation pitfalls but also to offer strategic insights to ensure the success of AI initiatives. It's crucial to recognise that AI in radiology isn't intended to replace radiologists but to empower them. Incorporating AI into medical practices signifies more than just a technological shift; it represents a disruptive evolution in enhancing diagnostic accuracy, patient care,

and operational efficiency. Successfully implementing AI is not merely adopting new technology but enhancing the practice.

## The Importance of Vision, Governance and Strategic Framework

One of the most fundamental errors is the absence of a clear, strategic vision for AI integration in your organisation. Many healthcare institutions rush to adopt AI technologies without a solid plan that aligns with their long-term goals. The result is a piecemeal adoption that fails to leverage the full potential of AI, leading to underwhelming outcomes and wasted investments. Leaders must develop a comprehensive AI strategy that addresses immediate needs and sets the stage for future scalability and integration.

Actual AI governance is crucial and involves establishing frameworks that oversee all aspects of AI introduction in your institution, including the ethical use of AI, compliance with regulations, and alignment with healthcare standards. With robust governance, institutions can avoid facing clinical, legal, and ethical issues, damaging trust, and hindering the acceptance of AI technologies.

## AI is a Cultural Shift That Must Involve All Stakeholders

One of the most critical steps in implementing AI in a healthcare setting is the preparation phase, which often goes overlooked. AI is not just a technological upgrade but a cultural shift that impacts every layer

of an organisation. Another common mistake is the insufficient engagement of stakeholders at all levels—clinicians, IT staff, management, finance personnel, payers, and patients. Radiologists are one of many stakeholders in the healthcare system.

Incorporating AI into medical practices signifies more than just a technological shift; it represents a disruptive evolution in enhancing diagnostic accuracy, patient care, and operational efficiency

Every stakeholder has different insights, concerns, and levels of power that can significantly impact the success of AI initiatives. Engaging these stakeholders early and often ensures that the implemented AI solutions are practical, well-received, and seamlessly integrated into daily operations.

## Understanding ROI Perspectives and Aligning Stakeholder Expectations

The economic angle of AI implementation is complex and often overlooked. AI tools are not magical plug-and-play gadgets that will automatically deliver savings and efficiencies. They require thoughtful integration and a clear understanding of their return on investment (ROI) from multiple perspectives. One must keep in mind that what excites a hospital CFO won't necessarily thrill your clinicians. The economic implications of AI are often poorly understood. One of the significant challenges in adopting AI in healthcare is justifying the investment due to the ambiguity in return on investment. This ROI significantly varies depending on the stakeholder in play. As a CEO, the focus might be on the bottom line. Still, as a radiologist, the emphasis might be on diagnostic accuracy and patient safety. Understanding and communicating how AI affects these areas differently is crucial for gaining broad support and aligning AI goals with organisational objectives. Costs can be direct, such as software and hardware, or indirect, like training, monitoring, and changes in workflow. The benefits are optional, and decision-makers must thoroughly analyse the expected ROI, considering various perspectives and not only potential financial impacts. Radiologists must also understand how AI will improve their workflow, save time, alleviate work overload, and enable incremental revenue growth that must ultimately be shared among various stakeholders. They must participate in defining KPIs related to the expected ROI and commit to being active players in adapting the transforming work processes.

## Pre-Implementation Evaluation for a Seamless Integration

From there, a common oversight would be skipping comprehensive pre-implementation evaluation. AI models may perform well in controlled test environments or other regions but might translate poorly to local demographics or case mixes. Pilot testing a prospective AI application on local data or providing clean case-based specific databases to be tested by the vendor is crucial to sniff out any performance quirks before it goes live. AI tools must also seamlessly integrate with existing healthcare IT systems—EHRs, RIS, PACS, etc. This usually takes longer than expected, as many operating systems have already been tailored to local needs. Poor interoperability can disrupt clinical workflows, reduce the efficiency gains that AI promises, and consequently impair the necessary trust that has been difficult to gain, especially among the more conservative users. To avoid this failure, fully integrating the IT department as a major stakeholder from the start is of utmost importance to fully understand the vision of the project and let them participate in the implementation pace. Barriers will need to fall, and a 360° active collaboration is necessary to deliver milestones in due time.

## User Training to Tackle AI Educational Needs

Another stumbling block is the lack of proper training for healthcare providers on using and interacting with AI tools. AI isn't just about technology; it's about people. Without proper education on how

to interact with AI tools, your staff might as well be using expensive paperweights. Training should cover the technical aspects of operating AI systems,

Engaging stakeholders early and often ensures that the implemented AI solutions are practical, well-received, and seamlessly integrated into daily operations

the possibilities and limitations of AI technology, the interpretation of AI-generated bias, and the importance of maintaining clinical judgment in decision-making processes. Proper education helps mitigate the risk of over- or under-reliance on AI decisions and supports a balanced approach to machine-human collaboration in clinical settings.

## Feedback Loops are Needed for Continuous Improvement

Deploying AI solutions without a mechanism for ongoing monitoring and feedback is a recipe

for stagnation. Regular evaluation of technical performance, particularly in case of updates/upgrades and user satisfaction with AI tools, is essential for sustaining effectiveness, adapting to evolving clinical needs, and pinpointing any performance loss of AI apps. Interactive practical feedback loops also allow users to express concerns and suggest improvements, fostering a culture of collaboration and continuous improvement.

## Navigating Regulatory Compliance and Scalability Challenges

Mastering the regulatory landscape is yet another crucial but challenging step. AI in healthcare is subject to strict regulations concerning patient privacy, data security, and bias. Some aspects, such as monitoring and lack of regulations, must be anticipated. Ensuring compliance and meticulously addressing ethical considerations are necessary to maintain trust among all stakeholders and protect the institution against legal repercussions. Finally, a common rookie mistake is not planning for the scalability of AI solutions. What works in a pilot project may not be suitable when scaled across larger or more diverse parts of the organisation. Scalability challenges include managing larger datasets, ensuring consistent performance across different settings and providing adequate support and infrastructure. This aspect needs to be integrated right from the beginning of the change management process.

The journey towards AI integration in healthcare is undoubtedly fraught with challenges but also rich with opportunity. Exchanging thoughts and kicking off a

discussion around these most common mistakes is the first step for healthcare leaders to ensure their AI initiatives don't remain a distant dream. Implementing AI today will help decision-makers confront current challenges and lead to tangible improvements in

patient care and institutional efficiency. Time is too precious of a resource to be wasted; action is needed now. All AI enthusiasts, curious seekers, explorers, navigators, or even advanced players can benefit from the discussion opened today by Re:Source

and can help make AI a strategic, practical, and successful reality in their organisation.

### Conflict of Interest

None.

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# How Change Management Activates Digital Transformation in Healthcare

Navigating healthcare’s digital transformation demands comprehensive change management, including transparent communication, collaborative culture building, and strategic investments, to realise improved patient outcomes and operational efficiencies.



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## key points

- Digital transformation is crucial for healthcare organisations to remain competitive and renew their business models, requiring significant investments in technology to enhance access, delivery, and coordination of care.
- Despite the promise of technological advancements, effective change management remains a critical hurdle, with issues such as staff resistance, legacy infrastructure, and regulatory compliance posing significant obstacles.
- Successful digital transformation necessitates addressing human factors, fostering collaboration, and prioritising communication, alongside meticulous risk assessment and robust leadership.
- Improved leadership and management practices are essential for navigating change successfully, requiring investment in capacity building, training, and a comprehensive change management strategy involving all stakeholders.
- Building a culture of collaboration, transparency, and continuous learning, alongside effective communication strategies, is crucial for overcoming resistance to change and driving successful digital transformation initiatives in healthcare.

The healthcare industry stands at a crossroads. Technological advancements are surging, promising a future of personalised medicine, streamlined processes, and improved patient outcomes. However, embarking on this digital odyssey necessitates a crucial companion—effective change management. Unfortunately, navigating the complexities of change often proves to be the Achilles’ heel of digital health initiatives. This article addresses the main challenges in managing change management and digital transformation in the healthcare industry.

## Pushing the Digital Frontier: Strategic Investments to Transform Healthcare

Digital transformation has become a strategic priority for many organisations in the health industry as they seek to renew their business models and stay competitive in a fast-evolving digital landscape. Digital

healthcare is a model that emphasises the integration of digital technologies into health and care services while incorporating them with traditional, in-person care to establish a “hybrid care” model. It involves a profound mindset shift, fundamentally transforming how health and care enterprises engage with patients.

According to IDC data on technology spending within healthcare in EMEA, the market will reach \$65.46 billion in 2024, a 9% increase compared to 2023, showing a growing trend in the period 2024-2027 and a CAGR of 8.9% for that period.

The transition to a digital healthcare model involves enhancing access and delivery of care throughout the care process, regardless of location or time. Therefore, ensuring proper coordination and management of care requires significant investments in healthcare technology and the support of a patient-centred ecosystem.



To develop a proper digital health strategy, it is necessary to establish digital touchpoints, or a “digital front door” (DFD), to empower patients, strengthen relationships, and improve health outcomes. Achieving this goal requires investments in hardware and software technologies, such as video communication tools, patient portals, digital applications, connected medical devices, AI, and ML. This approach, particularly favoured in high-income countries, aims to offer patients more convenient access to healthcare services, and the successful integration of these technologies expands accessibility.

Similarly, healthcare enterprises face substantial financial burdens to drive “care anywhere.” They must allocate resources to develop and maintain digital infrastructure, including telehealth platforms and HCE systems that can support remote care. Additionally, they need to continuously integrate new technologies, such as health mobile apps, wearable devices, and IoT sensors, to facilitate care delivery. These investments are crucial for providing accessible, high-quality, and safe healthcare services outside traditional healthcare settings in all regions, especially in low- and middle-income countries.

## Overcoming Challenges Needs a Strategic Approach to Change Management

However, while digital transformation holds great potential for improving healthcare services, implementing change management in this industry can be challenging and sometimes wrong. The implementation of digital transformation initiatives in the health industry requires a careful and

well-executed change management strategy that considers at least the following principles:

## The implementation of digital transformation initiatives in the health industry requires a careful and well-executed change management strategy

- **Uncertainty and the Fear Factor:** The human element cannot be ignored. Uncertainty about the impact of digitalisation can breed apprehension among staff. Worries about job security, the potential for errors with new systems, and the sheer learning curve associated with new technologies can create a climate of fear and resistance. It can lead to a cultural **clash between traditional and digital dexterity**. Many times, healthcare professionals have established workflows honed over years of practice. Introducing digital solutions can disrupt these routines, fostering resistance and fear of the unknown. The digital divide, where some staff may struggle to adapt to new technologies, further exacerbates this clash. To avoid this, focus on the people involved in the change, such as healthcare providers and staff,

patients, and other stakeholders. Without proper involvement, communication, and support for these individuals during the digital transformation process, resistance to change may arise, leading to implementation challenges and suboptimal outcomes.

- **Legacy Infrastructure and Siloed Systems:** Healthcare institutions often grapple with outdated IT infrastructure characterised by a network of disparate systems. These systems lack interoperability, hindering data exchange and creating fragmented patient records. Implementing new digital solutions becomes an uphill battle when the foundation itself is unstable and disconnected.
- **Failure to assess and prioritise risks.** Organisations often overlook the potential risks associated with digital transformation, particularly regarding data security, privacy, and legal considerations. If not properly managed, these risks can have serious consequences.
- **Data Privacy Concerns and the Labyrinth of Regulations:** The digital landscape is riddled with ethical and legal concerns surrounding patient data privacy. Stringent regulations like HIPAA (Health Insurance Portability and Accountability Act) add another layer of complexity. Healthcare organisations must navigate this labyrinth of regulations while ensuring patient data remains secure and anonymised.
- **Lack of sufficient controls and change plans.** This can result in underdeveloped processes, minimal input from security



and legal teams, and an overall lack of preparedness for potential challenges. As a result, the implementation of digital solutions may be rushed or incomplete, leading to inefficiencies and suboptimal outcomes.

- **Poor leadership and oversight.** Successful change management hinges on solid leadership. However, healthcare leaders may lack the necessary digital literacy or struggle to articulate the vision for digital transformation. This communication gap between leadership and staff can lead to confusion, disengagement, and, ultimately, failed initiatives.

## The Role of Leadership and Management in Building Resilience

These challenges can be addressed through improved leadership and management practices, including capacity building and training for healthcare workers, increased budgetary allocation to health, advocacy for political support and commitment, and improved leadership and management in the healthcare sector. If not, this can lead to increased healthcare costs, reduced efficiency and effectiveness, dissatisfaction among staff, lower patient satisfaction, and compromised quality of care.

