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Editorial

Successful Digitalisation Pathways

Alexandre Lourenço
Hospital Administrator
Centro Hospitalar e Universitário de Coimbr, Portugal, Editor-in-Chief HealthManagement.org, EXEC

The COVID-19 pandemic has triggered several changes in how healthcare systems are run globally. The focus has shifted from relying exclusively on brick-and-mortar healthcare facilities to digital avenues that could help deliver care virtually. Telemedicine, remote patient monitoring and out-patient care are some of the avenues that have been explored.

Over the last two years, there has been a growing realisation that the digitalisation of healthcare is an undeniable reality that must be embraced and utilised. Digitalisation increases operational efficiency, provides better access to care and offers patient convenience. However, digitalisation requires careful planning and implementation of functional changes that must consider factors like interoperability, culture, and technology. Moreover, equity and universal access to digital care need to be considered. A dystopic world where only the well-off have access to the latest technologies and precision medicine is a possibility. European health systems need to do better to minimise this risk, including using the digital to promote health promotion and disease prevention.

Healthcare will be different. New kids on the block will emerge. We need to adapt and evolve into a new digital reality or become obsolete. In this issue, our contributors discuss successful digitalisation pathways in healthcare and explore best practices for successful implementation, highlight strategies to ensure this transition can occur smoothly, and discuss the challenges and barriers that must be addressed.

We hope you will enjoy this issue. As always, your feedback is welcome.

Happy Reading!

We hope you will enjoy this issue. As always, your feedback is welcome.

Happy Reading!

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DISCLOSURE OF CONFLICT OF INTEREST:
Point-of-View articles are the sole opinion of the author(s) and they are part of the HealthManagement.org Corporate Engagement or Educational Community Programme.

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There are many areas in healthcare that could potentially benefit from Artificial Intelligence (AI). How can these benefits be realised? What are some gaps that AI can address? How can healthcare meet challenges associated with AI? What are its limitations, if any?

Submit your abstract to **edito@healthmanagement.org**

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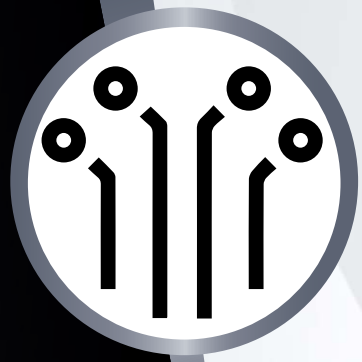

Successful Digitalisation Pathways

People Centric Model to Harness User Value

Reflection on Personal Data Spaces in Transformation of Health and Care

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To reap full benefit of ongoing health system transformation, digital health tools and services are urgently needed to equip citizens as patient, informal caregiver or family member. They are the most important, but least supported actors in healthcare, in need of digital health data and services for health management activities at their personal convenience, discretion and control. This will add use-value and assist to attain better health and wellness contributing to more sustainable healthcare. We are proposing a model to drive the discussion of what health managers, policymakers, and society at large can do better to engage citizens.

Key Points

- A people centric model for use-value in personal health data exploration has implications for citizens, healthcare, and policy actors alike.
- For citizens: Ongoing digital transformation of health systems needs adequate digital tools and services that allow for personal use, reuse and control of all health information according to preferences, discretion and convenience while ensuring that no one is left behind due to low digital literacy or inability to access tech.
- For healthcare: Access to, active use and reuse of personally recorded and appropriately curated health data - personal secondary use – is necessary to reap the full benefit of digital transformation.
- For policy actors: The European Digital Health Landscape (including the forthcoming European Health Data Space) needs to include opportunity for personal use and reuse of health data, which include functionality to add and curate, understand and explore, to employ digital tools for healthier lives and successfully coping with disease.
- Hospital managers, and health managers in general, including IT managers who often have to make choices regarding IT projects and digital services for healthcare organisations may benefit from taking the proposed people centric model into account, and this is the essence of a future personal health data space.

Introduction

Across Europe the healthcare systems - hospitals, primary care as well as social care and long term care - are increasingly capitalising on and relying on digital support. Electronic Health Record (EHR) systems are widely implemented across hospitals and other care settings, and more data are available in digital form. Telehealth has transformed patient and citizen interactions with care providers. Deployment of digital health interventions were boosted by a combination of COVID-19 restrictions, achievements in interoperability standards, and widely available, well established national ePrescription solutions that allow patients the convenience to fill their prescriptions. These initiatives demonstrate the importance of digital health data across settings, health institutions and stakeholder constituencies (Moen 2018).

Consistent with the aims of the EU Digital Single Market Strategy, which highlights the need for digital transformation of health and care innovations to build a healthier society, the recently completed Digital Health Europe (DHE) project highlighted the need to empower citizens and foster health data activism in patients. To reap the full benefit of these initiatives, digital health tools and services are urgently needed to equip the most important, but least supported actors in healthcare - the citizen as the patient, informal caregiver or family member – with digital health data for personal health management activities at personal convenience, discretion and control for personal health and wellness. Digital health services that support and offer a good overview of health data with an understanding of its implications, will, if successfully deployed at scale, come with opportunities and convenience that improve user-experience, engage the person, and transform personal health management (Moen et al. 2022).

This is a demand-side push for a more interoperable digital health ecosystem that can only be realised with the offering of tailored and patient-friendly digital tools.

So, what can we do better to advance digital health and transform how citizens, health professionals, and policy makers engage with tech?

1. For engaging citizens, it is important to recognise that the ongoing digital transformation of health systems needs adequate digital tools and services that allow for personal use, reuse and control of all health information according to preferences, discretion and convenience while ensuring that no one is left behind due to low digital literacy or inability to access tech.
2. Health professionals should be able to have access to, active use and reuse of personally recorded and appropriately curated health data. Such personal secondary use is necessary to reap the full benefit of digital transformation.
3. Policy actors can contribute by advancing a more sophisticated view of the European digital health landscape, expanding it to include opportunity for personal use and reuse of health data, to employ tech for healthier lives and successfully coping with disease.

Rapid Deployment of Digital Tools and Services Increase Availability of Personal Health Data in Digital Form and Call for Citizen Participation

Without interoperability guarantees, the significant investment in digital solutions cannot build up integrated tailored functionalities to the level that users expect and need. Standards provide the framework for technical interoperability, i.e., agreed upon format for how the data is exchanged, and semantic interoperability, i.e., agreed upon understanding of what the data represents. Currently, the emergence of the HL7 Fast Healthcare Interoperability Resources (FHIR®) standard, allows for data to be electronically exchanged in real-time with both technical, structural and some semantic integrity as well as data security. HL7 FHIR® is rapidly being adopted by large and small technology vendors, regulatory agencies, third party payers and pharmaceutical companies, among many others. Within HL7, several FHIR® accelerator initiatives have been launched. One of them is VULCAN to help healthcare researchers more effectively acquire, exchange and use data in translational and clinical research, and to define a common set of standards using the HL7 FHIR® standard to facilitate data exchange internationally. HL7 FHIR® is moving towards a universally agreed upon interoperability standard, changing the way healthcare data can be exchanged, received and reviewed.

While efforts to create FHIR® resources advance technical interoperability, for meaning to be clear and actionable by humans and algorithms, other challenges

Digital health tools and services are urgently needed to equip the most important, but least supported actors in healthcare - the citizen as the patient, informal caregiver or family member

in the cross-context identification of diagnosis, clinical status or medicinal and device information must be overcome. For the Identification of Medicinal Products (IDMP), the ISO IDMP standard points to ongoing global consensus processes to describe and identify unambiguously medicines and pharmaceutical products. IDMP standards and accurate medicinal product information can deliver multiple benefits for pharmaceutical companies, regulators, healthcare providers, and especially citizens in all the countries where a medicinal product is prescribed, dispensed and used. ePrescription is widely adopted across Europe and increasingly available eDispensation services transform how medication is made available within country of residence or in markets across borders. Health data accumulated in silo EHR systems serve documentation purposes. To open up the silos, the International Patient Summary (IPS) concept, evolved from the already implemented cross-border EU Patient Summary, provides a summary snapshot and definitions for a curated set of relevant, structured information facilitating continuity and cross-border care (Kay et al. 2020). The ongoing EU funded X-eHealth project seeks to take this a step further by developing three new use cases for the European EHR-exchange Format (EEHRxF) namely laboratory results, imaging reports and hospital discharge letters, on top of revised ePrescription and patient summary guidance and detailed specifications (Bonacina et al. 2021).

Stimulating hospitals and other healthcare organisations to use existing and coming standards and formats for health data sharing, particularly with citizens will create necessary innovation ecosystems in which citizens need also to be allowed to co-create the digital solutions they are to benefit from. For the citizen in its multiple roles, but always as the key actor, these new opportunities call for ethical considerations particularly relevant following the recently proposed European Ethical Principles for Digital Health and new codes of conduct and governance for equity and to take full advantage of emerging opportunities in accessible and understandable services that do not leave people behind.

Innovative, digital tools for citizen's active use and engagement include opportunity to share health data at personal discretion, across borders when needed, to support treatment and care

Situating Citizens and Health Data in the European Digital Health Landscape

A patient's health information remains fragmented and collecting all information about oneself or even access the information to support health and care activity is still quite complicated today. This is largely due to technical and structural obstacles, such as limited availability of or partial access to personal digital health information, interoperability challenges and little opportunity to actively select or use information for relevant, everyday purposes. At the same time, adding health information management to everyday activities can be a challenge. For example, it can be a struggle to read fine print in paper-based medicinal product leaflets and at the same time combine this information with personal health data to understand implications, verify contraindications, risks and in general protect from harm, stimulate coping and obtain best possible health outcomes.

As citizens use digital tools to navigate and use personal data, also for their health management, the more likely they are to favour its use and reuse held in multiple organisations. Many Europeans support greater transparency or want to guide on how their personal health data is used. We can show a digital certificate of vaccination to enter the bus, an airplane or to go across borders. We can benefit from ePrescription on email/phone or at the pharmacy to dispense a needed medication or we can take advantage of the digital summaries in the maturing patient summary. These examples of cross-border digital health services come with opportunity to read personal health information, most often via tethered patient portals, and expectations for additional services.

To expand service repertoires and maintain trust, integrity and control, active use of personal health information, including collection, processing and use of personal and sensitive personal data requires responsible and ethical conduct in compliance with the European Union General Data Protection Regulation (GDPR). GDPR sets out requirements to be met by service providers who wish to collect and process personal data while providing a service and demands that tool developers ensure that their tools incorporate data protection principles. Furthermore, the European Union Medical Devices Regulation (MDR) and the Revised Directive on Security of Network and Information Systems Directive (NIS2) entered into application May 2021. Prospective citizen centred digital

tools should take this complex regulatory framework into account to include security and data protection issues together with national sectoral laws. While ethics in digital health for the most part are not mentioned at EU level, professional and industrial codes of conduct exist and will be taken onboard as well as contributions to digital health ethical reflections (Bonacina et al. 2021). Innovative, digital tools for citizen's active use and engagement include opportunity to share health data at personal discretion, across borders when needed, to support treatment and care, efficient self-management, and EU-mobility grounded in better data to advance research, disease prevention and personalised health care.

