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Virtual and Retail Healthcare

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Editorial

PROF FAUSTO J PINTO

Head of the Cardiology Department and Heart and Vascular Department | Santa Maria University Hospital | Lisbon, Portugal | Editor-in-Chief Cardiology, HealthManagement.org - The Journal

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.

With virtual healthcare, patients can access medical care from anywhere. It also reduces the need for physical infrastructure and in-person visits, thus lowering costs for both providers and patients. A patient-centric retail healthcare approach focuses on convenience, speed, and service quality. Effective integration with patients' primary care providers is important to ensure continuity of care. Retail healthcare must also adhere to healthcare regulations and standards.

The success of virtual and retail healthcare depends on robust technological infrastructure. It is also crucial to ensure the privacy and security of patient data in virtual settings. Both virtual and retail healthcare models aim to improve access, convenience, and affordability, making healthcare more patient-friendly and adaptable to patient needs. However, each has its own set of challenges and limitations that must be managed to ensure high-quality care.

In this issue, our contributors explore the status quo and look into real and available applications and solutions.

In an innovative round-up on virtual and remote care, Thierry Godelle reports on the latest real-world insights obtained through conversations with various digital therapeutics leaders. Bishan Nandy goes over the best practices in strategic planning, technology integration, and patient engagement for the operational success of outpatient clinics.

Focusing on how outpatient clinics can achieve better care quality, Bishan Nandy discusses the best practices in strategic planning, technology integration, and patient engagement for their operational success.

José A. Cano and Alan Zettelmann share their experience of the CardioManager app roll-out in Spain, demonstrating that combining traditional treatments with wearable technologies and mobile applications can enhance health management by improving patient adherence, enabling continuous monitoring, and reducing healthcare costs.

Samar Abdelsalam deep dives into how telenursing bridged the gap between patients and healthcare providers through innovative communication technologies, promising to reshape the landscape of patient care and nursing practice. The Lovexair Foundation explores maximising telehealth adoption to enhance patient care by focusing on human-centric solutions that improve communication, trust, and accessibility.

The Lovexair Foundation explores maximising telehealth adoption to enhance patient care by focusing on human-centric solutions that improve communication, trust, and accessibility for patients and healthcare professionals.

Bragadeesh Sundararajan explores how AI multimodality is transforming retail healthcare by integrating diverse data sources for more accurate diagnostics, personalised treatments, and real-time monitoring.

Precious Chisom Uzoeghelu offers insight into the impact virtual reality can bring in healthcare, enhancing patient care through advancements in pain management, rehabilitation, and mental health treatment.

Ismail Moola highlights the critical role of contract management and compliance in healthcare organisations, exploring why they are indispensable pillars for success. Iffi Wahla discusses how medical practices can leverage AI to improve service and profitability.

In a hectic year in EHR contract activity, purchases affected 734 hospitals and over 128,000 beds. Global EHR growth is expected to rise, driven by government initiatives and investments, with KLAS tracking trends and market share worldwide. KLAS Research also presents its cybersecurity benchmark for the healthcare industry.

Susana Alvarez Gómez highlights the importance of measuring health outcomes through efficacy, effectiveness, and efficiency, emphasising value-based care and strategic procurement for sustainable, high-quality healthcare.

We hope you will like this issue and find it helpful. As always, your feedback is more than welcome.

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Contributors

Samar Abdelsalam, Saudi Arabia

Samar Abdelsalam is an expert in healthcare solutions and biomedical engineering with over 12 years of experience in healthcare technology and projects. She has driven excellence in healthcare through technology, focusing on expanding effective healthcare management using digital transformation and innovative solutions to enhance healthcare delivery and patient outcomes. Samar holds an MBA in healthcare management and is pursuing a PhD in virtual care and patient experience.

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Mustafa Abusalah, Spain

Mustafa Abusalah, PhD, Experienced Digital Transformation Executive with a proven track record of leading multi-functional teams and implementing large-scale digital transformation projects. Adept at leveraging technology to drive business improvements and achieve revenue growth. Invited speaker at various international conferences.

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Susana Alvarez Gómez

Susana Alvarez Gómez is a Family and Community Medicine specialist and a Medical Inspector at the National Institute of Social Security. As Deputy Director General for Contracting at the Madrid Health Service, she boasts extensive experience in health management across diverse roles in regional health services and institutions. Susana is a prolific author with over 100 contributions to national and international congresses and 70 publications in journals and books. She is a University teacher and an active member of The American College of Healthcare Executives

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José Antonio Cano, Spain

José Antonio Cano holds a PhD in Telecommunications Engineering from the University of Valladolid and a master's in international relations and foreign trade from INFOREM. He is the Director of Analysis and Consulting at IDC and has over 20 years of experience in strategic consulting and technology. He has advised large corporations, SMEs, and startups on business transformation and innovation. He is also an executive advisor for the Spanish Aeronautical Society and a professor at institutions like CEU, DBS, and EOI.

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Jonathan Christensen, USA

Jonathan Christensen, Senior Insights Director, is leading a team of KLAS analysts focused on imaging research, clinical software and medical research for international markets. His role led him to engage with executive leaders from around the world to identify research needs for the industry that will benefit vendors, providers and investors. His goal is to identify gaps in market understanding and then help close those gaps to spur the industry forward and ultimately deliver better healthcare for patients.

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Shane Fitch, Spain

Shane Fitch, Msc, BSC, is CEO and founder of Lovexair Foundation and has worked in the not-for-profit patient organisation sector for 25 years. As an Alpha-1 parent, her dedication to improving people's quality of life through innovation in care for rare and chronic respiratory diseases has been her main focus. Harnessing the advantages of digital transformation with humanity and empathy is essential to unlocking our potential for addressing disparities in access to care for a worldwide population under increased strain.

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Contributors

Thierry Godelle, France

Thierry Godelle is an accomplished professional with 27+ years of experience in strategic consulting and tech product development. With an engineering background and an MBA from INSEAD, he held key roles at GE Healthcare, including MRI General Manager for Emerging Markets and Europe Chief Strategy Officer. Since 2018, he has been an independent consultant in MedTech and e-health, specialising in go-to-market strategies, marketing/sales team structuring, and business growth for startups, SMEs, and corporations.

Ismail Moola, Canada

Ismail Moola is the CEO and co-founder of TimeSmart.AI, a healthcare tech company focused on compliance automation, clinician time tracking, and contract management. With over 20 years of healthcare technology experience, he has spearheaded initiatives to boost operational efficiency for healthcare organisations. Ismail aims to improve healthcare operations and workflows through innovative solutions to enhance patient care. He is dedicated to advancing healthcare through strategic leadership and technology.

Bishan Nandy, USA

Bishan Nandy is a healthcare executive with 17+ years of experience in healthcare strategy, operations, and digital innovation. As Director of Hospital Administration at UI Health, he has led programmes to improve capacity, patient experience, and safety. He previously worked as a healthcare consultant at Deloitte and Ernst & Young, leading system-wide process improvement, strategic integration, and future growth initiatives for major health systems. Bishan holds an MBA from Purdue University and a Bachelor's in Civil Engineering from Jadavpur University, India.

Fausto Pinto, Portugal

Prof Fausto Pinto is the Editor-in-Chief, Cardiology at HealthManagement.org. He is the President of the World Heart Federation (WHF) and the Head of the Heart and Vascular Department at Santa Maria University Hospital, Lisbon, Portugal. Prof Pinto's main areas of interest are ischaemic heart disease, anticoagulation, and cardiovascular imaging.

Precious Chisom Uzoeghelu, Cyprus

Precious Chisom Uzoeghelu is a dedicated educator and healthcare professional at Cyprus International University, where she has been teaching in the Faculty of Health Sciences, Nursing Department since 2019. With a BSc in Nursing from Near East University and an MSc in Healthcare Organisations Management, she is now pursuing a PhD in Management Information Systems. Precious specialises in critical thinking, health policies, and nursing ethics, with a passion for optimising healthcare education and management systems.

Bragadeesh Sundararajan, India

Bragadeesh Sundararajan is the Chief Data Science Officer at Dvara KGFS, leading data-driven initiatives to enhance financial services for rural and low-income households. With over 14 years of experience, he heads a team designing AI and ML solutions to improve customer experience and operations. Recognised as one of India's Top 100 AI Influential Leaders in 2023, his notable projects include a Generative AI model and a COVID-19 vaccination slot system. He holds degrees in AI/ML from UT Austin, an MBA from IIT Madras, and a bachelor's in Computer Science from BITS Goa, with expertise in analytics, cloud computing, and full-stack development.

Contributors

Leonor Tirado Gutiérrez

Leonor Tirado Gutiérrez is a healthcare management professional with over 30 years of experience specialising in economic management and healthcare information systems. Her career has largely been developed within Hospital Clínico San Carlos, one of the most complex hospitals in Madrid, where she held key positions in economic management. In recent years, she has worked in the central services of the Regional Health Service of Madrid, overseeing public procurement and health information systems. Leonor has contributed to numerous national and international conferences and is recognised for her efforts in protecting healthcare professionals during the COVID-19 pandemic, earning recognition from the International Hospital Federation.

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Iffi Wahla, USA

Iffi Wahla co-founded the global HR recruitment platform Edge in 2020, which connects companies with high-quality, reliable, full-time talent from around the world. He has travelled extensively and encountered remarkable individuals whose ambitions were limited by their local economies. This experience was behind the creation of the Edge Platform Marketplace, with a mission of democratising access to fair wages and jobs worldwide while also giving businesses access to qualified professionals around the globe.

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Sofia Zanrosso, Spain

Sofia Zanrosso holds a Master's Degree in ICT Innovation with a specialisation in Cyber Security (2024) and a Bachelor's Degree in Computer Science (2022), both from the University of Trento, Italy. As a Researcher in Digital Health at Lovexair, she has focused on humanising technology in the domain of Telehealth and mHealth, with the goal of strengthening the connection between patients and healthcare professionals.

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Alan Zettelmann, UAE

Alan Zettelmann, a partner at Innovation 360 Group AB in UAE, has over 17 years of experience in technology and entrepreneurship. He holds a Master's in Business Innovation and Administration from the University of Deusto and won an Innovation Award in Austria in 2017. Based in Dubai, he's known for strategic innovation consulting and measuring organisations' 'Innovation IQ.' He also teaches at CEU, Deusto Business School, and EOI, and is the founder of INNOCONSULT, a consultancy focused on Space travel, Immortality, and ESG projects.

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fp@healthmanagement.org

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Cover Story

Innovation Round-up: How Virtual and Remote Care Transform Patient Outcomes Across Medical Fields

As the population ages and chronic diseases rise, healthcare systems increasingly turn to virtual and remote care to meet growing demands. These innovations transform patient outcomes by enabling preventative care, offering personalised treatment and reducing hospital readmissions. Applied across a wide range of medical fields, virtual care helps address critical healthcare challenges. However, overcoming obstacles such as regulatory frameworks, data security, and integration remains key to fully unlocking these innovations' potential.

THIERRY GODELLE

MedTech Strategy Consultant I
Objectif Croissance Healthcare I France

key points

- Healthcare systems are increasingly adopting virtual and remote care to address the challenges of ageing populations and rising chronic diseases.
- These technologies enhance care in mental health, cardiology, oncology, and wound care by reducing hospital readmissions and enabling timely interventions.
- Virtual care focuses on preventive care and allows for more personalised treatment, enabling patients to receive care at home.
- While AI and digital therapeutics are transforming healthcare, issues like data security and regulatory hurdles remain.
- Telemonitoring and AI-driven tools are set to significantly improve healthcare efficiency, patient care, and accessibility.

As the global population ages and the prevalence of chronic diseases rises, healthcare systems worldwide are increasingly turning to virtual and remote care as indispensable tools. These innovative approaches are crucial in addressing the challenges of an ageing population and rising chronic diseases. They help sustain healthcare delivery and drive significant improvements in patient outcomes. By focusing on prevention and enabling patients to receive care in the comfort of their homes, virtual and remote care contribute to a more personalised and positive healthcare experience. This article explores how these technologies are applied across various medical fields, from mental health and cardiology to oncology and wound management. Virtual mental health consultations are expanding access to care, especially

in underserved areas, while heart failure telemonitoring is reducing hospital readmissions and improving patient management. Oncology remote monitoring enables timely interventions, and wound management remote care is cost-effectively optimising treatment outcomes. Furthermore, the emerging field of digital therapeutics is on track to transform the way chronic conditions are managed, offering tailored, data-driven solutions.

To provide practical insights into these advancements, Thierry Godelle interviewed leaders in telemedicine, remote patient monitoring (RPM), and digital therapeutics (DTX) across these clinical domains. They shared the encouraging trends in the adoption of these solutions and highlighted the challenges that must be overcome to fully realise their potential in transforming healthcare delivery. These challenges include data security, interoperability, and regulatory frameworks. Overcoming these hurdles is needed to ensure the widespread and effective implementation of virtual and remote care technologies.

Remote Patient Monitoring (RPM) of Heart Failure Patients

In 2021, Oliver Piepenstock, Marcus Hott, and Leonhard Riehle established Noah Labs in Berlin with the ambitious goal of revolutionising cardiology through artificial intelligence. Their flagship product, Noah Labs Ark, is a state-of-the-art remote monitoring solution tailored specifically for heart failure patients. What sets Ark apart is its proactive monitoring of key biomarkers, enabling early detection of deterioration. This unique feature positions Ark as a promising tool in managing heart failure, as it can stabilise patients and prevent hospital admissions.

Progress in Virtual and Remote Care for Heart Failure Patients

Oliver Piepenstock highlights the substantial progress made in Europe regarding virtual and remote care for chronic conditions such as heart failure. Programmes like France's ETAPES and Germany's TIM-HF1 and TIM-HF2 studies have demonstrated the transformative impact of integrating virtual care elements into treatment pathways. These studies have shown that virtual care can significantly reduce hospitalisations and mortality rates. This success paves the way for the broader adoption of such technologies, provided that supportive policies, reimbursement structures, and guidelines are in place. France, in particular, has been at the forefront of expanding virtual care across various medical conditions, setting a precedent for other European countries to follow.

Hospital Adaptation and Telemonitoring Trends

As telemonitoring becomes more prevalent, hospitals adapt their practices to integrate these technologies. In Germany, hospitals have increasingly acquired outpatient practices to benefit from outpatient reimbursement schemes. Though primarily targeting outpatient care, telemonitoring is becoming integral to hospital systems. With their extensive infrastructure, large hospital networks are ideally positioned to manage telemonitoring on a large scale, centralising these efforts in specific facilities to ensure consistent care across regions. Financial incentives, such as reducing costly readmissions and enhancing brand loyalty, drive hospitals to embrace telemonitoring. Similar trends are seen in other European countries, including the Netherlands and Austria, where hospitals play a central role in telemonitoring within more integrated healthcare structures.

Technological Advancements and Challenges

Technological advancements are significantly reshaping telemonitoring and patient care management. Early systems required manual data recording and human decision-making, but today's AI-driven solutions, like Noah Labs Ark, offer real-time data analysis and actionable recommendations. Innovations such as Noahlabs' Vox, which utilises voice recognition technology to monitor vital signs, exemplify the progress in predictive healthcare. These advancements improve patient outcomes, reduce costs, and enhance accessibility for facilities with limited infrastructure. Despite these benefits, challenges remain, including patient technological proficiency and inconsistent infrastructure. Addressing these issues, by exploring passive technologies or ensuring robust data transmission, is crucial for making virtual care more inclusive and seamlessly integrated into the healthcare system.

Teleconsultation in Mental Health

The Evolution of Virtual Mental Health Care

In a recent discussion with Marie-Laure Bry, Medical Director at Eutelmed, she discussed the rapidly advancing field of virtual mental health care. This sector has seen significant progress, particularly

since the COVID-19 pandemic. Eutelmed, a pioneer in mental health teleconsultation since 2012, offers a unique perspective on remote mental health services' current state and future prospects. The pandemic was a significant catalyst for the widespread adoption of teleconsultations, as physical visits became restricted and people turned to virtual consultations out of necessity. This shift not only expanded access to mental health care but also helped reduce the stigma surrounding it. Virtual consultations are often perceived as less intimidating than traditional in-person visits, making it easier for people, especially younger generations who are comfortable with digital tools, to seek help.

Benefits of Mental Health Teleconsultation

Marie-Laure highlighted several advantages of teleconsultation in mental health care. One difference with in-person consultations is the increased sense of intimacy it can create between patients and practitioners. By conducting sessions in patients' personal spaces, virtual consultations may facilitate more open discussions on some personal topics—something that can be challenging to achieve in a conventional clinic setting. Teleconsultations also offer continuity of care for individuals who travel frequently or live far from home, allowing them to maintain regular mental health support without needing to travel. This ensures ongoing care and follow-ups regardless of the patient's location or medical deserts, particularly for psychiatry, which is becoming a rare and sought-after medical service. Additionally, Eutelmed's commitment to providing services in over 60 languages addresses both language and cultural barriers, ensuring culturally sensitive care that meets patients' specific needs. The company has also developed a comprehensive digital physical and mental health assessment tool available in 20 languages, which helps identify risk and protective factors and guide targeted in-person consultations if necessary.

Challenges and Innovations

Despite the numerous advantages, teleconsultation in mental health faces several challenges. Marie-Laure noted the need for clear regulations governing cross-border teleconsultations, especially regarding medication prescriptions and adherence to global data protection standards like GDPR. The absence of standardised regulations complicates international consultations and can impact the effectiveness of telehealth services.

> "[Virtual and remote care innovations] improve patient outcomes, reduce costs, and enhance accessibility for facilities with limited infrastructure."

Another concern is the potential for increased patient isolation. As more aspects of life are managed online, there is a risk that individuals may become more socially isolated, which could negatively affect their mental health. Additionally, issues with internet connectivity can limit access to telehealth services, particularly in rural or underserved areas.

Marie-Laure also discussed several promising innovations in the field. Vocal biomarkers, which aim to detect or estimate the severity of psychological distress and mental health disorders through vocal patterns, are a significant advance still in the development phase. These biomarkers could enhance teleconsultations by providing additional clinical insights.

Conversational chatbots are another innovation being explored to offer ongoing support between consultations, maintain patient engagement, and address concerns outside scheduled sessions.

AI-driven tools are already being used to assist with administrative tasks such as drafting medical reports, potentially streamlining processes and improving care efficiency by increasing the exchange time between patient and doctor.

However, Marie-Laure emphasised that while these technologies offer exciting possibilities, they should complement rather than replace the essential human connection in mental health care. The ultimate goal is to enhance the patient experience with digital tools while preserving the core human element crucial for effective therapy.

Balancing Human Interaction and Virtual Care for Mental Health Patients

Virtual mental health care has evolved rapidly, driven by necessity and innovation. While virtual care offers substantial benefits, such as reduced stigma, increased accessibility, and better continuity of care, it also presents challenges, including regulatory issues, potential patient isolation, and connectivity barriers. Innovations like vocal biomarkers and conversational chatbots hold promise for the future. Still, balancing these technological advancements with the irreplaceable value of human interaction in mental health care is essential.

> "Digital solutions provide a lower-cost, more accessible, and engaging approach to treatment, […] more reachable for underserved populations while addressing some of the limitations of conventional therapies."

Digital Solutions Aid Mental Health's Transformative Shift

Virtual care in mental health is on the cusp of a significant transformation, driven by advancements in technology that address longstanding challenges in diagnosis, treatment, and patient management. To gain deeper insights into this evolving landscape, I interviewed Tanel Petelot, founder and CEO of Emobot. His perspective sheds light on how innovative digital tools are revolutionising psychiatric care, offering a promising glimpse into the future of mental health treatment.

Addressing the Gaps in Mental Health Care With Virtual Care

Emobot, founded in April 2022, is making waves in the mental health field with its focus on the objective evaluation of mood disorders such as bipolar disorder and depression. These conditions affect 20-25% of the general population but remain poorly understood and inadequately treated. With a third of patients not responding to current therapies, the complexity of mood disorders—intersecting biological and psychological factors—challenges the efficacy of treatments based solely on pharmaceuticals. Traditional diagnostic tools are often inadequate, exacerbating difficulties in treatment due to a limited understanding of these disorders.

In France, the disparity between the number of psychiatrists and the growing patient population is glaring, with 3.2 million patients on antidepressants and only 15,000 psychiatrists. This imbalance results in long waiting times, sometimes up to four months, particularly for young people. The situation has been further aggravated by the COVID-19 pandemic, highlighting a critical need for more efficient and accessible mental health care solutions.