To mitigate these challenges, organisations in the health industry must prioritise change management and consider the human factors involved when implementing digital transformation initiatives. This

includes developing a comprehensive change management strategy that involves all stakeholders, providing adequate training and support to healthcare providers and staff, proactively addressing risks and concerns about data security and privacy, and continually evaluating and adapting the change management approach as needed. Additionally, government involvement and support are crucial for successfully integrating digital health solutions.

## Empowering Change Through Culture And Communication

Additionally, cultural and organisational capacity to manage digital health information is crucial for successfully integrating mHealth into current healthcare systems. Therefore, some key elements to adequately address change management in digital transformation projects involve harnessing the power of communication: Transparency and clear communication are crucial. Leaders must articulate the “why” of the change, highlighting the benefits for patients, staff, and the organisation.

Similarly, fostering a culture of collaboration allows stakeholders at all levels to be engaged throughout the change process. A sense of ownership and shared purpose is encouraged by actively seeking feedback and addressing concerns. Likewise, it is essential to invest in people through training and support. That is, equipping staff with the tools and knowledge they need to succeed. Provide comprehensive training programmes and ongoing support and establish a culture of continuous learning.

Any change management process must be led, so identify and empower change champions within the organisation. These individuals can act as peer mentors, providing valuable support and guidance to their colleagues, resulting in better project implementation and less resistance to change. Lastly, celebrate milestones and embrace the learning process. Recognise and celebrate successes along the way, no matter how small. This reinforces the positive aspects of change and keeps motivation high. Adopt a culture of learning from setbacks and adjust the implementation strategy as needed.

The digital revolution presents a unique opportunity for the healthcare industry to leapfrog into a future of improved patient care, enhanced efficiency, and groundbreaking research possibilities. However, navigating the digital odyssey demands an unwavering focus on effective change management. By understanding the challenges, acknowledging the human element, and implementing best practices in communication, collaboration, and training, healthcare organisations can transform digitalisation from a daunting journey into a voyage towards a healthier tomorrow.

## Conflict of Interest

None.



# The Chessboard of Radiology: Learning from Each Move through Peer Review



**DR CHARLES NIEHAUS**

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### key points

- In the precise and critical field of radiology, peer review embodies the philosophy of continuous improvement.
- Like chess grandmasters who meticulously analyse every move to enhance their gameplay, radiologists engaged in peer review explore their diagnostic decisions, learning from each case to improve patient outcomes.
- Peer review assesses the imaging report for continuous learning through feedback to improve and maintain the quality and diagnostic accuracy.
- By embracing a culture of continuous improvement, characterised by meticulous peer review and the leveraging of cutting-edge technology, Affidea is setting a benchmark for the healthcare industry.

In 1972 the legendary World Chess Championship Bobby Fischer faced off against Boris Spassky. Fischer’s victory was not just a triumph of talent over experience but a showcase of meticulous preparation, strategic foresight, and the ability to adapt under pressure. Fischer’s approach to the match was a masterclass in learning from others’ moves. He delved deep into Spassky’s previous games, analysing his playing style and preferences in various phases of the game.

Fischer’s preparation was not just about studying Spassky; it was about understanding the entire body of chess knowledge available to him, identifying patterns, and devising counter-strategies. This historic match underscores the essence of precision and accuracy.

This continuous cycle of performance review and refinement mirrors the peer review process in radiology, where each diagnostic interpretation can be seen as a move on the board, contributing to the overall outcome of patient care or, in the case of chess, the result of the game and learning from each case.

In the world of chess, mastery is achieved not just through individual skill and strategic acumen but significantly through the study and analysis of others’ strategies. Each game of chess, with its myriad of moves and counter-moves, offers invaluable lessons on strategy, foresight, and adaptability.

Similarly, in the precise and critical field of radiology, peer review embodies this philosophy of continuous improvement. Learning from each ‘move’—each diagnosis and interpretation—enhances the collective expertise, leveraging the unique expertise and experiences of various colleagues and sub-speciality groups to synergise their efforts towards improving clinical outcomes.

Peer review is defined as the anonymised and blinded process by which a reviewing radiologist assesses a scan and compares his interpretation of the images to a report previously written and authorised by the primary radiologist. All discrepancies identified are discussed and debated during discrepancy meetings, and, if appropriate, targeted actions are implemented to improve the results. These actions include educational plans if areas of knowledge gaps are identified, training in focused subspecialties in radiology, training support in pattern recognition and repetition, and improvement of reporting conditions.

**Grandmasters spend countless hours reviewing past games, not just their own but those of their peers, to identify areas for improvement and to adapt their strategies for future matches.**

**So, what does this have to do with radiology?**



Peer review allows the assessment of the imaging report for continuous learning through feedback to improve and maintain the quality and diagnostic accuracy of the radiology report. Moreover, peer review improves the doctors' and patients' confidence and trust in the clinical services provided and also ensures radiologists' accountability.

The American Journal of Radiology reports that diagnostic error rates in radiology can range from 3% to 5%<sup>1</sup> for everyday clinical practice and may be higher in complex cases, highlighting the potential for improvement in diagnostic accuracy.

## Chess Masters and Radiologists: A Comparative Lens

The analogy between chess masters and radiologists extends beyond the pursuit of excellence. Both disciplines require a keen eye for detail, a relentless pursuit of precision, and a commitment to continuous improvement.

Like grandmasters who meticulously analyse every move to enhance their gameplay, radiologists engaged in peer review explore their diagnostic decisions, learning from each case to improve patient outcomes. This relentless pursuit of precision and quality mirrors the intellectual rigour and strategic depth of chess, underscoring the shared ethos of excellence that defines both fields.

Safety and precision are paramount for patient care. Therefore, Affidea has implemented a comprehensive peer review program in radiology across 11 countries and across MRI and CT examinations, with plans to

expand further, setting a new standard for diagnostic accuracy and patient care.

Affidea's peer review process involves a systematic evaluation of radiological interpretations by other expert radiologists within its network, ensuring that deficiencies are identified, and amendments are made swiftly when discrepancies arise. The findings reveal a notably low incidence of inconsistencies within radiology reports, especially when contrasted with various other studies, and these are regularly monitored every month. Future directions entail expanding the peer review mechanism to include additional procedures like mammography (where not double read) and X-rays alongside Nuclear Medicine evaluations. This expansion aims to broaden the spectrum of clinical services subjected to thorough verification.

The drawback of conducting peer review is that it adds to already heavy workload of radiologists, who are in limited supply, and it might not be conducted in nearly real-time. This could lead to delays in identifying discrepancies, which need to be managed. However, the learning experience for radiologists, from this feedback, is a key pillar of their ongoing learning. In the end, this initiative is about fostering a culture of continuous improvement and excellence in diagnostic accuracy.

## Integrating AI into Peer Review: The Next Frontier

The future of radiology peer review lies in the integration of Artificial Intelligence (AI). Just as chess engines like Stockfish or AlphaZero have revolutionised the way chess players prepare and improve, AI technologies

have the potential to transform radiology by enhancing diagnostic accuracy and efficiency, supporting radiologists in their clinical practice.

AI can serve as an invaluable tool in the peer review process by providing a second layer of analysis, flagging potential discrepancies for review by human radiologists. This dual-layer review system combines the irreplaceable critical thinking skills of experienced radiologists with the pattern recognition and data processing capabilities of AI. Studies have shown that AI can detect anomalies with precision, acting as a powerful adjunct to traditional peer review methods.

This synergy of human expertise and technological innovation holds the promise of setting new standards in diagnostic precision, much like the evolution of strategic play in chess through the use of algorithms, advanced analytics and AI.

## Conclusion: Embracing a Future of Precision and Continuous Improvement

By embracing a culture of continuous improvement, characterised by meticulous peer review and the leveraging of cutting-edge technology, Affidea is setting a benchmark for the healthcare industry. As we look to the future, inspired by the chess analogy, strategic foresight, meticulous preparation, and the embrace of technological advancements will continue to guide the quest for diagnostic precision in radiology, promising a new era of quality and safety in patient care.

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# United Imaging Healthcare Advances Medical Diagnostics in Lithuania

United Imaging Healthcare has installed its innovative uMR 670 MRI system at the Antėja Clinic in Klaipėda, Lithuania.

## key points

- The innovative diagnostic equipment installed in the clinic is the uMR 670, a state-of-the-art 1.5 T wide gantry scanner that provides efficient, reliable and comfortable MRI examinations.
- The groundbreaking uAIFI DeepRecon technology, which uses image reconstruction methods based on deep learning, achieves image quality similar to a 3.0 T system.
- The revolutionary uAIFI EasySense non-contact respiratory motion monitoring system improves patient comfort during abdominal scans.
- With its advanced software and high-speed image acquisition systems, the uMR 670 enables fast and accurate scanning.



The uMR 670 MRI system at the Antėja Clinic in Klaipėda, Lithuania

In Lithuania, United Imaging Healthcare has installed its innovative uMR 670 MRI system at the Antėja Clinic in Klaipėda.

Klaipėda is a port city in Lithuania situated on the northern coast of the Baltic Sea. The city has a rich history and is one of the most important commercial and cultural centres in Lithuania. It has a distinctive architecture whose German and Scandinavian influences give it a unique charm. It is a dynamic city where tradition meets modernity, making it a fascinating place to visit and explore.

Antėja is one of several medical and diagnostic centres in Lithuania. It performs a variety of blood tests and offers consultations by experienced general practitioners and medical specialists. At Antėja, a professional team of doctors is always ready to help. The clinic is staffed by general practitioners and a midwife, as well as specialists, including a geneticist. The idea behind a modern medical centre is to assign the same general practitioner to all members of a family, because knowing the family's medical history is one of the best ways to effectively treat and prevent diseases.

The innovative diagnostic equipment installed in the clinic is the uMR 670, a state-of-the-art 1.5 T wide

gantry scanner that provides efficient, reliable and comfortable MRI examinations. It has an ergonomic table that ensures that the patient is comfortable during the scan and an intercom that allows the patient to communicate with the medical staff during the examination. The groundbreaking uAIFI DeepRecon technology, which uses image reconstruction methods based on deep learning, achieves image quality similar to a 3.0 T system. In addition, the revolutionary uAIFI EasySense non-contact respiratory motion monitoring system improves patient comfort during abdominal scans. With its advanced software and high-speed image acquisition systems, the uMR 670 enables fast and accurate scanning. The system can be used in a wide range of clinical applications, including brain, spine, joint and soft tissue scans.

Project realised in collaboration with the distributor MedUS Medical.

Read more about the uMR 670 at: <https://eu.united-imaging.com/en/product-service/products/mr/umr-670>



# Accelerating Healthcare Innovation: How to Harness the Full Potential of Digital Solutions

Exploring the transformative potential of user-centric digital solutions in healthcare, case studies showcase how these innovations drive improved patient outcomes, operational efficiency, and accessibility in healthcare delivery and management.



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## key points

- Prioritising user needs and seamless integration into existing workflows is critical to drive successful adoption and deliver transformation in healthcare.
- Simplifying complexity and streamlining workflows to optimise efficiency and enhance user experience showcases the power of simplicity in driving technological advancements.
- Digital solutions must generate their own effectiveness data, validating their benefits and facilitating widespread adoption, emphasising the importance of evidence-driven adoption:
- Strategic partnerships and a commitment to usability and user experience drive successful product development and adoption, demonstrating how collaborative efforts and user-centric focus are essential for driving healthcare transformation.
- Innovations democratise access to advanced healthcare tools, promising improved patient care and outcomes across diverse healthcare settings.

In the rapidly evolving landscape of healthcare, technological advancements stand as catalysts for transformative change. Among these innovations, digital solutions emerge as pivotal drivers that have the potential to dramatically improve the delivery of care from clinical, operational and financial points of view. From streamlining administrative processes to optimising patient care pathways, digital solutions offer unprecedented opportunities for efficiency, accuracy, and accessibility. As a specialised healthcare consultant, Thierry Godelle witnessed firsthand the profound impact of these technologies on the industry and is in a privileged position to offer insights on how embracing technological and digital solutions accelerates innovation in healthcare towards a future defined by improved patient outcomes and enhanced quality of care. Thierry Godelle's experience from recent projects ranges from the implementation of digital monitoring systems in hospital pharmacies to ensure safe medication

compounding, to the utilisation of robotisation to get complete a patient skin complete digital representation to improve dermatology follow-up and improve diagnostic, and to the development of advanced instruments for measuring nanoparticle size to engineer effective nanomedicines.

## Putting Users First: Empowering Healthcare Through User-Centric Digital Solutions

Digital transformation projects in healthcare often encounter pitfalls leading to failure. These failures stem from various causes, including inadequate user engagement, poor alignment with existing workflows, and insufficient consideration of user needs. However, these setbacks have served as valuable lessons for innovators. They've realised the importance of developing user-centred digital solutions tailored to address pressing healthcare challenges. Today,



there's a concerted effort to design products that seamlessly integrate into existing practices while significantly enhancing them. Ultimately, failure in digital transformation projects doesn't result from the technology itself, but rather from the design of the product. By prioritising user needs and workflow integration, innovators can mitigate the risk of failure and drive the successful adoption of digital solutions in healthcare.