Personal Health Data Spaces Adding User Value in Transforming Health and Care Transformations

When citizens are trying to navigate and comprehend their health information, we have observed a plethora of *ad-hoc,* time consuming strategies with limited scalability, little reliable guidance or proper quality control, aggravating the consequences of disconnected, non-centric services. Going beyond opportunity to read personal health data comes with opportunities for active use of collected personal health data, curate and control as well as analysing or visualising personal health data can improve the value of health data to support scenarios for data support in everyday life challenges. This is in essence a future personal health data space, Figure 1 represents a 4 layered pyramid of personal user needs as a simplified people centric model of looking into the health data space and individuals' needs.

The pyramid can guide discussion on key features and need for integration of functionality in the personal health data space, and zoom in on necessary steps to nurture personal engagement with personal health information. Personal experience,

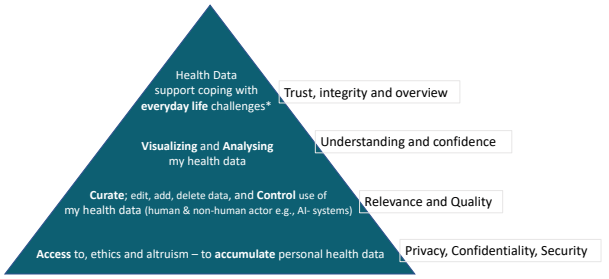

Figure 1: Personal Health Data Space

access to understandable and actionable information, and capacity in terms of digital health literacy are important to fully appreciate the rapid digitalisation in healthcare and take advantage of new digital health information services. Citizens' meaningful engagement with digitally provided information is the way to build up necessary trust and ethical conduct in digital health ecosystems, without which ambitious targets such as a thriving European Health Data Space, health data altruism and advanced secondary use of health data cannot easily be realised. A personal health data space can be seen as a right. We anticipate that citizens needs and motivators to use their health data varies with experiences, and with capacities to leverage functionalities for curation to contribute quality of data for real world visualisations and analytics.

Citizens, Access and Use of Personal Health Data and Prospects of Digital Tools

Engagement in personal health can only be achieved with actionable, understandable, relevant, reliable and evidence-based information that meets the user's (patient or citizen) specific needs, health context, and literacy level. As digital health information becomes more available interoperability of these information resources is very important to offer tools to engage and empower citizens. In addition, there has been increasing recognition of the importance of relevant health information trusted sources, e.g., medicinal product information, health promotion material for wellness or disease specific information in times of crisis. The ongoing transformation comes with opportunities to engage with personally relevant health information, for an increasingly personalised experience. We conceptualise this as *personal health data space*. Here are opportunities for efficient interactions, based on smart, convenient and trusted data-driven contributions solutions. This will allow for participation, engagement and increase awareness and vigilance where our everyday, personal health decisions are rooted in engagement with and capacity to comprehend, understand and engage.

Opportunities – An Example From Gravitate-Health

Over the last years, several important trends and strategic developments in the European Digital Health Landscape can be seen as enablers for developments that leverage from the opportunities that comes in the ongoing development of digital services that transform health and care systems. One example is the IMI funded Gravitate-Health Public-Private Partnership. This project is an example of opportunities to enrich and increasingly focus the health information from trusted sources to the user needs, preferences and context of use. The goal is to equip and empower citizens with digital information tools and make them confident, active, and responsive in their patient journey, specifically encouraging safe use of medicines for better health outcomes and quality of life.

Gravitate-Health is operating in an environment in which there is increasing focus on how to exchange and use health data for multiple purposes to demonstrate that smart delivery of digital health information can improve access, understanding and adherence, leading

to better outcomes and a healthier society. In that sense, additional HL7 FHIR® resources and standards come into play to advance quality and provenance of information, while integrating digital health services and so allowing for maximum value to be derived from the increasing availability of health data. Digital tools that support novel and new access to and understanding of personally relevant health information about medicine treatment with ePI content, based on personal health and medicinal product information are essential. In this context, digitising medicinal product information – in Patient Information Leaflets (PIL), SmPC and labelling – is also taking place. In Europe, Medicinal Product information compendiums are available online (often in collaboration with National Medicines Agencies) and the European Medicines Agency (EMA) launched the ePI set-up project in early 2021, with the publication of a FHIR-based common EU standard for ePI following in 2022. In the US, the Food and Drug Administration (FDA) is working on Structured Product Label (SPL), in Japan work on structured labelling is emerging, and in regions including Asia and Latin America there is growing interest and activity in the area. Starting from digital availability of the regulator-approved medicinal product information included in the package inserts and the label, the future ePI, combined with the specifics of a person's use of medicinal products opens novel opportunities to support the digital transformation of

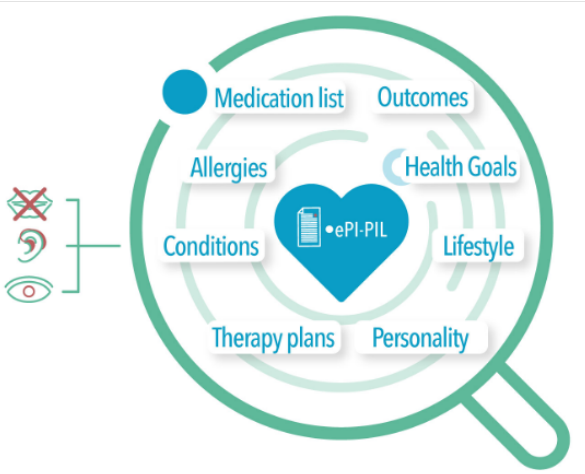

Figure 2: G-lens®

healthcare across the EU, which in turn is anticipated to offer significant public health benefits. From this stance, Gravitate-Health is the catalyst for bringing very important, complementing and different perspectives together to deliver a tool, which we call G-lens® to address the challenge at hand and drive benefit for patients, mobilising public and private stakeholders.

To create and harness the G-lens®, Gravitate-Health offers testbeds which takes the theory and puts it into agile practice, seen as new and deeper insights into how improved access, availability and understanding of health information can translate to higher levels of adherence to treatment, safer use of medication (pharmacovigilance), and when optimised act as effective risk minimisation measures driving better health outcomes and quality of life. The G-lens® (Figure 2) is effectively a tool that operates to focus ePI data according each patient's needs, and when combined with the IPS data, if the patient so wishes, creates the conditions to support the top two layers of needs of our proposed personal health data space model (Figure 1). Over time, we anticipate to illustrate significant contributions that underline the importance of interoperability in action to reap the wider benefits of focusing personally relevant health information from trusted sources.

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Conflict of Interest

None. ■

REFERENCES

Bonacina S, Koch S, Meneses I, Chronaki C (2021) Can the European EHR Exchange Format Support Shared Decision Making and Citizen-Driven Health Science? Studies in Health Technology and Informatics. 281:1056-1060.

Kay S, Cangioli G, Nusbaum M (2020) The International Patient Summary Standard and the Extensibility Requirement. Studies in Health Technology and Informatics. 4;273:54-62.

Moen A (2018) Citizens and Health Data – untapped resource for Telehealth. Studies in Health Technology and Informatics. 254: 63-69. IOS Press.

Moen A, Cramer A, Chronaki C (2022) Engage the people – health informatics and personal health management. In Delaney CW, Weaver CA, Sensmeier J, Pruinelli L, Weber P (eds) Realizing Digital Health – Bold Challenges and Opportunities for Nursing - Nursing and Informatics for the 21st Century – Embracing a Digital World. 3rd Edition. Taylor & Frances.

A Services Readiness Levels Stage Model: A Roadmap

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Help with digitisation of healthcare needs a focus on service innovation – using a roadmap can help make implementation more successful.

Key Points

- Service innovation is a key element for the future of Europe's health and care.
- Cities, regions, and sites working on health and care can benefit from using a service innovation roadmap.
- Successful implementation of new services needs these practical kinds of tools.
- Much wider use could be made of such a roadmap in many more fields.

Introduction

Service innovation in healthcare has become an increasingly widespread area of investigation. The European Health Telematics Association (EHTEL) focused part of its innovation-related work on developing an 8-stage service readiness levels model. As a result of its investigation, the EHTEL Innovation Initiative (the EHTEL initiative or initiative) produced an early service innovation roadmap.

Europe Focuses on Service Innovation

Service innovation has become an area of major concern in Europe.

Horizon 2020 was a European Union programme of activities that aimed at improving innovation in Europe in a large number of disciplinary areas. Among the societal challenges faced in the programme were health, demographic change, and wellbeing. One area of importance was the technological support to be given in the service-related fields of health, care, and active and healthy ageing.

In the context of Horizon 2020, the EHTEL initiative concentrated on fields like the tackling of social and societal challenges, and a combination of health care and social care (integrated care) (Kodner and Spreeuwenberg 2002), innovative technologies in the provision of care (Guldemond and Hercheui 2012), and general services including service innovation (Witell et al. 2016). These orientations led EHTEL's initiative to focus on the notion of service readiness and service innovation in integrated care.

Today, EHTEL continues to update this work under ongoing European endeavours related to Horizon Europe and Digital Europe. Working with European regions and countries, it explores what could be done throughout European countries under the Resilience and Recovery Facility. Chief among progress to be made towards resilience and recovery will be services reform and innovation. As Europe heads towards new sets of major

milestones in 2030, one could imagine the potential growth of use of service readiness innovation as a domain for practical application in the integrated care fields of health and care.

Background to Technological Readiness Innovation

Technology readiness is a notion that has increasingly pervaded technological research over a 40-year time-period. Originating from work undertaken in the USA and taken up by international organisations including the space industry and standardisation bodies, it was transformed into the International Organization for Standardization (ISO) standard 16290. A similar, yet simplified, list of technology readiness levels was adopted by the European Commission (European Commission 2014). As part of its own work on service innovation, EHTEL's initiative decided to critique the model of technological readiness and see to what extent it needed to be complemented by a service readiness levels model.

TRL9 • Actual system proven in operational environment	**SRL8** • The service has been rolled out to its target population
TRL8 • System complete and qualified	**SRL7** • The organisation supporting the service has been adapted as appropriate
TRL7 • System prototype demonstration in operational environment	**SRL6** • Wide-scale adoption: The service (with its technology solution) is adopted by its users and non-users
TRL6 • Technology demonstrated in relevant environment	**SRL5** • Evidence of the benefits of the service has been assessed with a statistically significant number of users and non-users
TRL5 • Technology validated in relevant environment	**SRL4** • Service prototype developed, tested and validated in lab
TRL4 • Technology validated in lab	**SRL3** • Technology identified as an enabler for the desired change
TRL3 • Experimental proof of concept	**SRL2** • User readiness to change a process or create a new one
TRL2 • Technology concept formulated	**SRL1** • Capturing drivers and scoping for change
TRL1 • Basic principles observed	

Table 1: Roadmapping for Service Innovation. Source: EHTEL

A Service Innovation Model

The model developed by the EHTEL initiative brings together in a single instrument innovation management and service readiness (Table 1). It was originally called a Service Readiness Levels Stage Model, and produced in the 2015-2017 timeline.

This service readiness levels model is a stage-based model. It was designed to provide a complementary mechanism to the notion of technology readiness levels (TRLs). The main purpose of the model, and its associated template for gathering information, was to focus on the processes involved in scaling-up service innovation. The fields to which it has been applied are in both healthcare and social care, i.e., integrated care. The model was refined by undergoing several iterations.

