Transatlantic Digital Research Network (TDRN)

Together Across Borders for Better Digital Health

Conference Proceedings TDRN CPH26

The Future is Digital – International Perspectives on Healthcare Transformation

Introduction

Welcome to the proceedings of the TDRN CPH26 Conference, The Future is Digital – International Perspectives on Healthcare Transformation.

The conference marks a significant milestone: the 15th anniversary of the Transatlantic Digital Research Network (TDRN), established in 2011. Over the past 15 years, TDRN has brought together researchers, healthcare professionals, technology developers, decision-makers, patients, and international partners across borders. What began as a transatlantic collaboration has developed into a strong international network committed to advancing evidence-based, person-centered, and sustainable digital healthcare.

These proceedings reflect the breadth and maturity of the digital health field. The contributions explore hospital-at-home models, artificial intelligence in clinical practice, human-centered and social robotics, digital cardiology, digital technologies in child and adolescent mental healthcare, and pathways from co-design to implementation and measurable outcomes. Together, they demonstrate that digital transformation is not solely about developing new technologies. It also requires changes in clinical practice, professional roles, organizational structures, cross-sector collaboration, education, ethics, regulation, and health economic evaluation.

Across the contributions, several shared priorities emerge: the importance of involving patients, citizens, families, and healthcare professionals; building trust in digital solutions and artificial intelligence; ensuring equity and digital health literacy; generating robust clinical evidence; and creating the organizational conditions necessary for successful implementation and scale-up. The proceedings also highlight that meaningful transformation depends on sustained collaboration across disciplines, sectors, institutions, and countries.

As TDRN celebrates 15 years of collaboration, this anniversary provides an opportunity to recognize what has been achieved while looking ahead to the next decade of digital healthcare. The challenges facing healthcare systems are substantial as well as the opportunities. By continuing to share knowledge, test new approaches, and learn across borders, TDRN aims to contribute to healthcare that is more accessible, connected, personalized, and sustainable.

We sincerely thank all keynote speakers, authors, reviewers, session chairs, panel participants, partners, and conference delegates for contributing their expertise and perspectives. We hope these proceedings will inspire further research, dialogue, innovation, and international collaboration.

Together, Across Borders for Better Digital Health

TDRN CPH26 organizing and scientific committee

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Keynotes

The Future of sundhed.dk in Digital Health Denmark

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Background: Sundhed.dk provides digital solutions for citizens and healthcare professionals, including trusted health information, the Danish Medical Handbook, and access to personal health data such as EHR notes, medication overview, lab results and appointments. In 2025, 86% of the Danish population knew sundhed.dk and the MyHealth app, and the platforms had more than 58 million visits. At the same time, Danish healthcare is undergoing major transformation due to an ageing population, increasing chronic diseases, and a shortage of healthcare professionals. The national healthcare reform aims to strengthen primary, digital, and home-based care, with a Digital Front Door as a central element.

Objective: AI technologies such as ChatGPT and Google AI are rapidly changing how citizens access health information. Users increasingly expect conversational and personalised answers rather than navigating traditional public web portals.
At the same time, the Danish healthcare reform aims to create greater equality between somatic and psychiatric care. As part of this development, there will be increased focus on dedicated digital environments and expanded use of digital solutions and data sharing within mental healthcare, regardless of where people live.
The objective is therefore to explore how sundhed.dk can continue to serve as a trusted public digital infrastructure supporting citizens across both somatic and mental healthcare in an AI-driven healthcare landscape.

Results: An external analysis showed that sundhed.dk is the most frequently used Danish health source in AI-generated health answers, demonstrating the strong trust and quality associated with the platform. At the same time, AI systems often combine information from multiple international sources, reducing transparency and potentially weakening the connection to evidence-based Danish healthcare information.
To address this, sundhed.dk is, among other initiatives, exploring new AI-based services, including a chatbot built on a closed and trusted medical universe, as well as AI services designed to help citizens better understand their health records and medical data.
The future challenge may therefore not only be how to further develop sundhed.dk, but also how to contribute valuable insights to the pre-analysis of the future Digital Front Door in Danish healthcare.

Conflicts of Interest: None declared.

Keywords: AI, mental healthcare

Home Hospitalization as the New Way Forward

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Background: Healthcare systems are facing growing pressure from increasing demand, workforce constraints, and limited hospital capacity. At the same time, hospitalization itself carries risks, including delirium, functional decline, and other hospital-acquired complications. Advances in digital health, remote monitoring, and new models of integrated care now make it possible to rethink where and how acute care is delivered. Home hospitalization has emerged as an approach, enabling hospital-level treatment in patients' homes. In Denmark, the development of the first evidence-based hospital-at-home (HaH) model (Influenzer) illustrates how research and innovation can support this shift from hospital-centered to patient-centered care.

Objective: To explore home hospitalization as a new paradigm for acute care, and to illustrate how research, clinical innovation, and digital solutions can enable safe, effective, and patient-centered care at home, while identifying key principles for implementation and scale.

Results: Evidence from clinical evaluations demonstrates that home hospitalization can deliver outcomes comparable to inpatient care while improving key aspects of recovery and experience. In a randomized trial, patients treated at home showed increased early physical activity and higher satisfaction, with no differences in safety outcomes such as mortality, readmissions, or adverse events. Beyond clinical outcomes, real-world development and implementation of the Influenzer HaH model demonstrate that hospital-level care can be effectively delivered at home through a combination of remote monitoring, virtual care, and coordinated clinical workflows. This work highlights that successful adoption depends not only on technology, but on rethinking clinical pathways, ensuring 24/7 clinical responsibility, and enabling collaboration across sectors. Key challenges include organizational alignment, regulation, and scalability, while strong governance, standardized protocols, and patient acceptance act as critical enablers.

Conclusions: Home hospitalization represents a fundamental shift in acute care delivery from hospital-centered systems to care designed around patients' lives. It offers the potential to improve

outcomes, enhance patient experience, and strengthen healthcare system resilience. However, realizing this potential requires more than evidence alone; it demands integrated approaches that combine research, digital innovation, and organizational transformation. Home hospitalization is not simply an alternative to admission it is a key component of the future of care.

Conflicts of Interest: None declared.

Keywords: Home Hospitalization, Digital Health Innovation, Healthcare Transformation

Track: Hospital at Home

Tele-Palliation creates greater security and increases accessibility

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Background: More than 20 million people worldwide require palliative care. In Denmark, palliative care is provided at both generalist and specialist levels. Generalist palliative care is delivered by healthcare professionals (HCPs) who do not work exclusively with palliative care, whereas specialist palliative care (SPC) is provided by professionals working full-time within the field. Only 20–30% of all patients requiring palliative care are referred to SPC. Key challenges include late referrals, short intervals between referral and end of life, and difficulties attending outpatient clinics due to severe illness.

Through a co-creation process, we developed the six-month Telepalliation Programme and the Telepal digital platform. The platform provides information about palliative care, symptom reporting, assessment of sense of security, a calendar, secure messaging, personal notes, and video consultations. All patients referred to SPC were eligible for inclusion. Exclusion criteria were delirium or an active psychiatric disorder.

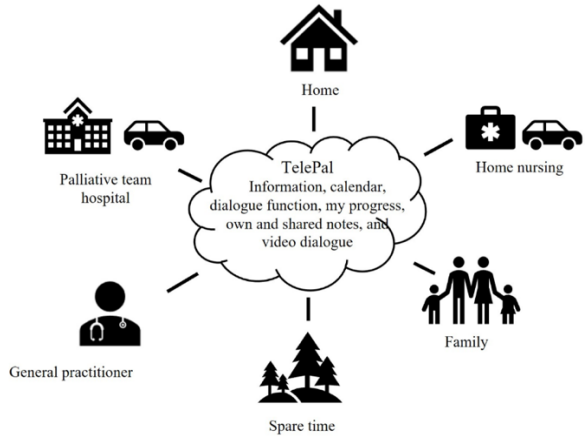

Figure 1: Telepal digital platform

Objective: To implement and evaluate the Telepalliation Programme for patients receiving SPC at Esbjerg and Grindsted Hospital, Denmark.

Methods: A randomized controlled trial involving 182 patients was conducted. The primary outcome was health-related quality of life (HRQoL). Secondary outcomes included pain, sense of security, the experiences of patients, relatives, and HCPs, platform use, and healthcare costs. The study was approved by the North Denmark Region Committee on Health Research Ethics (N-202000094) and registered at ClinicalTrials.gov (NCT04995848).

Results: HRQoL, symptom burden, and sense of security deteriorated over time in both the intervention and control groups, with no significant between-group differences. However, patients reported an increased sense of security and improved continuity and communication regarding care and treatment plans across healthcare sectors. Patients, relatives, and HCPs considered the Telepal platform user-friendly. Relatives experienced greater security and involvement in care. HCPs reported that the platform supported more individualized care and saved time during home visits.
Telepal increased the number of virtual contacts with SPC, indicating improved access among patients already receiving specialist services. Mean total costs were slightly higher in the Telepal group due to intervention and implementation costs. Other healthcare costs were similar between groups, with no evidence that virtual contacts replaced in-person services.

Conclusion: Telepal did not prevent deterioration in HRQoL or sense of security, although perceived health remained more stable in the Telepal group. The platform improved perceived security, communication, continuity, and family involvement and may therefore serve as a valuable alternative to existing palliative care services.

Conflict of interest: None to declare

Keywords: Telepalliation; palliation; digital platforms; digital communication

People use digital health – but not consciously: why communication, trust and literacy decide if it works

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Background: Digital health is everywhere and already part of daily life. People use apps, wearables and AI to manage their health or change their lifestyle. Still, this does not automatically improve health. Data is tracked but often not used in an informed way. Tools are available but not integrated into care. When it comes to more complex applications like telemedicine, many hesitate. Access is not the issue. Informed and conscious use is.

Objective: To understand why digital health use does not lead to patient empowerment, and what role communication, trust and literacy play.
Based on ongoing work in patient communication and digital health literacy, including exchange with patient communities and practical experience across digital health initiatives.

Results: The pattern is clear: people use digital health – but not consciously. Use is often driven by availability, not understanding. Data is collected but rarely interpreted and often remains unused. Tools are not connected to real health decisions, partly because wearable data is rarelyintegrated into healthcare systems. Trust is fragile. If people do not understand what happens with their data or how tools relate to their health, they step back – especially in more complex settings.
The problem is not a lack of technology. It's a lack of knowledge and the ability to use it. People are expected to use digital health but are not equipped with the digital and health literacy needed to do so.