The importance of user-centricity in healthcare innovation is vividly illustrated by the story of Eureka and its Drugcam solution for safe chemotherapy compounding in hospital central pharmacies. Founded by Pharmacist Benoît Le Franc, Eureka's journey began with a keen observation of the challenges faced in his own department. Benoît Le Franc recognised that the conventional method of double visual control was prone to errors, jeopardising patient safety and taking a toll on staff morale due to heightened stress levels. The Drugcam solution was conceptualised with the primary objective of addressing these critical issues. By placing the needs and experiences of pharmacists and technicians at the forefront of product development, Eureka ensured that Drugcam not only enhanced patient safety but also improved workflow efficiency and staff well-being. This user-centred approach yielded tangible benefits and facilitated the implementation process at new sites, as user engagement came naturally, minimising the need for extensive change management efforts.

Extreme attention was given to the workflow to ensure that the transition to Drugcam was as seamless as possible. The first step involved simplifying the workflow, a task that proved crucial

yet challenging. Simplification necessitates making trade-offs, as famously stated by Einstein, "Everything should be made as simple as possible, but not simpler". Eureka understood the importance of focusing on the critical steps of chemotherapy compounding. Along the way, they made the strategic decision to abandon monitoring certain steps if it risked alienating users rather than assisting them. This approach ensured that the solution added substantial value without unnecessary complexity.

Innovations must seamlessly integrate into existing workflows or offer substantial operational gains that make them indispensable, ensuring their widespread adoption

### Simplifying Workflows with AI Integration

The second step involved making the workflow as intuitive as possible, minimising clicks and manual interventions. Eureka prioritised the seamless integration of AI and video recognition technology within Drugcam, leveraging these advancements

to enhance the solution's speed, intuitiveness, and practicality. By harnessing the power of AI and video recognition, Drugcam was able to streamline the compounding process monitoring, reducing the need for manual interventions and clicks. This technological integration not only optimised workflow efficiency but also simplified the user experience, making Drugcam a practical and user-friendly solution for pharmacy staff. In essence, the focus was on simplicity, achieved through the seamless incorporation of advanced technologies into the workflow.

### Leveraging Data Insights for Evidence-Driven Adoption

Last but not least, Drugcam, like other relevant digital solutions, produces its own effectiveness evidence through the data it generates and makes available to its users. This aspect is pivotal in the virtuous circle of digital transformation. By leveraging the data insights provided by Drugcam, hospital pharmacists can demonstrate the tangible benefits of the solution, ranging from improved medication safety to reduced product and related financial losses. This evidence not only validates the effectiveness of Drugcam but also simplifies the process of convincing future customers of its ROI. In essence, the ability of digital solutions to generate and showcase their own effectiveness data serves as a cornerstone in driving widespread adoption and continuous improvement within the healthcare ecosystem, particularly as healthcare providers face financial constraints; the capacity for a digital solution to pay for itself significantly facilitates its adoption from a budgetary perspective.

## Digital Skin Mapping Innovation Improves Accessibility and Efficiency for Dermatology

The demand for skin exams is skyrocketing due to ageing populations and increased sun exposure, while the number of experts remains stagnant, resulting in waiting times of several months to a year. Dermatology faces accessibility and efficiency challenges, all the more given that the practice remains largely manual-intensive, with today's standard of care remaining a handheld magnifier invented 30 years ago. When compared to other medical verticals, dermatology is still prone to digitisation, in this very case, high-resolution scans for efficient longitudinal patient follow-up and the deployment of AI in clinical routines as a second pair of eyes. This issue is notable considering that 80% of melanomas develop on healthy skin and not from existing moles.

SquareMind, an innovative company in dermatology, stepped up to the plate to tackle this crisis prevalent in many countries. SquareMind has developed an innovative full-body imaging solution scheduled for the European market in 2024. It features an automated system capable of digitising a patient's entire skin with a definition comparable to that of a dermatoscope, the currently utilised tool, in just 3 to 5 minutes. A robot equipped with a high-resolution camera navigates around the patient's body, enabling complete, automated image acquisition. The device is compact, user-friendly, manoeuvrable, and can be operated by a medical assistant to initiate a scan. The potential for healthcare centres is enormous:

significant workflow efficiencies through automation, and more accessible care through tele-dermatology thanks to the digitisation of the skin map. One can easily imagine patients getting scanned in 5 minutes, with images being reviewed by an expert, unlocking workflow efficiency but also democratising access to care in physician-deprived areas.

From streamlining administrative processes to optimising patient care pathways, digital solutions offer unprecedented opportunities for efficiency, accuracy, and accessibility

The implementation of SquareMind's digital skin mapping capability offers a self-sustaining solution that effectively "pays for itself" over time. By boosting throughput, it allows centres to increase their revenues, creating a compelling incentive to adopt the solution. SquareMind's ability to alleviate a critical bottleneck not only improves patient care but also generates tangible financial benefits, ensuring

a rapid return on investment for healthcare facilities. Part of SquareMind's offered solution is an initial AI companion that will highlight new and modified moles over time, proving useful for follow-ups. While it does not provide a diagnosis or identify the nature of the change, this supplementary information will be a welcome addition to patient care.

In the long run, SquareMind aims to demonstrate that its digitised skin maps of the body will offer a more comprehensive context for AI to analyse lesions with high sensitivity and specificity. Instead of analysing potential lesions in isolation based solely on the lesion pattern using a data bank of annotated patterns, SquareMind's approach considers the broader context provided by the entire skin surface, akin to a physician's typical assessment. For instance, by integrating information such as the temporality of the lesion or its shape in the surrounding environment, the AI algorithm will likely classify lesions more sensibly and precisely.

SquareMind's iterative approach, beginning with workflow simplification and then gradually enhancing skin assessments with a 2nd pair of eyes, serves as a compelling illustration of the evolution of healthcare technological solutions; by prioritising user needs and addressing organisational bottlenecks, the company ensures its adoptability and effectiveness within healthcare institutions, while gradually developing a suite of tools for improved patient care. SquareMind exemplifies the transformative impact of upcoming healthcare technological solutions, promising a future where innovation drives accessibility, efficiency, and excellence in healthcare for all.

## Emerging Technologies Must Address Unmet Needs to Secure Successful Adoption

It is crucial to recognise that breakthrough healthcare technological innovations can also emerge from the technology itself. Some entrepreneurs possess a remarkable ability to identify novel technologies and uncover and delineate the problems they can solve, transforming them into effective solutions. Reflecting on the rapid evolution of technology, it's remarkable to consider that just a couple of decades ago, the concept of a smartphone seemed unnecessary. Yet, the subsequent revolution it brought to our daily lives underscores the potential for innovation to arise from unexpected sources. Similarly, within the healthcare sector, entrepreneurs adept at harnessing emerging technologies have the opportunity to reshape the landscape by addressing unmet needs and unlocking new possibilities for enhanced patient care and outcomes.

For these technological innovations to gain successful adoption among healthcare practitioners, they must undergo a rigorous process. Firstly, they must identify unmet needs within the healthcare landscape, addressing significant challenges that warrant attention and engagement from users. These needs must be substantial enough to ensure sustained user engagement and avoid potential derailment. Additionally, the innovations must seamlessly integrate into existing workflows or offer substantial operational gains that make them indispensable, ensuring their widespread adoption.

Moreover, they should produce their own data as evidence of their added value, validating their effectiveness and benefits. These essential product development and design steps are increasingly recognised as indispensable, laying the foundation for the successful implementation and adoption of healthcare technological innovations.

## Innovation Must Commit to Usability and User Experience

Nanoscale Metrix, founded by serial entrepreneur Gérard Meunier, introduces the TaylorSizer solution, pioneering nanoparticle size distribution measurement for particles as minute as 0.5 nm. Traditional instruments capable of assessing particles below 50 nm are typically expensive and complex to operate, limiting accessibility. Nanoscale Metrix seeks to revolutionise this landscape by democratising ultra-small nanoparticle sizing, making it widely accessible in both healthcare research and clinical settings. This breakthrough holds immense promise for advancing the development and evaluation of nanomedicines.

Gérard Meunier and his team recognise that the successful adoption of the TaylorSizer solution hinges on its ability to address real-world challenges and deliver tangible value to users. To achieve this, they have forged strategic partnerships with key players in pharmacology and bioengineering, tapping into their expertise and domain knowledge. These collaborations provide invaluable insights into the diverse applications and potential benefits of TaylorSizer across various healthcare settings.

By immersing themselves in these partnerships, the product development team gains a deep understanding of the unique needs and requirements of their target users. They leverage this knowledge to fine-tune the features and functionalities of TaylorSizer, ensuring it aligns seamlessly with existing workflows and addresses specific pain points encountered by researchers and clinicians.

Moreover, the emphasis on optimising the user interface reflects a commitment to usability and user experience. Recognising that complex instrumentation can often be daunting to operate, the team strives to simplify the user interface, making it intuitive and user-friendly. This user-centric approach not only enhances the adoption and acceptance of TaylorSizer but also maximises its impact by empowering users to leverage its capabilities effectively.

Overall, these strategic partnerships and the iterative product development process underscore Nanoscale Metrix's experience in delivering a solution that not only meets but exceeds the needs and expectations of the healthcare community.

## Driving Healthcare Transformation: Case Studies Support Digital Innovation

In conclusion, the examples of Drugcam, SquareMind, and TaylorSizer underscore the transformative power of digital and technological solutions in accelerating healthcare transformation. Each product exemplifies how companies are delivering innovations tailored to

meet the evolving needs of healthcare practitioners and patients alike.

Drugcam's user-centric approach revolutionises chemotherapy compounding, streamlining workflow processes and enhancing patient safety. By prioritising user needs and integrating seamlessly into existing practices, Drugcam demonstrates how digital solutions can mitigate errors and improve outcomes while reducing stress levels among healthcare professionals.

Similarly, SquareMind's innovative robotic device revolutionises dermatologic follow-up procedures, offering a comprehensive solution for mapping and

digitising the patient's skin surface. By addressing a critical user issue and leveraging advanced technology, SquareMind enhances diagnostic capabilities and streamlines clinical workflows, ultimately improving patient care and outcomes.

Lastly, Taylorsizer exemplifies how companies are harnessing emerging technologies to democratise access to critical healthcare tools. By partnering with industry and clinical research labs, Nanoscale Metrix ensures that Taylorsizer meets the specific needs of pharmacology and bioengineering, optimising its features and user interface for seamless integration into healthcare R&D and clinical settings.

Collectively, these examples showcase how companies are delivering digital and technological solutions that are increasingly suited to accelerate healthcare transformation. By focusing on user needs, optimising workflow integration, and harnessing the power of emerging technologies, these innovations pave the way for a future of improved efficiency, efficacy, and accessibility in healthcare delivery and management.

### **Conflict of Interest**

None.



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# The Apulian e-Health Ecosystem: CORēHealth and TOC Interconnection

In the Apulia Region, healthcare innovation in telemedicine began many years ago through various projects. The National Recovery and Resilience Plan (NRRP) provides for interventions to strengthen and innovate the technological and digital structure of the Italian NHS. Therefore, in continuity, Apulia has started the design and implementation of the platform for the management of transitional assistance by the Territorial Operational Centers (TOC) of the health authorities of the Apulia Region. The Apulia Region and AReSS have also approved a series of acts aimed at regulating the establishment of the Apulian TOC and the interconnection with regional and national information systems.



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## key points

- Interoperability with digital health regional and national systems.
- Empowerment, change management, training and digital literacy of all stakeholders of the health system.
- e-Health ecosystem and interconnection.
- Systematic approach in *Continuing Training and Digital Competence Consolidation*.

## Introduction

The Apulia Region is a precursor in terms of innovation in digital healthcare and telemedicine; in fact, the design of the new Apulian e-Health ecosystem model began as early as the 2000s. The COVID-19 pandemic has evidently accelerated the need to update, strengthen, and develop digital systems in healthcare.

In recent years, the Apulia region has committed itself to responding to the new and ever-increasing health needs of Apulian citizens and to adapting local health services in compliance with the legal framework, quality, and sustainability criteria.

The Apulia Region's experience in telemedicine culminates in the *Regional Operating Center of Telemedicine for Chronic Diseases and Clinical Networks (CORēHealth)*.

Furthermore, Apulia, exploiting the resources of the NRRP - C2 M6, has started activities of designing and implementing the platform for the management of transitional care by the Territorial Operations Centers of the Health Authorities of the Region: TOC interconnection.