Emobot's Innovative Approach with EmoDTx

Emobot's solutions address these issues by developing technology that continuously measures patients' emotions, providing passive and objective data on their emotional state. This data aids doctors in diagnosing and adjusting treatments while also empowering patients to understand better and manage their moods. The company is also integrating digital therapies into its offerings in collaboration with hospitals in Germany. This integration, EmoDTx, associates mood monitoring with real-time personalised cognitive behavioural therapies, aiming to provide personalised and effective care, with around a hundred psychiatrist partners and ongoing clinical studies for approval in Germany. By enhancing both accessibility and effectiveness, Emobot is at the forefront of a paradigm shift in psychiatric care.

Navigating Challenges and Opportunities of Digital Solutions for Mental Health Care

Despite the potential benefits, integrating digital solutions into mental health care presents several challenges.

One significant issue is patient engagement, particularly for those suffering from depression, where motivation can be a barrier. Digital tools, while promising, must be designed to avoid further discouraging patients. Tanel emphasised that careful design and thoughtful strategies are crucial to ensuring these tools are effective and engaging.

> "It's crucial to demonstrate that [virtual and remote care] solutions will save physicians time while improving patient care."

Another challenge is the generational divide among psychiatrists. While many younger practitioners are open to incorporating digital tools, older generations trained in traditional psychoanalytic methods may resist such changes. This divide can create institutional hurdles, particularly in decision-making bodies dominated by older practitioners.

Additionally, digital therapeutics offer a promising alternative to traditional medications, often insufficient or poorly adhered to by patients. Digital solutions provide a lower-cost, more accessible, and engaging approach to treatment, making mental health care more reachable for underserved populations while addressing some of the limitations of conventional therapies.

Virtual mental health care is undergoing a significant transformation, driven by technological advancements and accelerated by the COVID-19 pandemic. Companies like Eutelmed and Emobot are at the forefront of enhancing accessibility and personalising care. Eutelmed's teleconsultations have expanded access and reduced stigma, while Emobot's Emo-DTX technology provides objective data to manage mood disorders better.

Despite the progress, challenges remain. Ensuring patient engagement, particularly among those with depression, requires careful tool design. Additionally, the generational divide among psychiatrists can create institutional hurdles. Yet, innovations such as vocal biomarkers and AI-driven tools offer promising solutions. Overall, integrating digital solutions into mental health care holds great promise. Balancing these technologies with essential human interaction will be key to achieving effective and transformative mental health treatment.

Wound Care

After examining virtual care advancements in heart failure and mental health, it's essential to address wound management, which warrants its own focus due to its distinct complexities. Unlike other specialities, wound care involves diverse, interdisciplinary treatments and specific monitoring needs that differ significantly from chronic disease management or mental health support. Virtual care in wound management requires specialised tools to handle detailed documentation and real-time assessments, addressing challenges unique to this field. By exploring this area separately, we wanted to share insight into how tailored digital solutions can optimise wound care, enhance efficiency, and improve patient outcomes.

Integrating Remote Care Solutions in Hospitals

In my discussion with Matis Ringdal, CEO of Pixacare, a Strasbourg-based remote Wound Care application, several crucial insights emerged about integrating remote care solutions into hospital settings and their influence on clinical practices. Matis emphasised that adopting remote management technologies requires a tailored approach to meet the unique needs of different medical specialities. While the COVID-19 pandemic accelerated the adoption of these technologies, their success hinges on aligning them with the specific workflows of each department, such as cardiology or surgery. A one-size-fits-all strategy is inadequate due to each speciality's distinct demands and challenges. Effective integration requires addressing these unique needs to ensure that remote care solutions enhance rather than disrupt existing practices.

Challenges and Solutions in Remote Care Adoption

Matis highlighted several challenges in adopting remote care technologies, including regulatory hurdles and the need to maintain essential human interaction. Remote

care solutions must adhere to regulatory standards while complementing existing care structures without causing disruptions.

Furthermore, Matis pointed out that AI-driven tools have the potential to enhance traditional care practices rather than replace them. Pixacare's focus on wound care management exemplifies the complexity of integrating remote care. Wound care often spans multiple disciplines, leading to inconsistencies in treatment due to varying expertise and approaches. Traditional documentation methods, reliant on paper forms and manual measurements, introduce variability and communication issues among providers.

Pixacare's Innovative Approach to Wound Care

Pixacare addresses these challenges with a platform that standardises wound documentation and facilitates collaborative care. Clinicians use the platform to photograph wounds, automatically document their size, and track healing progress over time. This remote monitoring capability allows for asynchronous wound assessment, enabling quicker responses to worsening conditions.

By reducing hospital visits and improving communication among healthcare providers, Pixacare's solution enhances healing by 30%, lowers costs, and streamlines the care process. Currently operational in 30 hospital sites across France, including major academic hospitals and cancer centres, Pixacare's technology serves over 90,000 patients.

Because of the current lack of reimbursement, the company employs a B2B model to secure earnings, providing its solution directly to specialised wound care centres. Matis stressed the importance of securing reimbursement to expand market reach, aiming to democratise access to remote monitoring by integrating reimbursement models similar to those for chronic conditions like diabetes and heart failure.

Future Prospects and Strategic Expansion of Pixacare

Pixacare plans to expand its operations beyond France into other European markets, including Germany, the Nordic countries, and the UK. These markets are more mature and receptive to telemonitoring. Matis mentioned the upcoming potential for integrating paramedical support through external platforms to enhance patient monitoring and data documentation. For now, Pixacare remains focused on advancing technology, ensuring regulatory compliance, and securing reimbursement.

The company is also open to future collaborations with healthcare service platforms to further its mission of improving remote care. In summary, Pixacare's approach underscores the importance of customising remote care solutions to meet specific clinical needs, overcoming barriers to adoption, and strategically expanding market presence. The company's innovative platform addresses critical inefficiencies in wound care management, significantly improving patient outcomes and operational efficiency.

Current State and Future of Virtual and Remote Care

Today, telemedicine is advancing on multiple fronts, thanks to critical improvements in hospital workflows, integration between hospital and community care, and financial and patient-related aspects. Key developments include customising telehealth solutions to meet the specific needs of different medical specialities. Telemedicine technologies are increasingly being integrated with existing care systems, which enhances efficiency while minimising disruptions to traditional processes.

To better understand the outlook of Virtual and remote care, I interviewed Axel Pilicer who founded GutyCare, one of the first French Digital Therapeutics solution that was eventually integrated into Résilience, a leader remote patient monitoring solution editor for cancer patients. From where he sits, Axel is ideally positioned to observe and analyse where virtual and remote care currently stands and how it should evolve in France, Europe and globally.

As Axel shared, the accelerated adoption of telemedicine has been driven by better workflow management, simplified interactions between remote and in-person care, and evolving financial models such as developing reimbursement options, as we already saw in particular for heart failure patients. Additionally, educating healthcare professionals about the benefits and use of new technologies has been crucial in this process. However, challenges remain, including regulatory hurdles, integration with existing systems, and the need to maintain essential human interactions. To fully realise the potential of telemedicine, it is crucial to address these barriers and continue improving the patient and provider experience.

GutyCare: CEO's Axel Pilicer testimonial on launching and developing a digital therapeutics solution in France:

"We developed a device to monitor patients with chronic illnesses, predict adverse events and relapses, and support home care through a Digital Therapeutics (DTX) module, which includes nutrition and psychological support beyond just treatment. These solutions complement each other well. After extensive development, we pursued both fundraising and a potential sale to Résilience. Ultimately, we completed our fundraising in 14 months and decided to sell, given the complex market conditions and the realisation that the startup landscape had become less favourable.

Raising funds in this field is challenging, particularly before securing reimbursement from health insurance. In France, RPM (remote patient telemonitoring) is more advanced than in Germany, where Digital Therapeutics (DTX) is gaining traction but faces high barriers to entry. While telemonitoring is progressing and achieving reimbursement milestones in France, DTX is still in its early stages and has seen limited success. For instance, Resilience is the first company in France to receive reimbursement for a telemonitoring solution in oncology as it has reached a level of maturity that is not common in the market where DTX remains underdeveloped and still faces many hurdles. Overall, the market for DTX in France is evolving slowly, with many companies needing to prove their effectiveness and secure funding before achieving widespread adoption."

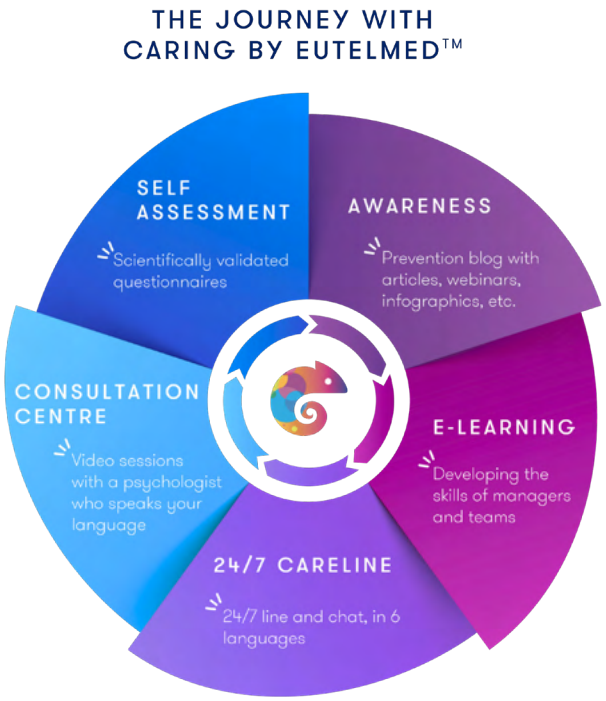

Figure 1: The journey with caring by Eutelmed

Integration of Telemonitoring in Healthcare Facilities

Axel concurs that telemonitoring has the potential to significantly impact healthcare systems, mainly by reducing hospital congestion, saving time for medical staff, and lowering costs. This appeal is particularly relevant to hospital directors and managers. The core goal is to predict falls, adverse events, and complications before they occur, thus streamlining patient care and easing the burden on healthcare facilities. However, integrating these solutions is challenging. For telemonitoring systems to be successful, they must be user-friendly and efficiently integrated into existing workflows. Past failures often stemmed from solutions that were either too complex or not adequately adapted to user needs despite passing clinical studies.

Several factors influence the speed and success of telemonitoring adoption. For instance, healthcare professionals may resist new technologies if they perceive them as time-consuming or if they don't clearly benefit their daily routines. Therefore, it's crucial to demonstrate that these solutions will save physicians time while improving patient care. Effective integration requires ongoing support to address technical issues and adapt to evolving needs, while regulatory constraints (namely revalidations of the solution) can slow down necessary improvements.

Patient acceptance is another hurdle. Solutions must cater to diverse patient populations, including elderly individuals who might be less inclined to use new technologies. Ensuring patients understand the benefits and feel comfortable using the technology is also essential.

Overall, successful telemonitoring solutions must balance usability with regulatory compliance and demonstrate clear benefits to both healthcare providers and patients. When well-designed, these systems can lead to a more efficient, cost-effective healthcare environment where all parties benefit.

Facilitating the Adoption of Telemonitoring and Digital Therapeutics

For telemonitoring and digital therapeutic solutions to be effective, healthcare providers and patients must fully engage with them. Success hinges on overcoming several hurdles related to usability and integration.

According to Axel, these solutions must offer clear value and be easy to use. A key challenge is ensuring physicians and patients are willing to adopt these technologies. Physicians often face scepticism about new tools due to the overwhelming number of digital solutions they encounter and their already heavy workloads. To address this, digital solutions must seamlessly integrate into existing systems, be straightforward, and clearly demonstrate how they save time and improve patient outcomes.

For physicians, avoiding a fragmented experience across multiple portals is crucial. Ideally, digital tools should not add to their already complex workflow but should instead simplify their tasks. An effective strategy could be integrating telemonitoring data into existing medical record systems or using simple communication methods like SMS for patient updates. The goal is to make the process as streamlined and intuitive as possible, avoiding additional complexity.

On the other hand, patients need solutions that are easy to use and demand minimal effort. Many patients, especially those with chronic conditions, prefer simplicity. Complex systems or demanding processes can lead to disengagement. Solutions that offer easy-to-navigate interfaces and require minimal input from the patient, such as SMS-based questionnaires, are more likely to be embraced.

Both telemonitoring and digital therapeutic tools should be designed with a focus on user experience (UX). Drawing from successful consumer applications can guide the creation of user-friendly, practical solutions. Balancing comprehensive content with ease of use is critical; overly complex systems can deter users, while overly simplistic ones may not meet clinical needs.

Ultimately, the success of these digital tools depends on their ability to integrate seamlessly into healthcare practices and provide a user-friendly experience for both patients and providers. Digital solutions can better address real-world needs and facilitate wider adoption by focusing on simplicity and direct value.

Future Outlook for Digital Health Technologies

The digital health sector is expected to experience significant evolution and growth in the coming years. Here's how Axel envisions the landscape unfolding over the next 12 months and the next five years:

Short-Term (Next 12 Months):

1. **Acceleration and Integration:** Adopting digital health solutions, including telemonitoring and digital therapeutics (DTx), is set to accelerate. Solutions that initially faced scepticism, such as the DIGA in Germany, are gradually gaining traction as their effectiveness becomes clearer.
2. **Standardisation:** Digital health solutions will likely become more standardised, moving from niche applications to common practices in healthcare. This includes both telemonitoring and DTx becoming routine tools rather than specialised or "gadget" solutions.
3. **Emergence of Leaders:** The competitive landscape will see the rise of key players who establish themselves as leaders in the field. These leaders will likely drive innovation and set standards.

Medium-Term (Next 5 Years):

1. **Consolidation and Dominance:** The sector will likely undergo significant consolidation. Smaller or less effective startups may struggle to survive, leading to the dominance of a few large players. These leaders could become akin to "digital pharmaceutical companies," managing multiple digital health assets.
2. **Integration with Traditional Healthcare:** Digital health technologies will increasingly be integrated into traditional healthcare systems. Tools like AI-driven diagnostic aids and telemonitoring will become standard components of patient care, complementing rather than replacing human expertise.
3. **Increased Automation:** With advancements in AI and machine learning, symptom tracking and disease management automation will become more sophisticated. This will help reduce costs and improve patient care by offering timely and personalised interventions.

Long-Term Vision:

1. **Health Tech Giants:** In the long term, digital health giants may emerge, potentially rivalling or surpassing traditional pharmaceutical companies in valuation and influence. These companies will likely

have expansive portfolios of digital health products and services.

2. **AI and Data Utilisation:** AI will be crucial in driving the next wave of innovation, enhancing diagnostic accuracy, treatment personalisation, and operational efficiency. Integrating AI into digital health solutions will facilitate faster and more accurate decision-making, further pushing the boundaries of what's possible in healthcare.

Overall, the sector is primed for rapid growth and transformation. The key to success will be navigating the integration challenges, maintaining simplicity and usability, and leveraging technological advancements to enhance patient care and operational efficiency.

Conclusion

As the global population ages and chronic diseases rise, virtual and remote care are becoming crucial for managing increased patient loads and clinical demands. These innovative approaches enhance patient outcomes by focusing on prevention and providing care at home, leading to a more personalised healthcare experience.

This article examines how virtual care is transforming various fields: mental health consultations and digital diagnostic and therapy solutions are expanding access and reducing stigma; heart failure telemonitoring is lowering hospital readmissions; remote oncology monitoring enables timely interventions; and virtual wound care improves treatment efficiency and cuts costs. Digital therapeutics are also on track to revolutionise chronic disease management.

Interviews with virtual and remote care leaders reveal promising trends and challenges, emphasising the need for tailored solutions, effective integration, and overcoming regulatory and engagement barriers. The future of digital health looks toward accelerated adoption, greater standardisation, and seamless integration with traditional care, promising significant improvements in patient care and healthcare efficiency.

Conflict of Interest

None.

Strategic Activation Planning for Outpatient Clinics

Outpatient clinics play a vital role in providing accessible, cost-effective healthcare, and activation planning—covering strategic planning, technology integration, and staff training—ensures efficient operations and improved patient outcomes. Focusing on facility design, workflow optimisation and patient engagement, while addressing challenges like staff burnout and no-shows, helps clinics enhance both care quality and efficiency.

BISHAN NANDY

Director, Hospital Administration I University of Illinois Hospital & Health Sciences I Chicago, USA

key points

- Outpatient clinics provide accessible, cost-effective healthcare, impacting patient outcomes.
- Effective activation planning ensures clinics transition smoothly to operational readiness.
- Strategic planning and well-designed facilities improve clinic efficiency and patient experience.
- EHRs, telehealth, and staff training enhance clinic operations and patient care.
- Clinics must manage staff burnout, patient no-shows, and tech barriers to ensure success.

Outpatient clinics are increasingly critical in providing accessible, cost-effective healthcare, offering services from routine check-ups to chronic disease management and specialised treatments. As these clinics are often patients' first point of care, their efficient operation directly impacts patient outcomes. This underscores the responsibility and commitment of healthcare administrators, making their role even more crucial. Activation planning, which involves transitioning from facility development to operational readiness, ensures clinics can deliver on their objectives effectively. This article examines key components of outpatient clinic activation planning, including strategic planning, facility design, staff training, workflow optimisation, technology integration, and patient engagement. By analysing best practices and challenges, this guide aims to equip healthcare administrators with practical tools to drive outpatient clinic success.

Strategic Planning for Clinic Success

Strategic planning is the bedrock of outpatient clinic success, as it sets long-term goals that align with the community's healthcare needs. It encompasses the creation of vision and mission statements, market analysis, needs assessment, and a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. This process instils confidence in healthcare administrators and empowers them with a clear roadmap for the future.

Vision and mission statements serve as a guiding framework, articulating the clinic's aspirations and the values underpinning its operations. Market analysis and needs assessment identify gaps in healthcare services, helping clinics tailor offerings to their target populations. Strategic planning enables outpatient clinics to focus on priority areas, ensuring services meet immediate and future health demands (Pearson 2019). Similarly, a thorough SWOT analysis allows clinics to anticipate potential threats while maximising strengths and opportunities.

Facility Design and Patient-Centric Layouts

The design and layout of outpatient clinics are critical in influencing patient flow, staff workflows, and overall patient experience. Clinics must be designed with both patient comfort and staff efficiency in mind. Features such as accessible entrances, clear signage, and comfortable waiting areas contribute to patient satisfaction and enhance operational efficiency.

The layout must minimise staff travel time between patient rooms and workstations, enabling smoother workflows and reducing fatigue (Anderson and Green 2020). The design should also comply with health and safety regulations to ensure a secure environment for both patients and staff. Accessibility features, such as ramps and wide corridors, are essential to accommodate all patients, including those with mobility impairments.

> "As [outpatient] clinics are often patients' first point of care, their efficient operation directly impacts patient outcomes."

Technology Integration: The Role of EHRs and Telehealth

Incorporating technology into clinic operations is crucial for improving patient care and administrative processes. Electronic Health Records (EHRs) streamline documentation, enhance communication between providers, and improve the accuracy of patient data. Optimising EHR systems ensures they are user-friendly and fully integrated into clinic workflows (Davis 2020).

Telehealth platforms have gained prominence in recent years, particularly in expanding access to care for patients in remote locations or those with mobility issues. Integrating telehealth services allows clinics to offer remote consultations and follow-up visits, improving patient convenience and reducing the demand for in-person visits, thus straining resources.

Staff Training and Development for Operational Excellence

A well-trained staff is the backbone of any successful outpatient clinic. Initial training ensures new hires know the clinic's workflows, technology systems, and policies. Comprehensive onboarding programmes and ongoing education opportunities keep staff updated on best practices and the latest technologies.

Continuous professional development is vital in keeping staff engaged and improving performance. Team-building activities foster collaboration and communication, contributing to a positive work environment. Ongoing training also plays a crucial role in preventing burnout, equipping staff with the tools to handle their responsibilities more effectively (Hill and Evans 2021).

Workflow Optimisation and Lean Management

Efficient workflow design is essential for minimising waste and maximising productivity in outpatient clinics. Standard Operating Procedures (SOPs) help ensure consistency in operations, while lean management techniques streamline processes by eliminating non-value-added activities. Applying lean principles to patient scheduling, inventory management, and administrative processes can significantly enhance operational efficiency.

Effective patient flow management is also critical for improving both patient experience and clinic efficiency. Optimising appointment scheduling and reducing bottlenecks in patient movement can minimise wait times and improve overall patient satisfaction (Johnson 2020).

Patient Engagement and Education Improve Outcomes

Engaging patients in their care is critical for improving health outcomes and clinic satisfaction. Patient education programmes empower individuals to take control of their health, leading to better adherence to treatment plans and improved disease management. Clear communication about care plans and treatment options fosters trust between providers and patients (Anderson and Brown 2020).