Ultimately, the model forms a roadmap. It has now been called Roadmapping for Service Innovation. This roadmap covers a set of stages. The stages range from the origins of an innovation proposal through its entire process of scaling-up. Eventually, actual integration of a service innovation is achieved in a healthcare system or service(s).

Three Sites Apply the Use of the Service Innovation Model

A range of sites and examples offered to test both the usability and workability of the service innovation model. These three sites used the model and the template to describe their own good practice(s) as an innovation incubator.

Each service innovation took place in a different region of Europe (both inside and outside the European Union). The three sites reported on their service readiness. They were located in Galicia, Scotland, and Humberside in England.

Each site dealt with a different form of innovation. Each concentrated on particular aspects of its health and care work. The innovations covered work in the secondary care sector (hospitals), the primary care sector (general practices), and a wider domain of activity that encompassed health care, social care, and voluntary care. They included a hospital; a primary

care institution with a focus on both cardiac and lung disease; and an organisation offering community social and health care support.

Overview of a Service Readiness Levels Stage Model

The EHTEL initiative's study of innovation showed that a Service Readiness Levels Stage Model, and the template accompanying it, is easy to use. Use can be made of it by sites that are preparing, or are involved in, the process of scaling-up service innovation.

Other Types of Service Innovation Models

EHTEL's initiative members designed the 8 levels of the model to be displayed in a way that permits the model to be compared to the international, and especially the European, technical readiness levels model (European Commission, 2014). It can also be examined in a similar way to the approach used in the Electronic Medical Record Adoption Model (EMRAM). EMRAM was developed by the Healthcare Information and Management Systems Society (HIMSS) in the USA.

These two instruments are both stage-based models. The greatest similarity is with their look-and-feel. Ultimately, the instruments might form part of a group of tools which could be grouped together as a toolkit. This toolkit of tools could be used to support the scaling-up of service innovation in a wide range of fields.

Other Types of Supportive Service Innovation Activities

The scaling-up of service innovation and service development could also be undertaken through at least three types of activities. These activities would include twinning, coaching, and self-assessment.

In the first two of these activities, the service innovation model/tool could function as a type of teaching aid or learning aid. Each of these types of activities to support scaling-up is becoming increasingly popular. These types of activities have been supported by a variety of European Commission co-financed activities, through studies such as ScaleAHA and projects like Scirocco and Scirocco Exchange.

The third activity – self-assessment – deserves more attention. When used as self-assessment, the service innovation form (or template) could be displayed online by using a more interactive, attractive visual format. It could then be filled in electronically through a user-based platform.

Future Developments of the Model and Application of the Roadmap

EHTEL members and people involved in the EHTEL initiative concluded that further elaboration of the Service Readiness Levels Model could enable the creation of several instruments: a roadmap; a tool; and a compendium/resource directory.

- **A Roadmap:** When used as a roadmap, the mechanism could help a site move towards making more advanced and applied innovative actions. It could enable the people on the site to understand how to make progress, stage-by-stage, on a service innovation journey.
- **A tool:** Used as a simple tool, the mechanism could help people to evaluate service innovation initiatives in both health and care. For example, it could constitute just a single component embedded in a user-friendly online course. The overall course could include a teaching set – modules of easily accessible documents – that would be used to introduce and teach the basic foundations of service innovation scaling-up.

As Europe heads towards new sets of major milestones, one could imagine the potential growth of use of service readiness innovation as a domain for practical application in health and care

- **A compendium or resource directory:** Such a compendium or directory could constitute the collection of a set of descriptions of service innovation good practices and experiences. When gathered together, these examples could provide accessible, easy-to-use case studies to be used as examples by other sites. The collection could be used as a reference point for ongoing innovation management and service innovation in health and care.

In this brief article the focus of further work is on the use of the model as a tool. It is evident, however, that investigation could also be undertaken on its use in a

much wider set of areas of innovation management and service development in health and care (Joiner and Lusch 2016; Mori et al. 2015; Wise et al. 2011). Other fields, such as food/agriculture, are also ripe for the application of readiness models (Jostein et al. 2021). Within the last year too, suggestions have been made for how to better evaluate and assess public health service innovation (Hughes et al. 2021).

Today, there is rapid growth in fields like hospitalisation@home, the greater need for the use of digital technologies, and for hybrid (physical and virtual) forms of care. All three might offer appropriate fields for further exploration and implementation of the model/tool and, specifically, the roadmap.

Conclusion

This 8-stage model shows that there is an opportunity to focus on concrete approaches to exploring and applying service readiness in real-life applications. With EHTEL's guidance, three example sites/regions in Europe were able to use the model/template to explore the service readiness and innovation of their digital health developments.

EHTEL remains keen to validate further the use of the model, the template, and especially the roadmap. The association would aim to do so by involving a wider range of organisations and stakeholders. Examples could include innovation incubators, users of services or health and care systems, and representatives or members of regional associations motivated by improved service innovation. Any ensuing gaps in knowledge will be highlighted by further active application and transferred practical learning.

There is considerable potential complementarity between this specific tool and the several others identified. The roadmap especially can be seen as one tool among several that could form a basic toolkit to be used by sites wishing, in the future, to make innovative shifts in their service provision.

As a member organisation, with some 50+ institutional members, EHTEL serves primarily its own members. EHTEL is eager to work with other sites/regions that might wish to apply its service readiness-oriented roadmap. It is especially keen that its application would help in building Europe's resilience and recovery before 2030 in the field of digitisation of healthcare.

There is rapid growth in fields like hospitalisation@home, a greater need for the use of digital technologies, and for hybrid (physical and virtual) forms of care

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Conflict of interest

None. ■

REFERENCES

European Commission (2014) Commission Implementing Decision of 22.7.2014 amending Implementing Decision C(2013)8631 adopting the 2014-2015 work programme in the framework of the Specific Programme Implementing Horizon 2020 – The Framework Programme for Research and Innovation (2014- 2020).

Guldemond N, Hercheui MD (2012) The Role of Technology in the Provision of Care for Patients with Chronic Conditions: the Chronic Care Model as a Framework for the Integration of ICT. In MD. Hercheui, D. Whitehouse, WJ. McIver Jnr. & J. Phahlamohlaka (editors).ICT Critical Infrastructures and Society. International Federation for Information Processing. Springer- Verlag: Heidelberg and Berlin, pp124-134.

Hughes J, Lennon M, Rogerson RJ, Crooks G (2021) Scaling Digital Health Innovation: Developing a New Service Readiness Level Framework of Evidence. Int. J. Environ. Res. Public Health. 18:12575.

Joiner KA, Lusch, RF (2016) Evolving to a new service-dominant logic for health care. Innovation and Entrepreneurship in Health. 3:25-33.

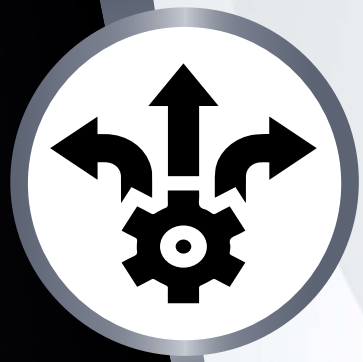
Jostein V, Melås MV, Stræte EP, Soraa RA (2021) Balanced readiness level assessment (BRLa): A tool for exploring new and emerging technologies. Technological Forecasting and Social Change. 129:120854.

Kodner DL, Spreeuwenberg C (2002) Integrated care: meaning, logic, applications, and implications – a discussion paper. International Journal of Integrated Care. 2(4).

Mori AR, Contenti M, Albano V (2015) Completeness Layers towards Integrated Care enabled by Technology (CLICT). Global Telemedicine and eHealth Updates: Knowledge Resources. 8:13-16.

Wise CG, Alexander JA, Green LA et al. (2011) Journey toward a Patient-Centered Medical Home: Readiness for Change in Primary Care Practices. The Milbank Quarterly. 89(3):399–424.

Witell L, Snyder H, Gustafsson A et al. (2016) Defining service innovation: A review and synthesis. Journal of Business Research. 69(8):2863-2872.



Decision Support

Unlocking Digital Tools to Expand Access to Healthcare

An overview of the emergence of digital front doors, their potential and key points to bear in mind during the technological transition.

Key Points

- For decades, basic healthcare interaction has been a human one. However, the limitations of this system are now becoming more and more apparent.
- Patients today are demanding fast, convenient, easy and affordable service.
- Primary care physicians are no longer the first option for finding and navigating care.
- Patients are seeking alternative front doors to obtain care. These digital doors can take many forms, including a website, an online portal, a mobile app or a technological interface.
- Digital front doors can serve as an alternative to a conventional doorway leading to a brick-and-mortar facility.