## CORēHealth

CORēHealth is Apulia's telemedicine operating centre (Gorgoni et al. 2022a),





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winner of numerous national and European awards (Gorgoni et al. 2022b; Gorgoni et al. 2022c; Regions4PerMed Best Practices Award; DT4REGIONS Award; Digital Agenda 2022 Award). In 2020, the Apulia Region, by act of the Regional Government n.1088, established CORēHealth within AReSS, providing operational guidelines for the promotion and dissemination of telemedicine in the health service.

The Agency followed up on the mandate conferred by the region and began to develop the infrastructure, the platform and the mobile app of the operating centre.

CORēHealth is part of the Regional Health Services Network via dialoguing and cooperating with the various institutional and operational stakeholders of the area. It is the institutional and operational reference for all e-Health initiatives implemented by Apulia. CORēHealth, in its full operational mode, provides for central coordination of the various e-health solutions implemented at

the regional level, guaranteeing technological interoperability and a vast range of services, working as a *service provider* for regional e-health services. The involvement is extended to almost all subjects belonging to the regional social-health sector.

Another key element is the systematic approach in *Continuing Training, Digital Competence Consolidation and digital skills* built to enable informed access of all the actors involved to the new digital technologies: among the enabling factors of digital health, the digital skills spread to all professionals are undoubtedly an essential strategic element. For this reason, AReSS has designed a path of *change management, training and digital literacy* of all users of the system (both medical and administrative teams) and patients so that CORēHealth does not remain a mere tool, albeit technologically advanced, but represents a real organisational shift toward a new and innovative way of caring for chronic patients with benefits for both patients and caregivers.

The platform will enable each supply centre to manage its clients according to defined and suitably modelled processes.

From a more strictly technical point of view, the platform implements an application solution that enables the model at a regional level, implementing the technological transformation towards a cloud environment, as well as the re-engineering and migration of its application systems on the cloud

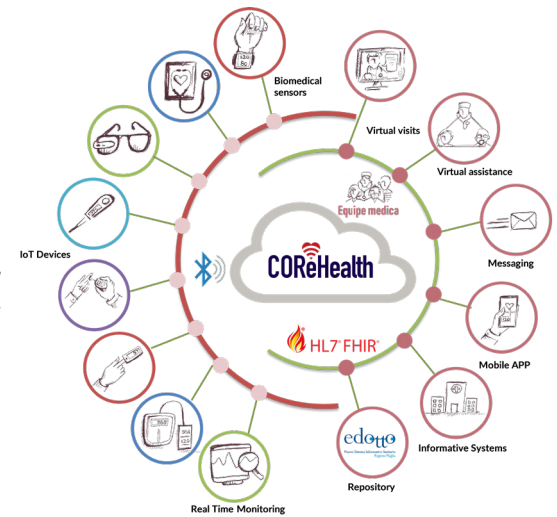


Figure 2: Interoperability of the CORēHealth

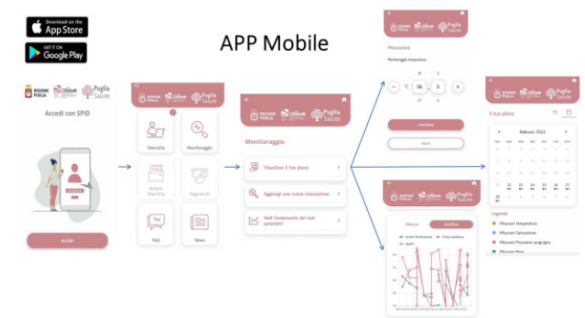


Figure 3: CORēHealth APP mobile interfaces

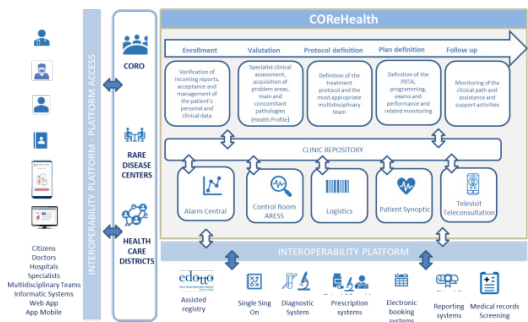
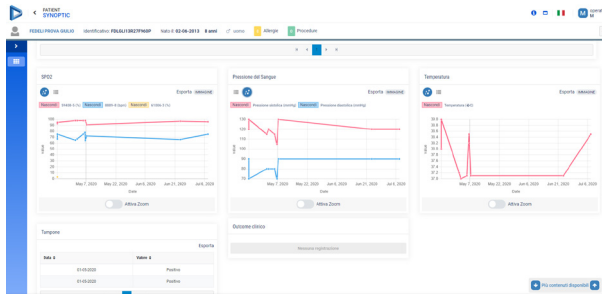


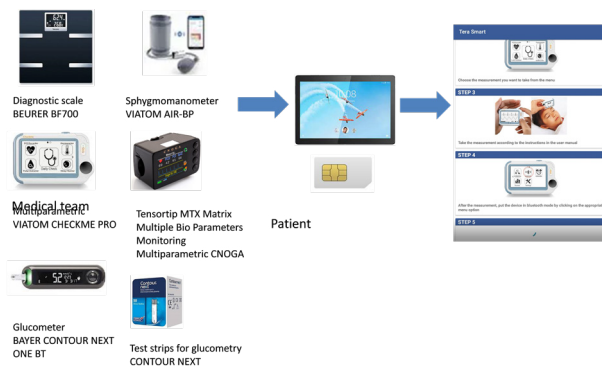
Figure 1: CORēHealth model

infrastructure of the service centre of Innovapuglia (in-house IT provider of the region). Furthermore, this software module is certified as a medical device.

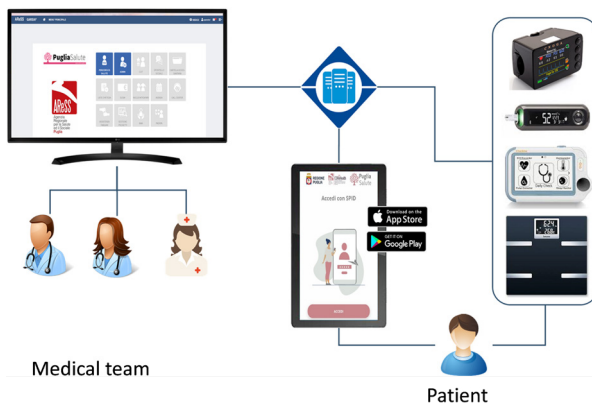
The project includes, among other technological components, the following (Figure 2):



**Figure 4:** CORēHealth patient synoptic



**Figure 5:** CORēHealth medical devices example



**Figure 6:** CORēHealth IT Architecture logical model

- platform for the management of chronicity and clinical networks;
- Televisit, teleconsultation, telemonitoring, telecooperation and teleconference platform;
- Televisit and teleconsultation system;
- Device traceability system;
- Clinical repository;
- Mobile app for citizens (available on the Android and iOS stores), with guaranteed access via SPiD/eIDAS, which facilitates their involvement in the care process: keeping in touch with their specialist doctor and caregiver (video calls and chat); consult the agenda of scheduled televisits with patient’s care team; view the treatment plan; enter the vital parameters that are communicated to the doctor in real-time; promote the measurement of adherence to the treatment pathway (drug intake, lifestyle), etc. (Figure 3);
- Patient synoptic: certified medical device for the collection and visualisation of parameters and clinical data (Figure 4);
- AReSS alarm centre for centralised monitoring by the agency, which is proposed in the form of a real-time dashboard;
- HL7 FHIR Interoperability Platform for integration management;
- Integration with the Regional Health Information System “Edotto”, EHR (Electronic Health Record), clinical files and with the LIS, oncological screening, RIS/PACS systems (in the planning phase).

Each patient is assigned an Integrated Care Pathway (“PAI”) based on the specific treatment plans of their pathologies (Diagnostic Therapeutic Care Plan) and, if necessary, a medical device kit, interoperable with the unit, for the detection and monitoring of key vital parameters.

The medical team, based on specific needs, can provide patients with a medical device kit (tablet, pulse oximeter, multi-parameter, scale, etc.), interoperable with the unit, suitable for real-time detection and monitoring of vital parameters, salient features that enable constant detection and monitoring, allowing possible intervention by virtue of the automatic alarm system with which the control unit is equipped (Figure 5).

CORēHealth thus provides the care team with a web-cloud (back office) platform available for the remote digital management of their patients by offering, among the main services: personalised patient monitoring paths (telemonitoring), teleassistance, televisit, teleconsultation and remote health collaboration, digitised services for taking charge of patients, personalisation and management of patient care plans, logistics/warehouse management of medical device kits (Figure 6).

The trial phase of CORēHealth, which ended in December 2021, focused on four regional pilot projects: the Oncology Department of the San Paolo Hospital in Bari (for breast cancer), the Thalassemia Center in Brindisi (for thalassemia), the Putignano District (for diabetes and hypertension), and the Local Health Authority of Taranto (for rural medicine).

As of January 2022, training of Regional Oncological Guidance Centers and Breast Unit providers and the

enrolment of approximately 23,000 cancer patients (breast).

## Territorial Operations Center

The National Recovery and Resilience Plan (NRRP) allocated approximately €9 billion for interventions in Italy aimed at strengthening the services provided in the area thanks to the strengthening and creation of local structures and facilities, the strengthening of home care, the development of telemedicine and more effective integration with all social and health care services. This initiative arises in the context of NRRP component 2 of mission 6, which embraces interventions aimed at strengthening and innovating the technological and digital structure of the Italian NHS to guarantee a significant evolution of healthcare methods. In this context, Apulia has started activities aimed at designing and implementing the platform for the management of transitional care by the Territorial Operations Centers of the Health Authorities of the Apulia Region: *TOC interconnection*.

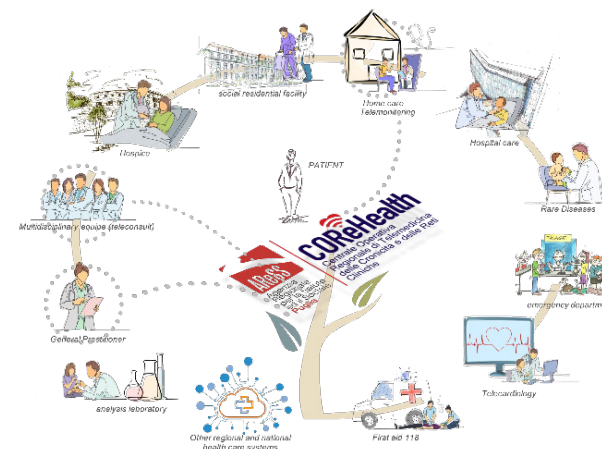
The Territorial Operations Center (TOC) is a back office organisational model that carries out the function of coordinating the taking charge of the person and relationships between services and professionals involved in the different care settings through the connection of the nodes of the intermediate care network enabling and facilitating connections between professionals and the patient journey between different healthcare locations and providers.

The Apulia Region and AReSS Puglia have approved a series of acts regulating the establishment of the Apulian TOC and its interconnection with regional and national information systems.

By the act of the Regional Government n.625/2023, AReSS has been committed by the Apulia Region to start the competitive relaunch within the framework of the Consip Framework Agreement, called AQ Digital Health 2, with a starting bid amount equal to Euros €2,292,555.25. The act also established that CORèHealth plays the role of a technological platform for the management of transitional care, which allows the TOC to play the role of integrator and facilitator between the hospital and the territory (Figure 7).

The TOC interconnection platform must interface to ensure interoperability with:

- Computer telephony integration;
- Regional registry of recipients, national registry of recipients and company contacts through the master patient index system and related caregiver contacts;
- Acceptance systems, waiting list management, etc;
- Emergency room systems;
- Single booking centre, e-prescription system and e-payment system;
- Company’s diagnostic therapeutic assistance management system;



**Figure 7:** The CORèHealth ecosystem

- Hospital systems and local healthcare settings;
- Electronic Medical Record;
- Regional screening modules;
- Third-party systems and any other clinical system necessary to provide data and information for patient care (both regional and national);
- National Telemedicine Platform and the related services;

Interoperability will be guaranteed by referring to technological standards, with particular regard to formats in the healthcare sector, as well as in compliance with current regulations.

The TOC interconnection interventions must inevitably consider the ecosystem of the Health

Information Systems of the Apulia Region and its local health authorities, including GDPR compliance, which is assured by continuous assessment of the related legal aspects.

## Conclusion

The road ahead is still long and challenging but certainly less tortuous than when this journey was undertaken. Our next goal is to follow and monitor chronic/ill patients in every stage of his/her illness thanks to CORēHealth, the COT module and the interoperability with other medical systems.

The technologies are now mature, as are the processes and actors. Now more than ever, they are fully aware of the benefits (in economic, time, and efficiency terms) that can be drawn from the use of digital technology in healthcare.

The greatest benefit, however, is for the patients, who are truly the protagonists of the innovation.