Feedback mechanisms, such as patient satisfaction surveys and suggestion boxes, provide valuable insights

into areas for improvement. Clinics actively seeking and responding to patient feedback demonstrate a commitment to continuous improvement, enhancing their reputation and trust within the community.

how to use these systems to overcome technological barriers. Regular system updates and ongoing IT support are essential for maintaining operational efficiency. Investing in continuous technical support to address any issues that arise ensures that technology functions smoothly and enhances clinic operations (Moore and Davis 2019).

> "Strategic planning is the bedrock of outpatient clinic success, as it sets long-term goals that align with the community's healthcare needs."

Challenges and Potential Solutions

Despite the numerous advantages of activation planning, outpatient clinics often face challenges that can hinder operational success. The most prevalent issues include staff burnout, patient no-shows, and technological barriers. Burnout, frequently caused by heavy workloads and stress, can reduce job satisfaction, lower productivity, and increase staff turnover. Patient no-shows disrupt clinic schedules, negatively impacting patient care and clinic efficiency. Furthermore, technological barriers, such as difficulties implementing and maintaining Electronic Health Records (EHR) systems, add to the operational strain.

1. **Staff Burnout and Retention**

To mitigate staff burnout, clinics should implement work-life balance initiatives and wellness programmes that promote staff well-being. These may include flexible work schedules, mental health resources, and stress management workshops. By prioritising staff health, clinics can maintain a motivated workforce, reduce turnover, and improve overall clinic performance.

2. **Addressing Patient No-Shows**

Automated appointment reminders via text messages or phone calls can significantly reduce patient no-show rates. Flexible and easy-to-use rescheduling options further improve patient attendance by allowing patients to adjust their appointments instead of missing them. This not only enhances clinic efficiency but also leads to better patient outcomes.

3. **Overcoming Technological Barriers**

Implementing health IT systems such as EHRs can be complex, often requiring significant training and support. Clinics must provide comprehensive training for staff on

Expanding Care Access Through Telehealth

Telehealth integration has become increasingly valuable in improving access to care. By offering remote consultations and follow-up visits, telehealth services enable clinics to reach patients facing barriers to in-person visits, such as geographic distance or mobility challenges. Investing in telehealth platforms and providing staff training for virtual care delivery can help clinics expand their services, improve patient satisfaction, and reduce the burden on in-person resources.

Conclusion

Activation planning for outpatient clinics is essential for ensuring operational readiness and long-term success. From strategic planning and facility design to staff training and technology integration, each phase of activation plays a critical role in enhancing patient care and operational efficiency. By addressing challenges such as staff burnout, patient no-shows, and technological barriers, clinics can optimise their services and deliver high-quality care.

Future initiatives should further integrate emerging technologies, such as artificial intelligence (AI) and telehealth, into clinic operations. Additionally, fostering stronger patient engagement and education efforts will continue to be vital in improving health outcomes. Research into innovative models of care, such as team-based approaches and proactive healthcare management, will help outpatient clinics remain agile in the ever-evolving healthcare landscape.

Conflict of Interest

None.

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Hybrid Health Approach: Integrating Traditional Treatments and Wearable Technologies

The hybrid approach of combining traditional treatments with wearable technologies and mobile appli-cations can enhance health management by improving patient adherence, enabling continuous moni-toring, and reducing healthcare costs, as demonstrated by the CardioManager app roll-out for heart failure patients in Spain.

JOSÉ A. CANO

Research Director I IDC I Madrid, Spain

ALAN ZETTELMANN

Principal Consultant I InnoConsult.com I Dubai, UAE

key points

- Combining traditional treatments with wearable technologies and mobile applications offers a more comprehensive approach to managing chronic diseases by enabling continuous monitoring and personalised care.
- Mobile applications and wearables empower patients by giving them control over their health, improving treatment adherence, and reducing hospitalisations.
- The hybrid approach can lead to significant cost savings for healthcare systems.
- Successful implementation of this approach requires collaboration between patients and healthcare professionals, data security measures, and ensuring equitable access to technology.

The evolution of technology has significantly transformed medicine, enabling the creation of new tools and approaches for treating various diseases. Cardiovascular health has seen remarkable advancements by incorporating mobile applications and wearable devices for monitoring and managing chronic diseases like heart failure. These developments have led to a hybrid approach to disease treatment, combining traditional methods with complementary technology-based solutions. This article explores how combining traditional treatments with wearable technologies can improve people's health and generate savings for

healthcare systems, using the economic impact study of one App on heart failure patients in the Castilla y León community of Spain as a reference.

A Hybrid Approach Empowers Health Management

Mobile technologies and wearable devices have opened new possibilities in health management. These tools enable constant patient monitoring outside the clinical setting, providing real-time data that can be used to adjust treatments more precisely and personally. Mobile applications like the one described in this article, CardioManager, allow patients to record their symptoms, activities, and health measurements, facilitating closer monitoring of their condition.

By combining traditional treatments and wearable technologies, we create a hybrid approach that offers multiple benefits. Patients can maintain more active control over their health, increasing treatment adherence and reducing the need for hospitalisations. Healthcare professionals, on the other hand, gain a more comprehensive and detailed view of the patient's condition. This enables them to make more informed decisions and achieve improved treatment outcomes, instilling confidence in the hybrid approach.

In today's world, where chronic diseases are a significant burden on healthcare systems, finding innovative and effective approaches to managing and treating these conditions is essential. One of the most promising combinations in this regard is the use of traditional treatments, which have proven their effectiveness over decades, alongside modern technologies, such as wearable devices and mobile applications, that facilitate continuous monitoring and health tracking. This hybrid approach not only optimises medical care but also empowers patients by giving them greater control over their well-being.

Traditional Treatments Remain Relevant

Traditional treatments, such as medication, diet, and exercise prescribed by healthcare professionals, remain the cornerstone of managing many chronic diseases. These methods have been validated over time and continue to be essential for maintaining and improving health. However, despite their effectiveness, traditional treatments often face challenges, such as patient adherence, variability in treatment response, and difficulty to monitor outcomes in real-time.

For example, conventional treatments for cardiovascular diseases include medications to control blood pressure and cholesterol, lifestyle changes to promote physical activity, and adopting a healthy diet. While these approaches are effective, they require continuous monitoring and the ability to adjust treatments based on the patient's response, something that is often limited by periodic doctor visits.

> "Introducing [the CardioManager] app could reduce heart failure management and treatment costs by 33%, translating into savings of more than 9,000 euros per patient."

The Wearables and Mobile Applications Revolution

With the advancement of technology, wearables and mobile applications have revolutionised how health conditions are managed. These devices allow continuous monitoring of key health parameters, such as heart rate, physical activity, glucose levels, and blood pressure, providing real-time data to both the patient and healthcare professionals. This continuous monitoring capability is particularly beneficial for patients with chronic diseases, where the condition's stability is crucial.

An example illustrating the benefits of this hybrid approach is described in the article through the case of the CardioManager app, specifically designed for heart failure patients. This app allows patients to record their physical activity, measure parameters like blood pressure and glucose levels, and receive reminders about medication and doctor's visits. Additionally, it offers educational information about the disease, helping patients better understand their condition and how to manage it effectively.

Benefits of the Hybrid Approach

Combining traditional treatments with wearable technology creates a hybrid approach that maximises the benefits of both worlds. This approach facilitates treatment adherence and improves health outcomes by allowing quick and personalised treatment regimen adjustments.

1. **Improvement in Treatment Adherence** One of the biggest challenges in treating chronic diseases is patient adherence. Wearables and mobile applications can help address this issue by providing regular reminders and allowing patients to monitor their progress. For instance, CardioManager enables patients to record their medication and receive alerts when it's time to take their medicines, thereby reducing the risk of forgetfulness and improving adherence.
2. **Continuous Monitoring and Personalised Adjustments** The ability of wearables to provide real-time data means that healthcare professionals can continuously monitor a patient's condition and make necessary adjustments to the treatment. This is particularly important in conditions like heart failure, where changes in symptoms may require quick adjustments in medication or condition management.
3. **Patient Empowerment** Access to information and the ability to monitor their own health empowers patients, making them more active in managing their condition. This can lead to a better understanding of the disease and greater motivation to follow treatment recommendations. Patients using apps like CardioManager report feeling more in control of their health, which can lead to better long-term outcomes.
4. **Cost Reduction for the Healthcare System** Using technologies like CardioManager can also generate significant savings for healthcare systems. A study conducted in the Castilla y León community in Spain demonstrated that introducing this app could reduce heart failure management and treatment costs by 33%, translating into savings of more than 9,000 euros per patient. This alleviates the financial burden on the healthcare system and allows for better resource allocation to other aspects of healthcare.

How to Implement a Hybrid Approach in Clinical Practice

To effectively implement a hybrid approach, healthcare professionals and patients must collaborate to integrate these new methods into existing treatment regimens. This includes educating patients on how to use wearables and mobile applications and training healthcare professionals to interpret the data provided by these devices. Moreover, applications and devices must be designed to be accessible and easy to use for a wide range of patients, including those unfamiliar with the technology. Personalisation also plays a key role, as each patient has unique needs to be considered when designing a treatment plan.

Despite the clear benefits, implementing a hybrid approach also faces challenges. One of the main obstacles is ensuring the security and privacy of patient data. With the increasing amount of information collected by wearables and mobile applications, it is vital to implement robust measures to protect this sensitive data. Another challenge is integrating these new approaches into existing healthcare systems. Healthcare professionals must be prepared to interpret and use the data provided by wearables effectively, which may require changes in clinical processes and continuous training of medical staff. Finally, it is important to consider equity in access to these technologies. Not all patients may have access to wearable devices or smartphones, which could create disparities in treatment. Healthcare systems must work to ensure that all patients, regardless of their economic situation or level of technological knowledge, can benefit from these advancements.

Future Considerations and Key Success Factors

The hybrid approach that combines traditional treatments with complementary technologies such as wearables and mobile applications has the potential to transform the management of chronic diseases. By integrating the proven effectiveness of traditional methods with the innovation and personalisation offered by new technologies, this approach can significantly improve health outcomes, increase treatment adherence, and reduce healthcare systems' costs.

The success of this integration depends on effective collaboration between patients and healthcare professionals and investment in education, technological infrastructure, and security measures. As we continue exploring the possibilities of this hybrid approach, we will likely see ongoing transformation in how health conditions are managed, with lasting benefits for both patients and global healthcare systems.

Case Study: CardioManager and Heart Failure

Context and Problems

According to the World Health Organisation (WHO), cardiovascular diseases are the leading cause of death globally, with a total of 17 million deaths per year. Among these, heart failure (HF) is one of the most critical conditions, affecting millions of people worldwide. In Spain, more than 1,200,000 people suffer from severe heart failure, with key risk factors including hypertension and ischemic heart disease. Traditional HF management involves a series of challenges, including high costs associated with treatment and frequent hospitalisations due to patient condition decompensation. These costs are not only economic but also social, as HF can significantly reduce the quality of life for patients.

Introduction of CardioManager

CardioManager is a mobile application developed to help heart disease patients self-manage their condition. This app includes several key features, such as an information section with medical details about diseases, a patient guide offering tips and recommendations, and a section recording health activities and measurements, such as blood pressure, glucose levels, and cholesterol. Moreover, CardioManager allows users to log their medication and set alarms to remind them to take their medications at the indicated times. These features not only facilitate better disease control by the patient but also provide valuable information to doctors about treatment adherence and patient progress.

Economic and Health Impact

The study conducted in the Castilla y León community, Spain, evaluated the economic impact of introducing an app (CardioManager) as a complementary treatment into the public health system. Using a cost-effectiveness analysis based on a Markov model, the study compared the costs associated with managing HF patients before and after the app's implementation. The results were significant. The introduction of CardioManager could generate a 33% reduction in disease management and treatment costs, translating into savings of more than €9000 per patient for the local healthcare system. At the regional level, this could represent total savings of approximately €6 million, equivalent to 0.31% of the total healthcare expenditure in Castilla y León.

These savings are derived from several key areas:

- **Reduction in Hospitalisations:** CardioManager allows better monitoring and management of the patient's condition, reducing the need for frequent hospitalisations.
- **Improvement in Treatment Adherence:** The app's alarms and reminders help patients follow their medication regimens more strictly, improving treatment outcomes.
- **Decrease in Travel:** Recording and monitoring symptoms and activities from home reduces the need for hospital or clinic visits, lowering patient transportation and time costs.

Cost-Effectiveness Analysis

The cost-effectiveness analysis of the study used the Incremental Cost-Effectiveness Ratio (ICER) to measure the cost-utility of introducing CardioManager compared to the scenario without the app. The results showed that the ICER indicated that the cost per additional quality-adjusted life year (QALY) achieved with the app was significantly lower than the willingness-to-pay threshold, suggesting that CardioManager is not only effective but also cost-efficient. Moreover, a univariate sensitivity analysis confirmed the robustness of these results, demonstrating that even with variations in certain key variables, the introduction of CardioManager remained highly cost-effective.

Additional Benefits of the Hybrid Approach Improved Control and Quality of Life

One of the most notable benefits of the hybrid approach is the improvement in disease management by the patient. Wearable technologies and mobile applications allow patients to constantly monitor their health, giving them a better understanding of their condition and enabling them to make informed decisions about their lifestyle and treatment. This not only improves treatment adherence but can also prevent serious complications by identifying issues before they worsen.

Patient Empowerment

The use of technological tools also empowers patients, giving them a more active role in managing their health. This empowerment can increase patient satisfaction, as they feel they have more control over their treatment and daily life. In the case of chronic diseases, where long-term management is crucial, this factor can be especially beneficial.

Savings for the Healthcare System

In addition to patient benefits, the hybrid approach offers significant advantages for healthcare systems. The reduction in hospitalisations, the decrease in unnecessary medical visits, and the improvement in

treatment efficiency contribute to an overall reduction in healthcare costs. In a context where healthcare budgets are limited, these savings can be reinvested in other critical areas of the healthcare system.

Personalised Treatment

The integration of wearable technologies allows for greater personalisation of treatment. Wearable devices can collect specific patient health data, enabling doctors to tailor treatments to individual needs. This personalisation not only improves treatment efficacy but also reduces side effects and enhances the patient's quality of life.

Challenges and Considerations

- Data Privacy and Security

Data privacy and security are key challenges when implementing wearable technologies and mobile applications. Wearable devices collect a large amount of sensitive health data, raising concerns about how this data is stored, shared, and protected. It is crucial that applications and devices comply with data privacy regulations, such as the General Data Protection Regulation (GDPR) in Europe, to ensure the security and confidentiality of patient information.

- Accessibility and Digital Divide

Another important challenge is the accessibility of these technologies. Although the use of smartphones and wearables is increasing, there is still a digital divide, particularly among older populations or in regions with less access to technology. For the hybrid approach to be truly effective, it is necessary to address these disparities and ensure that all patients can benefit from these tools.

- Education and Training

Introducing new technologies in disease treatment also requires education and training for both patients and healthcare professionals. Patients must be trained to use the apps and devices correctly, while healthcare professionals must understand how to interpret the data and adjust the treatment accordingly.

Conflicts of Interest

None.

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Evolution and Impact of Telenursing and Telemedicine

The healthcare industry is going through a transformation driven by rapid technological advancements and the increasing demand for accessible, efficient, and patient-centred care. In this digital era of healthcare delivery, telenursing has emerged as a crucial component, bridging the gap between patients and healthcare providers through innovative communication technologies. Telenursing is at the forefront of this digital revolution, promising to reshape the landscape of patient care and nursing practice.

SAMAR ABDELSALAM

Biomedical Engineer, Planning & Implementation Consultant I Dr. Sulaiman Al-Habib Medical Group, Flow Medical Solutions I Riyadh, Saudi Arabia

key points

- Telenursing represents a transformative shift in healthcare, prioritising accessibility, efficiency, and superior patient care through technology.
- Virtual nursing programmes have emerged as a viable solution to address critical nursing shortages.
- Telenursing's future success will depend on effectively addressing challenges such as privacy, technology access, and regulatory constraints.
- Telenursing supports various healthcare applications, including home care, case management, and telephone triage.

The Digital Health Landscape

The digital healthcare ecosystem involves integrating cutting-edge technologies and innovative digital solutions across various aspects of healthcare delivery and management. Technological advancements have transformed the healthcare industry, replacing traditional methods of patient care and record-keeping with a more efficient digital landscape. The integration of telemedicine and advanced information systems has ushered in a new era in healthcare delivery, offering significant benefits for both patients and healthcare professionals.

Telehealth, Telemedicine & Telenursing

Telehealth is "the use of electronic information and communication technologies to support virtual clinical healthcare practice, patient and professional health-related education, public health and health administration" (Saudi Health Council 2023). The World Health Organisation defines telehealth as the "delivery of health care services, where patients and providers are separated by distance. Telehealth uses Information and Communication Technologies (ICT) for the exchange of information for the diagnosis and treatment of diseases and injuries, research and evaluation, and for the continuing education of health professionals" (WHO 2022).

Telemedicine is the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease

and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities. WHO refers to telemedicine as “healing from a distance” and defines it as using telecommunications and information technologies to provide remote clinical services to patients. Telemedicine revolutionises healthcare delivery by leveraging information and communication technologies to bridge geographical gaps. This innovative approach enables healthcare professionals to provide remote clinical services, facilitating diagnosis, treatment, and disease prevention across distances.

Telemedicine revolutionises healthcare delivery by leveraging information and communication technologies to bridge geographical gaps.

Telenursing utilises telephone conversations and information technology to provide remote nursing care. Telenursing addresses the increasing shortage of nurses and maintains patient contact after hospital discharge for optimal outcomes. This approach is particularly beneficial for patients who live far from healthcare clinics or face long wait times for doctor appointments (Mohsen 2020).

Telenursing Key Applications:

- **Remote Clinical Care:** Nurses can effectively conduct virtual consultations, monitor patients’ conditions, and provide patients with necessary advice using telecommunication technologies (Mohammed 2020).
- **Triage, Assessing Conditions and Prioritising Care:** Remote triage has emerged as a crucial component of modern healthcare systems. It leverages technology to provide initial patient assessments without the need for in-person visits. The core of remote triage revolves around systematically evaluating symptoms through clinically based telephone conversations. Trained nurses play a pivotal role in this process, employing their expertise to conduct thorough symptom assessments (Greenhalgh 2020).
- **Management of patients:** This aspect of telenursing involves the continuous monitoring and assessment of patients’ health status through the transmission of vital information to the telenursing centre. This information typically includes vital signs such as blood pressure, heart rate, respiratory rate, and body temperature, as well as more complex data like electrocardiogram (ECG) reports. By relaying this critical health data in real-time or at regular intervals, nurses can effectively track patients’ conditions, identify potential health issues early, and make informed decisions about necessary interventions (Mohammed 2020).
- **Home Care During Illness or Recovery:** Telenursing offers significant benefits for patients who are recovering at home or don’t require hospitalisation. This innovative approach to healthcare provides essential support through remote monitoring, professional advice, and patient education. Nurses can regularly check in with patients via video calls or phone consultations, assessing their condition and addressing any concerns (Paton 2020).
- **Mental Telehealth Nursing:** Telenursing has emerged as a valuable tool in the realm of mental health care, offering innovative solutions to address the growing prevalence of mental illness in contemporary society. The rising incidence of mental health issues, especially among adolescents and the elderly, underscores the urgent need for proactive measures and systemic improvements in healthcare delivery (Collada 2023).
- **Telenursing in ICU:** The telenursing ICU combines informatics, telecommunications, telemedicine, and telenursing to enhance care for critically ill patients. Evidence-based studies inform cutting-edge services for treatment and monitoring. In ICU telenursing, nurses and physicians use audio and video technology to monitor critical patients remotely. This system allows for the assessment of multiple patients through cameras and continuous monitoring of hemodynamic values while providing access to diagnostics and medical records. Tele-ICU nurses virtually monitor patients and alert bedside nurses to any unusual observations. Telenursing ICU operations have long been associated

with excellent critical care outcomes. Tele-ICUs operating under a centralised hub with auxiliary resources can significantly improve family-centred care outcomes. Coordinated patient visits, collaboration, patient education, and care coordination are among the connected health options available for intensive care (Collada 2023).

Benefits of Telehealth Nursing

Numerous studies highlight significant advantages associated with telehealth nursing (Deering 2022; VirtualNurse RX 2024):

Addressing Nursing Shortages: Virtual nursing programmes have emerged as a viable solution to address critical nursing shortages and workforce challenges.

Efficiency in Healthcare Delivery: Telehealth can streamline workflows, enable faster decision-making, and enhance the coordination of patient care.

Challenges in Implementing Telehealth Nursing

Despite the benefits, the implementation of telehealth nursing is not without its obstacles (Deering 2022; Qadir 2022; Mohammed 2020):

Patient Privacy and Confidentiality: Telemedicine encounters are more vulnerable to privacy and security risks than face-to-face encounters. While most telehealth platforms use high-level encryption and comply with Health Insurance Portability and Accountability Act (HIPAA) standards and regulations, no platform is entirely immune to hackers or data breaches.