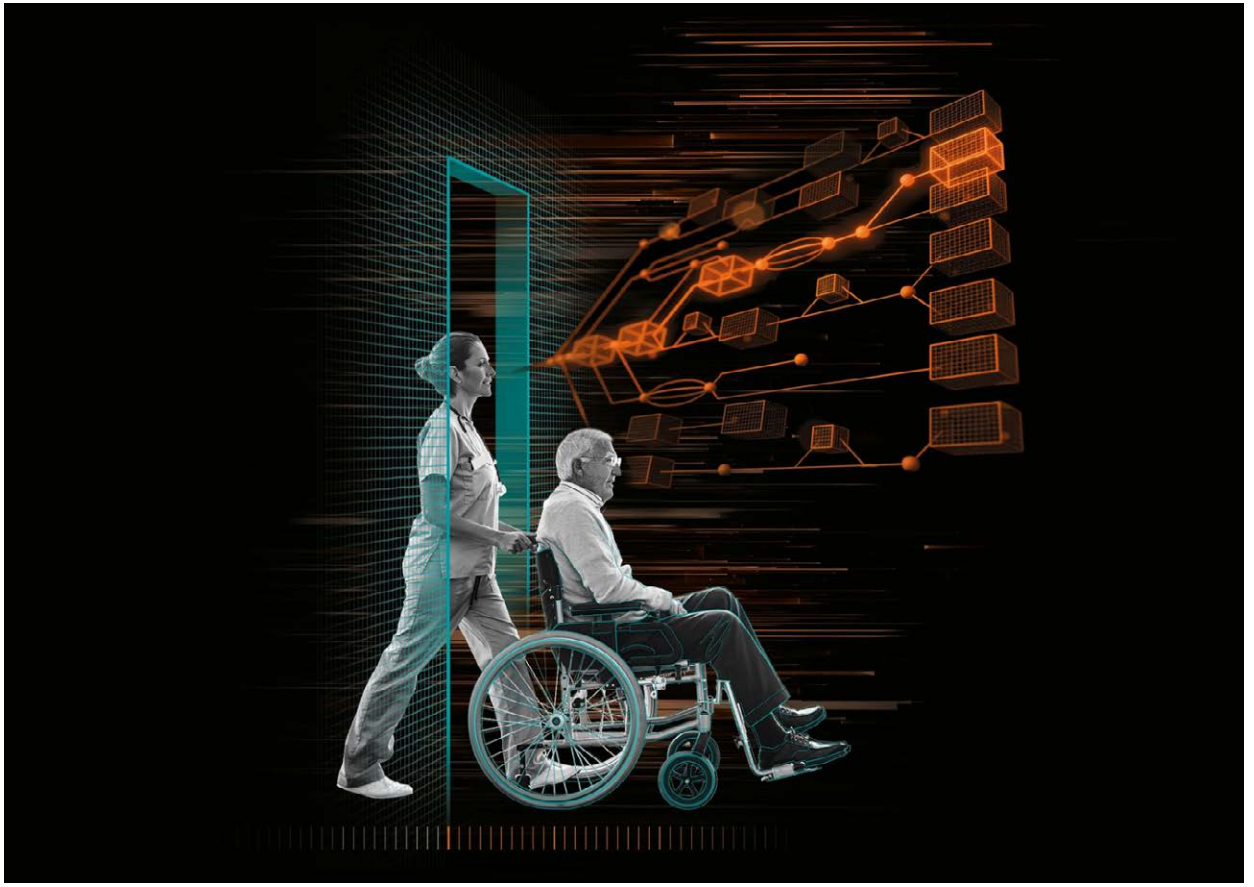
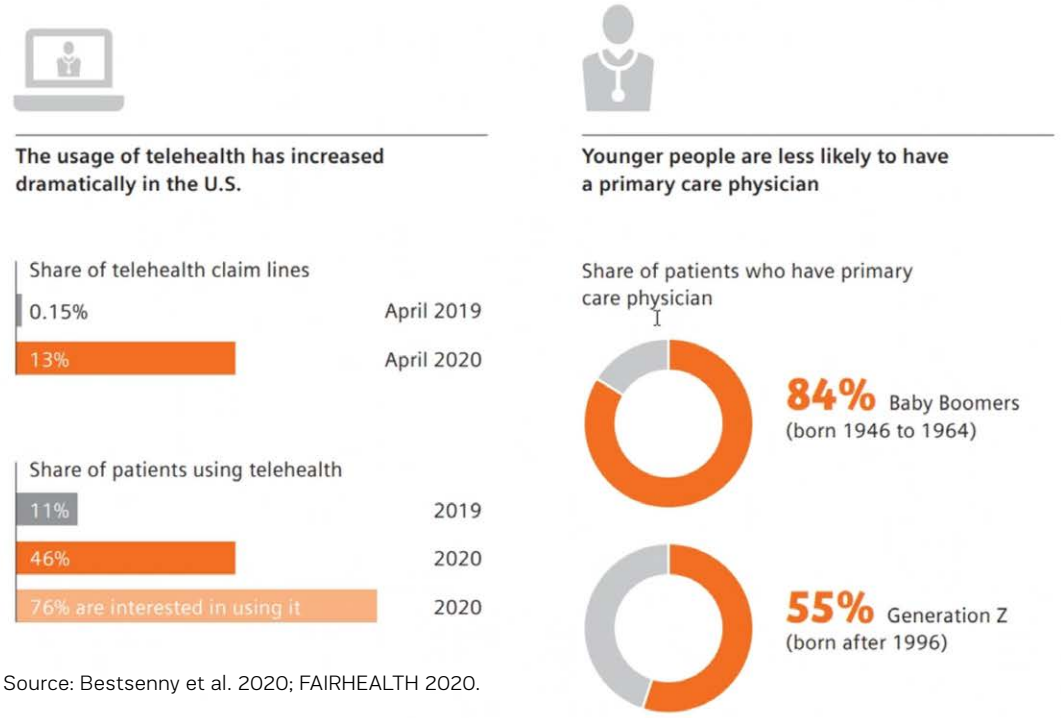


Image Credit: Siemens Healthineers

Introduction

Traditionally, patient access to healthcare has been a one-on-one interaction where patients visit their healthcare providers. The adoption of digitalisation in healthcare has been quite slow. However, the COVID-19 pandemic has changed this and has accelerated the pace of digitalisation throughout the healthcare system.



Source: Bestsenny et al. 2020; FAIRHEALTH 2020.

Source: Accenture 2019.

Due to this rapid acceleration, the point of access to care has now shifted. In 2019, only 11% of patients in the U.S. used telehealth solutions. Today, that number has increased to nearly 50%. 76% of patients are now interested in using virtual health solutions such as telehealth (Bestsenny et al. 2020). According to an Accenture survey, nearly 60% of patients who used virtual tools during the pandemic said they wanted to use the technology more for communicating with healthcare providers. 90% of patients who tried new devices or apps to manage their medical conditions liked them (Accenture Patient Survey 2020).

Possibilities for Digital Front Doors

Digital front doors allow healthcare providers to engage with patients throughout their healthcare journey. A strong digital front door strategy is not limited to a single solution but should leverage different virtual health solutions to create a digital ecosystem for patients. This can help transform care delivery, improve access to care, optimise clinical operations, better manage population health and increase workforce productivity.

Specifically, digital front doors can enhance four different areas of provider-patient interaction (Meinhardt and Staehr 2021). . These include:

Directing patients: Patients often need to be directed to the proper provider or source of care. Digital front doors can function as navigation signposts, triaging and directing patients to the appropriate level or type of care.

Engaging with patients virtually: A successful digital front door strategy would allow care teams to engage with patients virtually. This would mean patients could reach out to care teams any time, from anywhere, and healthcare providers would be able to respond with the click of a keyboard.

Monitoring patients remotely: Telehealth and tele-visits would allow patients to easily make appointments and reduce waiting times while delivering quality care to patients. Over 60% of patients and 59% of clinicians report no differences in the overall quality between virtual and office visits (Donelan et al. 2019).

Managing population health: Digital front doors also offer the opportunity for health systems to better manage overall population health, identify and respond to trends and establish new care delivery models. Healthcare providers would be able to analyse and operationalise digital data to identify vulnerable cohorts and pave the way for proactive and targeted engagement.

How to Unlock the Digital Front Door?

Successful utilisation and adaptation of digital front doors can be achieved by focusing on five key areas (Meinhardt and Staehr 2021):

Enabling patients

In order to make the transition to digital care successful, patient buy-in is essential. Real-time monitoring and easier access to physicians can have a positive impact on unplanned readmissions, patient quality of life and mortality. However, older patients, many of whom suffer from chronic diseases, are not always comfortable with new technology. They may require education and stronger engagement compared to younger patients. In any case, enabling patients to adopt digital care aveues would require offering them different options and different providers. More virtual care portals are likely to emerge to help patients navigate the marketplace. Digital marketing efforts would also have to increase, such as brand management, search-engine optimised marketing, social media engagement, and platforms for patient reviews to convince patients to choose digital front doors.

Empowering the workforce

In order to unlock digital front doors, existing workforces would have to be trained to work with new technology. They will have to be more aware of how new digital options can make their workplace more flexible. This will require incentives and motivation and the hiring of digital experts to make the transition smooth.

Upgrading infrastructure

Digital front doors will need to be integrated into existing infrastructure. This will require investment in new hardware and software as well as improvement in wireless capabilities for better connectivity. A shift to cloud-based storage may also be needed. These technology upgrades could prove to be a barrier, but this can be managed through flexible funding alternatives or partnership models.

Optimising workflows

In order to utilise the true potential of digital front doors, there will be a need to reorient parts of a provider's work and revenue streams. Workflows will change, and infrastructure, data, workforce and patients will have to be incorporated within this process.

Protecting data

Medical data is particularly sensitive. Healthcare systems must ensure patients are confident that their digital data is being treated securely. Internal data security governance capabilities will be essential, and a thorough understanding of data management will be required to anticipate any security vulnerabilities.

Conclusion

Digital access points to healthcare are not new and were not created as a response to COVID-19. However, the pandemic has provided a strong incentive for patients and providers to look at alternative models of care that have been underutilised. While face-to-face contact has its advantages in healthcare, digital alternatives can help fill this need if such contact becomes unavailable or too risky.

During the pandemic, patients have seen that alternative access platforms are safer, convenient and effective. The increased use of digital front doors has also reduced pressure on hospital emergency departments and has allowed a more efficient allocation of healthcare resources. The most important benefit has been improved patient outcomes, which is the ultimate goal of health services.

Healthcare systems worldwide have now seen how care can be proactive and how healthcare data can be better utilised to improve decision-making, better identify those at risk of certain illnesses or conditions, and develop a greater understanding of different therapies and treatments.

Digital front doors can provide a safe, convenient and effective access platform to healthcare services. Adoption was already underway before the pandemic, but it has gained further momentum and is likely to accelerate further in the years to come.

For more insight on this topic, please read Herbert Staehr's exclusive interview here.

REFERENCES

Accenture. Accenture Patient Survey (2020) "How COVID-19 will permanently alter patient behavior.

Bestsennyy O, Gilbert G, Harris A, Rost J (2020) Telehealth: A quarter-trillion-dollar post-COVID-19 reality? McKinsey & Company.

Donelan K, Barreto EA, Sossong S et al. (2019) Patient and clinician experiences with telehealth for patient follow-up care. American Journal of Managed Care. 25(1):40–4.

FAIRHealth. Monthly Telehealth Regional Tracker. (2020) Available from: fairhealth.org/states-by-the-numbers/ telehealth

Meinhardt R, Staehr H (2021) Unlocking the digital front door – How healthcare can be made more accessible. Siemens Healthineers Insights Series | The New Normal, (19). Available from https://www.siemens-healthineers.com/insights/insights-series?stc=wwhc221258

Clinical Care Management

vCare: Designing Individualised Virtual Rehabilitation and New Clinical Pathways for Parkinson's Patients

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An overview of the vCare design of a clinical pathway, by using the specific example of Parkinson's disease.

Key Points

- There is a major systematic gap in what is on offer in terms of rehabilitation to patients with Parkinson's disease.
- vCare combines an individualised clinical pathway, that has been activated by a clinician, with a holistic approach; a smart home installation that uses sensors; and a virtual coach.
- vCare's immediate step is to exploit more proactively the benefits it has for the rehabilitation of people with Parkinson's, such as improving their general quality of life, cognitive and motor improvement, and better patient adherence to rehabilitation, among others.

How to offer ongoing and sustained rehabilitation to patients' who require it? Today, there is a major systematic gap in terms of what is on offer in terms of rehabilitation. vCare focuses on handling the gap in the current discontinuity of care in available forms of institutional care. The vCare system aims to help. It concentrates on patients who experience several mental and physical conditions: one of them is Parkinson's disease. This article examines what the vCare system has to offer people with Parkinson's.

- The vCare system has much to offer patients with Parkinson's when they undergo rehabilitation.
- Between 50-80% of people with Parkinson's experience motor difficulties 5-10 years into their experience of the condition. Over half of people with Parkinson's eventually experience some level of dementia.
- vCare combines an individualised clinical pathway,

that has been activated by a clinician, with a holistic approach; a smart home installation that uses sensors; and a virtual coach. The holistic approach covers a patient's medical, social, cognitive, and other needs. The coach/avatar is supported by the use of both fixed rules and machine learning.

- Using experiences in the Basque Country in Spain, vCare has already shown there to be great benefits for people with Parkinson's.
- vCare's immediate step is to exploit more proactively the benefits it has for the rehabilitation of people with Parkinson's, such as improving their general quality of life, cognitive and motor improvement, and better patient adherence to rehabilitation, among others. Its next step is to demonstrate the benefits of the solution through a large-scale clinical trial.