Digital literacy processes are fundamental, aimed at increasingly reducing the gap between technology and users, who are often elderly.

The autonomy and independence in the management of medical devices by the patient who can be monitored in real-time from the comfort of home as well as follow a personalised treatment plan are increasingly important within the legal framework established at the national and regional levels.

The Apulia region, therefore, continues to invest in the topic with a series of objectives that can also be achieved in the medium term, such as:

- Implementation of CORēHealth at the Lecce Penitentiary Institute;
- Launch of further digitalised care lines at the local health authorities of BAT (Barletta-Andria-Trani) and Taranto;
- Extension of the telemedicine service to all chronic diseases in the Apulia Region, including rare diseases.

## Conflict of Interest

None.

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# Unlocking the Potential of AI in the NHS: A Path Forward

Leveraging the full potential of AI and technology at the NHS and setting out an action plan that maximises benefits for patient care and staff satisfaction.



JENNY  
LEWIS

Digital Healthcare  
Expert | PA  
Consulting | UK

## key points

- Harnessing AI to expedite patient access to care and optimise resource allocation can achieve significant improvements in healthcare delivery.
- AI algorithms and data-driven decision support tools to predict patient demand, optimise scheduling, and allocate resources efficiently can reduce waiting times and enhance patient satisfaction.
- Seamless integration of AI into standard processes requires a comprehensive overhaul of existing workflows, ensuring that technology augments rather than disrupts established practices.
- The NHS must fund the time and effort required to achieve this transformation, supporting Trusts in finding the budget to run the necessary change programme.

The recent announcement of increased funding for AI within the NHS by the Chancellor in his 2024 Spring Budget has been met with widespread approval, marking a crucial step in stabilising our healthcare system and ensuring its ongoing status as a global leader in healthcare provision.

However, while the injection of cash is a much-needed catalyst, it represents just the beginning of a transformative journey. To leverage the full potential of AI and technology, the NHS needs to set out an action plan that maximises benefits for patient care and staff satisfaction.

## Step 1: Focus on the Right Priorities

While the temptation to implement AI in high-profile clinical processes, such as radiology scan reporting, is understandable, it is like diving into the deep end of the pool without mastering the basics. There are many high impact use cases which directly address systemic challenges - such as waiting list management - and avoid many of the ethical

and clinical concerns of AI becoming part of a clinical decision chain. By harnessing AI to expedite patient access to care and optimise resource allocation, we can achieve significant improvements in healthcare delivery.

The perennial issue of maximising expensive hospital resources, such as operating theatres and radiology scanners, is one area where AI can have significant impact. Our research has shown that CT and MRI scanners in the NHS stand empty 10-20% of the time - despite there being almost half a million people on the waiting list for a scan (NHS Digital 2023). By deploying AI algorithms and data-driven decision support tools to predict patient demand, optimise scheduling, and allocate resources efficiently, hospitals can significantly reduce waiting times and enhance patient satisfaction. Our work with NHS Trusts has shown that the deployment of AI-driven scheduling tools resulted in an increase in patient throughput within imaging departments and through operating theatres within just three months.



AI can also play a pivotal role in augmenting back-office services. At a time when the finances of the NHS are at critical levels, and every Trust and ICS needs to find significant savings in 2024/5, AI could be used to ensure the thousands of contracts run by every hospital are effectively managed. Our work has shown a significant reduction in the time to review a contract using AI contract management support.

## Step 2: Cultivate Staff Buy-In

Critical to the success of any AI initiative within the NHS is the cultivation of trust and buy-in from frontline clinicians. Clinicians, who have dedicated their careers to refining their clinical judgment and providing personalised care, understandably approach the integration of AI with caution. Overcoming this scepticism requires a concerted effort to demonstrate the efficacy and reliability of AI-driven solutions through rigorous testing and evidence-based implementation.

Moreover, the pervasive ‘not made here syndrome’ within the NHS presents an additional hurdle, necessitating individual Trusts to actively engage and persuade their clinical communities of the tangible benefits of AI adoption. Building a culture of collaboration and transparency where the clinical community is leading the way will be essential.

One approach to fostering staff buy-in is through deep engagement from the very start in the design of the programme. We have found the use of the ‘Net Promoter Score’, which measures staff enthusiasm for a particular technology, is a strong

driver for engagement. If staff know that technology is supported by their peers, for example, following a pilot programme, they are more likely to want to engage. Another helpful approach where prediction is involved is to present the clinician’s own prediction alongside any AI prediction, allowing the staff to see instantly how the AI compares. Using this method, we were able to show that an AI algorithm was more

Deployment of AI-driven scheduling tools resulted in an increase in patient throughput within imaging departments and through operating theatres within just three months

predictive of the day a patient would be ready to leave the hospital than the clinician’s own estimate.

## Step 3: Integrate Technology into Standard Processes

The mere deployment of cutting-edge technology is insufficient without a corresponding redesign of

clinical workflows to accommodate and optimise its use. Seamless integration of AI into standard processes requires a comprehensive overhaul of existing workflows, ensuring that technology augments rather than disrupts established practices. Until such redesigns are thought through, implemented, and validated, AI will have next to no impact on patients or staff.

In our experience, the technology side of this change is the easy part. People are naturally resistant to change, and clinical pathways are complex. Taking a user-led approach to process redesign has the dual impact of bringing those impacted – for example, staff, patients and carers - along on the journey while also helping to ensure the change is not just a digitisation of existing processes.

The NHS must fund the time and effort it takes to get this transformation right, supporting Trusts to find the budget to run the necessary change programme. If we do this properly, we will reap the benefits for years to come.

## Looking Ahead: A Collaborative Imperative

As we embark on this journey towards AI-driven healthcare transformation, collaboration between the government, NHS leadership, frontline staff, and technology partners will be paramount. Our recent [research](#) has shown that 74% of organisations recognise that AI can make their operations more efficient, and a stunning 84% do not believe they are equipped to make this a reality. While the



## Cover Story

Chancellor's investment in AI represents an important moment, its true impact will be contingent on our ability to navigate the complexities of implementation effectively and provide frontline organisations with the support they need. By focusing on the right priorities,

cultivating staff buy-in, and effectively integrating technology into standard processes, we start to make a rapid and substantial impact on patient outcomes right now.

### **Conflict of Interest**

None.

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# Cardiovascular Strategies

# Strengthening Cardiovascular Care Resilience for Healthier Hearts: The RESIL-Card Project

Prompted by concerns over the substantial disruptions in cardiovascular care during the COVID-19 pandemic, a team of interventional cardiologists has joined forces with public health and healthcare delivery experts to launch the EU-co-funded RESIL-Card project, which aims to develop a toolkit for resilience assessment to improve preparedness and continuity of cardiovascular care during times of crises.



**PROF WILLIAM WIJNS**

Principal Investigator, RESIL-Card | PCR Chairman | SFI (Science Foundation Ireland) Professor in Interventional Cardiology | Lambe Institute for Translational Medicine and Curam | University of Galway | Galway, Ireland

## key points

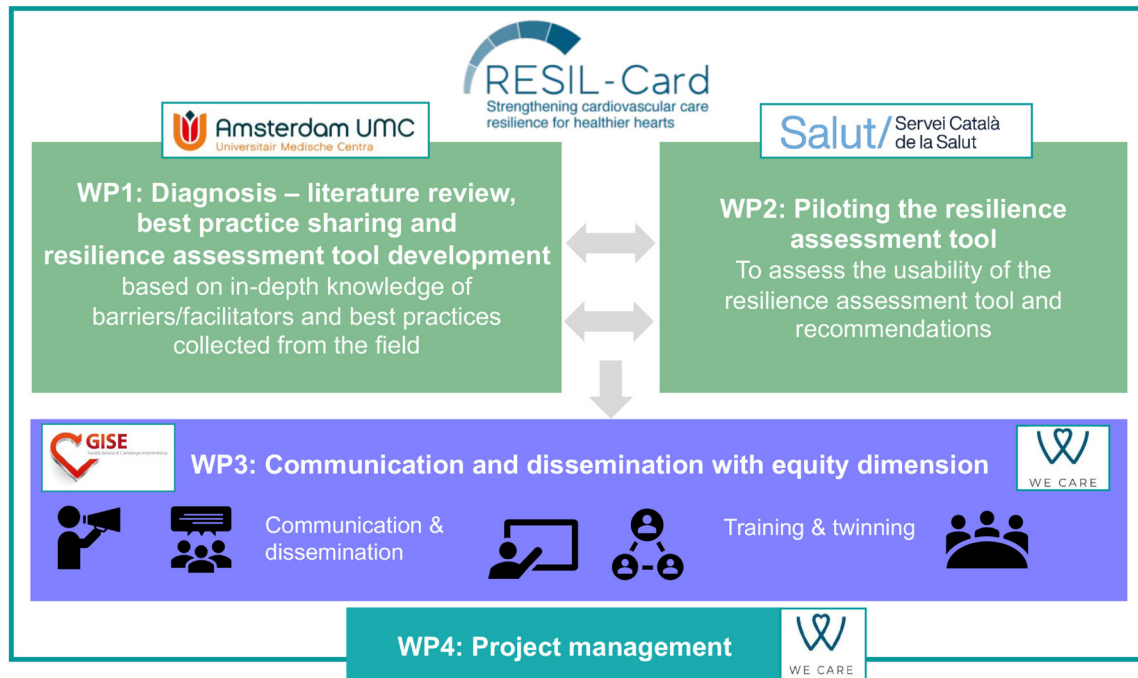
- Disruptions in care delivery for patients with cardiovascular diseases during the COVID-19 pandemic, including a decline in the number of life-saving procedures performed, came at a considerable health and societal cost and demonstrated the unpreparedness of healthcare services to maintain care delivery during crises.
- A team of international interventional cardiologists from the We CARE initiative has formed a consortium with public health and healthcare delivery experts to launch the EU-co-funded RESIL-Card project.
- Drawing on insights and lessons learned from the pandemic, this three-year project aims to develop and implement a groundbreaking resilience assessment toolkit to support healthcare systems to self-assess and improve their preparedness, working towards ensuring cardiovascular care continuity for all patients in challenging times.

Cardiovascular diseases (CVD) are leading causes of death and morbidity globally. The devastating consequences of disrupted cardiovascular care were highlighted during the COVID-19 pandemic, where a substantial decline in the number of life-saving interventions performed was observed, such as procedures to treat acute myocardial infarction and stenotic aortic valves (Roffi et al. 2020). This reduction in the number of procedures is likely to have increased out-of-hospital deaths and long-term complications (e.g. heart failure progression) (Mafham et al. 2020) while also having a considerable economic impact (Lunardi et al. 2024). As an example, it is predicted that patients who experienced an ST-elevation myocardial infarction during the first lockdown in Spain lost an average of 2 life-years compared with patients presenting

during the pre-pandemic period, with an estimated societal cost burden of €89 million (Lunardi et al. 2024).

Prompted by concerns over the disruption of cardiovascular care continuity, PCR, an organisation dedicated to education and information in cardiovascular interventional medicine, joined with the global 'Stent—Save a Life!' initiative to launch 'We CARE' in May 2021 ([We CARE 2024](#)). Led by a network of international interventional cardiologists, nurses, and allied professionals, We CARE's remit is to support all stakeholders in the CVD field in delivering effective and timely cardiovascular care sustainably, whatever the circumstances.

The pandemic demonstrated the unpreparedness of healthcare services, and thus, a key aim of We CARE is to learn



**Figure 1:** Four complementary work packages (WP) are integrated into the [RESIL-Card project](#)

important lessons and help to build more resilient healthcare systems that can withstand future challenging situations. We CARE, in partnership with the Italian Society of Interventional Cardiology, GISE, with public health experts from Amsterdam UMC and with the Catalan Health Service, CatSalut, formed a consortium and launched the [RESIL-Card](#) project in December 2023. Co-funded by the

EU4Health programme, the 3-year RESIL-Card project aims to develop and implement a groundbreaking resilience assessment toolkit to be applied to European cardiovascular care systems. This toolkit intends to support stakeholders in assessing the preparedness and resilience of their cardiovascular care pathways and identifying and addressing gaps using recommended standards.

The main objectives of RESIL-Card are to:

- Identify and document major gaps/barriers, good practices and lessons learned from the COVID-19 pandemic regarding CVD care efficiency and resilience in times of crisis.
- Develop a resilience assessment toolkit to support local and regional processes and minimum requirements for resilience.
- Make recommendations and contribute to guideline development for improved care pathways to enhance communication between all patient care levels and between healthcare professionals, patients and their families.
- Empower EU Member States and policymakers to provide patients and healthcare systems with protocols, monitoring tools and awareness engines that ensure actionable measures in a variety of scenarios.
- Mobilise and engage all relevant stakeholders in piloting a set of recommendations across sites where pandemic preparedness levels differ.
- Reduce inequalities with respect to awareness, accessibility and inclusion in care pathways by integrating underrepresented and marginalised social groups.