Telenursing represents a significant advancement in healthcare delivery, offering numerous benefits for both patients and healthcare providers.

Enhanced Access to Care: Telehealth services improve access for patients in rural and underserved areas, thus breaking down barriers to healthcare.

Cost-Effectiveness: Both patients and healthcare providers can save on transportation costs, time away from work, and establish more efficient healthcare delivery pathways.

Chronic Condition Management: Telehealth nursing facilitates better monitoring and management of chronic health conditions, improving patient outcomes and reducing hospital readmissions.

Increased Patient Engagement: Telehealth empowers patients by allowing them to engage actively with their health management, leading to improved adherence to treatment plans.

Promotes Preventative Health: Technology enables patients and healthcare providers to monitor various health metrics, including weight, blood sugar levels, and mental health indicators. User-friendly smartphone and tablet applications enhance accessibility to health information and increase the likelihood of adherence to medical guidelines.

Ability to Implement it in All Situations: Telehealth may not be suitable for patients with certain medical conditions or injuries that require physical examinations, hospital stays, or ongoing face-to-face care. Additionally, some states mandate an in-person visit or physical examination before prescribing medication.

Payment Confusion: Conflicting insurance policies regarding coverage for telehealth services pose barriers to widespread adoption in some areas.

Technological Disparities: There is a significant digital divide, particularly among vulnerable populations lacking access to reliable internet or the requisite technological literacy.

Regulatory Obstacles: Telenursing, like telehealth in general, faces numerous legal, ethical, and regulatory challenges. Many countries prohibit interstate and international tele-nursing practice; the attending nurse must be licensed both in their home state/country and in the patient's location.

Conclusion and Future Implications

Overall, the implications of telenursing in the coming years highlight a transformative shift in healthcare that prioritises accessibility, efficiency, and superior patient care through technology. Addressing the accompanying challenges will be crucial for successfully integrating telenursing into mainstream nursing practice.

Telenursing represents a significant advancement in healthcare delivery, offering numerous benefits for both patients and healthcare providers. As technology continues to evolve, telenursing is poised to play an increasingly important role in the future of healthcare. However, the future success of telenursing will depend on effectively addressing challenges such as:

- Privacy and security concerns in digital healthcare platforms
- Legal and regulatory issues, particularly regarding interstate and international practice
- Limitations in certain medical conditions that require physical examinations or in-person care

As healthcare continues to evolve, successfully integrating telenursing into mainstream nursing practice will be crucial for realising its full potential in improving healthcare accessibility, efficiency, and patient outcomes.

Conflict of Interest

None.

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Prime Plus provides the most clinical value of any blood gas/critical care analyzer profile by adding essential tests for kidney function (Urea, Creatinine, eGFR), plasma volume (ePV), ionized magnesium (iMg) and MCHC.

Creatinine, eGFR, and Urea

Over 50% of patients admitted to the ICU develop some degree of acute kidney injury.[1] Creatinine, eGFR, and Urea monitoring provides indication of changes in kidney function and helps guide therapy to prevent AKI.

Estimated Plasma Volume (ePV)

The plasma volume status of a patient is one of the top priorities in evaluating and treating critical illness including CHF, ARDS, AKI, and Sepsis.[2-4]

Ionized Magnesium (iMg)

Hypomagnesemia is a frequent finding in critically ill patients.[5] Magnesium therapy guided by real time ionized magnesium monitoring has been shown to improve outcome in these patients.[6]

Mean Corpuscular Hemoglobin Concentration (MCHC)

Helps differentiate types of anemia.

Test Menu:

pH PCO_2 PO_2 SO_2% Hct Hb MCHC Na K Cl TCO_2
iCa iMg Glu Lac Urea Creat CO-Ox tBil HbF

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Virtual Care Readiness: Exploring Adoption Perspectives

The Lovexair Foundation explores how to maximise the adoption of digital health technologies, particularly telehealth, to enhance patient care by addressing both benefits and challenges. This article emphasises the need for human-centric solutions that improve communication, trust, and accessibility for patients and healthcare professionals.

SOFIA ZANROSSO

Researcher in Digital Health | Lovexair Foundation | Madrid, Spain

SHANE FITCH

CEO | Lovexair Foundation | Madrid, Spain

MUSTAFA ABUSALAH

Advisor in Digital Transformation | Lovexair Foundation | Madrid, Spain

key points

- Digital health technologies, especially telehealth, are transforming healthcare by improving patient engagement, self-monitoring, and treatment adherence.
- The Lovexair surveys captured the perspectives of patients, caregivers, and healthcare professionals on telehealth services, emphasising the importance of human-centricity, accessibility, satisfaction, and communication preferences.
- While telehealth offers advantages like convenience and better access to healthcare, significant barriers remain, such as technological challenges and the preference for face-to-face consultations in specific contexts.
- There are disparities in telehealth adoption based on age, language, and country, with older individuals and certain countries facing increased technological difficulties.

In today's technology-driven world, healthcare is undergoing a significant transformation. Lovexair Foundation, an NGO based in Spain, is dedicated to improving the experiences of patients, caregivers, and healthcare professionals through innovative virtual care. They conducted a study to evaluate the real-life impact of online medical consultations. This article explores the benefits of digital health models and their potential to improve patient well-being. It investigates whether the rapid growth of digital health technologies can lead to advancements in self-monitoring, patient engagement, and treatment adherence.

The main objective of this study is to assess the influence of digital health, with a specific focus on telehealth services. A comprehensive methodology was used to achieve this, including developing, distributing, and analysing two online surveys for patients, caregivers, family members, and healthcare

professionals. The results emphasise the crucial role of communication and effective information sharing, underlining the importance of humanising technology and building trust in digital health solutions.

The increasing utilisation of digital technologies in healthcare signifies a notable transition towards a patient-centric methodology, highlighting the need for empowerment to support improved individualised care.

Exploring Digital Health Solutions Through Patient and Professional Insights

In recent decades, three major changes have significantly impacted our lives: the increase in human life expectancy, the rapid growth of digitalisation, and the merging of these two forces. This convergence has led to significant opportunities and complex challenges, particularly in the healthcare industry. Digital health solutions have become crucial tools for empowering patients to manage their health. These solutions enable patients to monitor their health and improve their understanding of their medical conditions. Additionally, digital tools complement traditional healthcare practices, offering healthcare professionals an alternative method for monitoring patients and ensuring timely interventions (Abernethy 2022).

This study aims to enhance the HappyAir Ecosystem (Zanrosso 2024) by exploring the perspectives of both patients and healthcare professionals on digital health technologies. The objective is to evaluate these factors by collecting data through an extensive two-month survey campaign. The study examines the benefits, challenges, and preferences associated with telehealth services to provide valuable information for developing technologically advanced telehealth systems prioritising human needs. The OPtimising HEalth LIterAcy (Ophelia) approach was used for the evaluation (Zanrosso 2024).

Innovation and Digital Transformation for Patient-Centric Care

The importance of innovation in the healthcare industry has grown significantly, mainly due to COVID-19, including fragmentation, limited resources, and deficiencies in data management (Toni 2023). The increasing utilisation of digital technologies in healthcare signifies a notable transition towards a patient-centric methodology, highlighting the need for empowerment to support improved individualised care. By adopting digital literacy skills in health care, individuals are motivated to participate actively in the management of their health by prioritising their active involvement, contributing information, and working together with HCPs (Toni 2023). This approach, in turn, results in enhanced health (Van Boven, 2023).

Telehealth technologies, which are digital interventions, provide flexible solutions beyond particular practices and healthcare organisations. These interventions are available in several formats, such as synchronous programmes (communication through video conferencing or telephone calls) and asynchronous solutions (emails, messaging, or notifications) (Watson 2022; WHO 2024). Multiple studies have provided evidence of the advantages of digital health applications, such as decreased hospitalisation rates, enhanced symptom management, and overall enhancements in quality of life (Quach 2023; Bao 2022; López Seguí 2018; Jiménez-Reguera 2020). Nevertheless, substantial obstacles still exist that hinder the implementation of digital health technologies, including economic, organisational, behavioural, and technological aspects, which may vary in different contexts (Cannavacciuolo, 2023).

Survey of Patient, Caregiver, and Healthcare Professional Requirements

To evaluate the requirements of patients/caregivers/family members and HCPs regarding telehealth services, Lovexair used a quantitative methodology to collect data from a substantial number of participants.

The main goal was to create surveys that gathered opinions and experiences with digital health services, with a specific focus on elements like accessibility and levels of satisfaction.

3. Endorsements and sharing strategy.
4. Questionnaire launch and analysis.

The questionnaire is customised for different types of users (Figure 1). Patients, caregivers, and family members have additional sections for profiling information and requesting further support. Both groups need to provide basic demographic data and assess their level of technological proficiency.

> The diverse experiences of participants reveal a clear preference for virtual health solutions that are both technologically advanced and human-centric.

The surveys were expected to take 5 to 10 minutes to complete to make the process more efficient for all participants. The questionnaire development was organised into four distinct phases:

1. Literature Review on Barriers and Benefits of Digital Health Solutions.
2. Questionnaire development.

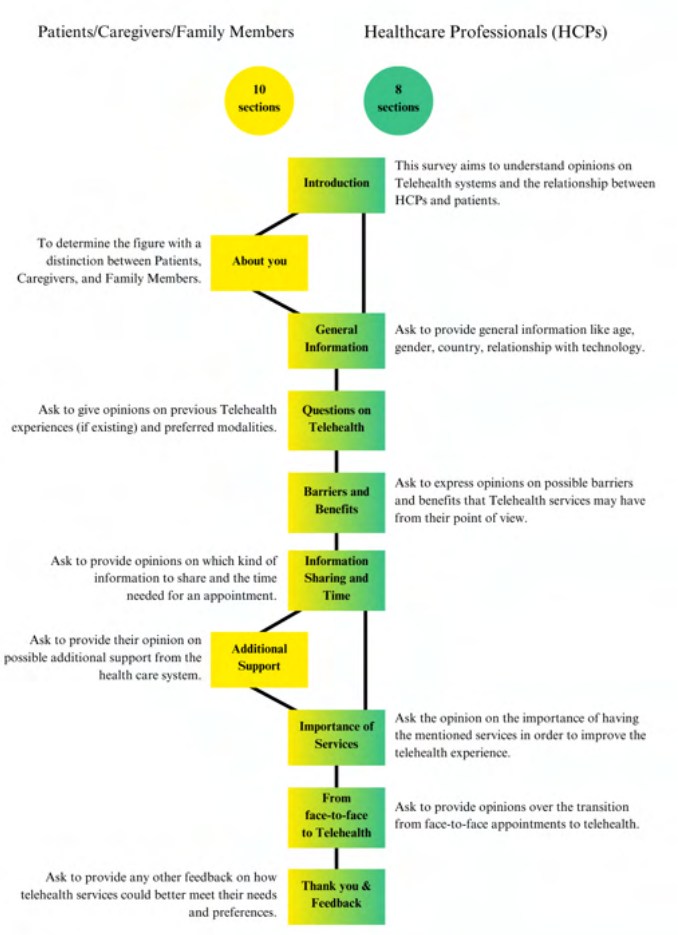

Figure 1: Structure of the questionnaires

- The "Questions on Telehealth" section is based on the user's previous experiences with telehealth services, considering the varied stages of telehealth advancement in different countries. Participants in this section need to specify their preferred methods of communication and the equipment they use for connectivity. They must also indicate whether their telehealth sessions were conducted within a public or private health system and specify the categories of telehealth appointments (regular examinations, medication prescriptions, urgent situations, etc.).
- In the "Barriers and Benefits" section, participants need to list potential obstacles (technological, privacy, and social barriers, perceived levels of stress) and advantages (such as decreased travel time and convenience) of telehealth services.
- "Access to Information" emphasises the importance of having precise information before or during a telehealth consultation, including reports from past visits, prescription details, and clinical test results.
- In the "Importance of Services" section, participants must assess different services, including the significance of readily accessible medical history and the feasibility of maintaining a health diary.
- "From Face-to-Face Appointments to Telehealth" encourages participants to consider the specific elements of in-person healthcare they find lacking in telehealth appointments.

The partnerships Lovexair formed with several entities have been crucial for enhancing the study process and expanding the pool of participants. By collaborating with

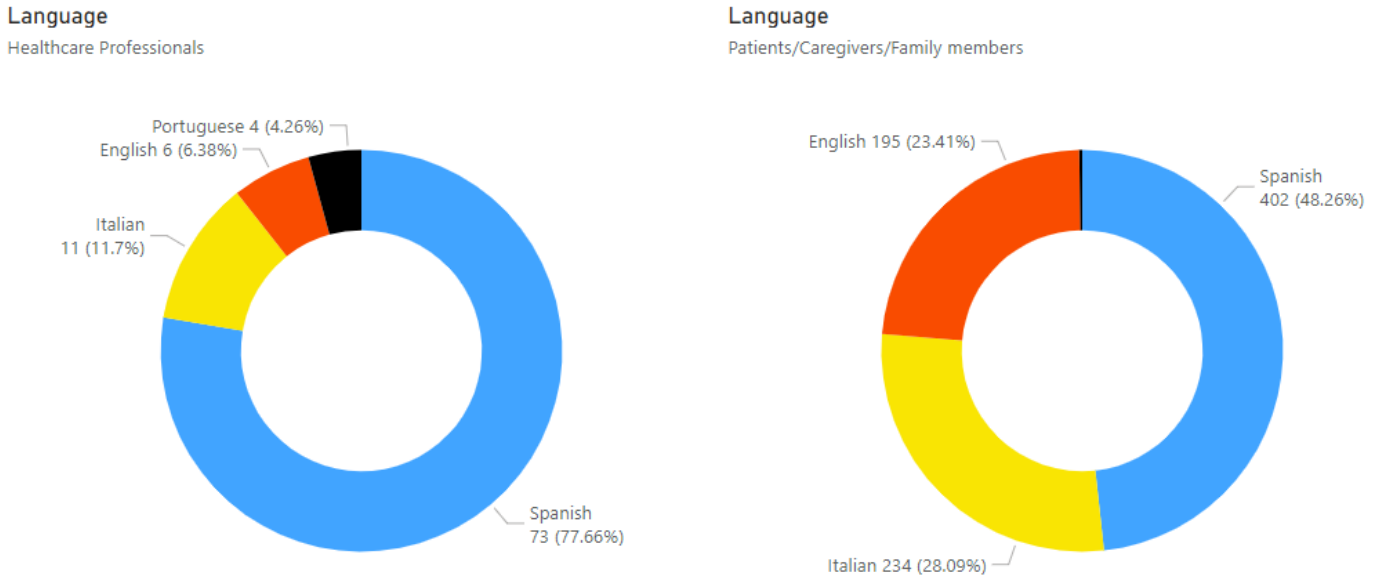

Figure 2. Survey entries' language distinction for healthcare professionals (94 responses) and patients/caregivers/family members (241 responses).

patient advocacy groups and professional associations, researchers were able to involve a broader and more diverse group of individuals. This collaborative approach not only improves the inclusivity and representativeness of the sample, but also enhances the legitimacy and relevance of the research findings. To reach a varied

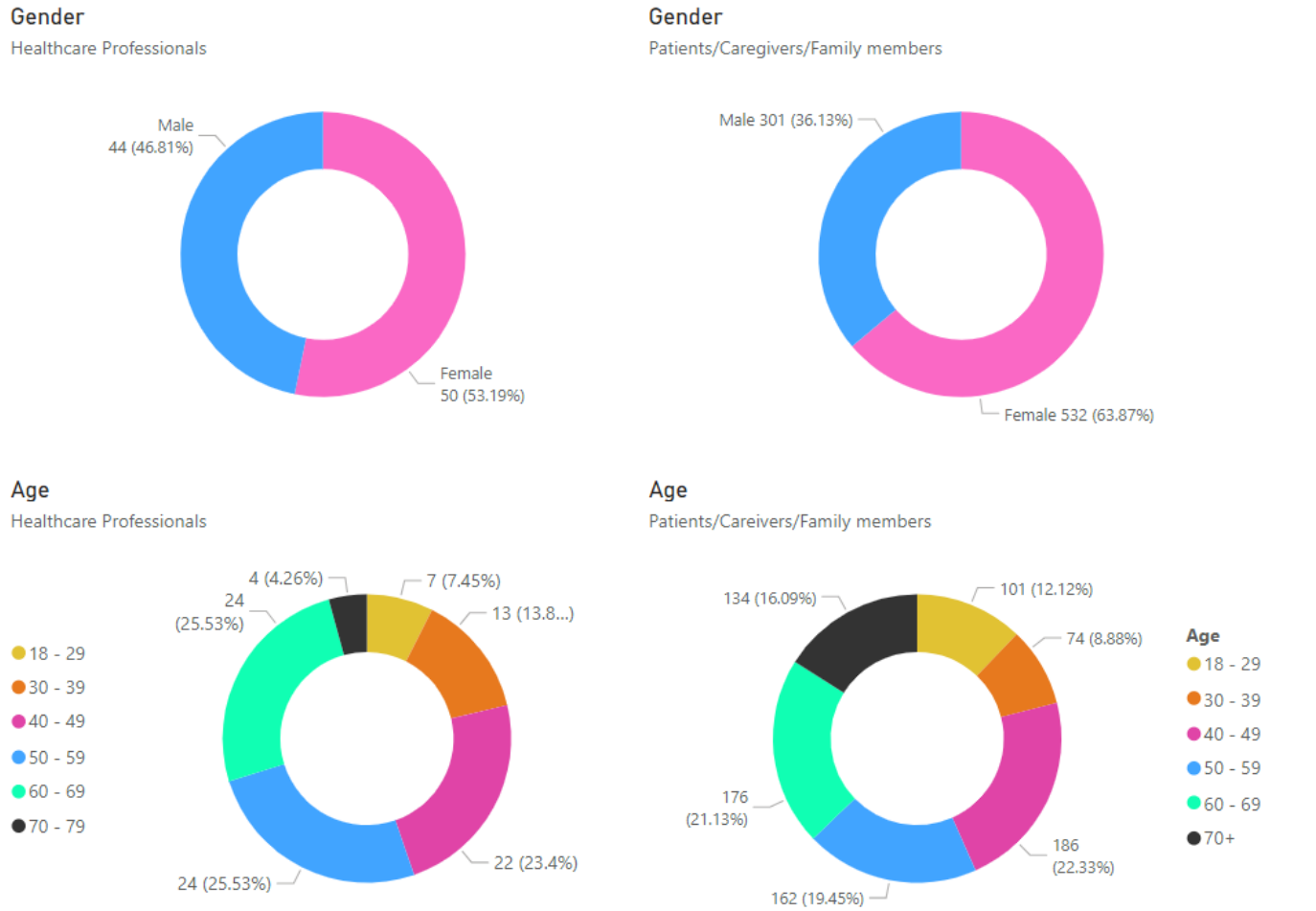

Figure 3 – Study demographics (gender and age) for healthcare professionals and patients/caregivers/family members.