Secondary prevention is an essential element of long-term rehabilitation. To improve this situation, strategies oriented towards risk reduction, treatment adherence, and the optimisation of quality of life need to be developed. Frail and sometimes isolated patients often fail to adhere to the proposed post-discharge clinical path due to a lack of appropriate clinical, emotional and informational support. A recent literature review has demonstrated that virtual coaching systems are still rarely used to support secondary prevention in this context. The proposed vCare service contributes both to the shift from hospital-based to home-based rehabilitation and aims to fill an existing gap well identified by the medical community. This article focuses on the vCare design of a clinical pathway, by using the specific example of Parkinson's disease.

Introduction to Patients with Parkinson's Disease

Parkinson's disease (Parkinson's) affects 1.8% of people aged over 65 years and up to 5% of those above 85 years old in Europe. Parkinson's is a slow, progressive disease, involving both motor and non-motor symptoms (Gómez-Esteban et al. 2007). The motor symptoms include slow movement, tremor/rigidity, and gait impairment. The non-motor symptoms cover cognitive impairment, neuropsychiatric symptoms, autonomic dysfunction, sleep disorders, constipation and urinary disturbances (Del Pino et al. 2021; Gómez-Esteban et al. 2011; Somme et al. 2015). Parkinson's is the second most prevalent neurodegenerative disease after Alzheimer's disease. Many of the symptoms are difficult for clinicians to monitor since they usually appear and get worse when a person is at home and/or during the night.

A group of clinicians based in the Basque Country in Spain (the Neurodegenerative diseases group at Biocruces Bizkaia Health Research Institute) has a particular interest in rehabilitation treatments that can be offered to patients with Parkinson's. The group has explored potential changes in rehabilitation that are taking place today. Given changing socio-economic conditions, these Basque neurologists have taken an in-depth look at improving rehabilitation in patients' own homes. The group has drawn especially on the work of the vCare initiative, a European co-financed project that aims at providing a smart solution to active secondary prevention.

Physical and Cognitive Rehabilitation of Parkinson's Patients is Often Overlooked

Between 50-80% of patients with Parkinson's present motor complications (such as fluctuations and involuntary motor movements) around 5-10 years after the onset of the disease. The risk of developing dementia is up to six times greater in Parkinson's patients than the prevalence rate in the general population. The risk of dementia increases in relation to Parkinson's disease duration, the patient's age and male gender. Indeed, more than 50% of Parkinson's patients have dementia. Among Parkinson's patients who do not have dementia, about 25-30% have a mild cognitive impairment (Aarsland et al. 2010; Emre 2003).

Due to today's high prevalence of Parkinson's and the current limitation of resources in the public health systems, the health-care provision offered is mostly based on patients' attending standard clinical visits to a neurologist (1 or 2 times per year). The neurologist attends to the patient's neurological status and controls his or her pharmacological regimen (covering both motor and neuropsychiatric symptoms). Yet, the neurologist does not treat other critical needs of the Parkinson's patient – such as physical and cognitive rehabilitation, risk factor monitoring, or social support – which can be resource-intensive and require continued supervision.

Currently, there are no universal recommendations/medical guidelines available on how to create programmes for home rehabilitation for patients with Parkinson's (most Parkinson's patients are outpatients and do not require a hospital stay: this differentiates them from patients with other pathologies). Instead, vCare can offer patients with Parkinson's overall maintenance of their conditions, thereby helping them to avoid risks and improve their functionality, autonomy, and quality of life. In addition, vCare can reach a large number of patients, which can help to reduce reliance on rehabilitation centres. (This is a great achievement that also affects the empowerment

of the patient and the long-term stimulation of rehabilitation programmes.) Thus, the ultimate scope of this component of the vCare project is to maintain and enhance the effects of long-term rehabilitation in patients with Parkinson's from a multidisciplinary perspective. A virtual coach, such as the one developed by the vCare system, offers patients a smart solution that can help to provide a personalised home rehabilitation plan. Designed according to the patients' own condition and habits, vCare can enhance patients' quality of life and empower patients in adopting a healthy lifestyle (Kyriazakos et al. 2020; Seregni et al. 2021).

A Design for a New Continuous Home-Based Clinical Pathway for Parkinson's: The vCare System Focused on Home Rehabilitation

The vCare system focuses on covering the gap in the discontinuities in institutional care available today. It aims to provide both a continuous home-based care pathway and an individualised form of virtual rehabilitation that combine Parkinson's risk factor monitoring and physical and cognitive rehabilitation. The pathway brings together current state-of-the-art knowledge into a single clinical pathway. It also enables a high degree of personalisation of care in order to match the specific expectations and requests of patients, caregivers, and relatives.

Figure 1: A patient performing a motor rehabilitation session

Rehabilitation is a process by which a patient follows a care plan, firstly in a protected environment (i.e., in a clinic or a rehabilitation centre) and, secondly, at home with supervision or with the help of a clinician. Current evidence shows that home-based programmes are effective, especially in terms of patients' capacity for exercise and health-related quality of life: they offer comparable benefits to hospital-based programmes (Parker et al. 2009; Tropea et al. 2019). Home-based rehabilitation is intended to re-build the patients' independence and to reduce their psychological stress so that they can, once again, take part in different daily activities or re-enter the economic sphere and return to being a productive member of society (Kyriazakos et al. 2020).

Home rehabilitation with vCare has many components. It follows a clinical status monitoring routine, and includes risk prevention and motor and cognitive rehabilitation. All are synchronised by an intelligent system that interacts with the individual patient through the use of an avatar, which programmes the form of rehabilitation needed by the patient based on a plan established by clinicians. The interaction between the patient and the avatar is carried out through a television and a tablet installed in the patient's home.

vCare rehabilitation sessions are based on a platform of video games presented on a television screen and activated by movement, which exercise motor and cognitive functions (Figure 1). The patient's condition is monitored through different wearable sensors (a smart watch that measures heart rate and motor activity, and an accelerometer placed on a belt that checks motor status), and by his/her performance in various rehabilitation routines. The system has a series of multimedia learning or e-learning materials for risk prevention and education (this introduces the patient to risky situations associated with Parkinson's, such as an increased risk of falls or problems with medication). The intelligent algorithms included in the vCare system adapt the rehabilitation routine established by the responsible clinicians and the e-learning routines to the patient's own situation: they continuously inform the patient and the responsible clinician of the clinical situation and the patient's response to rehabilitation.

Patient profiles in vCare

The vCare patient basic profile is based on three main criteria: Gait and balance impairment, motor fluctuations, and cognitive-behaviour-mood impairment. Once the criteria have been specified for each patient, the

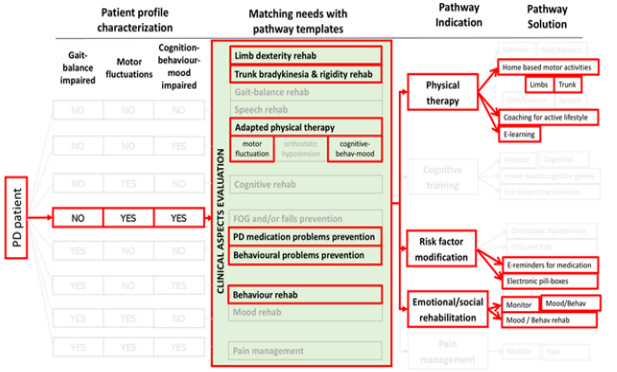

Figure 2: Parkinson's disease clinical pathway

system adapts to matching the needs and the related pathway indications. This leads to the activation of a number of appropriate solutions. Those solutions can then be further adapted by a clinician. An example of a Parkinson's patient profile is shown in Figure 2. The pathway combines a matching of the needs with the pathway templates, the pathway indications, and the specific pathway solution.

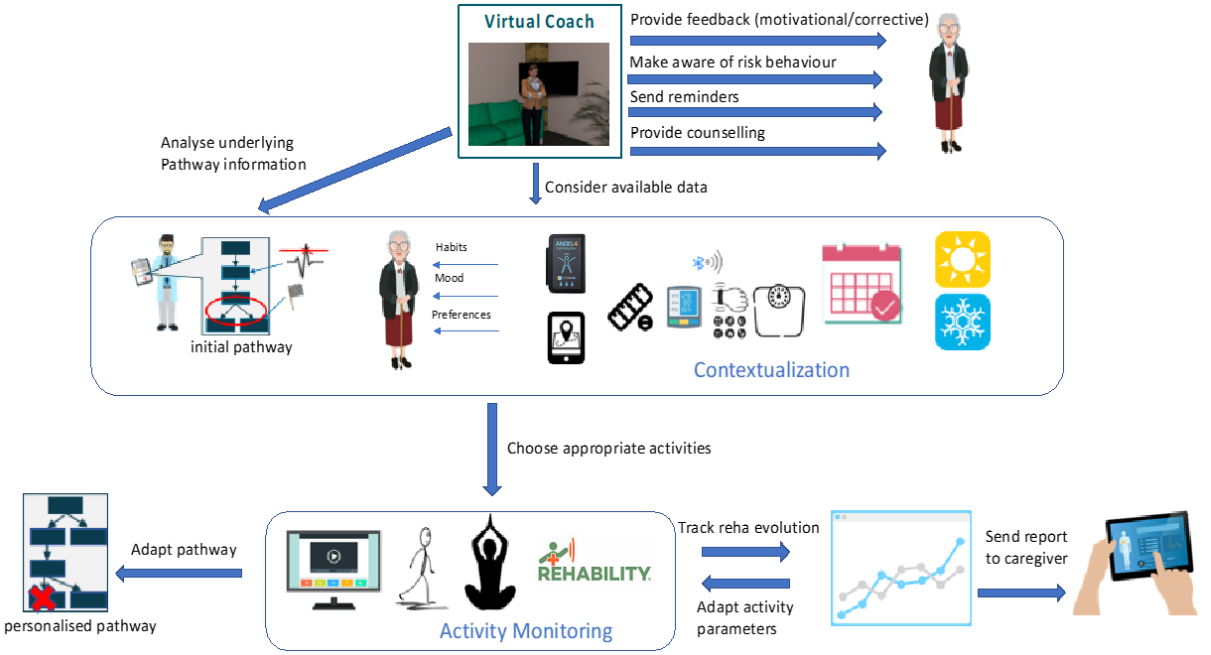

Figure 3: vCare workflow

vCare in Practice

Once a patient has been selected for home-based rehabilitation according to appropriate inclusion/exclusion criteria, the patient is advised on how to live his or her routine life every day, with the support of a virtual coach in the form of an avatar. Interacting with the patient through a tablet, the avatar supports the patient all day long, for example, through a series of rehabilitation sessions.

A great deal of data is involved in this whole process. Data is provided by the patients themselves, the care team, and via sensors (Figure 3). The sensors include environmental sensors to monitor movements inside the house and "motion capture" systems to evaluate the fulfilment of motor rehabilitation exercises. The data is processed continuously in order to provide appropriate advice and feedback to the patient. The clinical staff monitor the evolution of the situation on the part of the patient at any time 24/7 (i.e., during the day or night).