The project is supported by the expertise of Ireland’s National Institute for Prevention and Cardiovascular Health, Italy’s Cittadinanzattiva, the Global Heart Hub and Europa Group. In addition,



an Advisory Board has been formed, made up of members of the international Women as One group, the European Association of Percutaneous Cardiovascular Intervention's Nurses and Allied Professionals Committee, the GISE Foundation, as well as leading interventional cardiologists from Ukraine.

RESIL-Card comprises four interlinking work packages (Figure 1). The first work package, led by Amsterdam UMC, involves developing the resilience assessment tool using a bottom-up approach. Development will be based on diagnosis of continuity of care issues, encompassing a scoping literature review, large-scale surveys of healthcare professionals and the feedback of focus groups, with multiple stakeholders involved in discussing key barriers/facilitators and best clinical practices. The tool will focus on monitoring and strengthening the continuity of care delivery, aiming for better-integrated care systems and consolidating insights from the pandemic, for example, the use of innovations such

as telemedicine, always with the patient in the central role.

In the second work package, the resilience assessment tool will be pilot-tested by cardiovascular healthcare professionals and institutions from Spain (Catalonia) and Italy. Leading this phase, CatSalut will initially define a set of performance indicators to enable assessment of the tool's applicability and usability. After first-stage pilot testing, in-depth feedback will be collected from the users, with the aim to adapt and refine the tool before its official launch.

Co-leading the third work package – the communication and dissemination strategy – GISE and We CARE will encourage widespread adoption of the tool and recommended standards among the interventional cardiology community thanks to their respective networks. A national twinning approach will be used to foster broad implementation. Efforts will also include engaging with patient organisations to develop communication materials aimed at improving awareness and health literacy among patients and the

public. Workshops will be held with non-governmental organisations, and collaborations will be enhanced with the European Joint Action on Cardiovascular Diseases and Diabetes.

Across all these activities, We CARE will oversee project coordination, work with the Advisory Board, and manage finances, data, publications, and ethics assessments.

The conception and launch of the RESIL-Card project demonstrate a commitment from all the partners involved to help shape European healthcare systems, ensuring they are resilient, patient-centred, and capable of reducing care access inequalities, particularly in challenging times. Through collaboration, innovation and a commitment to excellence, the project aims to future-proof cardiovascular care across the continent.

## Conflict of Interest

None.

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# Finance

# Advancing in Value-based Procurement: From Theory to Practice

Experts in public healthcare procurement explore the benefits of value-based procurement on patient care, efficiency, and innovation within the framework of European legal directives and Spanish regulations.



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ALVAREZ  
GÓMEZ

Deputy Director  
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## key points

- Effective value-based procurement requires inclusive leadership and stakeholder engagement, including public administrations, managers, providers, and healthcare professionals.
- Conducting preliminary market consultations is crucial for identifying innovative solutions that meet healthcare needs. Project scopes must be delineated to align procurement strategies with market capabilities.
- Patient voices should be heard and incorporated into the design and evaluation of healthcare procurement strategies to ensure solutions are tailored to meet their needs effectively.
- Value-based procurement strategies focus on evaluating outcomes, quality, and long-term cost-effectiveness, thereby contributing to improved patient health and healthcare system efficiency.
- Continuous measurement and evaluation of results are essential for assessing the effectiveness of value-based procurement strategies and allowing for adjustments and continuous improvement.

When reflecting on public procurement, it is crucial to keep in mind both the public sector, the public purchasers, and the private sector, the economic operators, share a common objective of making available to healthcare professionals and patients the innovation available on the market to provide patients with the best possible care. However, healthcare spending has grown significantly in recent years. Although it is common to hear explanations related to the level of care intensity, such as the comorbidity associated with chronicity or the inversion of the population pyramid due to the low birth rate or increased life expectancy, the truth is that there are other explanatory factors, including the increase in spending associated with technological innovation. Indeed, the budgetary impact of the introduction of advanced technologies in the field of healthcare provision is growing steadily and sometimes faster than the financing capacity of the public healthcare model itself. Amidst regulation updates and frameworks evolution, Spanish experts convened to explore

the opportunity to move beyond conventional procurement methods and acquire solutions that not only meet healthcare needs but also improve patient care. Susana Alvarez Gómez is here reporting on the output of these conferences and taking this opportunity to thank the speakers for their active participation and their contributions.

## Intricacies of the European Legal Background

The Spanish legal system, Law 9/2017, of 8 November, on Public Sector Contracts, derives from the transposition of the European Directives of 2014, and specifically, Directive 2014/24/EU of the European Parliament and the Council introduced the concept of “Most Economically Advantageous Offer” (MEAT).

The Spanish regulation establishes as one of its objectives that the award of contracts will be carried out using a plurality of award criteria based on the best value for money, and

to this end, the contracting authorities must introduce as qualitative criteria environmental, social, quality and innovation criteria about the object of the contract that allow them to acquire not only supplies or services but to go a step further and acquire innovative, efficient and quality solutions, which contributes to improving the safety, well-being and health of patients and healthcare professionals.

We cannot ignore the fact that the reform of the Directives in 2014 was intended to:

- Simplify public procurement
- Make it more flexible
- increase the transparency of procedures
- Ensure access for SMEs
- Make strategic use of public procurement to support EU policy objectives
- Increase the efficiency of public spending.

## The Building Blocks for Strategic Procurement

Given this strategic use of public procurement and the improvement of efficiency, public procurement must provide value through the efficient application of public resources by evaluating not only the initial or immediate price of the purchase but also the results in terms of quality and improvement of patient health, and the reduction of the cost of the system as a whole in the medium and long term.

In the October 2023 Special Report on Public Procurement in the EU. Less competition for contracts

awarded for works, goods and services in the 10 years up to 202 of the European Court of Auditors stresses the need for:

Public procurement must provide value through the efficient application of public resources by evaluating not only the initial or immediate price of the purchase but also the results in terms of quality and improvement of patient health

- A proper design of public procurement procedures.
- The importance of selection criteria, which if too restrictive or too many technical requirements may limit the number of companies able to participate in the public procurement procedure or products that can be procured.

- The promotion of strategic procurement to encourage greater consideration of environmental, social or innovative aspects has had limited overall impact.

## Towards Value-Based Procurement: A Paradigm Shift in Public Sector Contracts

At the Conference “The Public Sector Contracts Law: Does it favour the purchase of value?” held on 6 June 2023 at the Hospital Clínico San Carlos in Madrid, it was concluded that: “public procurement should prioritise the value of the tendered service (in terms of quality, effectiveness, economic efficiency, impact on patient care, innovation and sustainability) as opposed to a traditional approach focused exclusively on the purchase of a predetermined product or service at the lowest possible price”.

Therefore, if today we are in the procurement of goods and services, we must move towards the procurement of solutions, which goes hand in hand not with payment by volume or procedure but with payment by health outcome. This will allow us to incorporate more advanced technological solutions for the detection, diagnosis and treatment of diseases to the benefit of the patient and, consequently, of society as a whole.

We are therefore facing a new paradigm, a necessary change of culture in public health sector contracting, and we must explore tenders where criteria are developed that define what the solution consists of and how to implement it. It is therefore time to delve deeper and make progress in the design of a methodology that will allow us to achieve the objective of obtaining the best value for money.



Furthermore, the Council of the European Union, in the document “Council Conclusions: Public Investment through Public Procurement: Sustainable Recovery and Reviving a Resilient EU Economy” (2020/C 412I/01), insists on the strategic role of public procurement and calls on Member States to develop comprehensive procurement strategies, especially in sectors where public demand has a significant impact, such as medicines and medical devices.

In this sense, value-based procurement is encompassed as a strategic public procurement model, which seeks to combine efficiency with results in terms of quality and improved patient health.

Value-based procurement cannot be understood in isolation from value-based healthcare; it can be understood in terms of the results obtained and the cost-benefit ratio.

In short, value-based care refers to a reorientation of clinical practice towards improving the health outcomes received by the patient, and value-based procurement is presented as a resource management model capable of modifying or transforming the production process of healthcare provision and, consequently, of the healthcare organisation itself.

## Promoting the Benefits of Value-Based Procurement

Building upon the discussions held during the conference on 6 June 2023 titled “The Public Sector Contracts Law: Does it favour value-based

procurement?”, experts in public procurement from both the public and private sectors gathered again for a new conference in the city of Cordoba on 14 November 2023. Titled “Advancing in value-based procurement: from theory to practice”, the conference was organised by the Deputy Directorate General for Procurement of the Madrid Health Service, with the collaboration of Impulsa Salud.

The discussion aimed to delve deeper into the realm of value-based procurement, exploring its theoretical underpinnings and practical applications. Opening statements were delivered by the Managing Director of the Reina Sofia University Hospital, Valle García Sánchez, and the Deputy Director General for Contracting of the Madrid Health Service, Susana Álvarez Gómez.

The first round table entitled “Advances in value-based procurement” featured the participation of Amparo Simón Valero, Director of the Provincial Procurement Centre of Cordoba, who presented a recent use case for value-based procurement focusing on the “Management of Patients with Arrhythmias at the Reina Sofia University Hospital”.

During their address, speakers delved into the imperative of promoting value-based public procurement within the healthcare sector. They underscored the benefits of this procurement model, aimed at securing value and fostering innovative solutions. Moreover, they outlined the opportunity it presents to transcend traditional procurement frameworks, acquiring solutions that not only address healthcare needs but also enhance patient care.

## Successful Integrated Management Projects Need Leadership Participation and a Legal Framework

A consensus emerged on the importance of involving all stakeholders, and inclusive leadership participation was deemed as a fundamental factor in carrying out an integrated management project for a healthcare process through value-based public procurement. Public administrations, public managers, product and service providers, and healthcare professionals have to all be consulted and play an active role in the co-creation and execution of any value-based procurement project.

Preliminary Market Consultation: emphasis was placed on conducting a preliminary market consultation, as stipulated in the Public Sector Contracts Law (Law 9/2017 of 8 November). Such consultation is to be leveraged to delineate the project’s scope and identify innovative solutions to meet healthcare needs.

## Use Case for the Management of Patients With Cardiac Tachyarrhythmias and Bradyarrhythmias

An in-depth analysis of the procurement dossier brought forward by the Reina Sofia University Hospital revealed its nuanced composition. It constitutes a mixed contract for services and supplies, employing an open procedure with a four-year execution period, tendered by lots and groups of lots. The general objective is the comprehensive management of patients with cardiac tachyarrhythmias and bradyarrhythmias, necessitating

invasive techniques or implantation of cardiac devices at the Reina Sofia University Hospital.

Services and supplies covered by this tender were procurement and management of the necessary materials to carry out the procedures; consultancy services for the re-engineering of operational processes to optimise care processes; service for the availability of the necessary equipment for patient care and service for the implementation and maintenance of a digital solution for remote home monitoring of patients with implantable devices.

### Milestones and Innovations in Value-Based Contracts

Several milestones and innovations were highlighted within the procurement framework:

- Definition of the contract's purpose to address specific healthcare needs. This involves describing the need to be covered and the "critical points" or points of improvement to be addressed using innovative solutions that guarantee this improvement in care in terms of efficiency, safety and effectiveness.
- Establishment of efficiency, safety, and effectiveness objectives according to the critical points detected and the services covered by the contract.
- Formation of a monitoring committee to oversee project coherence and progress. Such committee

will act as the contract manager and highest authority for the project and will therefore be responsible for decision-making, ensuring the overall coherence of the project, and coordinating and monitoring every step and milestone. Members will be comprised of at least one person in charge of the healthcare unit, one representative from the information technology area, three from the health centre management departments and one from the supplier who will be awarded the re-engineering contract.

- Payment for the material procurement should be linked to the cost per procedure, based on the definition of a standard of materials to be used for each procedure. Establishing an average cost per type of procedure will ensure the technological renewal of the specific material for each procedure throughout the duration of the contract. For some supply tender lots, the transfer of certain equipment necessary to use the material and perform the procedures is included as an obligatory service.
- Possibility was granted to accept an integrated offer for services corresponding to the re-engineering of processes and remote home monitoring of patients with a maximum of two of the lots or groupings of supplies, to allow for price improvement.
- The introduction of a consultancy service tender for the re-engineering of operational processes to optimise care processes shows how value-based procurement contributes to the management of the hospital value chain in its entirety.