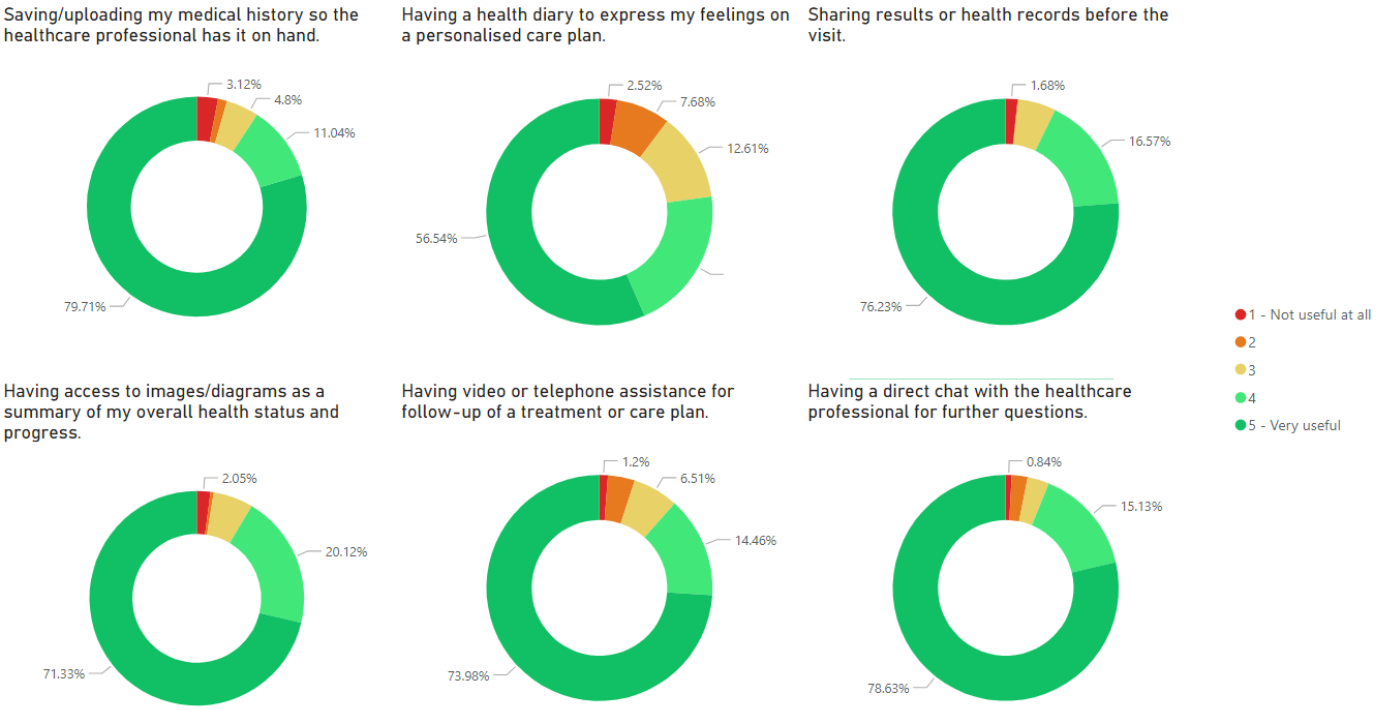

Figure 4 - Patients/Caregivers/Family member's feedback on proposed services' utility before or during a telehealth appointment

readership, social media sites were prioritised for posting regular updates during the survey campaign to maintain consistent engagement. Additionally, Lovexair developed a landing page in Spanish, English, Italian, and Portuguese to serve as a central hub for participants, providing essential information about the research topic.

The data analysis of the questionnaires was performed, and the responses were classified according to the language used to complete the questionnaires. This was done to cater to the participants' varied linguistic and contextual requirements, enabling the detection of language-specific differences. In addition, the replies were categorised based on the type of respondent, distinguishing between patients/caregivers/family members and HCPs to comprehend the viewpoints and requirements of each faction. Starting from this mindset, the analysis concentrated on three crucial domains:

- **Obstacles in Telehealth.** Identifying prevalent obstacles encountered by patients and HCPs in the adoption and utilisation of Telehealth services. This encompassed technological challenges, concerns over accessibility, and stress levels associated with virtual consultations.
- **Advantages of Telehealth.** Emphasising the advantages users acknowledge, such as the convenience, enhanced accessibility to healthcare, and the simplicity of exchanging health data with healthcare experts.
- **Preferences of Services.** Identifying the services that patients/caregivers/family members and HCPs would want to have either before or during their Telehealth appointments.

Survey Insights: Language, Gender, and Age Disparities

Between February and April 2024, 335 questionnaire responses were collected. 241 responses came from patients, caregivers, or family members, while 94 were from healthcare professionals. The analysis of the data revealed significant differences based on preferred language: significantly more respondents selected Spanish compared to those who chose Portuguese, Italian, or English, indicating greater engagement among Spanish speakers (Figure 2). This is likely due to Lovexair Foundation's base in Spain and its extensive network in Latin America.

Although there is an equal gender distribution among HCPs, there is a clear gender imbalance among patients, caregivers, and family members (Figure 3). Additionally, the examination of the age distribution indicates a need for more representation of individuals between the ages of 18 and 29. Consequently, the poll primarily captures the viewpoints of older age groups,

who may have different levels of experience with telehealth consultations.

Virtual Care Readiness: Barriers, Preferences and Perceptions

While analysing the questionnaire data, researchers explored different connections between important variables as follows.

Countries and Level of Technology. Data analysis showed notable disparities in technological expertise among various countries. Participants from specific countries, including Colombia, Paraguay, Spain, and Italy, had elevated levels of inadequate or non-existent familiarity with technology. The data indicated that those aged 40 and above were more likely to experience technological difficulties, implying a connection between age and difficulty with technology.

Assistance in Telehealth consultations and Perceived Level of Stress. Examining stress levels during Telehealth consultations indicated that although HCPs' reactions remained limited, their stress levels had no uniform trend. Nevertheless, when considering the patients' viewpoint, it is apparent that a low degree of stress is encountered during telehealth consultations.

Assistance in Telehealth consultations and Device Preferences. Data demonstrates a clear inclination towards smartphones as the preferred choice for Telehealth consultations, surpassing laptops, tablets, and other devices. This choice highlights the attractiveness of smartphones due to their user-friendly nature and convenient accessibility.

Preferences of Services in Telehealth. Figure 4 provides a comprehensive summary of service preferences as perceived by both patients and HCPs. Patients evaluated most of the suggested services as either "Useful" or "Very Useful", except for a health diary designed to monitor personal emotions. Although the literature supports using health diaries in healthcare settings, concerns regarding the time and effort demanded from patients and HCPs may have influenced the negative response received (Hilário 2023). Conversely, HCPs exhibited more significant doubt, specifically regarding the efficacy of health diaries and the value of follow-up conversations through video or chat.

Telehealth's Obstacles and Benefits and willingness to have more in-person consultations. The examination of barriers and advantages revealed in the Telehealth survey (Figure 5) reveals a significant pattern: individuals who encounter challenges with Telehealth are more likely to favour face-to-face consultations in the future. Interestingly, individuals who favoured more face-to-face sessions also acknowledged the advantages of faster access to healthcare professionals and less travel time. This implies a subtle viewpoint in

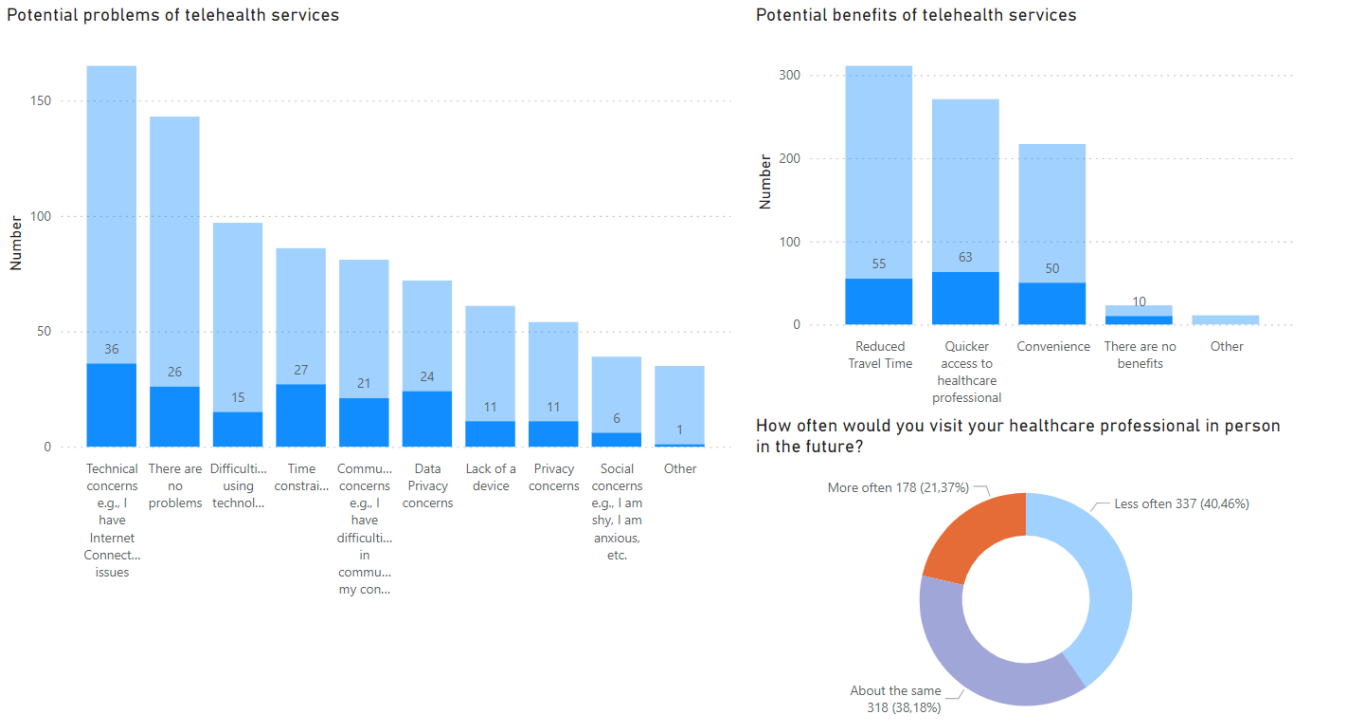

Figure 5 - Possible association between time management and appointments' preferences. The graphs highlight Patients/Caregivers/Family members who prefer more in-person appointments and their opinions on the barriers and benefits of telehealth.

which the challenges linked to telehealth can be more significant than the perceived advantages for specific consumers: technical obstacles are especially noticeable in certain areas, including Latin America. Nevertheless, an equivalent percentage of users indicated they encountered no difficulties using telehealth services, which complicates examining the correlation between advantages, barriers, and the inclination to participate in telehealth appointments. This viewpoint is consistent with existing research on the adoption of new technology, which frequently emphasises the equilibrium between perceived advantages and difficulties (Wakefield 2015).

Conclusion

This article presents a study exploring the value that hybrid care models and digital health technologies can offer patients with respiratory conditions, with the primary aim of enhancing the HappyAir Ecosystem established by Lovexair. Two surveys were conducted to achieve the study's objectives and utilised the Ophelia methodology (Zanrosso 2024) to assess and analyse the results.

The surveys aimed to uncover the perceived benefits and challenges associated with telehealth, as well as participants' preferences for digital health services.

The diverse experiences of participants, which include varying levels of technological proficiency and cultural backgrounds, reveal a clear preference for virtual health solutions that are both technologically advanced and human-centric. These solutions are supported by a business intelligence platform that facilitates better real-time health status monitoring for HCPs. Both patients and HCPs emphasised the importance of maintaining human relationships and ensuring effective communication in the digital realm. The study underscores the significance of relevant digital information sharing in enhancing patient engagement in virtual environments.

Conflict of Interest

None.

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Impact of AI Multimodality in Retail Healthcare: Diagnostics, Personalised Treatment and Consumer Experience

AI multimodality is transforming healthcare by integrating diverse data sources for more accurate diagnostics, personalised treatments, and real-time monitoring. Its incorporation into retail healthcare enhances accessibility, efficiency, and consumer experience, positioning retail clinics as key players in the future healthcare system.

BRAGADEESH SUNDARARAJAN

AI & ML Leader I Chief Data Science Officer I Dvara KGFS I Chennai, India

key points

- AI multimodality in healthcare integrates diverse data sources such as text, images, and clinical data to revolutionise diagnostics, personalised treatments, and real-time monitoring.
- Retail healthcare, particularly in clinics affiliated with drugstores or supermarkets, is becoming more popular and accessible, offering personalised care through AI-driven technologies.
- Privacy, security, and ethical concerns, particularly related to data protection and biases in AI models, are critical considerations as AI continues to reshape the future of healthcare and retail healthcare systems.

AI is currently reshaping most industries in various ways, but none seem to have as much potential to benefit from AI as healthcare. With its access to abundant data and digital advancements, AI multimodality, which utilises a combination of text, images, and clinical data, is expected to revolutionise how healthcare is delivered. AI multimodality offers new possibilities for diagnostics, personalised treatment, and real-time monitoring.

However, retail care, provided in clinics located in or affiliated with a drugstore or supermarket, is becoming a more popular and available option. When these retail strategies incorporate AI multimodality, delivering excellent, efficient, and personalised care to a larger group of people becomes possible.

AI Multimodality Integrates Diverse Data for Better Decision-Making Process

Multimodality in the context of AI refers to the ability of artificial intelligence systems to process multiple types of information simultaneously. In healthcare, this may include analysing and integrating various patient data such as X-rays, modern imaging, electronic health records, laboratory test results, and patient symptoms.

AI multimodal systems use data from multiple sources, rather than just one, to make the decision-making process more accurate and efficient. For instance, a diagnosis can be made by comparing an MRI scan of the brain with the patient's medical records, reports, and genetic test results. This makes multimodal AI valuable

for clinicians as it allows them to simultaneously assess different aspects of the human body.

AI multimodality is supported by several advanced technologies, including:

- **Natural Language Processing (NLP)** can perform literal comprehension of text, which may originate from patient records or research articles.
- **Computer Vision** is used in diagnosing medical images such as CT scans or X-rays.
- **Machine Learning and Deep Learning** enable AI systems to be trained on data to improve diagnostic and future prognostic capabilities.
- **Wearables, IoT, and EHR Integration:** Smartwatches and fitness trackers continually provide health data to the system, which AI then uses in conjunction with the patient's medical history.

One significant advantage of AI in healthcare is its ability to analyse data from multiple sources simultaneously. This capability is crucial for advancing personalised medical treatments, where patient characteristics are taken into account. For example, in cancer therapy, incorporating genetic data with images and laboratory tests can enhance treatment efficiency.

Additionally, using multiple forms of data through AI can help reduce diagnostic errors. Analysing various data types can prevent single-source blindness, allowing for the recognition of patterns or anomalies that may not be apparent when using just one data source.

AI multimodal systems use data from multiple sources, rather than just one, to make the decision-making process more accurate and efficient.

How Multimodal AI Can Transform Healthcare Management

1.Improved Diagnostics and Imaging

Co-modality is a revolutionary concept with diverse applications, especially in diagnostics and imaging. In radiology, AI can assist in analysing CT scans and X-rays by integrating them with patient lab data and medical history, leading to more accurate diagnoses. This is particularly crucial for detecting hard-to-diagnose conditions like cancer, where early detection is vital. For example, in breast cancer screening, AI-based systems can combine mammogram images with a patient's clinical history to identify early signs of the disease. Studies have shown that these systems have the potential to outperform human radiologists in early detection.

2.Personalised Treatment Plans

Machine learning multimodality involves integrating different data types, such as genetic information, demographics, and lifestyle information, into personalised treatment plans. These tailored treatment approaches may include targeted cancer treatment based on genetic test results, imaging data, and patient's medical history, aiming to provide the most effective treatment based on individual characteristics. This approach can significantly improve treatment effectiveness and suggests that better methods can be applied compared to traditional treatment regimens.

3.Tele-monitoring and Tele-care

AI multimodality is also beneficial in providing real-time observations during telemedicine practice. Wearable technology synchronises a patient's biometrics, such as heart rate, blood pressure, and glucose levels, with their previous clinical history and assists clinicians in delivering better care. This is particularly helpful in remote care situations as it allows patients to be proactively monitored, and interventions can be initiated immediately upon detecting any abnormalities. For example, in diabetes care, the multimodal AI system can monitor glucose levels, compare them to behaviours, and create plans for adjustment to enhance the patient's condition without requiring constant hospitalisation.

The Rise of Retail Healthcare in a Consumer-Driven Era

Retail healthcare is a form of healthcare delivery provided in a convenient store format rather than

traditional clinics and hospitals. These centres offer outpatient services such as administering simple injections, conducting tests, and treating non-severe ailments. The trend of retailisation of healthcare is growing as people seek easily accessible and convenient healthcare services. Patients find long wait times and high costs at traditional healthcare facilities inconvenient, and the option to receive healthcare while shopping is seen as convenient.

Extra-Modal Applications of AI for Retail Healthcare

The use of AI in retail healthcare has the potential to simplify many diagnostic procedures and make them more accessible. Retail healthcare centres are utilising AI systems capable of analysing data from multiple sources, such as patient history, diagnostic images, and real-time monitoring devices, to provide faster and more accurate diagnoses on-site. For example, a patient with flu-like symptoms visiting a pharmacy clinic may undergo AI-driven diagnostics that consider symptoms, medical history, body temperature, and oxygen saturation to determine whether the patient is suffering from pneumonia or COVID-19, among other conditions.

Enhancing the Consumer Experience

It is widely used to improve the consumer experience in retail healthcare. People's health records can be used to recommend care plans so retail clinics can offer customised advice. Symptoms and disease diagnoses could also be taken using AI self-service kiosks, expediting the visit and minimising wait time. All these AI tools enhance healthcare delivery while enhancing health consumerism, enabling the consumer to take charge of their health.

Improving Accessibility and Efficiency

AI multimodality encompasses accessibility and efficiency in retail healthcare. Artificial intelligence is particularly useful in reducing the manual effort required for tasks such as scheduling appointments, managing patient flow, and maintaining records. This, in turn, alleviates the workload of healthcare providers while improving service delivery to patients.

Privacy, Security and Ethical Issues

Privacy and security are always top concerns when dealing with health data, especially when it comes to technology. AI systems must comply with the regulations of the country or state in which they operate. For example, in the USA, AI systems must adhere to HIPAA (Health Insurance Portability and Accountability Act) regulations regarding the protection of patient data. Retail healthcare, in particular, requires improved data security measures to manage large volumes of patient information effectively.

> When these retail strategies incorporate AI multimodality, delivering excellent, efficient, and personalised care to a larger group of people becomes possible.

Another ethical dilemma concerns biases in specific AI models. If they are trained on a biased dataset, the systems will produce skewed results in the same manner. Therefore, the specifics of how an AI arrives at a decision must be made clear to patients so that everyone is treated fairly and prejudices are minimised.

Multimodal AI Will Shape the Future of Healthcare

Integrating medicine and technology aims to create a better future by simultaneously combining different modes. With the current advancements in AI systems, there will be further merging of multimodal data to assist in diagnosing, treating, and monitoring patients. The focus will shift towards personalised medical interventions rather than general disease treatments, with AI playing a pivotal role in enabling precision medicine.

Retail healthcare is expected to play a dominant role in the future healthcare system as AI's potential to accelerate and streamline services continues to grow.

As more people rely on retail clinics for affordable and accessible healthcare, these centres will likely become the primary point of contact for numerous non-critical patient cases.

Integrated AI multimodality can be the game changer in healthcare, with improved diagnostic accuracy, customised treatment, and continuous in vivo monitoring. Even in retail healthcare, one of the central benefits of AI – optimisation of processes and, consequently, consumer experience – is being actively explored. In the future, it will be even more so about how AI multimodality blends with retail healthcare strategies to advance the healthcare sector and the patients' experience. Healthcare professionals should adopt these technologies, keep themselves updated, and be prepared as AI continues to revolutionise the healthcare sector.

Conflicts of Interest

None.

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Virtual Reality in Nursing: A New Frontier in Healthcare

Virtual Reality has become a transformative tool in healthcare, enhancing patient care through advancements in pain management, rehabilitation, and mental health treatment.

PRECIOUS CHISOM UZOEGHELU

Education Consultant, Nurse I Faculty of Health Science, Department of Nursing, Cyprus International University I Nicosia, Cyprus

key points

- VR's Healthcare Integration: Virtual Reality has moved beyond entertainment, significantly enhancing patient care, pain management and medical training.
- VR has shown effectiveness in reducing pain and anxiety in various medical procedures, offering a non-drug alternative for pain relief.
- VR provides immersive and personalised rehabilitation experiences, particularly benefiting stroke and Parkinson's disease patients.
- VR is increasingly used to diagnose and treat mental health conditions, including PTSD, depression, and stress reduction.

The works of the Greek physician Galen of Pergamon were a foundation of medicine up to the Middle Ages. The Renaissance and scientific revolution prompted questioning of traditional authorities. The 18th century incorporated a more scientific approach to medicine, with further advances in the 19th century. The 20th century saw significant developments in medicine and the solidification of an evidence-based approach. In the 21st century, cutting-edge technology like Virtual Reality (VR) has become instrumental in improving patient treatment and outcomes.

Enhancing Patient Care with Virtual Reality

This cutting-edge technology has evolved beyond gaming and entertainment and found a prominent place in the healthcare sector. The inclusion of VR in patient care not only shows advancements made in medical technology but also highlights the recognition of a more holistic approach to patient care. This technology promises to improve pain management, mental health, rehabilitation, medical training and other aspects of health care. This article explores the multiple aspects of using VR in patient treatment and care, shedding light on its potential to change the healthcare experience for both patients and healthcare providers.

The growing body of research and real-world implantations of VR show a wide range of exciting possibilities, from using its immersive environment during therapy sessions to leveraging it as a distraction technique during medical procedures. As the world struggles to deal with the challenges of an ageing population, chronic diseases, and the demand for more efficient healthcare delivery, VR emerges as a promising tool for addressing these problems.