The virtual coach supplements the usual rehabilitation processes and adopts strategies that empower the patient and his/her caregiver. The personalised rehabilitation clinical pathway activated by the clinician interacts with the patient on the basis of evidence-based

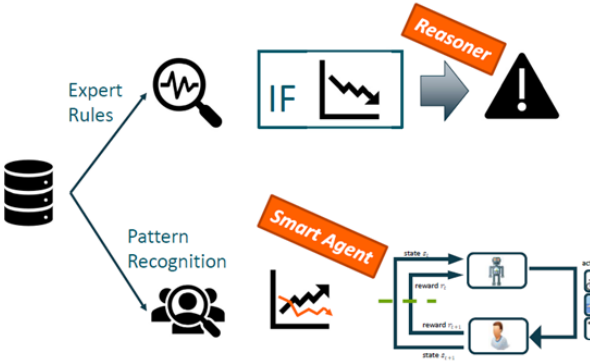

Figure 4: vCare expert rules and smart agent

tablet. These interactions include arranging the best time schedule for the rehabilitation sessions, offering precisions and feedback about the exercises, and advising the patient about good practices to enhance his or her well-being. While the avatar can promote activities which trigger social interaction and 'virtuous' behaviours, it can also alert the patient when his/her behaviour is inappropriate (e.g., whenever the behaviour is too risky or the person is insufficiently active).

vCare services can be used by patients with very different conditions, which include strokes, cardiovascular conditions like ischaemic heart disease and heart failure, and neurogenerative conditions like Parkinson's. For Parkinson's patients in particular, vCare focuses on helping them with rehabilitation that concentrates on some specific phenomena. These include motor fluctuations, slowness of movement, posture and gait

abnormalities, cognitive impairment (including memory, attention, executive function, and visuospatial abilities), fatigue, anxiety, and symptoms of depression.

Benefits to Patients and Caregivers

The benefits of vCare can be enormous. **For patients:** The patient is empowered to remain in control and is coached to avoid risks, such as falling, and to improve his or her own functionality, autonomy, and quality of life. **For caregivers:** vCare is a valuable tool that can support and educate caregivers and relatives on at least two fronts: the management of risk factors, and problem-solving in specific situations.

More specifically, the vCare virtual coaching platform aims to achieve a number of benefits/improvement for Parkinson's patients (Table 1).

These benefits have already become evident through the work done in the Basque Country and in the vCare project as a whole.

As a next step, the vCare project team wants to collect the necessary large-scale evidence in order to convince clinicians and insurers that the solution is both effective and efficient. It will do so through a randomised control trial.

Conclusion

The vCare system is an innovative form of virtual rehabilitation. The system offers a smart solution to the currently unresolved problem of active secondary prevention for a number of pathologies. The system relies on expert evidence-based rules but also adapts to the patient's needs and wishes through the use of machine learning. A clinical group based in the Basque Country of Spain has looked in depth at what vCare can offer to patients with Parkinson's, especially in terms of patients' treatment (including rehabilitation) in their

Reduction of hours in OFF situation.	The OFF situation occurs when the patient is very stiff or is unable to move before he/she is due to take another dose of medication. vCare helps with an improvement in functional ability related with OFF states. The improvement happens as a result of continuous monitoring of the patient's motor situation in indoor daily life activities, and providing coaching strategies (with motivational comments and feedback on the results) for guided physiotherapy at home and physical exercise outdoors.
Reduction of risk of falls.	Falls reduction occurs as a result of monitoring of especially severe OFF situations. Examples include the freezing of gait. Assistance is offered during potentially risky behaviours in indoor environments; information and feedback corrects movement behaviours at home, by involving the user so as to correct behaviours, predict dangerous situations, and promote virtuous behaviour in a proactive way.
Maintenance and improvement of cognitive function.	This takes place in terms of performance on memory, and executive-attentional and visuospatial tasks (through cognitive stimulation and generalisation techniques).
Improvement of mood.	The vCare avatar recommends different activities to the patient according to the data monitored (heart rate, the daily number of steps, questionnaire results, and rehabilitation scores).
Improvement of quality of life.	When symptoms related to fatigue, anxiety and depression are reduced, mood can improve. Monitoring daily life activities and rehabilitation of emotional status can help reduce negative symptoms and, hence, improve mood.
Therapy adherence improvement.	As the clinicians will be constantly in contact with the patient, the patient will adhere more closely to his or her therapy.
Personalised rehabilitation and active health promotion.	vCare will enable an individualised rehabilitation programme. Through regular monitoring of the patients' daily activities, vCare will be able to promote active health and well-being on the part of the patients.
Cost-effective solution.	vCare offers a cost-effective solution as compared to traditional care.

Table 1: Benefits experienced by Parkinson's patients when using the vCare system

own homes. Through machine learning, vCare adapts and personalises training programmes for home rehabilitation that can improve patients' motor and non-motor symptoms and support patients' daily life activities. As a next step, the vCare team wants to explore the collection of large-scale evidence on its benefits for Parkinson's patients through a large, randomised control trial. Exploitation of the vCare results is ultimately expected to occur for patients with Parkinson's.

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Conflict of Interest

None. ■

REFERENCES

Aarsland D, Bronnick K, Williams-Gray C et al. (2010) Mild cognitive impairment in Parkinson disease: A multicenter pooled analysis. Neurology. 75(12):1062-1069.

Del Pino R, Murueta-Goyena A, Ayala U et al. (2021) Clinical long-term nocturnal sleeping disturbances and excessive daytime sleepiness in Parkinson's disease. PLoS ONE. 16.

Emre M (2003) Dementia associated with Parkinson's disease. Lancet Neurology.

Gómez-Esteban JC, Zarranz JJ, Lezcano E et al. (2007) Influence of motor symptoms upon the quality of life of patients with Parkinson's disease. European Neurology.

Gómez-Esteban JC, Tijero B, Somme J et al. (2011). Impact of psychiatric symptoms and sleep disorders on the quality of life of patients with Parkinson's disease. Journal of Neurology. 258(3).

Kyriazakos S, Schlieter H, Gand K et al. (2020) A Novel Virtual Coaching System Based on Personalized Clinical Pathways for Rehabilitation of Older Adults—Requirements and Implementation Plan of the vCare Project. Frontiers in Digital Health. 2.

Parker SG, Oliver P, Pennington M et al. (2009) Rehabilitation of older patients: Day hospital compared with rehabilitation at home. A randomised controlled trial. Health Technology Assessment.

Seregni A, Tricomi E, Tropea P et al. (2021) Virtual Coaching for Rehabilitation: The Participatory Design Experience of the vCare Project. Frontiers in Public Health. 9.

Somme JH, Molano Salazar A, Gonzalez A et al. (2015) Cognitive and behavioral symptoms in Parkinson's disease patients with the G2019S and R1441G mutations of the LRRK2 gene. Parkinsonism and Related Disorders.

Tropea P, Schlieter H, Sterpi I et al. (2019) Rehabilitation, the great absentee of virtual coaching in medical care: Scoping review. Journal of Medical Internet Research.

Useful websites

https://vcare-project.eu

https://www.ehtel.eu/activities/eu-funded-projects/vcare.html

Carer Matters: Hospital to Home Care for the Caregiver

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Carer Matters offers a caregiver-centric approach to meet the unique and dynamic needs of caregivers of older persons during their adjustment from hospital to home, promoting both their well-being and ability to thrive at home.

Key Points

- Family caregivers bear the brunt of responsibilities to deliver long-term care for their loved ones, a key factor that facilitates ageing-in-place in the community.
- However, specific support for caregivers' personal needs remains inadequate due to a patient-oriented ecosystem of health and social care.
- To meet Singapore's greying population and concomitant healthcare and social needs, its transformation of population health should embrace approaches that deliver greater support for caregivers, ensuring families can provide sustainable care for their loved ones.
- Carer Matters is a caregiver-centric hospital-to-home programme that holistically screens, identifies, and provides targeted interventions to meet the needs of caregivers of older persons.
- Early feedback and findings of the programme have been positive, demonstrating the value of integrating a caregiver focus into the healthcare systems delivering dyadic support for both the care-recipient and their caregiver.

Singapore's population is rapidly ageing, and this demographic shift has profound implications for the nation's health and social care needs. It is anticipated that in 2030, one in four Singaporeans will be aged 65 or older, with over 900,000 seniors, a rapid increase from its 2015 estimates of 440,000 (Chan 2021). With the increasing prevalence of chronic diseases and limitations on their ability to perform activities of daily living independently, many of these seniors will rely on their family members to provide care to enable ageing-in-place in the community.

Family caregivers form the backbone of the healthcare system, often shouldering the bulk of long-term care. However, caregivers often assume the demanding role with little formal training or preparation while

simultaneously straddling other responsibilities in their personal lives. There is an increasing amount of time spent on caregiving that risks a knock-on effect on the economy, with more time spent on caregiving than on waged labour. Recent estimates suggest that the average time spent caregiving per week is expected to increase drastically by 41%, from 29 to 41 hours by 2030 (Chan 2021). This will disproportionately impact families caring for loved ones with multiple functional limitations, necessitating intensive around-the-clock care.

Furthermore, caregivers' needs extend beyond understanding their loved one's health condition and the skills to deliver direct care. Their needs are often highly complex and varied across multiple domains: physical, emotional, social, psychological, and financial (Chan et al. 2019b; Ong et al. 2022). Without any assistance or relief, these stressors can manifest as grief, distress, and anxiety, epitomised in the term "caregiver burden" which reflects caregiving's negative emotional, physical, practical, and social impacts. Unresolved caregiver burden is a recipe for future stress on the healthcare ecosystem. One in three caregivers of hospitalised older adults is at risk of depression, anxiety, and a poorer quality of life (Chan et al. 2018; Chan et al. 2019a). Unresolved stress can directly strain the hospital system, with caregiver distress contributing to emergency room admissions of older persons and their increased length of stay (Lau et al. 2021).

While effort has been made to smoothen care transitions through discharge planning, some caregivers still find the flow from hospital to home a frustrating experience. This points towards unaddressed gaps between current services and the assistance caregivers require to navigate the care transition effectively. For instance, caregivers often run into unanticipated problems during the transition home as they readjust their routines and take on new responsibilities to meet their loved ones' post-discharge needs. Realising that the skills taught by ward nurses during discharge may not always be transferable or applicable in the home context, caregivers can feel lost and distressed, unsure of who or where to turn to when these questions arise. This highlights an existing care gap for immediate post-discharge support for caregivers, especially if their loved ones do not possess complex care needs that require close follow-up by community health teams. Instead, such patients and their caregivers often 'fall through the cracks', assumed to be able to self-manage and cope until their outpatient follow-up.

With caregivers playing an indispensable role in supporting older persons, it is vital to ensure that their well-being is protected to allow the delivery of optimal, effective, and sustainable care. This reinforced the need for caregiver-specific interventions and targeted support beyond basic nursing skills. To help both the caregiver and the older person thrive at home, healthcare systems can provide additional holistic support to address caregivers' psychosocial stress and needs.

Figure 1: Carer Networks Framework and Structure

Smoothening the Transition from Hospital to Home

Hospitals provide an important touchpoint where caregivers experience higher stress levels due to the acute deterioration of a patient's condition and may need to acquire new skills to continue caring for patients, post-discharge. Recognising that hospitalisation serves as an opportune time to support caregivers, we established Carer Matters. This is a caregiver-centric hospital-to-home programme to holistically screen, identify and provide targeted interventions for caregivers of older persons hospitalised at TTSH. Carer Matters' suite of interventions are delivered by a team of caregiver support nurses, registered nurses specially trained in the management of older persons and addressing caregiving stress.