Conclusions: Digital health does not empower people by default. It requires understanding, trust and the ability to act on information. At the core of patient communication and empowerment is knowledge: people need to understand what they use and how it relates to their health. Without digital health literacy, empowerment cannot happen. The European Digital Health Academy (edha), a non-profit organization (gGmbH), addresses this gap together with patient communities by providing structured, patient-centred knowledge to support informed use and decision making.

Conflicts of Interest: None declared.

Keywords: digital health literacy; patient empowerment; trust

Implementation of a Cross-Sector Digital Platform Enabling Hospital-at-Home: Real-World Evidence from Danish Municipal and Regional Healthcare

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Background: Healthcare systems face increasing pressure due to demographic changes, workforce shortages, and rising demand for services. "Hospital-at-Home" models are emerging as a key strategy to shift care closer to the patient, but require robust digital infrastructure to support cross-sector collaboration and real-time clinical decision-making. In Denmark, national healthcare reforms emphasize care across municipalities and hospitals, highlighting the need for scalable digital solutions.

Objective: This study aims to evaluate the real-world implementation of a cross-sector digital health platform, based on data from Danish municipal home care and regional hospital services. Methods: The platform enables automatic transfer of vital signs from medical devices to electronic care records, including automated calculation of early warning scores. Data sources included system usage metrics, calculated time savings based on standardized activity durations, and qualitative feedback from healthcare professionals. Cross-sector collaboration was evaluated through integration with a regional eHospital service.

Results: Over a 12-month period, more than 50,000 vital sign measurements and 10,000 early warning scores were automatically documented across 48 active users in municipal care. This corresponded to an estimated 2,167 hours of time saved, equivalent to approximately 1.1–1.3 full-time equivalents. In parallel, 422 patients were treated in a cross-sector collaboration with a regional eHospital, demonstrating the platform's applicability in real-world care pathways. Qualitative findings indicated improved patient safety, reduced manual workload, enhanced clinical overview, and earlier detection of deterioration. Healthcare professionals reported increased time for patient-centered care and greater confidence in clinical decision-making.

Conclusions: The implementation of a cross-sector digital platform can support scalable Hospital-at-Home models by enabling real-time data integration, reducing administrative burden, and strengthening collaboration between municipalities and hospitals. These findings suggest that digital infrastructure plays a critical role in operationalizing healthcare transformation and supporting the ambitions of the Danish healthcare reform.

Conflicts of Interest: None declared.

Keywords: Hospital-at-Home; digital health; cross-sector collaboration

Scaling Virtual Nursing in Acute Care: From Pilot to Implementation - A Scoping Review

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Background: Healthcare systems are increasingly adopting digital technologies to address workforce shortages and rising care demands. Virtual nursing (VN)—the remote delivery or support of nursing care using digital technologies—has emerged as a promising model in acute care hospitals. However, evidence remains fragmented on how VN is structured, implemented, and scaled beyond pilot initiatives.

Objective: To map and synthesize the literature on virtual nursing in acute care hospitals, focusing on: (i) VN applications described through structure, process, and outcomes; and (ii) facilitators and barriers influencing implementation and scale-up.

Methods: This scoping review follows the JBI methodology, as outlined in a protocol published in JBI Evidence Synthesis. A systematic search of major databases was conducted to identify studies on VN in acute care settings. Eligible studies have been screened, with data extraction guided by a structure–process–outcome framework and thematic analysis of implementation factors.

Results: Preliminary findings indicate growing heterogeneous evidence describing VN applications, including centralized monitoring, telepresence-enabled care, and hybrid models. These range from pilots to integrated services, with variation in digital infrastructure, staffing configurations, and clinical workflows. Reported outcomes suggest improvements in workflow efficiency, task redistribution, and patient safety, although measures remain inconsistent. Key facilitators for implementation and scale-up include leadership support, organizational readiness, and alignment with clinical workflows. Persistent barriers include technological integration challenges, staff acceptance, and complexity of embedding VN into routine practice. Final results, including the number of studies included and detailed synthesis, will be presented at the conference.

Conclusion: Virtual nursing is transitioning from pilot projects toward broader implementation in acute care hospitals. This review provides a structured synthesis of VN models and identifies key enablers and barriers to scaling. The findings inform strategies for sustainable implementation of digital nursing models in complex healthcare systems.

Conflicts of Interest: None declared.

Keywords: Virtual Nursing; Acute care hospitals; Implementation

A Quality Matrix for Hospital at Home

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Background: Hospital at Home (HaH) is an increasingly central strategy in Denmark and internationally, driven by ambitions to improve patient experiences, release hospital capacity, and ensure more efficient use of healthcare resources. Providing hospital-level care in patients' homes, however, challenges established approaches to quality assurance and patient safety. Regardless of whether HaH involves home-based treatment, monitoring, or admission-level care, quality must be equivalent to that delivered within hospital settings. This creates a need for systematic and theoretically grounded approaches to quality planning, implementation, and evaluation.

Objective: This study explores how national and international experiences with quality indicators can inform the development of a comprehensive quality framework for HaH. A narrative review was conducted, drawing on systematic reviews, expert recommendations, and concrete indicator examples from international contexts, including the United States and Australia. Identified indicators were analyzed using a quality matrix integrating three established frameworks: the structure–process–outcome model, the seven quality elements, and clinical, interpersonal, and organizational aspects of quality. The matrix enabled systematic mapping of existing indicators and identification of gaps across the quality spectrum.

Results: The analysis shows that Denmark currently lacks a national standard or coherent indicator set for HaH. Internationally, indicator practices remain fragmented and are predominantly focused on narrow clinical outcomes such as readmissions, mortality, and complications. Patient-reported outcomes, organizational structures, and cross-sector continuity are insufficiently addressed.

Conclusions: The matrix-based analysis highlights these gaps and demonstrates the need for a more comprehensive and integrated indicator approach. Such a framework can support safer, more patient-centered, and sustainable implementation of Hospital at Home and provide a foundation for national standardization and international knowledge sharing.

Conflicts of Interest: None declared.

Keywords: Hospital at home; quality of care; indicators

Hybrid Hospital-at-Home Improves Early Physical Activity and Patient Experience in Acutely Admitted Adults: A Randomized Clinical Trial

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Background: Hospital-at-home (HaH) models have emerged as a promising approach to alleviate hospital bed capacity pressures and reduce hospital-associated risks such as immobility and nosocomial complications. While evidence supports their safety and feasibility, data from randomized trials on patient-centered outcomes – particularly early physical activity and patient experience – in acute hybrid HaH models integrating telemedicine and remote monitoring remain limited, especially within Scandinavian public healthcare systems.

Objective: To evaluate whether a hybrid HaH model increases early physical activity and improves patient-reported experience without compromising safety compared with standard inpatient care.

Results: In this single-center, randomized clinical trial, 111 adults acutely admitted to internal medicine wards at Nordsjaellands Hospital, Capital Region of Denmark, were allocated to hybrid HaH (n=58) or conventional inpatient care (n=53). The intervention combined remote patient monitoring, virtual ward rounds, and home-based clinical care with 24/7 clinical oversight. Participants in the HaH group demonstrated significantly higher physical activity during the first 24 hours after randomization compared with inpatient care (adjusted mean difference: 1,763 steps; 95% CI, 153–3,373; p=0.03). Exploratory analyses suggested even greater effects among participants transferred home within 24 hours, indicating that early transition to home may be a key driver of increased mobility. Time spent in active zones was also higher in the HaH group, reflecting reduced sedentary behavior.
Patient satisfaction was high overall but significantly higher in the HaH group (mean difference 0.31; 95% CI, −0.03 to 0.65; p=0.045), while perceived safety remained similarly high across groups. No statistically significant differences were observed in clinical outcomes, including mortality at 7, 30, and 90 days, readmissions, or adverse events during admission.

Conclusions: A hybrid hospital-at-home model was associated with increased early physical activity and improved patient satisfaction without evidence of excess harm compared with standard inpatient care. These findings highlight the potential of hybrid HaH models to promote mobility, enhance recovery, and support more patient-centered acute care pathways. Future multicenter studies should assess long-term effects, functional outcomes, cost-effectiveness, and scalability within routine healthcare systems.

Conflicts of Interest: None declared.

Keywords: hospital-at-home; physical activity; randomized clinical trial

Cost-effectiveness of Telemedicine-Supported Hospital at Home for Acutely Admitted Patients: Results from the Influenzer Randomised Clinical Trial

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Background: Hospital at home (HaH) is often promoted as a digital healthcare model that may increase hospital capacity and reduce healthcare costs. However economic evidence on telemedicine-supported HaH models remains limited, particularly including detailed intervention costs, follow-up care and productivity costs. The Influenzer project developed a telemedicine-supported HaH model for acutely ill patients.

Objective: This study aims to evaluate the cost-effectiveness of the HaH model compared to in-hospital admission.

Methods: This trial-based analysis took a societal and healthcare perspective over a 3-month horizon. Quality-adjusted life years (QALYs) were derived from EQ-5D-5L. Resource use included hospital, general practitioner and emergency services, personnel time, home visits, transportation, and productivity loss. Costs were valued using tariffs and micro-costing. Overall uncertainty was assessed via bootstrapping, and sensitivity analyses explored per-protocol, informal care during HaH, and cost assumptions.

Results: The analyses included 58 patients in the HaH group and 51 in the control group. The average HaH admission was 2.6 days, matching the continued stay in the control group. Few HaH patients required transfer to in-hospital care, resulting in longer total length of stay. The difference in QALY between groups was 0.007 [CI -0.014, 0.028]. Total societal costs were lower in the HaH group by EUR 195.88 [CI -4429.28, 4037.51]. The mean ICER indicated that HaH was less costly and more effective from a societal perspective, and more costly and less likely to be cost-effective from the healthcare perspective.

Conclusions: The HaH model demonstrated health outcomes comparable to inpatient care and suggested cost-effectiveness from a societal perspective. However, economic benefits depend on implementation costs, technology costs, patient identification and avoided in-hospital days. Uncertainty from cost variation in our sample underscores the need for larger studies to strengthen the evidence base.
Trial registration number: NCT05920304

Conflicts of Interest: None declared.

Keywords: Hospital at Home; telemedicine; cost-effectiveness

Track: AI in Clinical Practice

The Intelligent Clinic: AI in a Regulated World — Opportunities, Barriers, and International Perspectives

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Background: Health systems in the US, Europe and Oceania face mounting pressure to adopt generative and agentic AI technologies directly into clinical practice. Health system implementation must now navigate the intersection of established privacy and safety frameworks—including HIPAA, GDPR, and other equivalents—alongside rapidly emerging AI-specific regulations, while also contending with evolving and often skeptical consumer and patient sentiment toward AI in healthcare. The ongoing challenge is navigating responsible and compliant innovative deployment within a complex and shifting policy environment.