Virtual reality (VR) technology has made significant inroads in healthcare, proving an excellent means of improving patient care experience in diverse clinical contexts. VR can effectively impact patients and

caregivers. The current areas of application of VR in patient care can yield many benefits and open various avenues for further research and development. By elucidating the impact of VR in patient care and treatment, this article aims to provide insight into the journey towards a more immersive, personalised, and effective healthcare experience.

Transforming Pain Management with VR

One of the critical places virtual reality has been researched and implemented is its use in pain management and relieving pain-associated anxiety. VR does not inhibit any pain pathway, but rather, it alters the pain perception of the individual. From paediatrics to women in labour, VR has proved to be an effective tool in pain reduction, offering more comfort to patients. In an open-label RCT (Wong 2020), nulliparous women with a pain score of 4-7 who were having adequate contractions for at least every 5 minutes didn't receive any other form of analgesia. The study involved a VR intervention for up to 30 minutes for one group and no intervention for the control. Researchers reported a significant difference in pain levels between the two groups in pre-post-interview pain scores. While patients in the control reported increased pain, the intervention group reported a significant decrease in pain. Some limitations of this study include a small sample and an increased possibility of bias. This highlights the need for further studies to corroborate this study in exploring the optimal integration of VR in labour pain management protocols. Further studies should better define VR intervention and its long-term impact on obstetric patients. A study on VR effectiveness in pain reduction for first-time mothers during episiotomy repair (Zagami 2016) also showed a notable decrease in pain levels between the experimental and control groups. However, this study is limited by its small sample size (30) and specific population. Thus, further studies should focus on generalising these findings to a larger population. A single-blind RCT (Orhan and Bülez 2023) involving 50 participants also noted remarkable pain reduction during episiotomy and increased patient satisfaction. To improve the generalisability of these findings, a critical analysis of the sample size, diverse population and confounding variables needs to be considered. A double-blind RCT (Gür and Apay 2021) showed the effects of VR in reducing birth pain in 273 pregnant women from July 2015 to June 2019. After dividing the participants into five groups, they received different VR intervention techniques (patients were shown different pictures). All participants homogeneously reported a general result of decreased birth pain. The VR experience of newborn photos, with or without classical music playing in the background, was identified to be more effective. In a pre and post-test study on 54 women with uterine tumours treated with high-intensity focused ultrasound who were educated using a VR programme (Park et al. 2024), there was a significant decrease in anxiety and uncertainty and an increase in patient satisfaction with the healthcare provider recorded in the intervention group. There was, however, no remarkable difference in pain levels between the two groups.

> "Virtual Reality has evolved beyond gaming and entertainment, finding a prominent place in healthcare by improving pain management, mental health, rehabilitation, and medical training."

Many other studies and experiments have been done on VR as an effective non-pharmacological analgesic, a distraction technique, during different medical procedures such as wound care and burn wound dressing (Taşçı et al. 2023; Czech et al. 2022). VR also reduces pain and anxiety in patients undergoing bone marrow aspiration and biopsy (Korkmaz and Guler 2023) and appears as a vital adjuvant in treating preoperative pain and anxiety (Haisley et al. 2020; Yesilot et al. 2022; Martinez-Bernal et al. 2023). Similarly, VR interventions are linked to less preoperative anxiety and reduced postoperative pain in patients who underwent laparoscopic cholecystectomy (Abbasnia et al. 2023), as well as less pain, anxiety and improved outcomes

in patients who underwent coronary angiography and trans-catheter aortic valve replacement (Turan et al. 2023; Lind et al. 2023). A particular VR device, Fitjaw, was able to reduce the chronic pain and functional ability limitation associated with Temporomandibular joint disorder (Arroyo-Cruz et al. 2023). A review (Shrestha et al. 2024) on the impact of VR in cardiology patients demonstrated improvement in patient outcome and satisfaction particularly in developing countries. Patients were shown the organ using VR glasses before the surgical intervention. There is also evidence, albeit limited, that VR reduces pain during hysteroscopy (Vitagliano et al. 2023).

Virtual Reality can Advance Rehabilitation

VR's impact on rehabilitation is also noteworthy. In stroke and Parkinson's disease rehabilitation, VR provides an engaging and patient-centred approach, allowing patients to perform exercises that may be difficult or impossible in a traditional clinical setting. Its immersive nature enables patients to engage in tasks that promote recovery while enjoying a more interactive and personalised experience. This innovative approach to rehabilitation has shown promising results, making VR a valuable tool in helping patients regain function and improve their quality of life.

VR has proven more effective in the rehabilitation of patients with Parkinson's disease than traditional rehabilitation programs (Chuang et al. 2022). Using VR in stroke patients' rehabilitation has proved effective due to its immersive nature, allowing patients to do things otherwise impossible in clinics. VR is also more patient-centred than traditional or modern technology-based methods (Amin et al. 2024; Hao et al. 2023). VR was used to address the social, psychological, and neurological issues seen in patients with prolonged hospitalisation from the COVID-19 pandemic (Kolbe et al. 2021). VR has also proved to be effective in educating patients who have tested positive; they showed better understanding and satisfaction (van der Linde-van den Bor 2022; Grilo et al. 2023).

For metastatic breast cancer patients unable to walk in nature due to their disease, VR was used to immerse patients in a computer-generated natural environment (Chin et al. 2022). Preliminary data suggests that being connected to nature, even if only in VR, is associated with improved physiological and psychological status of the patients, reducing pain, anxiety and depression while improving overall quality of life. Critical analysis for confounding variables is essential for the generalisability of the study as it serves as a good diagnostic tool and a possible treatment for panic disorders and agoraphobia (Freeman et al. 2022; Jung et al. 2024). VR also reduced anxiety in patients with breast cancer undergoing radiotherapy due to a better understanding of the procedure (Shin et al. 2023; Schulz et al. 2023). VR has also been suggested as a treatment tool for patients with hemispatial neglect (Salatino et al. 2023).

Virtual Reality in Mental Health and Beyond

In the past years, VR applications have expanded their impact beyond just medical training, distraction technique for surgical procedures or pain management (Ma et al. 2023). Mental health care is another area where VR is making significant strides, as this technology can be used to diagnose, understand, and manage many disorders, such as psychosis, depression, substance abuse, and eating disorders. Controlled exposure in a VR environment can trigger symptoms of these conditions (Freeman et al. 2017) or cognitive impairments (Liu et al. 2023), and create a safe space for proper management.

A pilot study (Riches et al. 2023) focused on the use of VR to reduce stress, a common cause of violence in psychiatric patients (Jalil et al. 2017, Kramarz et al. 2022). A total of 42 participants participated in a one-hour-long individual relaxation exercise. Decreased stress and increased patient relaxation levels led to a diminution of violent episodes. VR builds upon available psychiatric treatments to benefit patients and offers other treatment plans that may not be available or feasible within the traditional clinical setting (Ka-Yee Essoe et al. 2022). A meta-analysis of randomised clinical trials (Vasodi et al. 2023) showed how a VR-based exercise led to significantly increased overall well-being and decreased depression levels in older adults, as well as improved cognitive performance for patients whose cognitive function is deficient (Chiu et al. 2023; Yu et al. 2024). Studies have also shown that VR exposure therapy significantly decreases symptoms of posttraumatic stress disorders (Deng et al. 2019; Jonathan et al. 2023).

The psychosocial well-being of patients hospitalised for severe or chronic medical conditions is vital for recovery. VR has been proven effective in improving the psychosocial well-being of individuals in hospitals (du Plessis and Jordaan 2024). The paediatric population also responds positively to VR interventions. VR decreases pain and anxiety during invasive procedures such as venipuncture (Ferraz-Torres et al. 2023; Niaz et

al. 2023) and can be leveraged as a distraction tool to mitigate distress in paediatric cancer patients (Yap et al. 2020). The use of VR during preoperative teaching and in managing postoperative pain to reduce pain exposure in paediatric and adolescent patients undergoing surgery has also been explored (Orgil et al. 2023). VR-induced hypnotherapy has also been used to relieve pain and anxiety in paediatric and adolescent patients during invasive procedures in the emergency department (O'Sullivan et al. 2023).

Conclusion

As VR technology continues to evolve, its applications in healthcare are expected to grow even further. From enhancing patient education and reducing preoperative anxiety to improving healthcare providers' time efficiency and accuracy, VR offers many benefits. Its acceptance among patients and healthcare providers alike (Jawed et al. 2021) suggests that VR will play an increasingly important role in the future of medicine. As researchers continue to explore and refine VR interventions, this technology promises to create a more immersive, personalised, and effective healthcare experience for all.

Virtual Reality is not just a futuristic concept but a present-day reality with the potential to transform healthcare. By improving patient care, enhancing rehabilitation, and addressing mental health needs, VR is paving the way for a more holistic and patient-centred approach to medicine. The journey toward fully integrating VR into healthcare is ongoing, but the possibilities are exciting and hold great promise for the future.

Conflicts of Interest

None.

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Governance & Leadership

The Vital Role of Contract Management and Compliance in Healthcare

Although it may not be the most exciting topic in healthcare, there is no doubt that contract compliance is critical in the healthcare landscape. Healthcare compliance experts witness first-hand the transformative impact of effective strategies in these areas. This article dives deeper into the critical role of contract management and compliance in healthcare organisations, exploring why they are indispensable pillars for success.

ISMAIL MOOLA

CEO and Co-Founder | TimeSmart.AI | Toronto, Canada

key points

- Effective management of healthcare contracts is paramount for ensuring operational efficiency, cost containment, and risk mitigation.
- Contracts must not only be drafted and negotiated effectively but also continuously monitored and enforced to ensure adherence to regulatory requirements.
- Compliance considerations must be integrated into the contract lifecycle to mitigate the risk of violations and ensure alignment with organisational objectives.
- Effective contract management yields multifaceted benefits for healthcare organisations, ranging from cost savings to enhanced patient care.
- Strategic partnerships facilitated through robust contract management enable access to cutting-edge technologies and specialised expertise.
- Effective communication and collaboration between legal, compliance, and contract management teams are essential for success.

The Nexus of Contract Management and Compliance

At the heart of every healthcare organisation lies a complex web of contracts governing relationships with vendors, suppliers, payers, and partners. These contracts range from agreements with clinicians for contracted services and pharmaceutical companies for the supply of medications to contracts with insurers for reimbursement arrangements. The effective management of these contracts is paramount for ensuring operational efficiency, cost containment, and risk mitigation.

Simultaneously, healthcare organisations operate within a highly regulated environment characterised by an intricate framework of laws, standards, and guidelines. In the USA, compliance with these

regulations, such as HIPAA, Stark Law, and Anti-Kickback Statute, is non-negotiable and carries significant consequences for non-compliance, including hefty fines, reputational damage, and even legal ramifications.

Contract management and compliance are intrinsically linked, with each informing and reinforcing the other. Contracts must not only be drafted and negotiated effectively but also monitored and enforced to ensure adherence to regulatory requirements. Conversely, compliance considerations must be integrated into the contract lifecycle to mitigate the risk of violations and ensure alignment with organisational objectives.

work hours and services rendered must be accurately documented to ensure that healthcare organisations receive appropriate reimbursement from insurance providers, government payers, and out-of-pocket patients. Errors or inconsistencies in timesheets can lead to billing discrepancies and potential revenue loss for the organisation.

Financial Stability: Healthcare organisations rely on financial stability to provide high-quality patient care and maintain their operations. Proper contract compliance ensures that physician compensation agreements are structured appropriately and aligned with the organisation's financial resources. Combining that with

Robust contract management practices enable proactive risk identification and mitigation, safeguarding organisations against legal and financial liabilities

The Impact of Effective Contract Management

Effective contract management yields multifaceted benefits for healthcare organisations, ranging from cost savings to enhanced patient care. By negotiating favourable terms and conditions, including pricing, delivery schedules, and performance metrics, organisations can optimise their financial resources and drive operational efficiencies. Moreover, robust contract management practices enable proactive risk identification and mitigation, safeguarding organisations against legal and financial liabilities. Here are just a few of the areas that a strong contract compliance programme can impact:

Legal and Regulatory Compliance: As mentioned, healthcare is heavily regulated, and healthcare organisations must adhere to various federal and state laws and regulations. Failure to comply with these regulations can result in significant legal and financial consequences, including fines, penalties, and legal actions. Accurate contract compliance and payment tracking can help healthcare organisations ensure they are meeting regulatory requirements, including those governing physician compensation arrangements.

Billing and Reimbursement Accuracy: Proper contract documentation is essential for accurate billing and reimbursement. For example, contracted clinicians'

an effective timesheet or invoice management process will help organisations track labour costs accurately and budget accordingly.

Reputation and Trust: Maintaining compliance with contracts builds trust and credibility with physicians, vendors, payers and other stakeholders. It shows that the organisation is committed to fair and transparent practices, which can be crucial for attracting and retaining top talent in the competitive healthcare industry.

Operational Efficiency: Efficient timesheet management streamlines administrative processes, reducing the risk of errors and delays. It allows healthcare organisations to allocate resources more effectively and optimise staffing levels based on actual workload and patient demand.

Audit Preparedness: Healthcare organisations are subject to audits by government agencies and third-party payers. Having well-maintained physician contracts and accurate records of payments makes it easier to provide documentation and evidence of compliance during audits, reducing the likelihood of adverse findings.

Furthermore, contract management extends beyond the traditional procurement process to encompass strategic partnerships and collaborations essential for innovation and growth. Whether forging alliances with research institutions to advance medical breakthroughs or entering into value-based care agreements with payers to improve patient outcomes, healthcare

organisations rely on contract management to navigate complex relationships and achieve shared objectives.

In addition to financial and operational benefits, effective contract management contributes to enhanced patient care and satisfaction. By ensuring the availability of essential supplies, equipment, and services, healthcare organisations can deliver timely and quality care to patients, thereby improving clinical outcomes and fostering patient trust and loyalty. Moreover, strategic partnerships facilitated through robust contract management enable access to cutting-edge technologies and specialised expertise, empowering healthcare providers to deliver state-of-the-art treatments and interventions.

The Imperative of Compliance in Healthcare

In an era of heightened scrutiny and accountability, compliance is paramount for healthcare organisations seeking to uphold ethical standards, protect patient privacy, and maintain the public's trust. Compliance transcends mere regulatory adherence to encompass ethical considerations and organisational values, underscoring the importance of integrity and transparency in all aspects of healthcare delivery.

Central to compliance in healthcare is the protection of patient data and privacy rights. With the proliferation of electronic health records and digital communication channels, healthcare organisations face unprecedented challenges in safeguarding sensitive information from data breaches and unauthorised access. Compliance with regulations such as HIPAA is not only a legal requirement but also a moral imperative, reflecting a commitment to respecting patient autonomy and confidentiality.

Compliance also extends to financial practices and relationships within the healthcare ecosystem. Stark Law and Anti-Kickback Statute, among other regulations, govern financial arrangements between healthcare providers and entities, aiming to prevent conflicts of interest, fraud, and abuse. Compliance with these laws is essential for maintaining the integrity of healthcare delivery and ensuring that patient care remains the primary focus.

The Intersection of Contract Management and Compliance

For healthcare operations leaders, contract management and compliance converge to form a cohesive framework for ethical and efficient organisational conduct. Contractual agreements serve as the foundation for business relationships and transactions, while compliance requirements dictate the parameters within which these relationships must operate. By aligning contract management practices with compliance imperatives, healthcare organisations can navigate the complexities of the regulatory landscape while maximising value and minimising risk.

Effective contract management begins with the establishment of clear policies and procedures governing the entire contract lifecycle, from initiation to execution to renewal. By integrating compliance considerations into these processes, organisations can ensure that contractual agreements adhere to regulatory requirements and ethical standards. This entails conducting thorough due diligence on prospective partners, vendors, and suppliers to assess their compliance track record and reputation.

There are many software tools in the market to help improve how contracts are managed and ensure that contract compliance is achieved. However, technology doesn't solve everything. Effective communication and collaboration between contract management and compliance teams are essential for success. By fostering a culture of cooperation and knowledge-sharing, organisations can harness the collective expertise of both functions to identify synergies, mitigate risks, and drive continuous improvement. Regular training and education initiatives further empower employees to understand their roles and responsibilities concerning contract compliance, fostering a culture of compliance throughout the organisation.

By embracing best practices in the areas of contract management and compliance, healthcare organisations can enhance their operational efficiency, mitigate risks, and uphold the highest standards of ethical conduct. As stewards of patient care and custodians of public trust, healthcare organisations must recognise the integral role of contract management and compliance in achieving our shared mission of advancing health and wellness for all.

Conflict of Interest

None.

Artificial Intelligence

How AI Could Transform the Operation of Your Medical Practice

This article discusses how medical practices can leverage AI to improve service and profitability.

IFFI WAHLA

Co-Founder and CEO | Edge | California, USA

key points

- Some of the most obvious and achievable benefits can be found in the simpler applications of AI.
- For most healthcare professionals, AI-enabled automation of administrative and back office functions is likely to account for the majority of their 'AI experience'.
- Staff shortages and retention problems are the root cause of many systemic issues for most medical practices.
- AI-driven digital onboarding can reduce the administration and time taken to bring new staff up to speed.
- It's important to create ground rules and a strategy that will allow you to use AI services in a safe and thoughtful manner.

Running an efficient and profitable medical practice in today's healthcare landscape requires balancing a huge range of factors - many of which are out of the business owner's hands - not least rising costs and regulatory complexities. However, when it comes to administration and staffing, technological developments open the door to practices that gain huge efficiencies and improve the customer experience. One of the major changes is Artificial Intelligence (AI).

Since ChatGPT launched at the end of 2022, professionals across the world and in nearly every industry have started to ask themselves what AI could do for their organisation. The answer, as many have discovered, is that it can do an extraordinary amount. So much so that it can be hard to know exactly where to begin. The truth is that some of the most obvious and achievable benefits can be found in the simpler applications of AI, such as automating routine tasks, business intelligence, speeding up communications and improving staff assessment and performance.

Although these applications may not sound as exciting as using AI to design new drugs or diagnose conditions, they have the capacity to profoundly change how most people experience healthcare. Indeed, for most healthcare professionals, AI-enabled automation of administrative and back office functions is likely to account for the majority of their 'AI experience' in the medium term.

Leveraging AI for Efficiency

How can medical practices leverage AI to become ultra-efficient while at the same time improving the patient experience? The first step is to understand where the real pain points and inefficiencies are in your medical practice.

Research has time and time again highlighted three main complaints about the doctor's office - poor communications, negative staff attitudes and clinical treatment. This is in addition to slow response times, lack of availability and a subpar checkout experience. For physicians, challenges include a lack of time with patients due to time on administration or regulatory compliance, staffing shortages, ethical dilemmas and financial constraints. According to our own research, on average, practices miss 35% of their calls due to

understaffing, and 34% of doctors worldwide have observed an increase in medical errors due to staff shortages and stress. A lack of available talent is compounding the issue. Last year, 1.5 million fewer people participated in the workforce. This now means that it takes, on average, three months to fill an open front-office position. Retention is also a problem - most office hires leave within a year, with many citing workplace stress due to staff shortages.

AI-Driven Recruitment

For the majority of medical practices, staff shortages and retention problems are the root cause of many systemic issues. Luckily, this is where AI can make a real difference.

On average, practices miss 35% of their calls due to understaffing, and 34% of doctors worldwide have observed an increase in medical errors due to staff shortages and stress

An end-to-end AI-driven recruitment process can vastly reduce the time it takes to find and onboard staff. It can also allow for more precise targeting of applications and a fairer, unbiased process.

The easiest starting point is to use generative AI to create job descriptions, the application process and job adverts. From there, you can use AI applications to create automated resume screening to instantly identify the people you really want to interview. One of the added bonuses of automated screening using AI is that the algorithm can be trained to find exactly the type of personality you would want working in your office. AI can go beyond simply reviewing qualifications to looking at the attributes of the individual hidden in their resume or application.

Remember, at the outset, it is key to have human oversight over this process. Review a sample of rejected applications to ensure you and your AI are of the same mind. A good AI recruitment system will become more and more accurate as it understands the type of applicant that you ultimately end up hiring. AI itself can also help challenge you on what you consider to be an ideal recruit. It may be that some hiring and retention issues come down to the recruiter not really understanding who is the best fit for their office. An AI screening process may bring forward people you may have otherwise rejected.

When it comes to the interview process itself, AI can also help generate questions and create metrics on which you can assess individuals. You can even let an AI system analyse the responses and make the recommendation on the best hire.

After recruitment, AI-driven digital onboarding can vastly reduce the administration and time taken to bring new staff up to speed. It can be used to create tailored training programmes and assess progress.

Even if you use AI to automate just one aspect of your recruitment process, it will result in significant time and cost savings. From there, you can look at other ways to improve the administration of your practice. The most obvious opportunity is through automating scheduling and communication with patients. AI chatbots embedded into your website can answer routine questions and funnel patients into the right communication channels. An AI scheduler can also ensure that appointments are booked in the most efficient manner. By using AI within your CRM software, you can create automated triggers that keep patients updated with the latest news on their appointments, test results, and other regular queries.