- Weighting criteria for the successful bids favoured technical quality over price in contract awards by limiting the weight of the price criterion to 30% for services and 40% for supplies.
- The value-based criteria for supplies of medical equipment and implants include aspects such as quality, ease of use, safety of use and results, performance and efficiency.
- The possibility of modifying the contract is contemplated, highlighting modifications derived from technical advances in the way of performing any of the procedures covered by the contract. Such flexibility allows for the procedures to be realised with different material from what was awarded, as long as this change or technical advance is considered beneficial based on the clinical criteria of the doctors, and as long as this modification does not involve an increase in the price awarded per procedure.
- Payment by results is introduced so that 30% of the payment for the last two years of the operational process re-engineering service will be based on the achievement of certain health results, measured by a series of indicators defined in the specifications.

Finally, participants recognised the need to incorporate patient experience more prominently in such contracts, allowing the final recipients of these implemented solutions to play a pivotal role in enhancing healthcare outcomes in response to their needs. The voice of patients must be heard, as it is a valuable addition to the objectives laid down by healthcare professionals.

## Value-Based Procurement Model is Serving Healthcare Strategy

In essence, value-based procurement emerges as a catalyst for redefining resource management and transforming healthcare delivery processes and organisational structures. The use case displayed a good example of the model at work, transforming the production process of healthcare provisions and, consequently, of the healthcare organisation itself.

The speakers conclude that the new value-based public procurement model is an innovative solution that demonstrates that public procurement is a strategic tool for meeting the needs of healthcare centres through the acquisition of quality goods and services at competitive prices, with an impact on improving health outcomes.

We cannot forget that value-based procurement is a strategic public procurement aiming to contribute efficiently and effectively to get the best possible health care.

## Ten Recommendations to Drive the Adoption of Value-Based Procurement

1. It is essential to define our needs to find the best possible solution.
2. We must define the object of the contract that contemplates the solution to be implemented through public procurement.
3. It is fundamental to choose well the procedure. The procedure should be preferably an open procedure, to facilitate concurrence and with plurality of criteria.
4. The type of contract best suited to value-based procurement is the mixed contract.
5. It is necessary to hire a group of professionals from both the clinical and public procurement fields to form a team that believes in the implementation of this type of value-based public procurement and that contributes with knowledge and cooperation.
6. The multidisciplinary of the team is essential. The members of that team should be part of the follow-up team once the contract is formalised.
7. It is unavoidable to advance the professionalisation of public procurement managers.
8. It is necessary to insist on the culture of measuring and evaluating the results obtained. without measuring results it is not possible to link payment to them.
9. It is necessary to advance in making visible this type of strategic public procurement.
10. It is essential to include the patient's voice.

## Conflict of Interest

None.

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# Misconceptions and Risks of Medical Tourism

Medical Tourism has been hyped to be an exponential growth sector. However, investors, government officials and healthcare executives should be cautious as healthcare is and will remain a primarily local business.



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## key points

- Medical Tourism data is usually provided by stakeholders, with a vested interest, varies widely, and should be viewed with a high degree of scepticism.
- An ageing global population and a constantly growing middle class will increase the demand for healthcare services. However, this will not translate into exponential growth for the medical tourism sector.
- Patients experience feelings such as stress, anxiety, depression, and grief that make them prefer to stay in familiar environments, close to home.
- Healthcare is not a simple service but is viewed as a fundamental human right. When people are forced to travel abroad for medical services, this is considered a systemic failure and governments are criticised and pressured by local societies to develop an adequate healthcare system.
- Influential interest groups will work against the idea of losing a significant portion of their clientele to foreign providers.
- Although opportunities for investments in medical tourism exist in centres of excellence, niche markets, and specific geographical regions, healthcare is a local business and will remain so in the foreseeable future.

## Navigating the Landscape: The Evolution and Challenges of Medical Tourism

In the last two decades, the term “Medical Tourism” has gained significant traction. Analysts, consultants, and, to a lesser extent, academics have popularised it by publishing analyses, projections, and coverage. Government officials have been concurrently forming regulatory frameworks, providing incentives, and organising medical tourism clusters.

Over a hundred national or local organisations have emerged globally dedicated to promoting medical tourism. Meanwhile, many private healthcare operators—often in cooperation with government organisations—have been actively promoting their services in foreign markets and investing substantial resources in their efforts to secure a prime position in the industry.

This surge in activity engendered two key challenges. First, there is confusion about what medical tourism is and what it is not. Second, there persists a climate of speculative discourse

regarding the potential market scale and growth prospects within the industry.

Given the significant financial implications for both public and private stakeholders and funding, it is essential to provide an accurate description of the current landscape in the field of medical tourism.

## How to Define Medical Tourism?

A quick search in business and academic publications uncovers more than a dozen definitions. The following three can be selected as the most concise.

“When consumers elect to travel across international borders to receive some form of medical treatment, which may span the full range of medical services (most commonly includes dental care, cosmetic surgery, elective surgery and fertility treatment). Setting the boundary of what is health and counts as medical tourism for the purposes of trade accounts is not straightforward. Within this range of treatment, not all would be included within health trade. Cosmetic surgery for

aesthetic rather than reconstructive reasons, for example, would be considered outside the health boundary” (Lunt et al. 2011).

When a person, whose primary and explicit purpose in travelling is to obtain medical treatment in foreign country. The definition excludes emergency tourists, wellness tourists, expatriates seeking care in their country of residence, and patients travelling to neighbouring regions to the closest available care (Ehrbeck et al. 2008).

Broadly speaking, it is the act of travelling to obtain medical care. There are three categories of medical tourism: outbound, inbound, and intrabound (domestic) (Keckley and Underwood 2008).

Adding to the confusion, “health tourism” and medical tourism, though not the same, often are used interchangeably. Health Tourism is a broader term that includes medical tourism and wellness tourism (UNWTO 2018).

The main differentiating factor between medical and wellness tourism is the existence of a medical distress in the case of medical tourism (Lunt et al. 2011).

Upon further examination of the challenges associated with defining medical tourism, it becomes evident that the term itself appears to encapsulate a contradiction: patients who travel for the purpose of being treated for an ailment are essentially different from tourists who travel for pleasure.

## Medical Tourism-Market Size

The estimates for medical tourism’s market size vary widely. This can primarily be attributed to several factors: the absence of a universally agreed-upon definition, the lack of a definitive approach to collating pertinent data, the reluctance of medical travellers to disclose their true motivations for travel and concerns regarding patient confidentiality.

Given the significant financial implications for both public and private stakeholders and funding, it is essential to provide an accurate description of the current landscape in the field of medical tourism.

The data and projections circulated in the press and academic journals are produced by stakeholders with a vested interest: advisors and consulting companies, brokers and facilitators, accreditation companies and

medical tourism associations. As a result, a large part of the data is questionable. For example, in 2007, Deloitte estimated the number of US citizens going abroad for medical treatment to be 750,000 and projected this number to reach 15.75 million in 2017. The total overseas spending of US medical tourists was estimated at around 2.1 billion dollars in 2008 and was expected to grow in the range of 27.6 billion in 2013 and to 49.5 billion in 2017 (Keckley and Underwood 2008). However, a 2015 report by the Office of Industries-USITC reveals that only 150,000 to 320,000 U.S. travellers listed healthcare as a reason for travelling abroad. Imports of health-related personal travel services (which include US medical tourists travelling abroad) amounted to \$3.3 billion in 2013, far from the 27.6 billion projected by Deloitte (Chambers 2015). Furthermore, in 2019, U.S. cross-border exports of health-related travel services were US\$1.2 billion (inbound medical tourism) and imports (outbound medical tourism) totalled US\$717 million, a significant decrease compared to 2015 (LaingBuisson News 2022).

Another instance highlighting the inconsistency of data can be observed in Turkey. In 2016, the Turkish Statistical Institute estimated health tourism revenues at \$700 million, while the Association of Health Strategies and Social Policies projected figures ranging from \$2.3 to \$3 billion, and the Turkish Healthcare Travel Council reported estimates as high as \$5.8 billion (Pollard 2017).

Another example that illustrates the unreliability of data is the case of Turkey where in 2016 the revenues from health tourism were estimated at 700\$ million by



the Turkish Statistical Institute, between \$2.3 to \$3 billion by the Association of Health Strategies and Social Policies and at \$5.8 billion by the Turkish Healthcare Travel Council.

Despite the unreliability of data, projections continue. A quick Google search reveals tens of projections covering a wide range. Research Nester predicts medical tourism market revenue to surpass USD 100 Billion by 2035 (Nester 2024). Marketresearch.biz reports that the Health Tourism Market size is expected to be worth around USD 475.8 Bn by 2032 (MarketResearch.biz 2024). Allied Market Research states that the global medical tourism market is projected to reach USD 273.7 billion by 2032 (Allied Market Research 2023).

## Why Do People Travel For Medical Reasons?

McKinsey indicated five factors that promote medical tourism through a survey of 49,980 patients: most advanced technology (40%), better-quality care for medically necessary procedures (32%), quicker access to medically necessary procedures (15%), lower-cost care for medically necessary procedures (9%), and lower-cost care for discretionary procedures (4%) (Ehrbeck et al. 2008).

KMPG, on the other hand, listed geographical proximity and cultural similarities as prime reasons, later lower costs, better technology and wider treatment options, long waiting periods, tourism and vacation as

factors that incentivise patients to follow treatment abroad (KPMG 2011).

Familiarity, availability, cost, quality and bioethical legislation (international travel for abortion services, fertility treatment, and euthanasia services) are often quoted as the most important elements for medical tourists (Glinos 2006).

## Driving Forces Behind the Growth of Medical Tourism

Various factors support a growth projection for healthcare services.

### Demographics

Global life expectancy at birth for both sexes has improved from 46.5 years in 1950 to 71.7 years in 2022 and is expected to rise to 77.3 by 2050 (Richter 2023).

### Economic Development

The global middle class has been rising steadily over the past three decades and is expected to include 5 billion people in 2030. As a result, an increasing demand for better health care has fostered the appetite for more investments in the sector (Brookings 2024).

### Ease of travel and declining travel costs

The cost of travel has been significantly reduced in the past few decades. A London-New York City round-trip airfare in 1970 would cost \$5,350 in today's money.

Tickets between New York and London range from \$300 to \$1,000 in economy (Russell 2020).

### Long waiting lines

Nations with universal healthcare systems often have lengthy waiting lists for elective procedures. This has, in turn, created incentives for healthcare providers in other countries to meet this demand. However, a study by Rand Corporation in the UK revealed that a patient who, hypothetically, had been waiting more than six months and would have their travel paid for by the NHS, would require a reduction in waiting time of around 5.4 months at the alternative hospital before accepting the offer to travel abroad for treatment (Burgh 2005).

### Lower cost of treatment

Patients from developed countries can undergo bypass surgeries and other specialised care at one-fourth or one-fifth of the cost in high-quality corporate and super-speciality hospitals in developing countries (Chanda 2022). However, most developed countries offer nearly universal healthcare coverage to their citizens. As for those who can't afford insurance, they usually don't have sufficient income that will allow them to travel abroad for treatment. Therefore, the lower cost factor will be significant only for a modest percentage of patients who happen to be affluent enough to afford travelling and paying medical bills but have no medical coverage in their country and patients whose treatments are not covered by their insurers, national and/or private. Stigma attached to certain treatments

(assisted reproductive technologies, cosmetic surgery) in the home country can also factor in the decision to receive healthcare abroad.

## Challenges and Barriers to Medical Tourism Growth

### Patients' Psychological State

Common psychological responses to medical conditions include stress, anxiety, depression, and grief (Roberts 2023). As a result, patients prefer to be treated in a familiar environment, close to their family and friends, instead of travelling to a foreign country (hope.be 2015). Distance to medical providers is among the most critical predictors of provider choice (Dixon 2010).

### Social Pressure on Governments

Healthcare is not just another service provided by state actors; it is regarded as a basic human right (UN 2008). Affluent countries are under pressure to maintain a decent healthcare infrastructure while developing nations aspire to build their own. When large numbers of patients are forced to travel abroad for treatment, it is considered a major policy failure and causes heated political debates (Das 2023). In addition, important interest groups (physicians, hospitals, public administrators, local providers of medical supplies and medicines, insurers) with strong social influence on both the patients and the policy decision-makers will lobby against the idea of losing a significant portion of their clientele to foreign providers (Lunt 2014).

### Incentives for investors to invest locally.

As soon as a critical mass of medical tourists from a source country exists, investors are strongly encouraged to invest in medical facilities in that country (Rau 2021).

### Fragile/negative sector image

Although most people who have been treated abroad might have had a positive health outcome and a good overall experience, there are horror stories, published in the press regularly, of cases with a negative outcome. Since most patients/ consumers do not differentiate the healthcare market abroad by providers or even countries, these bad examples have a disproportionate spillover effect on the whole sector.

### Sensitivity to global issues

The demand for medical tourism, as well as for tourism in general, is affected by global and/or regional economic and geopolitical factors such as wars, political instability, pandemics, recession and fluctuation of currency exchange rates.