Objective: This presentation reviews the current policy landscape governing clinical generative and agentic AI deployment across the U.S., Canada, and Europe, with attention to how international, national, and, where relevant, state or provincial requirements intersect, conflict, and create practical obligations for health systems. A core focus is that compliance and patient benefit are not competing goals—policy alignment is a prerequisite for trustworthy implementation, not an obstacle to it.

Discussion: Across the U.S., Canada, and Europe, distinct but overlapping frameworks are taking shape: the EU AI Act classifies clinical AI as high-risk and imposes conformity, transparency, and human oversight requirements; U.S. federal agencies (FDA, ONC, FTC) are issuing guidance across safety, algorithmic accountability, and health data use; Canadian provincial and federal privacy law creates additional constraints on cross-border data flows and vendor agreements. Key controversies include: the evidentiary bar for clinical deployment, vendor data use and model retraining rights, post-market surveillance obligations, and the capacity of health systems to meaningfully audit agentic AI behavior. The generative AI ecosystem is evolving faster than regulation, creating both opportunity and governance gaps.

Conclusions: Implementing generative and agentic AI in clinical environments requires health systems to understand and oversee technical, clinical, and policy dimensions.

Conflicts of Interest: None declared.

Keywords: Artificial intelligence; clinical decision support; healthcare transformation; AI governance; health policy; implementation science

Scanner-Independent 3D Color Calibration: A Data-Driven Framework for AI-Based Biofilm Quantification (BioCal3D)

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Background: Advances in optical dental scanning enable acquisition of high-resolution 3D surface and color data, creating new opportunities for data-driven analysis in clinical and experimental workflows. However, scanner-dependent variability in color representation may represent a major limitation, preventing reproducible cross-device comparison and hindering the development of robust AI-based quantification methods. This challenge is particularly relevant in applications such as performing diagnostic and quantification tasks on scanned 3D dental data.

Objective: This study aims to develop a scanner-independent color calibration framework that enables consistent cross-scanner representation.

Methods: A data acquisition pipeline is established using standardized specimens made from acrylic denture base material (n = 40) coated with an artificial biofilm equivalent. Multi-condition data from fresh and mature biofilm are generated across defined biofilm coverage and removal stages following 0, 3 and 6 brushing movements during standardized brushing simulation. Fresh biofilm (n = 16 per group) is assessed in two conditions (fully covered and cleaned), while mature biofilm (n = 24 per group) is assessed in three conditions (fully covered, partially cleaned, and cleaned). Repeated acquisitions across these experimental conditions results in 104 individual scan states. Each scan state is subsequently acquired using five optical dental scanners (four intraoral scanners and one laboratory scanner), generating a total of 520 acquisitions.
Color calibration is addressed through a hybrid approach combining reference-based calibration using physical color targets with advanced normalization methods for cross-scanner harmonization. The resulting pipeline is designed to support reproducible feature extraction and AI-readiness of the dataset.

Results: Data acquisition and calibration pipeline development are currently ongoing. Initial experiments focus on evaluating cross-scanner variability and the effectiveness of normalization strategies for reducing domain shifts between scanner systems.

Conclusions: The proposed framework addresses a key challenge in applying automated analyses to 3D clinical and experimental imaging by enabling scanner-independent color consistency. This may support more reproducible diagnostic and quantification tasks in scanned 3D dental data.

Conflicts of Interest: None declared.

Keywords: 3D scanning; color calibration; machine learning

Translating the AI-PACE Framework into Practice: Curriculum Design for a Medical AI Elective

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Background: AI deployment in healthcare has outpaced clinician preparation, and medical education has not kept pace. We recently published the AI-PACE framework (Psychomotor, Affective, Cognitive, Embedded) in *npj Digital Medicine*[1] to establish longitudinal AI competenciesacross the training continuum. The practical translation of this theoretical framework into a functional curriculum presents unique pedagogical challenges.

Objective: To describe the curriculum design process of operationalizing the AI-PACE framework into a 4-week online clinical elective for pre-clerkship students at UC Davis School of Medicine, documenting pedagogical decisions prior to the collection of final course analytics.

Methods: Using the implementation strategy outlined in the AI-PACE framework, we mapped the Cognitive, Psychomotor, and Affective domains to a weekly progression for an online clinical elective. We documented the structural challenges of compressing a longitudinalframework into a finite course and the design decisions required to scaffold human-AI interaction concepts appropriately.

Results: Three design decisions shaped the final curriculum structure. First, the Affective domain (trust calibration and ethics) could not be introduced without prior Cognitive and Psychomotor grounding. Consequently, trust calibration exercises were placed in Week 3, followinghands-on tool experience. Second, prompt engineering served as an effective pedagogical bridge between the Cognitive domain (understanding hallucinations) and the Psychomotor domain (iterative clinical workflow). Third, to address the compression of a longitudinal framework into four weeks, students completed a professional development plan requiring them to map ongoing AI learning across residency.

Conclusions: Operationalizing a competency framework into medical curriculum requires careful domain sequencing, particularly for trust calibration. This design report offers a replicable model for institutions seeking to implement AI competency curricula. Future work will reportstudent outcomes and course efficacy as a formal case study.

Conflicts of Interest: None declared.

Keywords: Medical Education, Artificial Intelligence, Curriculum Development

Augmented Reality Application for Improving Patient Communication and Satisfaction in Emergency Departments

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Background: Patient dissatisfaction in emergency departments is linked to waiting times, poor communication, and limited visibility of clinical prioritization. Patients often overestimate waiting time and may feel forgotten when little information is provided. This project examined whether a patient-facing augmented reality (AR) application could improve communication, increase care pathway transparency, and support patient experience.

Objective: To identify how an AR application could address communication-related dissatisfaction in emergency departments and under which conditions such a solution could be implemented safely and equitably.

Methods: A clickable Figma prototype was developed and evaluated through nine semi-structured interviews with emergency department clinicians in the United States and Denmark, including nurses, physicians, and an administrative coordinator. The same interview guide was used in both countries to support comparison. Data was analyzed using meaning condensation inspired by Kvale and Brinkmann and interpreted through the Psychology of Waiting Lines, Science and Technology Studies, and the Technology Acceptance Model.

Results: Four themes were identified: (1) a communication vacuum in which patients feel forgotten and overestimate waiting time; (2) the hidden logic of emergency department flow, including diagnostic bottlenecks and acuity-based prioritization; (3) support for four AR functions—real-time process visibility, plain-language explanations, family-sharing via QR code, and passive EHR integration; and (4) four implementation conditions—clinical interpretation of results, inclusive digital access, uncertainty-tolerant communication, and strong HIPAA/GDPR governance. Findings were largely consistent across both countries, although Danish participants emphasized expectation-setting during first telephone contact.

Conclusion: A patient-facing AR communication tool appears credible for addressing both actual and perceived waiting in emergency departments. The findings suggest a shared core design could be adapted across healthcare systems with appropriate ethical and governance safeguards.

Conflicts of Interest: None declared.

Keywords: Augmented reality; emergency department; patient communication.

The Perspectives of Citizens on the Use of AI in Health

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Background: The presenters will be discussing the perceptions of Danish citizens, as well as their faith in, AI for the use in the healthcare system. As AI has moved from futuristic to an everyday technology, there has been an increasing interest in using AI within the healthcare system. Initially, efforts focused on using AI to aid in the screening and diagnostic aspects based on image analysis, for example various cancers. Since then, the possible uses of AI have expanded to include among others; diagnostics of rare diseases, broad screening, monitoring, health communication, "professional" sparring, as well as ongoing projects within journaling and robotics. That being said, as AI is steadily being introduced, tested and incorporated in our healthcare systems, there has been a lack of interest in the perspectives of the citizens, that in their capacity as current or future patients, are at the heart of it all. A study investigating these themes within the NHS was published in 2024, but no studies have since been published in academic journals, and none focusing on the Danish population.

Objectives: The objective of this study is to explore the perspectives of Danish citizens, regarding the use of AI, within the fields of diagnostics, screening, information, and advice within a healthcare setting. In addition, the study aims to determine if Danish citizens have faith in the use of AI in health care in the abovementioned fields.

Methods: A digital questionnaire has been developed, and a survey will be performed across the Danish population using the Likert scale to quantify responses. Data will be stratified based on age, sex, education level and occupation. Descriptive statistics will be performed.

Results: Review of the literature show that there have not been any studies conducted in Denmark on this issue. As the study at the time of writing is in the initial phases, no results can be reported yet.

Conclusions: None yet made.

Conflicts of interest: None declared.

Keywords: AI, citizens, perspectives

From Japan to Denmark: Implementing Social Robots in Elderly Care

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Background: The proportion of people aged 65 years and older in Europe and North America is expected to rise to 26.9% by 2050, increasing the need for innovative approaches to support well-being in long-term care. According to the World Health Organization, 12% of adults aged 60 years and older experience loneliness, while an additional 25–33% are socially isolated. Social robots have been proposed as a supplement to elderly care. The social robot LOVOT, designed to promote joy and social interaction through emotional engagement, may offer a potential supplement to elderly care. Understanding both implementation processes and cultural contexts is therefore essential when introducing social robots into nursing homes.

Objective: This study aimed to explore how the social robot LOVOT can be implemented in Danish nursing homes.

Methods: A qualitative case study was conducted in two Danish nursing homes in the Municipality of Aarhus to investigate the implementation of LOVOT in everyday life. Data collection included documentary analysis, participant observations, and semi-structured interviews with healthcare professionals and experts. Findings were used to develop an implementation guide. In addition, an exploratory study visit to Japan (February–March 2026) provided cultural perspectives on the understanding and use of social robots in elderly care.

Results: Successful implementation of LOVOT in Danish nursing homes required a structured yet flexible process involving three phases: pre-implementation (organizational preparation, managerial support, and technical readiness), implementation (staff training and active facilitation of use), and post-implementation (ongoing evaluation and contextual adaptation). Residents generally responded positively to LOVOT, and staff highlighted its potential to promote joy, communication, and social interaction. Cultural perspectives from Japan suggested that expectations and acceptance of social robots may be shaped by broader societal understandings of technology and care. Overall, findings indicate that implementation depends not only on technological availability, but also on organizational readiness and contextual adaptation.

Conclusions: Implementation of social robots in elderly care requires more than technological innovation alone. Organizational readiness, contextual adaptation, and cultural understandings appear important for successful implementation. Findings suggest that social robots may hold relational

potential across cultural settings, while emphasizing the need to adapt implementation strategies to local care contexts.