Using an AI Strategy

As you get used to AI, you can use it in other functions, such as invoicing and financial management. However, before we get too far ahead of ourselves, it's important that you create some ground rules and a strategy that will allow you to use AI services in a safe and thoughtful manner. It's worth remembering that no AI system is infallible - it requires a strong degree of oversight to ensure that it is functioning in the way it was intended. To be able to do this, you and your team need to understand the fundamentals of how AI operates, and this requires at least a rudimentary understanding of data analysis. Luckily, this can be easily acquired

through online training. The key is to ensure that these skills are dispersed throughout your practice so that every staff member feels empowered to question when the AI system may be malfunctioning.

Oversight means regularly verifying outputs - particularly communications with patients and the scheduling of appointments. Patients should also have the ability to circumvent your AI systems to talk directly to your staff or highlight when they think something has gone wrong with your processes.

If you like the idea of AI but the whole process of getting it up and running and then overseeing it seems too difficult, don't worry; a whole ecosystem of businesses has grown up to provide and administer these services and tools. The best way to get started is to start small. Choose a problem that AI can solve and then find the tool or service you believe provides the best solution. After you, your team and your patients get used to how AI operates and verify that it provides the ROI you expected, you can expand it to other aspects of your practice. This incremental approach enables you to mitigate risk and reverse decisions with minimal cost and disruption if required.

Conflict of Interest

None.

Digital Transformation

Global EHR Market Share in 2024

Global healthcare organisations, particularly in Europe, showed increased activity in 2023 in Electronic Health Record (EHR) purchases and implementations. Regional initiatives and investments drove significant decisions, while multiregional vendors like Dedalus and Epic led the market.

JONATHAN CHRISTENSEN

Senior Insights Director I KLAS Entreprise I Utah, USA

key points

- Global EHR activity surged in 2023, with organisations outside the US making significant EHR purchase decisions that impacted 734 hospitals and over 128,000 beds, marking the highest impact since the COVID-19 pandemic.
- Europe led the global EHR market in 2023, driven by regional investments in healthcare IT infrastructure, with Italy and France showing strong activity and future growth expected in Belgium and the UK.
- Epic secured the largest EHR decision in Oceania, impacting 191 hospitals in New South Wales and Australia, while regions like Latin America and Canada also experienced notable EHR activity.
- Multiregional vendors like Dedalus, Epic, Oracle Health, and MEDITECH dominated larger contracts, with Dedalus leading the market, particularly in Europe, while regional vendors remained strong in local markets.
- Global EHR purchase energy is expected to continue rising in the coming years, fuelled by government initiatives and investments, with KLAS tracking trends and market share across all regions.

Across the world, healthcare organisations are continuing to prioritise EHR initiatives, whether they be purchase decisions, implementations, extensions, or optimisations. From January 2023 to December 2023, organisations outside the US made EHR purchase decisions that impacted many hospitals—the highest since the start of the COVID-19 pandemic. In the recently published Global EHR Market Share 2024 report, KLAS examined this trend and others within the following regions: Africa, Asia, Canada, Europe, Latin America, the Middle East, and Oceania.

Which Markets Have the Highest Energy?

In 2023, KLAS validated 186 EHR purchase decisions (net-new wins and migrations) across these vendors that impacted 734 hospitals and over 128,000 beds. As previously mentioned, the number of hospitals impacted by global EHR decisions reached a five-year high. However, the total number of finalised decisions in 2023 was slightly below that of past years. Europe is the most active region in terms of total EHR contracts and the number of hospitals affected. Regional investments are driving this energy to modernise healthcare IT infrastructure, specifically in Italy and France. In the coming years, we will likely see increased activity in Belgium and the UK due to regional convergence strategies.

Although only two EHR purchase decisions were finalised in Oceania, this region had the second most impacted hospitals after Europe, thanks to a significant decision in New South Wales, Australia, impacting 191 hospitals. This decision—the largest KLAS validated for 2023—was finalised in favour of Epic. More purchase decisions will be finalised in Oceania in the next few years. Additionally, 2023 was a fairly active year for Latin

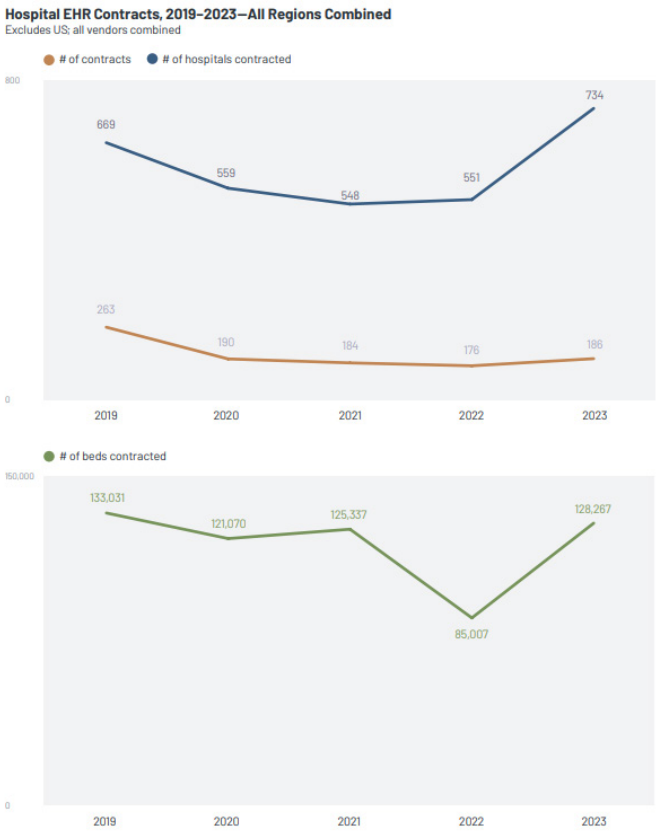

Figure 1. Hospital EHR Contracts, 2019-2023, all regions combined.

America, Canada, and Africa. Purchase energy was slower in both Asia and the Middle East (though KLAS currently has limited visibility into EHR purchasing in parts of Asia, such as China and India). Government initiatives and investments will likely continue to be a driving force in purchases across the globe.

Which EHR Vendors Are Selected Most Frequently?

KLAS tracked EHR decisions for 46 vendors and validated decisions recently finalised in favour of 28 different EHR vendors throughout 2023. To provide more detail for readers, this report breaks out the vendors into the following two groups: multiregional and regional. Around two-thirds of the 186 contracts validated in 2023 involved a regional vendor; despite this, 68% of hospitals were impacted by multiregional vendors, who are more likely to be selected in larger, multihospital decisions.

Among the multiregional vendors, Dedalus was selected in the most decisions, affecting 147 hospitals with over 31,000 beds. The vendor's most active market was Europe, specifically Italy, and they were also selected in Latin America. Epic had the second-largest number of beds contracted. Oracle Health and MEDITECH had the following most among multiregional vendors and were selected in 10 and 9 decisions, respectively.

Regional EHR vendors with the highest purchase energy include Europe-based CompuGroup Medical (Germany), Hopsis (France), Kranium Healthcare Systems (India), MV (Brazil), and Softway Medical (France). The full KLAS report offers a deeper look at all the vendors selected in 2023 purchase decisions.

Europe

Europe continues to have the most hospital EHR activity. France has been the most active EHR market in previous years, but the market tapered off in 2023. Investment picked up in Italy in 2023 and will continue to

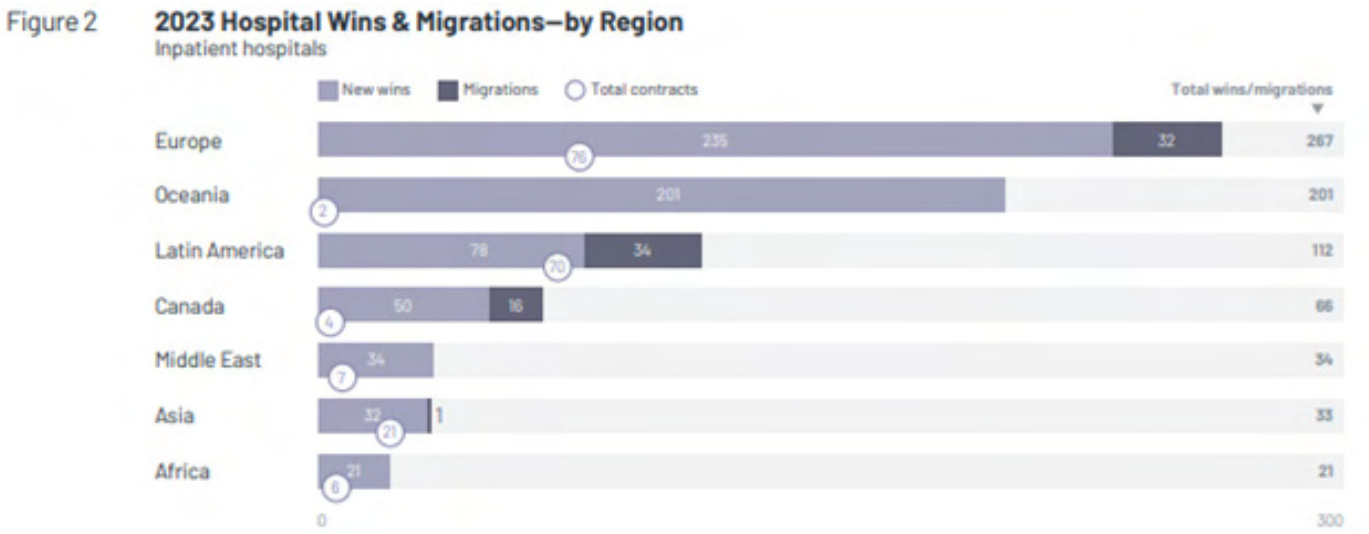

Figure 2. 2023 Hospitals Wins & Migrations – by Region

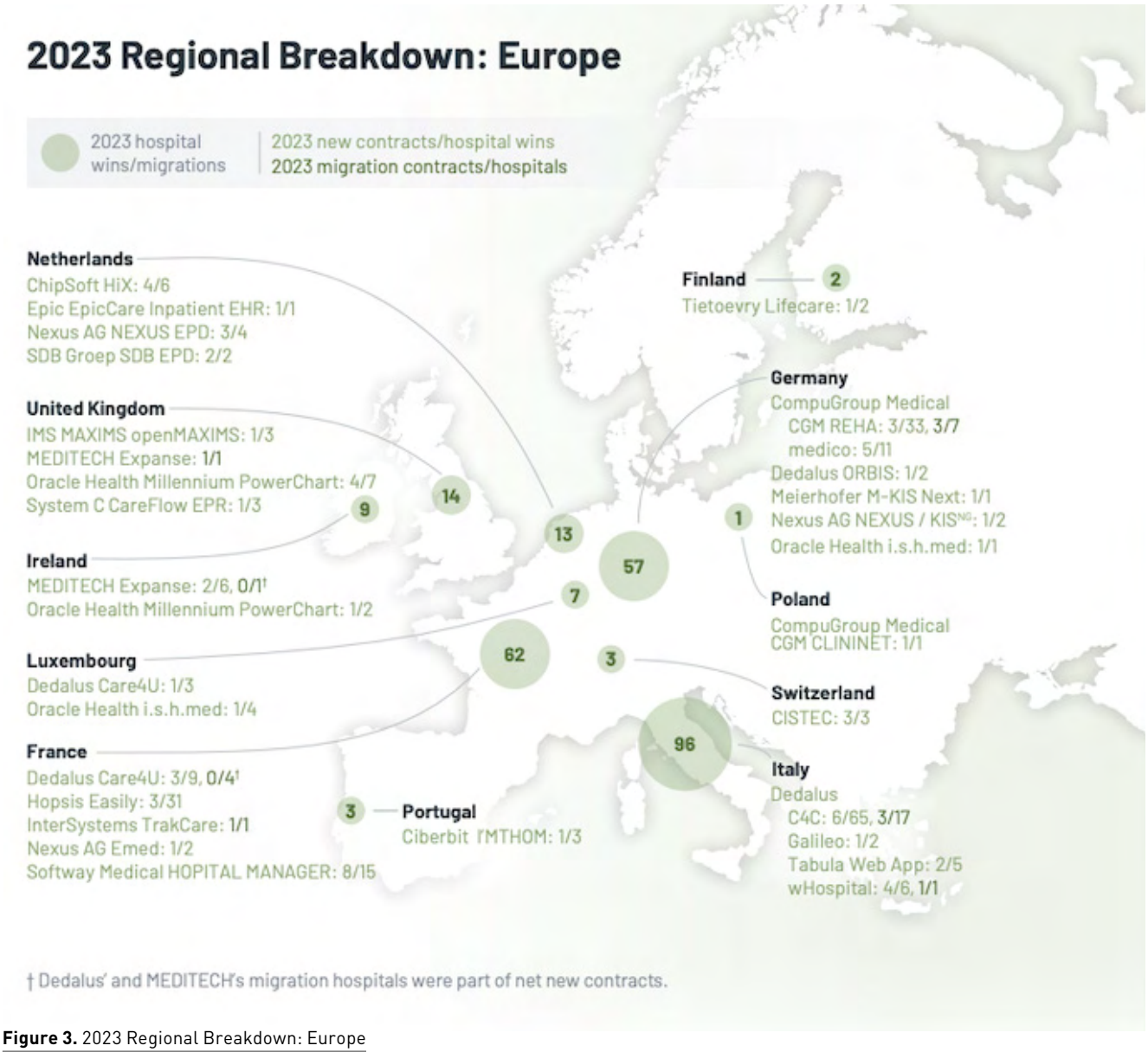

Figure 3. 2023 Regional Breakdown: Europe

ramp up in the UK and Belgium thanks to regional EHR initiatives in the coming years, keeping the region active.

Of multiregional vendors, Dedalus had the strongest year in Europe, benefitting most from the activity in the Italian market and also being selected in France, Luxembourg, and Germany. The other vendors with the most activity in 2023 in Europe are local. CompuGroup Medical's strong year was driven by two prominent private groups selecting the EHR for rehab hospitals. Several nonprofit groups in Germany also chose medico for their acute care hospitals. Hopsis saw continued growth in their home country, France. One large territorial hospital group (GHT) selected the EHR as their go-forward solution, and two other organisations are consolidating onto the platform. Softway Medical was selected for two GHT contracts—one in France involving a psychiatric hospital group and one in a French Overseas Territory. SIB also won a GHT contract in a French Overseas Territory.

DACH (Germany, Austria and Switzerland)

KLAS validated 18 EHR contracts in DACH countries. While purchase energy slowed down in the region among acute care hospitals, the rehab market was particularly active. In the future, activity is anticipated

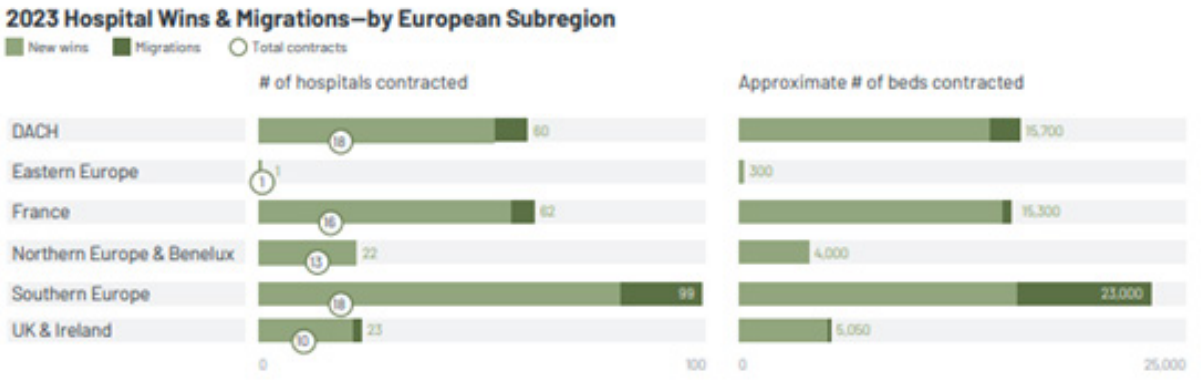

Figure 4. 2023 Hospital Wins & Migration – by European Subregion

to increase as Oracle Health i.s.h.med clients evaluate their options and more funding becomes available. Dedalus and CompuGroup Medical have been selected most in recent years in the region and currently stand best poised for future growth.

selected as the go-forward platform in Lombardia but also has energy in the region.

Northern Europe & Benelux

Thanks to purchasing energy from rehab groups, the Netherlands was the most active country

Global EHR purchase energy has gradually increased since its pandemic-induced decline, and it will likely continue to rise in the coming years as healthcare organisations finalise decisions and as government programs invest in EHR purchasing.

France

The tail end of the GHT purchasing wave continues to buoy EHR activity. Softway Medical and Hopsis have been the most selected recently, followed by SIB and Dedalus. EHR activity in the French market will likely ebb in the coming years as many of the GHTs will have reached a decision and will be focused on other priorities.

Southern Europe

Significant investment from the PNRR (Piano Nazionale di Ripresa e Resilienza) programme has driven a large portion of EHR activity in Italy, which will continue to be high in the coming years. Dedalus (with 3+ solutions available in the market) is the most widely selected vendor. In 2023, KLAS validated 17 finalised contracts in favour of Dedalus—most of which are going with the C4C platform. GPI (not covered in this report) was

across Northern Europe and Benelux. ChipSoft, the predominant EHR player in the acute care market, was selected the most. Going forward, Belgium will likely be the hub of EHR activity in these countries as regional hospital networks look for go-forward platforms. There is also a significant EHR decision that should soon be finalised in Stockholm.

UK & Ireland

Decisions in England ramped up in the past year. Although EHR consolidation across integrated care systems has been a frequent topic of recent conversation, most finalised decisions in 2023 were made by trusts that had no enterprise EHR in place. Multiregional vendors, like Oracle Health and MEDITECH, were selected the most in 2023 and are positioned to grow the most in the future alongside another multiregional vendor, Epic. A local vendor,

System C, has the most energy out of the local suppliers. In addition to purchasing among public trusts in England, the Irish market should also see increased activity.

What's Next?

Global EHR purchase energy has gradually increased since its pandemic-induced decline, and it will likely continue to rise in the coming years as healthcare organisations finalise decisions and as government programs invest in EHR purchasing. As KLAS publishes this report year after year, they remain committed to uncovering trends in EHR purchases and providing transparency into global market share.

KLAS encourages healthcare organisations worldwide to read the report, which provides detailed breakdowns of activity in each global region, high-level market share data for validated vendors, and purchasing trends since 2019.

Conflict of Interest

None.

references

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Cybersecurity

KLAS 2024 Cybersecurity Benchmark in Healthcare

The latest updated and comprehensive study by Censinet, KLAS Research, and the AHA highlights significant cybersecurity challenges in healthcare. It reveals that organisations remain better prepared for incident response than for identification. They are reactive in risk management, especially in supply chain and medical device security. The study underscores the need for proactive measures and clear cybersecurity leadership to enhance protection and reduce financial impacts.

KLAS RESEARCH

Information Technology & Services I Utah, USA

key points

- Healthcare organisations does better in incident response than in proactive risk management, especially in supply chain and asset management.
- Organisations are strong in the NIST Respond function but struggle with the Identify function, particularly in supply chain risk management.
- Email systems have high protection, while medical device security is weak, with coverage barely above 50%.
- Clear infosec leadership improves network and medical device security, highlighting the importance of assigning responsibility.
- NIST CSF adoption: Most organisations use NIST CSF, which is correlated with lower cybersecurity insurance premiums.

The digital transformation of the healthcare sector has brought remarkable benefits, including enhanced patient care, streamlined operations, and improved data management. However, this shift has also introduced significant cybersecurity challenges. To address these concerns, Censinet, KLAS Research, and the American Hospital Association (AHA) have published reports in 2023 and 2024 to establish collaborative cybersecurity benchmarks for the healthcare industry. The 2023 study included 48 healthcare organisations; the 2024 study evaluated 54 healthcare organisations—ranging from small critical access hospitals to large academic medical centres and including several payers and IT vendors—to assess their adherence to the NIST Cybersecurity Framework (NIST CSF) and Health Industry Cybersecurity Practices (HICP).

This article explores the study's key findings (KLAS, 2024), focusing on the maturity of healthcare organisations in managing cybersecurity risks, their alignment with HICP guidelines, and their cybersecurity investments.