Since its establishment three years ago, Carer Matters has supported over 600 caregivers, helping them to navigate the care journey back home. Carer Matters' framework and structure can be described in four key components reflected in Figure 1. More details on the individual interventions provided for caregivers and the mechanisms are discussed in our earlier paper (Chan and Glass 2022). We have also included below some of the findings from a feasibility study we conducted on Carer Matters below. The study elicited feedback from caregivers and relevant stakeholders and revealed programme evaluation findings, using data collected over the programme's pilot from 2019 to 2022. Two case studies of caregivers supported through Carer Matters can be found in Table 3.

1. Identifying and Assessing Caregivers' Needs and Stressors

The identification of caregivers begins when they visit

their loved ones in TTSH inpatient wards. Caregivers are approached by the inpatient ward team, such as nurses and ward clerical staff, to communicate the objectives of Carer Matters and its services, directing them to complete an online needs assessment form upon affirming their interest.

Risk stratification methods are essential to identify caregivers at the highest risk of poor physical and mental health outcomes, enabling better triaging into appropriate services and tailoring care. To identify caregivers at risk of distress and burden, Carer Matters uses a locally validated brief screening tool to screen and stratify family caregivers at risk of negative health outcomes (Chan et al. 2019a). The tool is shown in Table 1. Caregivers at risk of stress are then flagged for priority telesupport, detailed below.

Domains	Questions
General information	I am: ☐ A new caregiver ☐ A caregiver for some time ☐ Caring for my care recipient with advanced medical conditions My care recipient has: ☐ Dementia ☐ Stroke ☐ Others: (please specify)
Caregiving burden	1. Do you feel that because of the time you spend with your care recipient you don't have enough time for yourself? 2. Do you feel stressed between caring for your care recipient and trying to meet other responsibilities for your family or work? 3. Do you feel strained when you are around your care recipient? 4. Do you feel uncertain about what to do about your care recipient?
Mastery	1. I have little control over the things that happen to me. 2. There is really no way I can solve some of the problems I have. 3. I can do just about anything I really set my mind to do. 4. Often I feel helpless in dealing with the problems of life. 5. Sometimes I feel like I am being pushed around in life. 6. What happens to me in the future mostly depends on me. 7. There is little I can do to change many of the important things in my life.
Community resources requested	I need information on the following community resources: ☐ Services to help with the care of my care recipient (transport and escort services, home medical care, home nursing care, home personal care, daycare) ☐ Financial assistance ☐ Counselling services ☐ Respite care services (temporary care services that you can use to take a break from caregiving) ☐ Support groups (platform to meet other caregivers and learn useful resources and caregiving tips)

Table 1: Caregiver screening tool (Adapted from Chan et al., 2019a)

2. Educating and Empowering Caregivers

The entry into caregiving can be abrupt and unexpected. Caregivers are increasingly called upon to deliver complex care, monitor and manage their loved ones' health symptoms, but often possess unmet needs as they lack the information, support, and confidence to perform these tasks adequately. Additionally, caregivers may not be aware of the range of support services for them and their loved ones, posing a barrier to accessing formal support services.

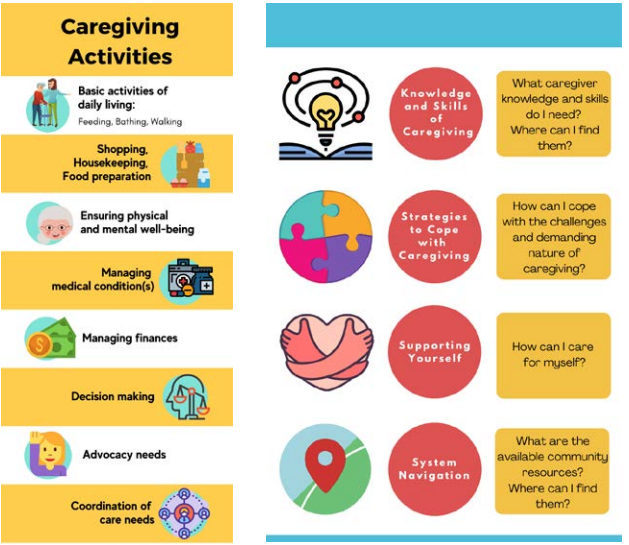

Figure 2: Caregivers Guide

Personalised resources sent to caregivers

To increase the accessibility to information and education resources, Carer Matters provides personalised resources to caregivers via email or text messages. Based on their identified needs, caregivers receive a caregivers' guide containing relevant resources such as information on their loved one's condition, community-based services, and financial aid. Some extracts from the guide are in Figure 2. All caregivers referred to Carer Matters have received resources personalised according to their needs, which were automatically despatched upon completing the needs assessment form. Individuals new to the caregiving role were especially appreciative of the list of collated emergency contacts and links to respite care, counselling, and support groups.

Caregiver training courses

The caregivers' guide also offers recommendations for in-house and community training courses to assist them with caregiving, strengthening their ability to care for themselves and their loved ones. One example is an adaptation of Mount Sinai Hospital's CARERS Programme, which equips caregivers with practical skills and knowledge of their loved one's health condition and management. Such courses enhance caregivers' competence and readiness to handle current and future care needs. A list of these courses is shown in Table 2.

Underpinned by adult learning pedagogies, Carer Matters delivers a range of in-house training courses that adopt a combination of experiential learning and social learning approaches. For instance, caregivers of persons with dementia can learn practical skills to improve communication and better manage difficult behavioural and psychological symptoms of dementia, such as agitation and aggression. During the course, caregivers are also encouraged to share their caregiving experiences, personal tips, or advice with other participants. The recognition of their shared experiences helped to build a sense of interconnectedness and

Figure 3: Telesupport

reduce feelings of loneliness and isolation inherent in caregiving.

3. Supporting the Well-being of Caregivers

It is essential to provide emotional and psychological support to caregivers, which can take the form of telesupport or routine text-based wellness check-ins to assess their current coping capabilities. We do so through our telesupport, as shown in Figure 3.

Through the needs assessment, caregivers identified to be at risk of stress will be prioritised for immediate telesupport and proactively contacted and engaged. The caregiver support nurse first obtains a better understanding of their caregiving context, needs, and available resources and subsequently adopts a collaborative approach with the caregiver to problem-solve and explore various care options.

The help rendered includes directing caregivers towards medical or social support services and advising them on the process of navigating community resources, arranging clinic appointments and coordinating with other clinical teams to facilitate access to care services. Caregivers were greatly appreciative of the telesupport and information provided, sharing that it gave them a sense of relief knowing that they were not alone on their caregiving journey and that the nurses were just a phone call away.

4. Strengthening Collaboration and Coordination among Stakeholders

Carer Matters aims to bridge service linkages between healthcare and community care services. Establishing tighter referral processes with other service providers allows caregiver support nurses to quickly connect caregivers to relevant services or programmes in the community. The caregiver support nurses then assess the caregivers' needs and caregiving context and hand the case to the community partners for long-term follow-up and monitoring.

Carer Matters have also worked closely with TTSH's Central Health's community partnership team to establish eight partnerships with community providers in our region.

Training Courses	Courses Description
CARERS (Coaching, Advocacy, Respite, Education, Relationship, Simulation) Programme (Chiu et al., 2013)	A therapeutic group intervention that features a unique hands-on simulation exercise in the presence of a simulated patient to practice the application of problem-solving techniques. The course is co-led by two facilitators and held weekly over eight weeks in small groups of four to six participants.
TEACH Programme	An interactive group course aims to build caregiving skills and provide emotional support for family caregivers. Sessions are tailored to central themes of caregiving (changing relationship, community resource navigation, future planning, self-care).
Understanding Dementia	This course helps caregivers understand dementia, the nature of Behavioural and Psychological Symptoms of Dementia (BPSD) and general approaches to challenging behaviours.
Problem-solving techniques	This course introduces a five-step problem-solving technique adapted from the CARERS programme. This is a group session tailored to help caregivers address practical problems faced (Chiu et al., 2013).
Self-care techniques	This course will help caregivers recognise the importance of self-care and learn practical self-care tips.
Caregiving Essentials	This group course will help caregivers understand more about caregiving and provide practical caregiving tips.
Public forums/Seminars	Seminars are designed to provide generic sought-after information for caregivers, such as financial support availability and home safety.

Table 2: List of caregiver training courses delivered by Carer Matters (Accessible at http://www.ttsh.com.sg/Patients-and-Visitors/for-caregivers/Pages/Programs.aspx)

Impact of Carer Matters

The preliminary successes of Carer Matters have been promising, extending its outreach to caregivers in need beyond the hospital setting. To date, 664 caregivers have been identified and referred to Carer Matters upon completing the needs assessment form. 275 caregivers were identified as at risk of caregiver stress and were contacted by the caregiver support nurses, 74 of whom required longer-term follow-up support by the nurses. Additionally, a total of 27 caregiver training courses have been conducted, benefitting 240 caregivers. 97% of surveyed caregivers reported that the training improved their knowledge of their care recipients' disease, and 99% said the programme addressed their needs. This shows the value of caregiver-centric training and equipping, strengthening their knowledge and skills for care. Carer Matters has linked several caregivers to

community partners' services and connected many caregivers in need with peer support groups.

Building Towards Family-Oriented Patient Care

The transition from hospital to home can be a stressful and challenging experience for both patients and caregivers. To create a society where seniors can age-in-place and lead empowering and enriching lives, the invisible contributions of caregivers should not be ignored. Implementing a hospital-to-home service for caregivers like Carer Matters provides an opportunity to transform the caregiving experience and improve patient outcomes, such as reduced readmissions and institutionalisation. Moving forward, Carer Matters can be a building block for establishing dyadic care from the hospital-to-home, designed to benefit both the patient and their caregiver.

Conflict of Interest

None. ■

Caregiver at low risk of stress and burden	Caregiver at high risk of stress and burden
Ms H is a caregiver looking after her father with early-stage dementia while juggling her full-time work commitments. While Ms H was initially not found to be at high risk of caregiving stress, she subsequently contacted Carer Matters. She was uncertain how to cope in the future, concerned with the possibility of her father developing wandering behaviour. The caregiver support nurses provided her with a comprehensive caregiver's guide developed by local community partners on supporting persons with dementia who wander. Ms H was also encouraged to download the Dementia Friends mobile application to access relevant dementia and caregiving resources. Ms H found the resources very helpful. Through the caregiver support nurse, Ms H found out about various in-house Carer Matters programmes. She attended most of them as she felt the need to equip herself with more caregiving knowledge and prepare herself for her father's future care needs. Gradually, she was empowered to be more resourceful and felt more confident in caring for her father. She found great value in the group sharing sessions, where she could connect with other caregivers to share her personal caregiving journey and caregiving tips. She also began to advocate for self-care through the programmes, encouraging other caregivers to care for their personal well-being. As an activated caregiver, she did not require any regular telesupport from the nurses but was appreciative that she could always reach out to the nurses if she had further queries or needed support. Ms H now actively encourages other family members to attend caregiver programmes, building a team of family members who are equipped and able to support her in caregiving.	Mr K is a full-time caregiver caring for his 93-year-old mother, who has limited mobility and experiences constant pain due to her fractured back and pelvis. Mr K is widowed and does not possess any source of income or social support from his extended family. During his mother's first hospital admission, he completed the needs assessment form and was found to be at high risk of caregiving stress. The caregiver support nurse quickly followed up with him through telesupport to understand his caregiving situation and specific needs. Mr K was then informed of the different financial aid grants and community services available, of which he was previously unaware. Realising that Mr K struggles with technology and encounters difficulty applying for grants, the caregiver support nurse applied for a home modification grant on Mr K's behalf. Grab bars were installed at his house, enabling his mother to move around the house safely. During a recent readmission, Mr K felt helpless and lost as he was unsure how to manage his mother's knee pain and sleep problems. He sought advice from the caregiver support nurse, who advised him to adhere closely to the pain medication regimen prescribed by the doctor, and provided a list of tips for better sleep (e.g., reducing naps during the day, limiting caffeine consumption during the evening). Additionally, the caregiver support nurse suggested that he could explore seeking help from a physiotherapist to identify treatment goals and better plan on reducing his mother's pain. Being a caregiver who wishes to provide his best for his mother, Mr K placed a high level of expectation on himself, which caused him to feel anxious. The caregiver support nurse offered emotional support to allay his caregiving concerns and reaffirmed his commitment to caregiving while reinforcing the importance of self-care and taking time to recharge. Through the support of Carer Matters, Mr K is able to return to work full-time while caring for his mother.