Conflicts of Interest: None declared.

Key Words: Social Robots; implementation; culture.

SchoolCare: A Social Intervention Introducing Telepresence Robots and School Navigation to Reduce School Fragmentation for Children Undergoing Cancer Treatment – Study Protocol of a Multi-Site Randomized Controlled Trial (RCT)

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Background: The presenters explore the use of telepresence robots and school navigation to support school attendance for children with cancer. Children undergoing cancer treatment experience disrupted educational trajectories due to prolonged periods of isolation and transitions between hospital, home, and school. These disruptions challenge academic progress, social participation, and overall well-being. Emerging technologies, such as telepresence robots, have been proposed to address these challenges. Telepresence robots enable remote classroom participation by allowing children to engage in real time through a device physically situated in the classroom, thereby fostering a sense of presence, engagement, and agency. While prior research has identified both the potential and limitations of such technologies, evidence regarding their effects on educational outcomes and well-being in pediatric oncology populations remains limited.

Objective: The SchoolCare study aims to evaluate the effectiveness of a combined intervention comprising school navigation support, telepresence robots (AV1 or BEAM), and a teleteaching program on school attendance, social well-being, and academic performance during the first eight months following cancer diagnosis.

Methods: A multi-site randomized controlled trial (RCT) will evaluate the effectiveness of the SchoolCare intervention. Approximately 128 children diagnosed with cancer or cancer-like diseases are being recruited from Aalborg, Aarhus, and Copenhagen University Hospital, with recruitment having begun in February 2026. Participants will be randomized (1:1) to either the intervention Arm A, receiving school navigation support, a telepresence robot, and a teleteaching program in addition to usual care, or intervention Arm B, receiving school navigation support in addition to usual care. The primary outcome is school attendance, assessed over an eight-month period.

Discussion: This multi-site RCT will provide quantitative evidence on the combined effect of telepresence robots and educational support to mitigate school fragmentation during children's cancer treatment. Complementary qualitative data will provide insights into practical implementation challenges, technological reliability, and strategies for integrating telepresence robots into classroom settings.

Conflicts of Interest: None declared.

Keywords: Telepresence robot; educational support; childhood cancer.

Exploring the use of social robots in daily situations for residents with or without dementia

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Background: Demographic changes in Aarhus Municipality present significant challenges, particularly due to the growing population of older adults and the increasing number of citizens with dementia. In response, the Health and Care Committee embarked on a study visit to Japan in November 2023 to explore innovative welfare technologies. Exposure to the social robot LOVOT at Groove X led to an interest in testing its use in practice in Aarhus Municipality.
The project was developed in collaboration with Aalborg University, which was responsible for the research related to the testing.

Objective: The testing of LOVOT aimed to examine its effects on residents in nursing homes, both with and without dementia. The study focused on familiar everyday situations that could be challenging for the residents.
The testing of 10 LOVOTs took place across four nursing homes over a period of 10 months.

Results: The residents were generally curious about LOVOT and engaged in positive interactions with it and they maintained their interest for it over time. For some residents, LOVOT made it possible to remain engaged in activities where they would otherwise be easily distracted.
However, the project faced some challenges, as LOVOT is not CE-marked and cannot be repaired in Denmark if it breaks down.

Conclusions: Lovots had a positive effect on the resident, but didn't have a significant long term effect for resident with issues related to loneliness.

Conflicts of Interest: None declared.

Keywords: Social robots, dementia, nursing homes

Social Robots to facilitate Group Sessions among Elderly in Nursing Homes

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Background: Socially assistive robots are increasingly being explored in nursing homes as welfare technologies that may support social engagement, emotional well-being, and communication among older adults, including residents living with dementia. LOVOT is designed as an emotional robot that interacts with people through movement, sound, responsiveness to touch, warmth, and expressive eyes. This study examined the use of LOVOT as a group intervention in four nursing homes in Aarhus Municipality, Denmark. Residents participated in 30-minute sessions twice a week for eight weeks. The study was conducted from May 2025 to April 2026.

Objective: To explore how a social robot can facilitate group sessions involving older adults living in nursing homes.

Methods: The inclusion criteria were residents living in nursing homes in Aarhus Municipality who were able to participate, sought social contact, and could have symptoms of dementia. Exclusion criteria included highly violent behavior, severe emotional outbursts, inability to participate, and an active psychiatric diagnosis. Etienne Wenger's Communities of Practice theory was applied, focusing on learning through participation, shared interests, and the exchange of experiences. Data collection included participant observations and semi-structured interviews with healthcare professionals (n = 10). The qualitative data were coded and analysed using an approach inspired by Brinkmann and Kvale, supported by NVivo 14.

Findings: A total of 17 residents participated: 4 men and 13 women. The median age was 86 years (IQR: 84–89), and participants had lived in the nursing homes for an average of 1.5 years (range: 1.0–2.5). Four themes were identified: LOVOT as a facilitator of social interaction; creating a sense of community through shared activities; the active role of staff in facilitating group sessions; and unequal access, jealousy, and the risk of exclusion.

Conclusions: LOVOT can facilitate social interaction, emotional engagement, and a sense of community in group-based activities. However, these outcomes depend strongly on active staff facilitation, equitable access to the robot, and sensitivity to residents' individual preferences. Engagement changes over time as residents become familiar with LOVOT and its novelty gradually declines.

Conflicts of Interest: None declared.

Keywords: Social robotics; nursing homes; group interaction

Trigger–Imagination–Response: A Play-Based Model for Robot-Assisted Therapy in Eldercare

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Background: Social robots are increasingly introduced into healthcare and eldercare settings to support older adults experiencing loneliness and cognitive decline. However, implementation often focuses on technological functionality rather than on the interaction. Drawing on medical anthropology and psychoanalytic theory, this presentation conceptualizes social robots as mediating objects that create a therapeutic "play space" in which emotional engagement, memory recall, imagination, and social participation can emerge.

Objective: This study aims to present a human-centered therapeutic model for social robotics based on the concept of play and to examine how robot-mediated interactions can support emotional engagement, and the development of robotic literacy among caregivers in eldercare environments.

Methods: A qualitative and ethnographic research design was used, including participant observation, caregiver interviews, intervention analysis, and field documentation in a day-care center. The study used a companion robot -RoBoHoN- and analyzed the interactions between caregivers and older adults experiencing cognitive decline.

Results: The findings suggest that the therapeutic value of social robots emerges less from robotic functionality itself and more from the caregiver's ability to facilitate meaningful play-based interactions. Based on the analysis, a three-stage therapeutic interaction model was developed: (1) Trigger – the robot initiates curiosity, sensory stimulation, or emotional activation; (2) Imagination – participants engage in associative play, memory recall, storytelling, symbolic projection, or role-play; and (3) Response – emotional and social outcomes emerge, including verbal participation, calming, empathy, laughter, and increased group interaction. The findings further indicate that caregivers play a central mediating role in shaping the interaction and adapting robotic use to the emotional, cultural, and cognitive needs of participants. This process contributes to the development of robotic literacy, defined not only as technical competence but as the ability to therapeutically integrate robots into emotionally meaningful and person-centered care practices.

Conclusions: Social robotics in healthcare should be understood not merely as a technological intervention but as a relational and symbolic practice. The proposed model contributes to discussions on Human-Centered Robotics and suggests that robotic literacy among caregivers is essential for the successful implementation of digital health technologies in eldercare.

Conflicts of Interest: None declared.

Keywords: companion robot; play; robotic literacy;

Deploying Robotic Field Trips from the Hospital

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Background: Hospitals are intimidating environments for children, often triggering anxiety, fear and loneliness. In the case of long-term hospital stays, pediatric patients often experience negative emotional responses particularly after separation from their parents, siblings and friends. To help manage anxiety and loneliness, healthcare teams often offer educational, playful, and engaging activities. However, developing scalable and effective solutions that cater to the unique environment of long-term hospital stays remains a significant challenge. Our research addresses this gap by introducing innovative robotic field trips to outside community spaces designed for children and families.

Objective: This study aims to evaluate the use of telepresence robots for hospitalized pediatric patients and reports their experiences using telepresence robots on field trips from the hospital.

Results: Twenty-two participants used the robot between September 2024 and October 2025. Sixteen children between the ages of 5 and 18 years participated in the study. Technology acceptance and expectations when first hearing about the robot were high across five conditions (range: 81% - 94%). Self-reported measures of enjoyment covering five conditions were also high (range: 80% - 88%). Regarding child-centered robot design insights, participants reported several technical issues and challenges with vision and mobility of robots. Participants were eager to move independently through physical community spaces and expressed frustration at the mobility issues that slowed them down or made them feel unstable.

Conclusions: Our pilot study of robot-mediated field trips explored quality of life experiences for children experiencing long-term hospital stays. We found that children hold high expectancy prior to using the robots, perceive strong environmental support from healthcare teams, and value robot-mediated experiences outside the hospital. Preliminary findings support the hypothesis that robotic field trips could reduce anxiety, loneliness, and improve quality of life experiences.

Conflicts of Interest: None declared.

Keywords: Telepresence; Robots; Pediatrics

Keynotes

Digital Twins: An Emerging Human-Centered AI Approach for Real-World Health Outcomes

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Background: Chronic health conditions such as diabetes and hypertension affect millions of people worldwide.[1] Uncontrolled diabetes and hypertension are associated with cognitive decline and reduced physical function[2–4]. Digital twins (DT) can be defined as (physical and/or virtual) machines or computer-based models that are simulating, emulating, mirroring, or "twinning" the life of a physical entity, which may be an object, a process, a human, or a human-related feature[5].

Methods: With the aggregation of multi-modal data such as clinical and demographic data from electronic health records (EHR), physiologic data from remote patient monitoring, and healthcare utilization data from administrative databases, DTs enable the application of a variety of AI strategies with the goal of improving health care efficacy, efficiency, and person-centered care.

Objective: In this keynote presentation, we offer an introduction to the topic of digital twins along with the opportunities and challenges ahead. We also share our current research developing a health DT via deep phenotyping of clinical data and demographics from electronic health records (EHR) and physiologic data derived from remote patient monitoring (RPM).[6] We offer a real-world application in predicting future trajectories of systolic blood pressure in hypertension and hemoglobin A1c in diabetes. Finally, we discuss the challenges and opportunities ahead in utilizing DTs for clinical decision support, learning health systems, and personalized therapies and care plans.