NIST Maturity: Reactive Versus Proactive Approaches

The study reveals that healthcare organisation practices remained similar from 2023 to 2024, with organisations predominantly adopting a reactive rather than proactive

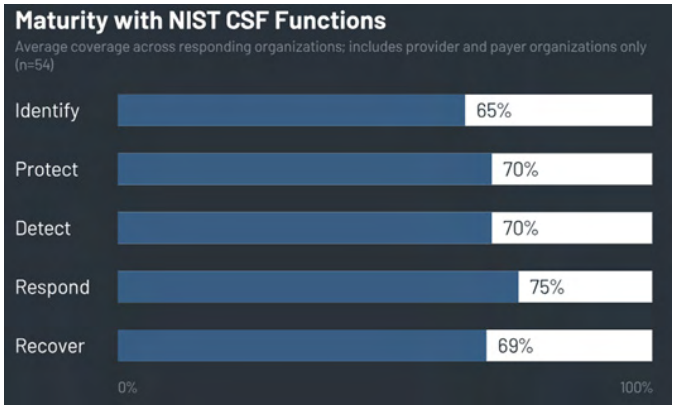

Figure 1. Maturity with NIST Guidelines.

stance when it comes to cybersecurity, especially in identifying and managing risks. Across the NIST CSF's five functions—Identify, Protect, Detect, Respond, and Recover—organisations exhibited the highest average coverage in the Respond function. This is mainly due to maturity in the Analysis category, which involves investigation, forensics, categorisation, analysis, and understanding of cybersecurity incidents. Almost all organisations reported robust investigation practices following detection system notifications, with a majority demonstrating at least 70% coverage in this area.

Conversely, the Identify function showed significant gaps, particularly in the Supply Chain Risk Management, Asset Management, and Risk Management subcategories. In the 2023 study, over 40% of organisations were non-compliant in conducting response and recovery planning with suppliers and third-party providers. Supply Chain Risk Management emerged as the subcategory with the lowest coverage across all five NIST functions. The challenge of coordinating cybersecurity testing with third-party suppliers and managing those processes appears to exceed the maturity level of many healthcare organisations. Despite these challenges, the data indicates that organisations with better supply chain risk management report lower year-to-year increases in cybersecurity insurance premiums, suggesting a potential benefit to improvement.

"The disparity between email protection and medical device security underscores the need for focused improvements in the latter area, with average coverage for medical device security barely exceeding 50%."

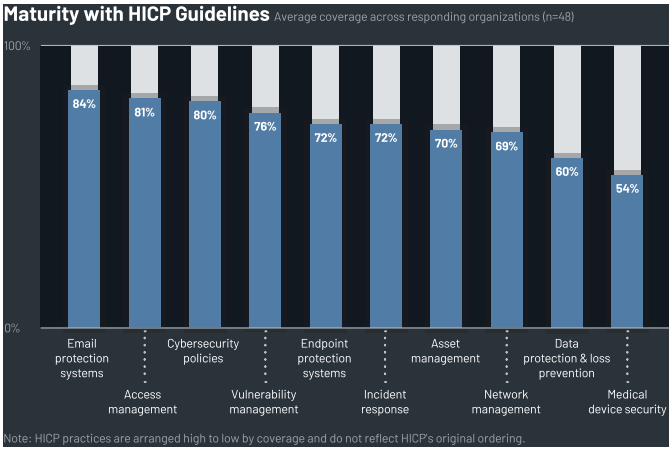

Figure 2. Maturity with HICP Guidelines.

Steady But Unbalanced Alignment with HICP Guidelines

Healthcare organisations' alignment with HICP guidance also remained steady from 2023 to 2024. Coverage is mixed, with organisations demonstrating substantial strengths in email system protection but significant vulnerabilities in medical device security. The 2023 study showed that organisations of all sizes reported high coverage for email protection—in most metrics, over 50% of organisations achieved 100% coverage. However, the landscape for medical device security was far more concerning. Average coverage for medical device security barely exceeded 50%, highlighting a critical vulnerability within the industry.

While almost all organisations ensure medical devices are wiped of data when decommissioned, less than two-thirds configure medical devices to allow only

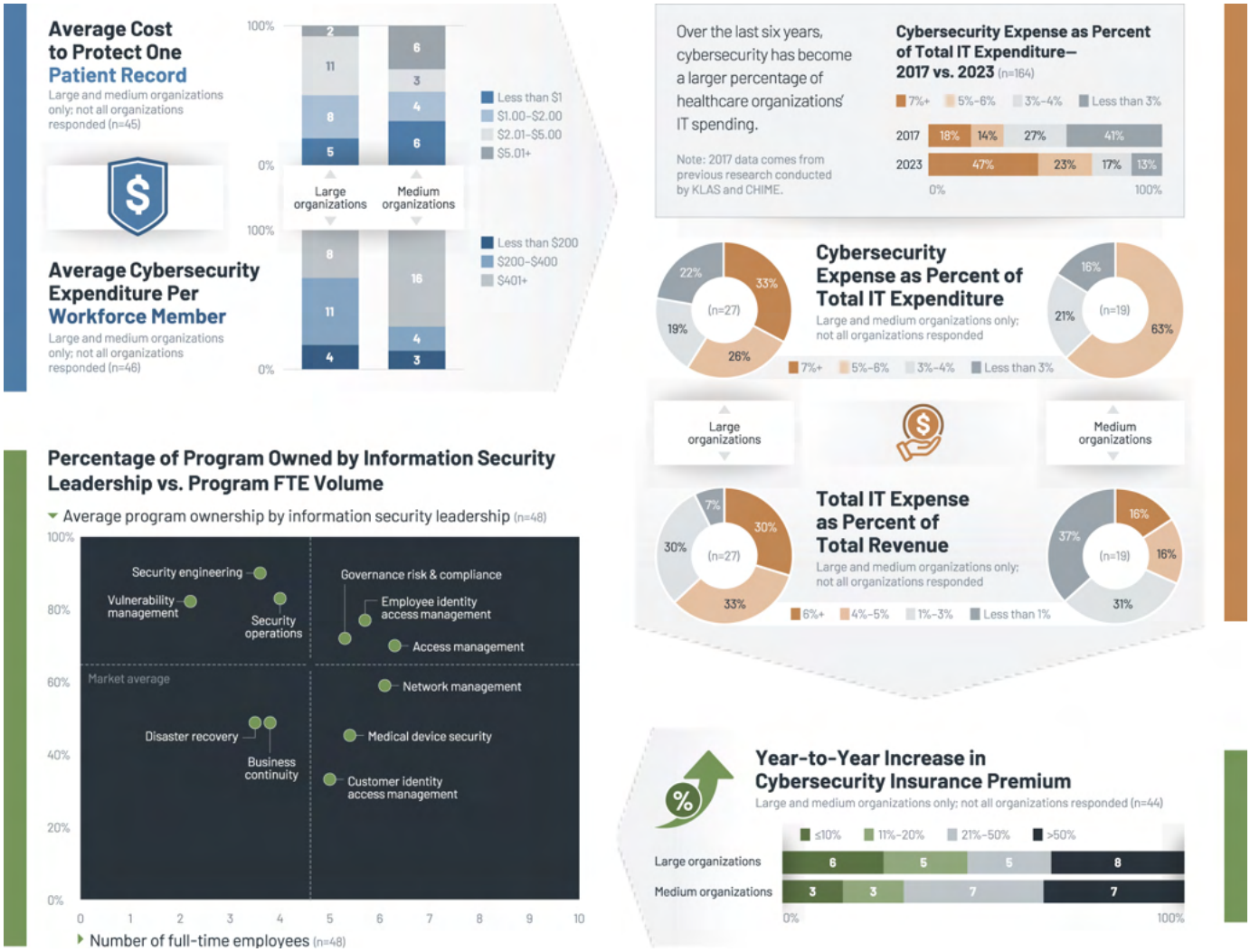

Figure 3: Snapshot of Cybersecurity Expense, 2023 data.

known processes and executables to run, and this configuration is often applied selectively. The disparity between email protection and medical device security underscores the need for focused improvements in the latter area. Interestingly, the study found that organisations with full information security ownership of network management and medical device security report significantly higher coverage in these areas. This correlation suggests that granting clear responsibility and ownership to information security leadership can enhance cybersecurity practices.

Cybersecurity Investments and Resource Allocation

Over the past few years, healthcare organisations have seen significantly more investment in cybersecurity programmes. The 2023 study examined cybersecurity spending compared to 2017 data, and more than 40% of organisations are now spending more than 7% of their IT budget on cybersecurity, compared to less than 3% six years ago. Not surprisingly, larger organisations have more resources to spend than others.

Different cybersecurity programmes also receive different FTE volumes, with access management having more resources than areas like vulnerability management.

Cybersecurity Ownership Is Crucial to Preparedness

Data from both years shows that organisations that have security leaders overseeing cybersecurity programmes tend to have more coverage when measured against NIST and HICP metrics. While the industry average for NIST CSF and HICP coverage is about 70%,

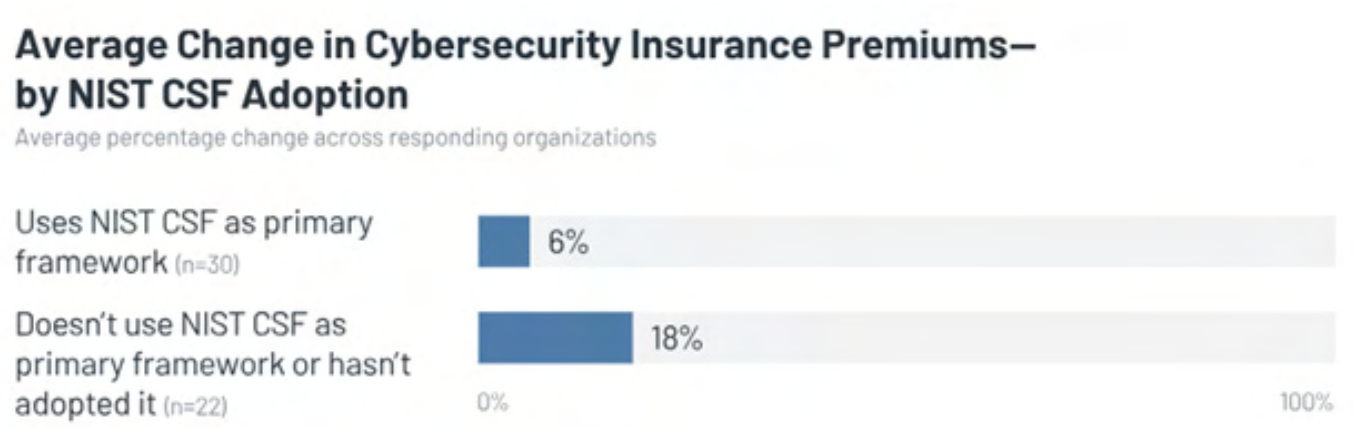

Figure 4: Cybersecurity Insurance Premium Increase by NIST CSF Adoption

organisations that assign information security leaders higher percentages of programme ownership achieve above-average cybersecurity coverage. In particular, higher programme ownership is correlated with significantly higher coverage in the HICP areas of Endpoint Protection Systems and Data Protection and Loss Prevention. Among organisations that participated in both the 2023 and 2024 studies, those that increased cybersecurity programme ownership under their CISO almost always saw increased coverage.

Most organisations use NIST as their primary cybersecurity framework (with many using more than one framework), and they report lower year-over-year increases to their cybersecurity insurance premiums than those not using NIST. In other words, the insurance cost for organisations using primarily NIST is growing slower than for organisations not using NIST.

Conclusion

The collaborative studies by Censinet, KLAS Research, and the AHA provide crucial insights into the current state of cybersecurity in the healthcare sector. While healthcare organisations demonstrate maturity in incident response, particularly in analysis and investigation, they remain largely reactive rather than proactive in risk management, especially concerning supply chain and asset management. Email protection is robust across the board, but medical device security is a critical area requiring substantial improvement. The studies underscore the importance of clear ownership and governance in enhancing cybersecurity practices. By aligning cybersecurity responsibilities with information security leadership and investing in proactive risk management, healthcare organisations can better safeguard their digital infrastructure and reduce the financial impacts of cybersecurity threats.

Conflicts of Interest

None.

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Purchase Optimisation

Value-Based Care: Balancing Outcomes, Efficiency, and Sustainability

Measuring health outcomes is crucial for evaluating healthcare delivery beyond services, focusing on efficacy, effectiveness, and efficiency. Efficacy ensures treatments meet patient needs, effectiveness assesses overall system performance, and efficiency maximises resource use. The cost-opportunity principle balances innovation with sustainability. Strategic procurement and continuous evaluation ensure quality care and financial stability.

LEONOR TIRADO GUTIÉRREZ

Subdirectorate General for Public Procurement | Madrid Health Service | Madrid, Spain

SUSANA ALVAREZ GÓMEZ

Deputy Director General of Contracting | Madrid Health Service | Madrid, Spain

key points

- Health outcomes are measured through efficacy (individual treatment effectiveness), effectiveness (overall system performance), and efficiency (cost-effectiveness of healthcare processes).
- Decision-making in healthcare must balance resource allocation with potential health outcomes, ensuring sustainability alongside innovation.
- Transparency and long-term strategic procurement, aligned with European directives, bring better health outcomes and sustainable healthcare.
- Integrating value-based care into healthcare systems ensures improved patient outcomes and financial sustainability through continuous evaluation and resource optimisation.

Perspectives on Measuring Health Outcomes

In recent years, there has been an increasing emphasis on the importance of measuring health outcomes. This shift reflects a growing recognition that healthcare delivery must be evaluated not just on the services provided but also on the tangible benefits to patients. Health outcomes can be examined from three distinct perspectives: efficacy, effectiveness, and efficiency.

- From the efficacy perspective, health outcomes are measured by assessing specific, relevant processes based on criteria such as the severity of a condition or the consumption of resources by a particular patient. This approach ensures that individual treatments deliver the desired results and are aligned with the patient's needs.

- Effectiveness, on the other hand, is considered from a broader viewpoint. It involves evaluating the overall performance of healthcare processes and examining key indicators such as the average length of stay, readmission rates, and care delays. This perspective emphasises how well healthcare systems function as a whole and whether they consistently deliver quality care to all patients.

- Lastly, efficiency in health outcomes focuses on the costs associated with the entire care process. It looks at whether resources are being utilised in a way that maximises value while minimising waste. This perspective is crucial in ensuring that healthcare systems remain financially sustainable and can continue to provide care to all who need it.

In the public healthcare sphere, the principles of good governance must guide all actions. These principles include financial sustainability, transparency, budgetary stability, and, importantly, efficiency in the allocation and use of resources. Focusing on efficiency affects everyone involved in healthcare, from managers to frontline healthcare professionals. It is not enough to allocate resources appropriately; they must also be used wisely. The responsibility falls primarily on healthcare providers, who must make critical decisions about what care is needed, when it should be provided, and how best to deliver it. By focusing on efficiency, healthcare systems can ensure they provide the best possible care while maintaining the sustainability needed to serve future generations.

The Cost-opportunity principle

In a healthcare system with limited resources and an ever-growing list of needs, the cost-opportunity principle becomes crucial. This principle involves making decisions by evaluating the potential repercussions, particularly regarding health outcomes. To apply this principle effectively, we can consider two critical perspectives.

First, health outcomes can be measured from an individual perspective through tools like Patient-Reported Outcome Measures (PROMs) and Patient-Reported Experience Measures (PREMs). These tools assess the patient's perspective on their health and treatment outcomes. Additionally, clinical improvements can be tracked through specific indicators, such as the reduction or improvement of a clinical parameter that signals a change in the health status of an individual patient or a broader population.

Second, from an economic perspective, decision-makers must assess the consumption of resources associated with various treatment options. This involves evaluating the costs and benefits of different healthcare interventions to ensure that resources are used efficiently.

Like many other developed countries, the Spanish National Health System (SNS) faces significant demographic and health challenges. These include an ageing population, the chronic nature of many previously fatal diseases, and the constant influx of new healthcare interventions, such as innovative drugs and technologies. While these advancements often bring significant benefits, they also come with high costs. Therefore, applying the cost-opportunity principle is essential to balance innovation with sustainability, ensuring that the healthcare system can continue to meet the needs of all patients.

> "Health outcomes can be examined from three distinct perspectives: efficacy, effectiveness, and efficiency."

Maximising Value in Healthcare Interventions

In the current healthcare landscape, a key strategy to implement swiftly is maximising the use of health interventions that offer true added value. This value must be assessed from multiple angles: clinical value, efficiency, patient efficacy, and societal effectiveness. By focusing on interventions that deliver significant benefits, both to individual patients and to society as a whole, healthcare systems can achieve better outcomes while maintaining sustainability.

To achieve this, measuring and evaluating the health outcomes generated by new technologies and their application in everyday clinical practice is increasingly important. This data-driven approach allows healthcare professionals, patients, funders, and managers to make informed decisions, prioritising high-quality care at the lowest possible cost. Ultimately, this would enable the implementation of truly patient-centred medicine that not only benefits individuals but also serves society's broader needs.

Health outcomes studies play a crucial role in this process. These studies focus on quantifying, analysing,

and interpreting treatments' real-world therapeutic benefits. By assessing clinical effectiveness and safety, healthcare providers can better understand the impact of their interventions.

From an economic perspective, health outcomes evaluation also considers the resources different treatment options consume. This includes analysing the costs generated by various alternatives and evaluating their efficiency by comparing costs to the health outcomes they produce, such as years of life gained or Quality-Adjusted Life Years (QALYs). This comprehensive evaluation helps ensure that healthcare interventions provide the best possible value, balancing costs with improved patient outcomes.

Strategic Change and Procurement in Healthcare Systems

Understanding how health interventions impact the cost of disease management has become increasingly important. It involves analysing the care process in terms of analytical accounting to assess whether resources are being used efficiently. Studies focused on health management outcomes play a vital role in evaluating the effectiveness of National Health Service (NHS) health services. These studies develop and calculate indicators that reflect outcomes in terms of population health, such as annual rates of myocardial infarction or stroke in a given region. By understanding these metrics, healthcare providers can determine if the interventions being used are the most appropriate and cost-effective.

One of the significant challenges in this area is the gap between the wealth of therapeutic information generated over the years and its continuous evaluation. Often, data is only analysed at specific points when required rather than being routinely reviewed. This approach limits the ability to make timely adjustments and improvements in healthcare delivery. To address this, a cultural shift is needed within the NHS, involving all stakeholders. Continuous evaluation of therapeutic information should become a standard practice to ensure that health interventions consistently deliver the best outcomes.

Another critical factor in this evolving landscape is Spain's new law on public sector contracts. Law 9/2017 on Public Sector Contracts mandates that all parties involved—administrations, public entities, and supplier companies—make maximum efforts towards transparency. One of the key objectives of this law is to enhance transparency in public procurement, ensuring that public funds are spent wisely and effectively. This law sets the foundation for a future in which public procurement evolves towards a more strategic approach, with a medium to long-term vision prioritising quality, innovation, and improved health outcomes.

Leveraging European Law and Directives

The law also emphasises the importance of obtaining the best value for money, which aligns with the broader goal of ensuring the sustainability of the healthcare system. Achieving this requires a shift towards value-based care, where the focus is on optimising the cost of care through the effective use of resources. Significantly, this shift should not be constrained by short-term budgetary considerations. Instead, it requires a longer-term perspective that measures health outcomes in terms of their impact on the overall cost of care over time.

> "Focusing on efficiency affects everyone involved in healthcare, from managers to frontline healthcare professionals."

In this context, value-based care emphasises doing well what needs to be done—providing the proper care at the right time and in the right way. This approach not only improves patient outcomes but also contributes to the financial sustainability of the healthcare system by reducing the overall cost of care in the long run. Strategic value-based public procurement is a critical component of this approach. By aligning procurement practices with the award criteria outlined in Law 9/2017 and the Directives of the European Parliament and of the Council 2014/23/EU and 2014/24/EU, healthcare

providers can ensure that they are acquiring goods and services that contribute to improved health outcomes and better value for money.

Conclusion

Ultimately, the goal is to create an effective and sustainable healthcare system. This requires a balanced approach that considers both the short-term budgetary impact and the long-term benefits of improved health outcomes and reduced costs. The healthcare system can achieve this balance by focusing on value-based care and strategic public procurement, ensuring high-quality care while maintaining financial sustainability.

In conclusion, integrating value-based care into healthcare delivery and procurement practices is essential for addressing the challenges faced by the NHS and other healthcare systems. This approach requires a cultural shift towards continuous evaluation of health outcomes, strategic procurement practices, and a long-term perspective on cost management. By doing so, we can ensure that healthcare systems remain both effective and financially sustainable, providing the best possible care for patients and society as a whole.

Conflict of Interest

None.

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FOR SUBMISSIONS CONTACT

edito@healthmanagement.org

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