## Risks and Opportunities for Potential Investors

- Traditional and new global/regional centres of excellence will continue to attract patients from other countries who seek and can afford the best available healthcare services. This is not a new phenomenon since elites from less developed countries have been travelling for centuries to more developed countries that offer the most advanced cures for their ailments.
- While some niche markets, like IVF or certain cosmetic surgeries, might flourish in some medical tourism destinations, healthcare is and will remain primarily a local business in the foreseeable future. Medical tourists will be a nice addition, but they will represent a small percentage of the total number of patients, especially in major healthcare units.

- Focus on country markets with diasporas from the destination country, cultural/linguistic affinity or historical ties (Lunt & Mannion 2014). Some successful examples of medical tourism flows are Germans of Turkish descent travelling to Turkey, Hispanics from the US travelling to Mexico and Costa Rica, British Indians travelling to India, and Middle Easterners travelling to the UAE.

## Conclusion

Medical Tourism does not seem to be the Eldorado that has been hyped to be. The projections for wild growth have failed to materialise. Available data remains insufficient and comes mainly from sources with a vested interest. There is a need for a commonly accepted method of tabulating medical tourists' data that will lead to better and more substantiated conclusions. If achieved, it would help build trust, improve the reputation of medical tourism and allow decision-makers in the public and private sectors to draw relevant conclusions. However, there exist opportunities for investors, primarily in global and regional centres of healthcare excellence, niche specialised markets and specific regions of the world.

## Conflict of Interest

None.

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# Green Hospitals



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# Shortcut to Sustainable Healthcare Innovation: The NCSH Model

Empowering the global healthcare sector with practical sustainability solutions, the NCSH Model facilitates swift, impactful change and offers a shortcut to implementing best practices and tackling urgent environmental challenges.

## key points

- Healthcare faces pressing sustainability challenges that demand immediate action, yet change remains slow, prompting the search for innovative, time-efficient solutions.
- Developed by the Nordic Center for Sustainable Healthcare (NCSH), the NCSH Model offers a tangible approach to implementing sustainable practices in hospitals worldwide, empowering healthcare professionals to drive meaningful change.
- The NCSH Model's four pillars - Determine, Baseline, Action, and Reference - provide adaptable guidelines for hospitals to identify, plan, and implement sustainable initiatives tailored to their unique contexts.
- Through pilot testing in Indian hospitals, the NCSH Model demonstrates its transferability and potential for widespread impact, offering valuable insights for sustainable healthcare development beyond Nordic and European settings.
- With tested green solutions readily available, the NCSH Model presents an opportunity to expedite the transition to sustainable healthcare, leveraging existing knowledge and practices for immediate implementation.

Most of the sustainability issues facing today's industry sectors demand urgent action. The healthcare sector, calling for more innovative approaches, is no exception to such urgency. Yet, change in the industry remains slow. Relying on future healthcare innovations can be challenging when time is running out, considering the long learning path which usually goes into the process. The pressing state of climate change and biodiversity loss means that waiting for innovation can delay changes that need to be made. Turning instead the challenge on its head, is it possible to find a practical tool where best practices can be copied and pasted to bypass slow processes? Can we take a shortcut?

### Empowering Sustainability: The NCSH Model for Greener Healthcare

The Nordic Center for Sustainable Healthcare (NCSH) is currently developing a model that promises to facilitate the journey towards sustainability. This model,

aptly named The NCSH Model, is not just a theoretical concept but a tangible, practical tool. It's a hands-on approach to creating greener hospitals worldwide, based on existing knowledge, technology, and know-how accumulated over twenty years of hospital audits, legal compliance, and international projects focused on energy efficiency, waste management, and reducing pharmaceutical residues. This model is designed to be applied in real-world healthcare settings, empowering healthcare professionals and administrators to make a difference.

The NCSH Model offers hospitals and healthcare facilities a unique opportunity to adopt the best practices in sustainable healthcare and customise these practices to their own needs and conditions. The model identifies realistic and achievable implementations, some of which may be necessary by legislation, and offers a roadmap for short-, medium-, and long-term investments with significant impact. Once





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the copy-and-paste procedure is complete, it paves the way for further innovation, creating a fertile ground for positive change.

The NCSH Model is a tool designed to empower healthcare facilities. It enables them to establish more efficient resource use and reduce their environmental impact, all while maintaining quality care for patients and a conducive working environment for staff. Its four pillars (see below: Determine, Baseline, Action, and Reference) are not rigid rules but adaptable guidelines. They can be tailored to meet the specific contextual needs and conditions of healthcare facilities worldwide. This adaptability puts the power of sustainability in the hands of healthcare professionals and administrators, allowing them to steer their facilities towards a greener future.

### Strategic Sustainability: The Four Pillars Behind the NCSH Model

Such contextual needs and conditions are essential for the model's success. Although The NCSH Model is standardised in its pillars, short-, medium—and long-term recommendations are based on specific situations for concrete goals with action plans—both quantitative (involving energy consumption or similar) and qualitative—to follow. Across all the pillars, there is a continuous need for training and research on multiple levels, internal and external communication, and structures for engagement and networking.

- **Determine:** This pillar confirms the

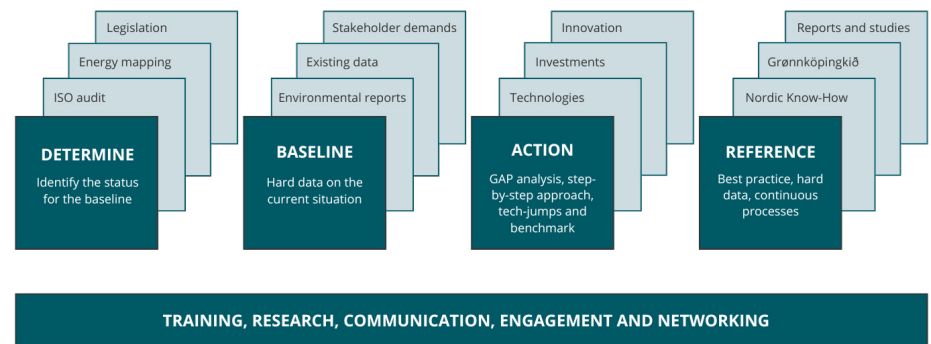
starting point and the current position of the hospital or healthcare facility. (If this point is already established, the model

The pressing state of climate change and biodiversity loss means that waiting for innovation can delay necessary changes

moves on to the next pillar.) For the Determine pillar, NCSH has developed an extensive audit protocol that, with two to three days of site visits at a hospital, will provide enough information to identify the most relevant issues that need to be addressed.

- **Baseline:** This pillar depends on the Determine pillar and on revisiting present know-how. Hospitals with environmental management systems, reports based on standards and legislation, and goals and strategies for progress measurement tend to already have the existing data and documentation for the Baseline in place.
- **Action:** This pillar is based on a GAP analysis mapping the road towards a reference point, with action points to be

## THE NCSH MODEL





implemented in the short-, medium- and long-term. The action points are concrete and based on the level of progress, the hospital buildings' specific settings, the opportunities available in the regional or national contexts, and economic factors. The GAP compares the Baseline with the best practice(s) possible to help pinpoint what the priorities should be.

- **Reference:** This pillar refers to the aim (the best outcome in every given moment and category). The objective is everchanging and does not rely on a fixed number of measures. Resources that comprise a knowledge base – with best practices and solutions from different parts of the world – can be used to set the Reference pillar. In an ideal scenario, these resources will be ongoing and peer-reviewed. Examples of knowledge bases from the Nordic countries are NCSH's Nordic Know-How series as well as the platform of the World's Greenest Hospital ([worldsgreenesthospital.org](http://worldsgreenesthospital.org)).

### Know What is on the Market and Build on Best Practices

Together, the four pillars and The NCSH Model make up a quick and easy shortcut to sustainable healthcare. Depending on the hospital's status, recommendations could range from cleaning waste from hospital grounds to installing autoclaves for medical waste to procuring other more circular products, or from cleaning heat pumps to introducing LED lights to investing in solar cells for energy efficiency. The most appropriate best practice needs to be implemented based on what is feasible for a specific facility.

While keeping visions and long-term thinking in mind, shortcutting means that The NCSH Model takes a complementary route to public policies and international agreements that focus on goals for 2030, 2045, or even 2050. Embedded in these goals is a seeming consensus on waiting for new solutions that

Many of the best practices can be found in Nordic countries and can contribute to a shortcut for sustainable healthcare for countries with larger populations and infrastructure needs

will solve the sustainability issues rather than turning the gaze to what is available today. NCSH's model can make actions of the bigger vision tangible.

If (or when) the gaze is turned, it is possible to see that the products and services needed to lower healthcare sector impacts already exist. The same goes for the knowledge base, made visible by the countless studies on healthcare's negative effects on the climate and information about what should

be done—highlighting the sector's possibilities for economic and sustainable development.

For the solutions not yet in view, actors can be connected to innovate together based on their conditions and needs. Involving the public sector, healthcare providers, engineers, and professionals working with public expenditure, such innovation could become a transdisciplinary process improving healthcare provision while decreasing environmental impacts.

On the contrary, not making use of existing knowledge and solutions could lead to a reality in which relevant companies lose out on the market share and may come to down-prioritise their green innovations. One factor that could be realised in this scenario is the lack of practical information among hospital management, not knowing “the what” and “the how” to go about changes: What are the concrete steps, and how can they be taken? What are the priorities under the available budget, and how do we prioritise them? What skills are required to achieve the sustainability goals, and how do we increase these skills? What are the available solutions, and how do we access them? The NCSH Model places the knowledge, the solutions, “the what” and “the how” into the same method.

### Putting the Model to Work: Scaling Sustainability in India

In November and December of 2023, The NCSH Model was tested through NCSH's hospital audits in the Indian states of Himachal Pradesh and Uttar Pradesh. The state leads sanctioned the audits and provided access to all parts of the hospitals.



In dialogue with the state, the audit results led to recommendations about what activities and areas to prioritise to generate the most impact in each specific case. Based on the impact, the NCSH Model's assessment is planned to be implemented on a broader scale among the states' thousands of hospitals in India, which is set to have positive environmental effects that exponentially exceed changes at two hospitals.

By putting The NCSH Model to work, a lot of know-how has been obtained on how to tackle sustainability challenges in an Indian setting with different needs and conditions than a Nordic or European context. Such know-how is transferrable to other healthcare facilities in India and beyond. If transferability is taken one step further, different actors could be trained to use the NCSH Model to accelerate the impact in many hospitals through a global snowball effect.

### **Accelerating Sustainable Healthcare the Quick and Easy Way**

So far, good intentions and strategies have resulted in insufficient outcomes for the healthcare sector's sustainable transformation globally. While spending substantial quantities of financial and human resources on writing policies with little accountability, time for change is running out.

The positive side is that tested green solutions, financially solid measures that will save money, and knowledge on how to best generate change all exist and can be implemented as early as tomorrow.

At hospitals, the work begins at the management level. By recognising limitations in the in-house knowledge bank of sustainable healthcare, management needs to look outwards to learn from best practices of "the what" and "the how" to go about change.

Many of these best practices can be found in Nordic countries and can contribute to a shortcut for sustainable healthcare for countries with larger populations and infrastructure needs. Taking the shortcut means improving healthcare services for thousands of millions of people and considerably reducing CO2 emissions worldwide.

The NCSH Model is currently being designed to facilitate the healthcare sector's transition in a practical manner. Turning to green products, services, and knowledge at work in today's hospitals allows more actors to – with little effort – copy and paste solutions for future custom-made innovations.

## **About NCSH**

NCSH is a cross-sectoral network boosting sustainable healthcare globally, the Nordic way. The NCSH network includes companies, hospitals, regions, universities, NGOs, clusters, and more. Together, the members form an arena that generates collaborations, projects, business, knowledge, and new innovative ideas.

The Nordic countries and many of NCSH's international members have a solid knowledge base and advanced technologies for improved environmental performance and sustainability in healthcare. The network aims to make knowledge and solutions more accessible and visible worldwide.

Do you want to join NCSH in developing and testing The NCSH Model further? Please reach out to [info@nordicshc.org](mailto:info@nordicshc.org) to start the conversation.



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# WHAT'S COMING NEXT?



### COVER STORY:

#### Most Regrettable Business Decisions

Regrettable healthcare management decisions, including errors, missed opportunities, and resource allocation pitfalls, can prove costly and impactful. Learning from these missteps is vital for crafting more efficient, patient-centric healthcare systems, ensuring the preservation of both health and trust. We will explore various facets and showcase how these issues were rectified.



### COVER STORY:

#### Virtual and Retail Healthcare

Virtual healthcare enhances access and equity with remote consultations, optimising the patient experience at home. Retail Healthcare excels in customer-friendly, in-person services, boosting accessibility and convenience. Both are reshaping healthcare through innovation, personalised care, and enhanced efficiency. We will explore the “Status Quo” and look into real and available applications and solutions.

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