References

1. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract. 2022 Jan;183:109119. doi:10.1016/j.diabres.2021.109119
2. Kuo H, Jones RN, Milberg WP, Tennstedt S, Talbot L, Morris JN, et al. Effect of Blood Pressure and Diabetes Mellitus on Cognitive and Physical Functions in Older Adults: A Longitudinal Analysis of the Advanced Cognitive Training for Independent and Vital Elderly Cohort. J Am Geriatr Soc. 2005 Jul;53(7):1154–61. doi:10.1111/j.1532-5415.2005.53368.x
3. Madavanakadu Devassy S, Baby John S, Scaria L. Cognitive factors associated with hypertension and diabetes control among diagnosed and treated patients; findings from a community cohort in India. Prev Med Rep. 2023 Dec;36:102495. doi:10.1016/j.pmedr.2023.102495
4. Jamalnia S, Javanmardifard S, Akbari H, Sadeghi E, Bijani M. Association Between Cognitive Impairment and Blood Pressure Among Patients with Type II Diabetes Mellitus in Southern Iran. Diabetes Metab Syndr Obes Targets Ther. 2020 Feb;Volume 13:289–96. doi:10.2147/DMSO.S238247
5. Barricelli BR, Casiraghi E, Fogli D. A Survey on Digital Twin: Definitions, Characteristics, Applications, and Design Implications. IEEE Access. 2019;7:167653–71. doi:10.1109/ACCESS.2019.2953499
6. Kim KK, McGrath SP, Solorza JL, Lindeman D. The ACTIVATE Digital Health Pilot Program for Diabetes and Hypertension in an Underserved and Rural Community. Appl Clin Inform. 2023;14(4):644–53.

Digital trendsetting treatment in Child and Adolescent Psychiatry; Internet-based Emotion Regulation Therapy for Adolescents engaging in non-suicidal self-harm – the IERITA Approach

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Background: Non-suicidal self-injury (NSSI) is common in adolescents receiving psychiatric treatment and is a significant risk factor for suicidal behavior. There are few randomized clinical trials testing interventions for NSSI in youth and knowledge about internet-delivered interventions is limited.

Objective: To assess and explore the feasibility of internet-based *Emotion Regulation Individual Therapy for Adolescents* (IERITA) in a psychiatric outpatient sample of NSSI engaging adolescents. A Feasibility randomized clinical trial with a parallel group design including a nested qualitative exploration of IERITA delivery by five synchronous, online semi-structured focus group interviews: three with adolescents (n=9) and two with parents (n=8) during 2020-2022. The intervention **I**ERITA is a therapist-guided, emotion regulation therapy, based on elements of CBT, consisting of 11 modules plus six modules for their parents. The control intervention was treatment as usual (TAU). Main outcomes Feasibility outcomes were the proportion who completed follow-up interviews at end of intervention; proportion of eligible patients who participated in the trial; proportion of participants completing ERITA; and participant safety measured by the Negative Effects Questionnaire.

Results We included 30 adolescent participants, 15 in each group. 90% (95% CI, 72-97%) of the participants completed post-treatment interviews; 54% (95% CI, 40-67%) of the eligible participants were randomized; and 87% (95% CI, 58-98%) of the participants completed more than six out of eleven IERITA modules. We observed no difference between the two groups regarding safety. Participants in the IERITA group had significantly fewer risk-related events (Point estimate: 1; 95% CI, 0-3, P = .02). We observed no differences between the two groups regarding the other exploratory outcomes.
Themes generated were: 1) Fatigue – barriers to and during treatment, 2) inter- and intrapersonal insights as facilitators of change, and 3) internet-based intervention: writing to the therapist an essential aspect.

Conclusion and relevance We conclude that a large-scale trial was feasible and that adolescents and their parents engaged in IERITA experiencing the therapeutic alliance in witting essential though arriving exhausted due to cross-sectoral barriers.

Conflicts of Interest: None declared.

Hospital-At-Home Delivery System: One Hospital Health Care System's Model

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Background: The presenter will provide an overview of outcomes of acutely ill patients treated in a hospital-at-home program rather than being admitted to a brick-and-mortar hospital. I previous research studies, Hospital-at-Home was found to be safe (in regard to adverse events) and was associated with acceptability and lower costs. Patient experiences were generally positive (in qualitative analyses), and physical activity was higher when patients were treated in their homes. Further caregiver burden and satisfaction were high.

Objective: This presentation aims to provide details of the collaborative team, processes and equipment used in hospital-at-home services for patients who receive acute hospital care in a home setting after presentation to the emergency department for an acute or chronic medical condition.

Results: A brief discussion of routine equipment will be shared, and the holistic nature of nursing work will be discussed. A brief day-in-the-life of a virtual RN's work will be described.

Conclusions: Four lessons learned will be presented.

Conflicts of Interest: None declared.

Keywords: Virtual care; Hospital-at-Home; interdisciplinary collaboration

Digital Health and Aging: Rethinking Care for an Older Population

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Background: The aging population represents a profound opportunity and challenge for technology-enabled innovation. While agetech and AI sectors are expanding rapidly, they face complex structural barriers with achieving their full commercial and societal potential. This review study examines US, European, and Asian agetech and AI innovations to assess how startups are using technology-enabled solutions to address healthy aging globally. An initial landscape assessment survey identified 558 agetech companies via web searches, accelerators, and conference exhibitions. A human-centered framework established the structural pain points and categorized solutions by four dimensions: health condition, user role, care activity, and process. Solutions were screened for potential impact using criteria to assess the potential to enhance functional ability, promote health equity, and support emotional well-being.

Objective: To assess the global agetech landscape, categorize solutions using a human-centered framework, evaluate criteria for impact, future directions, and potential limitations to adoption, with real-world examples provided.

Results: Agetech interventions successfully target interconnected customer pain points across core categories, including social isolation, chronic disease management, and caregiver burnout. Future directions point to advanced AI capabilities, including predictive analytics and personalized treatment plans that augment human performance. However, potential limitations persist, including market fragmentation, complex payor systems, high regulatory compliance costs, and algorithmic bias and data privacy concerns.

Conclusions: Technology-enabled solutions that seamlessly integrate into existing healthcare workflows are increasingly effective in reducing the burden of chronic illness and optimizing functional ability for older adults. Interdisciplinary design and responsible AI frameworks offer critical contributions to mitigating market challenges and structural limitations of technology-based interventions.

Conflicts of Interest: None declared.

Keywords: agetech; digital health; older adults

Cost-effectiveness of digital stroke rehabilitation in Ireland

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Background: Digital health interventions provide people who have experienced a stroke with alternatives to the traditional models of care and rehabilitation. Digital interventions may be classified as mobile apps, wearables, telehealth options, including online consultations, remote monitoring, and distributed rehabilitation programmes. To facilitate discussions about adapting digital interventions into the standard programme of care subsidised by public and other healthcare funding bodies, decision makers would require technology assessments that demonstrate the applications' relative effectiveness, safety, patient acceptance and cost-effectiveness in comparison with traditional non-digital standards.

Objective: This presentation aims to consider some of the challenges relating to the assessment of effectiveness, cost-effectiveness and distributional cost-effectiveness of digital health interventions and identify possible strategies for robust and reliable economic evaluations. Digital stroke rehabilitation services will be used as the illustrative case.

Methods: The principles of health economic evaluations are well-documented. National and international bodies for assessment of technologies have issued guidelines for appropriate conduct and reporting of evaluations of pharmaceuticals and other healthcare interventions. However, digital health interventions have qualities that require different methods for evaluation. First, digital health does not provide better health outcomes directly, but may provide better information that facilitates decisions that improve health or prevent health deterioration. Also, assessments of the costs of digital health are challenging by requiring substantial upfront funding, often with a high uncertainty about potential effects and running costs. They also require substantial investment in infrastructure, including technology and human resource development. But as the adoption increases, the average cost per person decreases, improving cost- effectiveness over time. Finally, when implemented, many digital health interventions are scalable at reasonably low running costs. These and other factors make health economics evaluations of digital health solutions challenging.

Results: Using a model-based (ex-ante) perspective for digital health stroke rehabilitation interventions, this presentation will discuss how model-based economic evaluations can demonstrate potential "value for money" of digital health before real-world implementation. Such evaluations may also help to identify important features of the digital health intervention and the implementation process, including identification of the appropriate patient user-groups, organisation of the use and the necessary support facilities, and appropriate effect and outcome measures.
The opportunities of pre-implementation what-if analysis facilitated by a model-based economic evaluation framework enable demonstration under which circumstances a specific digital health intervention may be cost-effective and represent "good value for money". The framework can also be

used to demonstrate potential budget impact by upscaled implementation strategies, and demonstrate the potential trade-offs between efficiency in resource use and equity through a distributive cost-effectiveness perspective. Finally, through the application of "value of information" analysis, the framework may be used to design efficient experimental implementation programmes.

Conclusion: Model-based economic evaluations are useful for assessing early-stage digital health technologies and advising technology developers and implementation scientists prior to large-scale implementation. By explicitly addressing uncertainty, scalability, and equity, such frameworks can support more informed adoption decisions and efficient allocation of resources in stroke rehabilitation and beyond.

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Keywords: Digital health; Economic Evaluation; Stroke;

Track: Digital Cardiology

Future Patient - Telerehabilitation in Atrial Fibrillation: Patients' experiences

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Background: The prevalence of atrial fibrillation (AF) is increasing and constitutes a substantial burden on healthcare systems worldwide. AF negatively affects quality of life (QoL) and may restrict patients' ability to perform daily activities. AF is associated with anxiety and depression, which may be addressed through patient education and empowerment. Furthermore, patient education and empowerment are fundamental components in reducing acute hospital admissions due to AF episodes.

Objective: We conducted the Future Patient-AF (FP-AF) study to investigate the feasibility of a telerehabilitation program focusing on patient education and empowerment. Patients with AF were randomized to either telemedicine monitoring and education (delivered online and at a local healthcare center) or standard care. In this sub-study, we explored patient perspectives using semi-structured interviews.

Results: The FP-AF study randomized 208 patients, with 104 in each arm. Fourteen patients from the intervention group were randomly selected for interviews.
Three overarching themes were identified:

Coping strategies for living with AF:

- Increased knowledge to manage one's own symptoms (n = 12)
- Feeling empowered to manage one's own condition (n = 4)

Community of practice:

- Peer support is beneficial (n = 10)
- Experienced patients already possess sufficient knowledge (n = 2)

The FP-AF program creates a sense of security:

- Information provided by the healthcare center is useful (n = 10)
- Patient education contributes to a sense of security (n = 11)
- Transition from uneasy to reassurance (n = 2)
- Home monitoring is beneficial (n = 2)

Conclusions: The FP-AF study demonstrated a positive impact on patients' sense of security and their coping strategies. Telerehabilitation for patients with AF should be considered as a standard approach to enhance patient empowerment, improve quality of life, and reduce hospitalizations. Given the increasing prevalence of AF, new strategies are required for the future, and transformation of patient care is essential.

Conflict of interests: None

Keywords: Atrial fibrillation, Telerehabilitation, Patient empowerment

Does home-based sleep apnea evaluation and potential treatment improve quality of life in patients with atrial fibrillation? Rationale and design of the decentralized randomized controlled VIR-SAAF trial

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Background: Obstructive sleep apnea (OSA) is a common and modifiable risk factor for atrial fibrillation (AF), yet it remains frequently unrecognized and undertreated. Despite guideline recommendations to consider OSA screening, no consensus exists on optimal strategies. The VIR-SAAF trial investigates whether home-based OSA screening and referral for potential treatment improve quality of life, physical activity, and AF-related outcomes compared with standard care.

Methods: VIR-SAAF is a national, investigator-initiated, decentralized randomized clinical trial enrolling adults with paroxysmal or persistent AF across Denmark. Participants are randomized 2:1 to home-based screening for OSA or to no screening. The trial is conducted entirely remotely using a purpose-built mobile application that supports electronic consent, digital questionnaires, rhythm

monitoring, activity tracking, and real-time communication with investigators. This design allows all study procedures, including device delivery, data collection, and follow-up, to be completed without in-person visits, enabling large-scale participation across geographical regions.
The primary outcome is the between-group difference in change from baseline to 18 weeks in quality of life, assessed using the Atrial Fibrillation Effect on QualiTy-of-life (AFEQT) questionnaire.

Results: As April 2026, 341 participants have been randomized.

Conclusions: VIR-SAAF is the first randomized trial to evaluate OSA screening itself as an intervention in AF. The fully decentralized design will generate novel evidence on whether systematic home-based OSA screening can improve patient-centered outcomes.

Conflicts of Interest: None declared.

Keywords: digital platform; telemonitoring; digital risk factor assessment

Using Gamification to Support Heart Failure Patients: Qualitative Experiences With "The Heart Game"

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Background: Heart failure (HF) is a complex clinical syndrome resulting from structural or functional cardiac impairment that limits the heart's ability to pump blood effectively. Although cardiac rehabilitation is essential for improving prognosis and quality of life, participation rates in Denmark remain low at 47.2%. Prior research indicates that aging, low exercise capacity, high levels of depression, and low levels of anxiety are associated with non-completion of rehabilitation programs. Gamification, defined as the use of game design elements in non-game contexts, may offer a promising approach to enhance patient engagement and learning. Studies have shown that board games and gamified tools can support HF self-management and telerehabilitation by increasing motivation, improving disease understanding, and encouraging healthy behaviors.

Objective: This study aims to explore HF patients' and relatives' experiences using The Heart Game, a gamified educational tool developed within the Future Patient II telerehabilitation program.

Methods: A qualitative feasibility study was conducted to investigate how patients and relatives engaged with and perceived The Heart Game. Eight patients with HF and five relatives participated. Participants received a smartphone with the game installed, a Fitbit activity tracker, an oral introduction, and a user manual, and used the game at home for four weeks with ongoing phone support. The game included quizzes, challenges, rewards, multiplayer features, Fitbit-based activity tracking, and personalization elements. Semi-structured interviews were conducted after four weeks, focusing on learning, motivation, interaction, usability, and recommendations. Interviews were transcribed and analyzed in NVivo 12 using Self-Determination Theory and thematic analysis.

Results: Participants reported that the game offered a novel learning approach, supported active and enjoyable learning, and served as a conversation starter between patients and relatives. Most participants considered the game a useful educational tool with potential to support HF self-management.

Conclusions: Findings indicate that The Heart Game is a promising tool for enhancing learning, engagement, and communication among HF patients and their relatives. Future work should include larger-scale evaluation, refinement of content and personalization, and optimization of usability to strengthen its educational and rehabilitative potential.

Conflicts of Interest: None declared.

Keywords: Gamification; heart failure; telerehabilitation

Digital Support for Heart and Mind: Addressing Psychological Needs in Cardiac Care

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Background: Psychological distress is common across all types of cardiac disease, and for most patients symptoms decrease over time. In addition psychosocial support may also be relevant in supporting life-style changes following cardiac disease. Psychosocial support has usually been provided as part of face-to-face rehabilitation or an add-on intervention, however, digital solutions, such as telerehabilitation, should also be designed with the aim of providing psychosocial support.

Objective: To explore and discuss existing digital solutions that incorporate psychosocial support in digital solutions in cardiac care.

Methods: A literature review of digital solutions incorporating psychosocial support in telerehabilitation.

Results: Several digital solutions integrate psychosocial support elements such as digital CBT or stress-management modules, telecoaching/counselling, peer/group sessions, and behavioral change tools have been developed. Conceptual models center on three dominant models: fully integrated, multidisciplinary platforms, add-on digital psychological interventions, behavioral/engagement-driven approaches. Studies show consistent improvements in quality of life and reductions in anxiety/depression, although these results are less consistent.

Conclusions: Incorporating psychosocial support in digital solutions in cardiac care is both feasible and effective, especially for improving quality of life. These results are most consistent, when these elements are explicit and structured, while being embedded in a multidisciplinary program.

Conflicts of Interest: None declared.

Keywords: Digital Cardiology, Psychosocial support, Psychological interventions

Early detection of worsening heart failure by changes in biological signals: From non-invasive recording methods to applications in remote monitoring

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Background: Heart failure is not only a disease with a poor prognosis characterized by repeated hospitalizations and exacerbations, but it has also become a social problem due to the increasing medical costs associated with hospitalization. Heart failure exacerbations progress before subjective symptoms or weight changes appear, and it may be possible to detect very early changes in the condition by non-invasively capturing changes in related biological signals (heart rate, respiration, heart sounds, voice, etc.).

Objective: This presentation aims to show our studies regarding non-invasively captured biological signals for detecting heart failure exacerbations

Methods: In our studies, sheer sensor detecting heart beats, respiration and body movements, heart sounds and those combined with electrocardiogram signals, and voice in patients with heart failure were investigated.

Results: A combination of heart beats and respiration by sheet sensor was associated with the increased clinical event rate in patients with heart failure. In addition, heart sounds and those combined with electrocardiogram signals were associated with cardiac function and with the increased clinical events in patients with heart failure. Voice analyses changed significantly before and after hemodialysis in patients with end stage renal disease, and according to the congestive status in patients with heart failure.

Conclusions: Biological signals recorded non-invasively may be useful to detect early signs of worsening heart failure.

Conflicts of Interest: Takatoshi Kasai is affiliated with endowed department by Philips, ResMed, Fukuda Denshi, and Paramount Bed.

Keywords: congestion; telemonitoring; worsening heart failure

Track: Use of Digital Technologies within Children and Adolescence Psychiatry

Digital Children and Adolescence Psychiatry in Australia

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Background: Australia's geography, characterized by a widely dispersed population and substantial distances between communities, has created longstanding challenges in accessing specialist mental health services. Digital psychiatry has emerged as an important strategy to improve access, particularly for children and adolescents living in regional and remote areas. High levels of internet connectivity, widespread smartphone ownership, and sustained investment in telehealth have supported the growth of digitally enabled mental health care across the country.

Objective: This presentation aims to provide an overview of the development, implementation, and evaluation of digital psychiatry in Australia, with a particular focus on child and adolescent mental health services. It will explore the drivers of digital service adoption, the range of telepsychiatry and digital mental health programs currently available, and emerging opportunities associated with artificial intelligence (AI).

Results: Examples of digital psychiatry initiatives include national telephone and web-based counselling services, statewide telepsychiatry outreach programs, school-based virtual mental health services, and government-supported digital mental health platforms. National telehealth activity data demonstrate substantial uptake of digital mental health care following policy and funding reforms introduced during the COVID-19 pandemic. Evidence from recent systematic reviews indicates that digital interventions can improve mental health outcomes for young people, achieve high levels of patient and caregiver satisfaction, and offer a cost-effective alternative or complement to conventional care. Emerging AI applications show promise for assessment, diagnosis, risk prediction, and personalized care.

Conclusions: Digital psychiatry has become an established component of mental health service delivery in Australia, improving access to care for children, adolescents, and families who may otherwise face significant barriers to treatment. Australia's experience demonstrates the potential of digital technologies and AI to enhance the accessibility, effectiveness, and sustainability of psychiatric care, while highlighting important priorities for future research, policy, and clinical implementation.

Conflicts of Interest: None declared.

Keywords: Telehealth, telepsychiatry, Australia

Best For You: Evolving a Digital Front Door for Young People's Mental Health and Wellbeing Support Through Co-creation and Insights

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Background: Best For You (BFY) was established in 2021 through a collaboration between NHS Trusts, charity, and academic partners to respond to increasing demand for child and adolescent mental health services. The programme delivers an integrated model of care, combining high-quality clinical environments, community partnerships, innovative solutions, and a digital platform to improve access experience, and outcomes. A core principle is co-creation, ensuring that young people, and professionals shape all elements of design and delivery. The digital platform was initially developed as a centralized hub of clinically assured information on mental health conditions, including videos, blogs, app library, and a crisis text service delivered in partnership with Mental Health Innovations UK. To date, the platform has achieved over 240,000 global website visits, 19,300 YouTube watch minutes, and has saved five young people from immediate harm through the text service. However, emerging feedback indicated that this diagnosis-led model did not reflect how young people understand or seek help for their mental health.

Objective: To demonstrate how a digitally enabled support offer can be redesigned through co-creation and research, shifting from a diagnosis-focused information model to a user-centred "digital front door" grounded in lived experience.

Results: Mixed-methods research with over 2,000 young people identified a mismatch between clinical framing and user needs. While 50% reported anxiety and 33% depression, many described broader concerns, including body image (37%), and 31% reported that not knowing how to access support prevented seeking help.
In response, the BFY website was redesigned in collaboration with 75 young people. The new platform focuses on feelings, life challenges, and pathways to support, alongside clinical information. Enhanced features include personalized filtering by age, location, and need, an expanded app library, video content in partnership with YouTube, and an improved user interface.

Conclusions: BFY demonstrates how co-created, insight-driven design can transform a digital platform into an accessible and effective gateway to care, providing a scalable model for future mental health support.

Conflicts of Interest: None declared.

Keywords: Co-creation; integration; collaboration

Digital psychoeducation; effects and benefits in Child and Adolescent Psychiatry

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Background: Child and adolescent psychiatry (CAP) faces a major challenge in providing high-quality care, given the significant demand for its services and limited resources. To meet these needs, CAP Skåne has worked systematically to standardize care processes within a step-by-step and digital care model, resulting in an entirely new service logic. In the first step begins the treatment for patient and there close relative with digital psychoeducation based on the current problem area and/or diagnosis, which is standardized and person-centered. But it must also be scalable to the extent necessary to ensure that the most patients can be offered this service without waiting times, as a quick start to their care process. This digital self-care treatment, in a family setting, includes factual texts, lecture videos, short animated films, diaries etc. The purpose is to increase knowledge about the diagnosis/problem area and how to work with it on one's own. This may be a sufficient intervention and/or a good basis for continued treatment. Useful at both the primary and specialist levels.

Results: CAP Skåne provides today digital self-care, psychoeducation, to approximately 10,000–12,000 patients per year, which meets the need for high-quality care provided in accordance with standardized care processes, and ensures that the care system offers a sufficient range of basic-level services part of treatment on “step I” in a stepwise care model, according to principles of digital first, physical when needed.

Conclusions: The experience is that digital help and treatment is available and scalable to meet the needs, according to the standardize care processes within a step-by-step and digital care model and to work more towards promoting health and well-beingfor children and youth with mental ill health.

Conflicts of Interest: None declared.

Keywords: Digital psychoeducation, Digital Child and adolescent psychiatry, Digital treatment, Digital service logic in health care

The Future of Cross-Sectoral Collaboration: Co-Designing a Digital Platform for Families in CAMHS

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Background: Care pathways within Child and Adolescent Mental Health Services (CAMHS) involve complex multi-sectoral networks. Families and professionals frequently face discontinuity in cross-sectoral collaboration and information sharing, which places a heavy organizational and emotional navigation burden directly on the parents. Digital health platforms can potentially bridge these communication gaps by supporting multi-sectoral coordination and mutual learning. As part of the Best for Us research project a platform will be developed.

Objective: This study presents an iterative participatory design process to develop the Family's Digital Toolbox (FDT) for families and professionals involved within CAMHS.

Methods: A multi-phase, iterative participatory design approach was conducted across two phases and four distinct iterations using activities of telling, making, and acting. Iteration 1 (telling) mapped challenges via a literature review and 34 semi-structured interviews with parents (n=13), CAMHS professionals (n=11), and municipal professionals (n=24). Iteration 2 (making) utilized a series of five co-creation workshops to generate ideas and prototype functionalities with stakeholders. Iteration 3 (acting) evaluated early, partially functional prototypes through mixed-methods usability testing (n=19) combining brief interviews, a card-sorting exercise, and questionnaires. Iteration 4 established the final requirement specifications.

Results: Iteration 1 identified 18 key challenges, highlighting cross-sectoral discontinuity, lack of responsiveness, and complex navigation. User needs were translated into core functionalities during iteration 2. Usability testing in iteration 3 showed strong user acceptance: 95% agreed that the team overview provided a good summary, and 90% found the messaging feature easy and clear. Furthermore, 12 participants described FDT as useful, and qualitative data confirmed that a digital platform reduces parental stress and improves cross-sectoral visibility via shared meeting minutes. The process resulted in five prioritized modules: Information, Communication, My Course, Monitoring, and Administration.

Conclusions: This study demonstrates that co-creation with families and cross-sectoral professionals is essential to bridge communication gaps in CAMHS. Through an iterative development process,

these stakeholder insights were successfully translated into five targeted digital modules. The resulting FDT platform achieved high user acceptance, proving that a co-designed infrastructure can effectively reduce the emotional navigation burden on parents and improve cross-sectoral visibility.

Conflicts of Interest: None declared.

Keywords: Co-creation; Participatory design; Digital platform

Co-Creating a Digital Information Site for Families with Children Experiencing Mental Distress

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Background: Mental health disorders are a major global health challenge among children and adolescents, affecting nearly 15% of young people aged 10–19. The transition into early adulthood is a vulnerable period, underscoring the importance of early identification and support. Despite personal, social, and economic consequences, many young people do not access specialized services, with lack of information about where to seek help being the most common barrier. Research and national strategies emphasize the need for accessible, engaging, and sustainable mental health literacy initiatives and municipality-based support. Although digital platforms exist internationally and some Danish resources are available, the landscape remains fragmented, and no national platform consolidates quality-assured information on well-being, psychiatric diagnoses, and community-based support.

Objective: This study aims to co-create an accessible digital information site that gathers quality-assured content on well-being and psychiatric diagnoses for children, adolescents, siblings, and parents.

Methods: A participatory design approach was applied across four iterations, structured around activities of telling, making, and acting. Iteration 1 (telling) identified needs and challenges in information seeking through a mapping of existing materials and semi-structured interviews with parents. Iteration 2 (making) defined content and functionalities via workshops with parents, professionals, and children. Iteration 3 (acting) tested prototypes through usability testing combining tasks, interviews, and observations. Iteration 4 (acting) established the final requirement specification.

Results: Iteration 1 identified four key challenges, including difficulties navigating the system and locating information and tools regarding diagnoses, alongside ideas for the site. These ideas were translated into content and functionalities during iteration 2. Usability testing in iteration 3 demonstrated strong user acceptance of content, functionalities, and navigation. The process produced a final specification for the site.

Conclusions: The study demonstrates that co-creation with end-users is crucial for developing relevant and usable digital mental health solutions. The participatory design process enabled user-identified needs to be translated into concrete content and functional requirements, resulting in a

final specification for an accessible information site tailored children, adolescents, siblings, and parents.

Conflicts of Interest: None declared.

Keywords: Co-creation; participatory design; information site

FRED: A Parent Training Mobile Application

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Background: Parents are an untapped resource for delivering preventative and early interventions. They play a crucial role in modifying risk and protective factors for various child emotional and behavioral problems (Adams & Emerson 2020). Parent training programs are available however, access to supportive parent training programs is limited (Lawrence et al. 2021). Mobile applications offer a solution to making supportive parent training programs widely available in a cost-effective and convenient way. Many apps are available for parents but they lack support for their efficacy and safety.

Objective: This study aims to test the feasibility of teaching parents of children with emotional and behavioral problems seeking help in the primary and secondary sectors new parenting skills using the mobile application, "FRED" which stands for "Family Resilience with Empathy and Dialogue." FRED includes a conversational agent with emotion recognition capabilities that we have developed in collaboration with the Danish AI start-up InterhumanAI and via participatory design with parents, psychologists, and pedagogs.

Methods: This is a nonrandomized, longitudinal feasibility study, which includes repeated experiments involving parent-child conversations. We are currently recruiting 70 parent-child dyads in total, 35 of which will be families referred to the secondary sector and 35 seeking help in the primary sector. Participating parents are asked to use the mobile app for 12 weeks. The app includes computer vision, speech recognition and affective computing tools to give parents a tailored experience. Parents will respond to a series of questionnaires and interviews before, during and after using the app. The primary outcome is parental sensitivity after 12 weeks. Parents and children wear biosensors that measure pulse, skin temperature, skin conductance and movement during resting periods and the conversations. The experiments are video and audio recorded for behavioral coding.

Implications: If found feasible, randomized trials can rigorously test the app in a number of different parent populations. An evidence-based training app would support an unserved population and provide a means of prevention of and early intervention for mental health disorders in parents and children.

Conflicts of Interest: None

Keywords: Child and Adolescent Psychiatry; Parent Training; Affective Computing

Track: From Co-Design to Outcomes: Pathways, Methods, and Impact

Why Is User Involvement Important for Digital Health Innovation?

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Background: Drawing on 23 years of experience in developing and applying Participatory Design (PD), JC will explore why user involvement is essential for successful digital health innovation. Participatory Design is a well-established research approach that actively involves users in the design process and typically results in the development of digital solutions that address real-world needs. Today, PD is widely used in health sciences, both in Denmark and internationally. Over the past seven years, JC has also integrated compassion into her work.

Objective: In this presentation, JC will discuss how she sees Participatory Design and compassion as closely connected, highlighting how both approaches emphasize listening to, understanding, and collaborating with users to create meaningful and person-centred digital health solutions.

Expressing Outcomes from Digital Health in Stroke – What is the current practice? Results from a review

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Background: Digital health (including telehealth, mobile apps, wearable sensors, remote monitoring, and online rehabilitation programmes) has become increasingly important in stroke care. Recent reviews highlight their ability to improve access to expert care, support remote rehabilitation, enhance monitoring, and reduce treatment delays, especially in regions with limited access to specialist services. Evidence on real-world effectiveness is fragmented. Many interventions lack rigorous clinical validation. Variations in digital competency may reduce impacts on older adults, those with low digital literacy, and those from disadvantaged backgrounds.

Objective: This study aimed to assess how the value of digital health interventions has been identified in published evaluative research. We also aimed to synthesise how digital health interventions generate value across the stroke care continuum for patients, carers, healthcare professionals, and health systems.

Methods: We conducted an overview of reviews following the JBI methodology and PRIOR reporting guidance. We grouped outcomes into the ICF domains of body functions, activities, participation, environmental and personal factors.

Results: Fifty-nine reviews spanned a broad range of digital health technologies, including prevention, acute care, rehabilitation, and long-term support. Telerehabilitation and mobile health were the most commonly studied modalities. Reported benefits often included improvements in motor skills, balance, gait, daily activities, self-management behaviours, and health-related quality of life. System-level advantages, such as reduced treatment delays, improved diagnostic accuracy, and enhanced continuity of care, were consistently reported. Although the economic evidence was weaker, it suggested positive trends in cost-effectiveness, cost-utility (QALYs), and cost savings, particularly in telestroke and remote monitoring. However, gaps remain in understanding long-term economic impacts and distributional effects across socioeconomic or digital-literacy groups.

Conclusion: Digital health technologies provide significant benefits across various aspects of stroke care, showing consistent improvements in clinical results, patient-focused outcomes, and overall system efficiency.

Conflicts of Interest: None declared.

Keywords: Stroke; Digital health; Health outcomes

From Data to Care: Reconfiguring Person-Centred Care through AI-Enabled Access to Resident Narratives

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Background: Person-centred care is a core principle in elder care, emphasizing individuals' life stories, identities, relationships, and psychosocial needs. Yet residents' life stories are rarely systematically integrated into everyday care practices and therefore seldom become part of the narratives that guide care interactions. Concurrently, workforce shortages, high staff turnover, and increased reliance on temporary staff challenge continuity in care, as residents are frequently met by unfamiliar carers with limited access to personal and narrative knowledge. The growing integration of artificial intelligence (AI) in healthcare creates new opportunities to support care work by making resident narratives more accessible and actionable in daily practice.

Objective: This study examines the potential of AI in elder care through the development of a Care-AI model designed to support the use of residents' narratives in everyday care work. Method: The project adopts a binational, interdisciplinary, iterative proof-of-concept design integrating nursing science, care practice, ethics, and software development.

Results: Findings indicate that the central challenge is not a lack of resident information but limited timely access to meaningful narratives in care situations. In response, Claire, a Care-AI prototype, was developed to document, organize, and retrieve data from residents' life stories. The prototype enables care professionals to access and apply narrative knowledge at the point of care, thereby supporting more responsive, relational, and individualized person-centred practices.

Conclusion: The study suggests that AI-supported access to residents' narratives may help reconfigure person-centred care by transforming fragmented life stories into actionable narrative knowledge. AI models such as Claire may support a broader digital transformation of care work in which narrative knowledge becomes central to individualized, relational, and context-aware care practice

Conflict of interest: None declared

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Keywords: Person-centred care; elderly care; artificial intelligence

Co-Designing Digital Support for Women With Urinary Incontinence: Exploring Needs and Barriers

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Background: Urinary incontinence (UI) is prevalent among women and associated with physical, psychological, and social consequences. Despite available treatments, many women do not seek help due to stigma, normalization of symptoms, and limited knowledge. Digital health solutions may support self-management; however, motivation, adherence, and usability challenges can limit effectiveness. This highlights the need for user-centered approaches addressing practical and motivational aspects of managing UI.

Objective: Using a participatory design (PD) approach, this study explored the needs and barriers experienced by working-age women with UI to inform the development of a digital platform

Methods: A qualitative, exploratory PD approach was applied in three phases. Firstly, needs and barriers were explored using mobile probes (n=32) and semi-structured interviews (n=13) to capture women's everyday experiences. Secondly, a co-creation workshop (n=9) was conducted to prioritize needs and generate solution ideas. Thirdly, a digital prototype was developed and evaluated in an online workshop (n=8), where participants tested the prototype and provided structured feedback on content and usability. Data were analyzed using inductive and deductive approaches inspired by the Self-Determination Theory (SDT).

Results: UI is experienced as a complex everyday condition characterized by loss of control, stigma, uncertainty, and continuous coping strategies. Core needs included trustworthy information, actionable guidance, peer recognition, and solutions that could be integrated into daily routines. Major barriers included uncertainty about correct management, normalization of symptoms, lack of motivation, and difficulties maintaining engagement over time. The co-creation workshop highlighted a preference for simple, accessible, and action-oriented solutions supporting self-management, adherence, and recognition through shared experiences. These insights informed development of a digital prototype translating needs and barriers into key platform features, including structured information, practical self-management tools, and opportunities for peer recognition

Conclusion: This study suggests that a PD approach can support development of digital solutions reflecting working-age women's needs and barriers related to UI. The prototype integrates trustworthy information, self-management support, and peer recognition in a discreet and accessible format. Further evaluation is needed to determine usability, acceptability, and relevance in practice.

Conflicts of Interest: None declared.

Keywords: Urinary incontinence; digital health; participatory design

From Prototype to Practice: A Family-Centered Digital Calendar for Children with Autism Spectrum Disorder

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Background: Children with autism spectrum disorder (ASD) benefit from predictable routines and visual support, yet families coordinating therapy, school, and daily activities carry a high administrative and cognitive load. Existing digital scheduling tools rarely address these needs and often fail through entry fatigue, notification overload, and poor adoption. A previous participatory design project produced Overblik+, a conceptual calendar prototype grounded in three principles—transparency, flexibility, and predictability—but it remained unimplemented.

Objective: To investigate how a participatory design prototype can be translated into a functional digital calendar application that preserves its core design principles and supports everyday coordination for families of children with ASD.

Methods: A three-phase approach was applied. Phase 1 was a structured literature search to select an appropriate usability evaluation method. Phase 2 was a moderated usability test with four families (children aged 9 to 17), combining the System Usability Scale (SUS) with qualitative think-aloud feedback, which informed a revised requirement specification. Phase 3 implemented the system using a cross-platform Flutter front end, a relational cloud backend, a layered architecture, and role-based access control for parent and child user tiers.

Results: The prototype achieved a mean SUS of 82.8 (SD 6.8), rated excellent. Four recurring issues were identified: ambiguous calendar ownership, unclear affordances, feature confusion, and excessive cognitive load during activity creation. These findings drove design refinements and additional non-functional requirements for performance, reliability, consistency, and security. The implemented system realized the majority of the revised functional and non-functional requirements, delivering a working family-centered calendar.

Conclusions: Iterative usability evaluation and requirement refinement enabled the transition from a conceptual prototype to a functional application while preserving transparency, flexibility, and predictability. Overblik+ demonstrates a structured pathway from participatory design to implementation for neurodevelopmental support technologies. Real-world evaluation with families is the necessary next step.

Conflicts of Interest: None declared.

Keywords: autism spectrum disorder; participatory design; usability

A Participatory Design Exploration of a Clinician-Centred Adaptive Exergaming Platform

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Background: Pediatric brain injury remains a major cause of mortality and long-term disability in children. A substantial proportion of affected children experience persistent cognitive and behavioural challenges, which can significantly affect academic performance and social participation. These long-term consequences place considerable strain not only on the child, but also on families, educational systems and healthcare services. Despite the importance of rehabilitation following pediatric brain injury, adherence to conventional exercise programmes remains challenging due to low motivation, repetitive tasks and limited feedback.

Objective: The study aims to identify clinician requirements for the design of a prescription dashboard to support personalised rehabilitation for children with brain injury using adaptive exergames. Unlike conventional rehabilitation platforms, the proposed system seeks to integrate clinician prescription control with adaptive exergaming tailored to pediatric recovery trajectories.

Method: A participatory co-design workshop was conducted with five rehabilitation clinicians with expertise in neurorehabilitation. Phase 1 elicited clinicians' current practices by asking participants to demonstrate their therapy environments, present their most-used digital tools, and describe their routine clinical workflows. Phase 2 involved patient journey mapping, during which clinicians collaboratively mapped a typical rehabilitation pathway to identify key touchpoints, challenges and unmet needs. In Phase 3, clinicians co-designed a prototype outline by collaboratively sketching and discussing potential features and functionalities of a proposed solution. The final reflection phase enabled participants to review ideas, validate priorities and highlight key considerations for the dashboard.

Results: The workshop identified key challenges in existing technologies, including limited personalization, poor interoperability, lack of progress visualisation, time burden during consultations and restricted remote monitoring. Clinicians prioritised real-time performance monitoring, adjustable exercise difficulty and longitudinal progress visualisation. They emphasized the need for an intuitive and time-efficient dashboard aligned with clinical workflows.

Conclusions: The findings underscore the importance of integrating clinician perspectives into the design of digital rehabilitation tools for pediatric brain injury. They provide a foundation for iterative prototype development and future feasibility testing, with the potential to enhance patient outcomes and support more effective, personalized rehabilitation pathways.

Conflicts of Interest: None

Keywords: pediatric brain injury; clinician dashboard; personalized rehabilitation

Keynotes

Making the case for Updating Health Economic Evaluation of Digital Technologies in response to the Demographic Challenges

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Background: The shortage of healthcare professionals is a major challenge for health care systems in many countries and the problem will increase due to demographic changes with a rising percentage of elderly patients with multiple chronic conditions. Digital health technologies are proposed as a strategy to tackle this challenge by saving clinician time. However, guidelines for health economic evaluation of digital health technologies remains generally unchanged in most countries. Thus, the guidelines focus on the clinical impact and estimation of ICER, with limited interest in the impact of digital technologies on the clinical staff.

Objective: The objective is to present arguments and practical tools for an adjustment of economic evaluations in order to ensure that assessments of digital health technologies reflect the current demographic challenges.

Results: The results include arguments and suggestions for two adjustment of economic evaluations and HTA: (1) By collection of data and presentation of results on the effects of the digital technologies on Time Needed to Treat. (2) By the use of shadow prices to ensure that the costs of health care professionals correctly reflected the alternative costs. Current data from Denmark are also presented, indicating that the alternative costs for hospital nurses are 20-30% higher then the average wages for this group of health care professionals.

Conclusions: Adjustment of health economic evaluation of digital health technologies is needed to ensure alignment with the demographic challenges to health care systems. Without adjustment of economic evaluations for the demographic challenges and the staff shortage, digital technologies that save clinician time may be underused.

Conflicts of Interest: None declared.

Keywords: Health Economic Evaluation, Digital Technologies

The AI Imperative: Preparing Healthcare for the Next Decade

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Background: Healthcare systems face increasing pressure from ageing populations, chronic disease, workforce shortages, limited capacity, and growing expectations for accessible and personalized care. Artificial intelligence (AI) is rapidly progressing from experimental applications towards clinical decision support, personalized treatment, digital communication, education, mental healthcare, rehabilitation, and elder care. However, successful implementation requires more than technological development.

Objective: To synthesize and identify the opportunities, requirements, and challenges that should guide the responsible integration of AI into healthcare during the next decade.

Methods: A narrative synthesis of the review has been conducted from 2020-2026 with focus on AI, digital twins, AI-supported clinical decision-making, personalized care, citizen perspectives, professional education, regulation, data quality, and implementation in clinical practice.

Results: The literature highlight the potential for AI to support earlier detection, prediction of disease trajectories, personalized interventions, improved access to trustworthy health information, and more efficient use of healthcare resources. Examples included digital twins based on multimodal health data, AI-supported access to residents' life stories, conversational agents, emotion recognition, predictive analytics, and applications in diagnostics and mental healthcare. Implementation is challenged by limited interoperability, variable data quality, algorithmic bias, privacy concerns, uncertain accountability, and insufficient evidence regarding clinical workflows, effectiveness and long-term value. Trust emerged as a central requirement among patients, citizens, and healthcare professionals. Human oversight, transparency, regulatory compliance, patient involvement, and continuous monitoring are therefore essential.

Conclusion: AI has the potential to transform healthcare, but its benefits will not emerge automatically. Preparing healthcare for the next decade requires trustworthy data infrastructures, strengthen AI competencies among healthcare professionals, robust clinical evidence, responsible governance, ethics and active involvement of patients and citizens. AI should augment rather than replace human expertise and must be integrated into clinical workflows in ways that strengthen person-centred, equitable, safe, and sustainable care.

Conflicts of Interest: None declared.

Keywords: Healthcare, AI, Digital Technologies

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