Table 3: Stories of caregivers who were supported through Carer Matters

REFERENCES

Chan A (2021) An overview of Singapore's long-term care system: towards a community model of care. In: Komazawa O & Saito Y (eds.) Coping with Rapid Population Ageing in Asia: Discussions on long-term care policy and cross-border circulation of care workers. Jakarta, Indonesia.

Chan EY, Glass GF Jr (2022) Delivering a holistic hospital-to-home framework to support family caregivers of persons with dementia: Protocol for a feasibility study. J Adv Nurs.

Chan EY et al. (2019a) Development of a brief caregiver-centric screening tool to identify risk of depression among caregivers of hospitalized older adults. J Nutr Health Aging, 23(6):578-585.

Chan EY et al. (2019b) Crossing, Trudging and Settling: A phenomenological inquiry into lived experience of Asian family caregivers of older persons with dementia. Geriatr Nurs, 40(5):502-509.

Chiu M, Wesson V, Sadavoy J (2013) Improving caregiving competence, stress coping, and mental well-being in informal dementia carers. World J Psychiatry, 3(3):65-73.

Lau JH et al. (2021) The association between caregiver burden, distress, psychiatric morbidity and healthcare utilization among persons with dementia in Singapore. BMC Geriatrics, 21(1):67.

Ong ZL et al. (2022) Four of a kind: Salient caregiver archetypes to better understand the psychosocial needs and behavioral patterns of dementia caregivers in Singapore. Geriatric Nursing, 43:299-308.

How Can Healthcare Organisations Improve Patient Safety?

Carsten Engel I Chief Executive Officer of the International Society for Quality in Health Care (ISQua) I Dublin, Ireland

In an interview with HealthManagement.org, Dr Carsten Engel, the Chief Executive Officer of the International Society for Quality in Health Care (ISQua), discusses issues affecting patient safety and strategies that healthcare organisations can enact to improve these issues.

Key Points

- Medical errors/adverse events often result from system weaknesses or misalignment between demand and capacity.
- Reducing complexity and streamlining workflows make a system more robust and thus improve patient safety.
- Patient safety should be incorporated into an organisation's culture and workflows, not siloed. Leadership can signal its importance through engagement by education and integration into all aspects of management thinking.
- Strategies to understand the factors involved in why a system works and why it goes wrong can better inform system improvements.
- As partners in their care, patients can be engaged to inform the system when a process functions incorrectly.

Would you briefly tell us about yourself and ISQua's mission?

By background, I'm an anaesthesiologist and have worked for 20 years as a clinician. For the past 15 years, I've been working full-time in quality, first as part of the healthcare accreditation organisation, IKAS, in Denmark and for the last year as ISQua's CEO.

ISQua is an organisation whose mission is to inspire and drive improvement in the quality and safety of healthcare through education, knowledge-sharing, and external evaluation. We support the healthcare system and connect people through global networks. ISQua's tagline is 'KNOWLEDGE | NETWORK | VOICE'. We gather knowledge to make it accessible through our networks and give a voice to those who need it.

How big a problem is patient safety?

It is a significant problem. Over 20 years ago, epidemiological investigations found that around 10% of hospital patients were affected by adverse events. Much hasn't changed in the meantime; the rate of adverse events is still around 10%. About one in 14 of these is fatal, with around 50% being considered preventable.

What are the challenges in preventing medical errors/adverse events?

One of the challenges is that healthcare is a complex system, where the result of an action can't always be predicted. Any complex system can be made less complicated by having standardised procedures for doing some things, but this does not provide a complete solution. In addition to having a solid foundation of standardised procedures, you also need the ability to anticipate what might happen, monitor what is going on, react properly, and learn from your experience.

Culturally, safety must be made a priority. It should be

accepted that safety issues are due to people working within a system with flaws rather than bad people. Creating and maintaining a blame-free culture is still a problem in many parts of the world. Most often, harm is not caused by recklessness but by people trying to do their best within systems that are not sufficiently strong and resilient.

it can be prevented from happening again. Nothing is wrong with the approach in itself, but it needs to be supplemented with another approach when working in a complex system.

What makes things go right so often, despite conditions sometimes varying in predictable or in unpredictable ways? One core idea is that there's something called 'work-as-imagined', and then there's 'work-as-done'. Work-as-imagined is the official procedure, and work-as-done is what happens in everyday practice. When working in the Safety-I paradigm, it is tempting to think of deviations from work-as-imagined as errors causing harm, which must be prevented. In the Safety-II paradigm, we recognise that conditions vary, necessitating adaptations. Often, these adaptions are deviations from work-as-imagined and are what saves the day. Sometimes, they make things go wrong. Thus, understanding why things go right most of the time is also needed to understand better why they sometimes go wrong.

This idea is a very appealing way of thinking. Translating it into action is more difficult: it's easier to fix a procedure than to improve the process of adapting to varying circumstances. But examples can be found. For instance, I've heard about a regulatory agency in the Netherlands that changed its approach to inspections. Instead of examining compliance with rules and regulations, they used a narrative approach to ask the organisation to describe how they handled safety issues.

There are also examples from several countries where organisations have used the Functional Resonance Analysis Method (FRAM). It's a way to analyse work processes and understand all that influence them. You create process maps that, as an example, make it easier to understand why incorporating a seemingly straightforward procedure like medication reconciliation is not always successful. To understand how medication reconciliation is incorporated into the workflow, one must know who is doing it, what information they need, how they can access it, and how they pass the information on. When this is depicted graphically, it is easy to understand why the process is perhaps not as simple. When performing root cause analysis, by looking at things through a Safety-II lens, one can understand how a system adapts for the better or worse so that more robust solutions can be reached and the ability to adapt in useful ways improves.

We can't avoid complexity, but we can reduce it: Standardise everything that can be standardised

What actions can an organisation take to improve patient safety?

One of the most important things is to mainstream patient safety. Patient safety is not a project separate from everyday operations. Although an organisation will benefit from having a safety committee and a safety department, safety responsibilities should not be partitioned off into these organisational structures.

Safety must be included every time a process is considered; we must ask not only how to deliver but also how to deliver safely. The organisation must signal that safety is important. Top management must consistently show commitment in multiple ways by deeds rather than words alone. Finally, the proper infrastructure must be provided to work safely.

Moving from Safety-I to Safety-II approaches requires a paradigm shift in managing patient safety. What are the challenges in implementing a Safety-II approach?

To briefly reiterate, Safety-I is a philosophy that focuses on learning from what goes wrong to discern how can

How have staffing shortages affected patient safety issues?

There are some alarming figures from the U.S. During the pandemic years, a great increase occurred in totally preventable issues like falls, pressure ulcers, catheter-associated urinary tract infections, ventilator-associated events, and MRSA bacteraemia. Relative staffing shortages may explain this. The staff didn't decrease, but the workload heavily increased.

There are two ways to address this shortage. One is to increase staff which is not always feasible. The other way is to make work easier for the staff available

to do the work that needs to be done. Prudent standardisation can reduce complexity. Standardise everything that can be standardised. In both clinical pathways and communication protocols, many procedures should be standardised. One should be aware that how to do things is often more standardisable than when to do things.

Technology should be leveraged as much as possible to reduce the burden of work. Workflow is important. When I was in healthcare, we spent much time making things flow: obtaining the right information, making the patients flow (for instance, transferring them from the emergency department to the ICU or the ward), and making equipment flow. Attention to and understanding of the flow and its variations can reduce friction, vulnerability, and bottlenecks. Understanding variations in flow also allows for better allocation of resources.

These are ways to proceed to make health care safer.

How can patient engagement improve patient safety?

Partnering with patients is an important part of patient safety. Patients are the only ones that see the whole patient journey; they will increasingly not just become passive recipients of care, as more care is moving out of hospitals into the patient's home, they also become providers of care. We should leverage their resources.

Some have talked about using patients as scaffolds for the system, about allowing them to reach in. An example of this is when patients call the hospital for test results they expected to receive but haven't; the call reveals that the response has gone missing for some reason. This does not mean that providers should renounce their responsibility for safety, but we should utilise the patients as partners to add some strength to the system's safety.

How can we better engage the workforce to improve patient safety?

As leaders, we must tell and show them that safety matters and appreciate what they do to improve safety. We must create a culture where they speak up about their concerns. One way to create such a culture is to have safety walk rounds where leaders ask staff what concerns they have. This is not just token activity. It's important that the people who have contributed are given feedback to acknowledge that they were heard. This demonstrates that it is taken seriously and can lead to improvements.

People must be trained to understand what safety is, how it works in a healthcare system, how important it is to anticipate what might happen and monitor if a patient responds in the right way, and to learn from previous challenges. This will contribute to improving the system continuously.

One of the things that the adverse event reporting systems have contributed to is improving culture. Sometimes, an adverse event story leads to learning something that can be changed. Every time an adverse event is discussed, a signal is sent that patient safety is essential and must be taken seriously. This is something that can change the culture.

Some hierarchies need to be broken down. It needs to be acceptable that anyone in the operating theatre can speak up if they have a concern or believe the surgeon is making a mistake. Whatever happens, say 'thank you for voicing your concern' even if the concern turns out to be wrong.

What innovations in the next five years might improve patient safety?

Some of the most important innovations will concern the flow of information (like information technology), the flow of patients, and facilitating a real-time picture of the organisation's status. Because if it's important to anticipate events and monitor patients, one must understand how patients flow through the systems. Everyone, including the patients, must have the opportunity to quickly see if there's a sickness or if something else is going wrong.

Regarding what physical form that might take, we have seen examples now. For instance, dashboards at one glance can visualise the bed occupancy in the whole hospital or across the entire hospital system. This visualisation can spot where a particular patient will get the optimal care.

We have also seen examples where intensive care services can be provided at a distance from where intensive care units are physically located via virtual communication. This can bring expertise to the patients from a much broader range than found in traditional systems where patients need to come to where the expertise is.

What sort of regulatory innovations do you foresee coming soon?

It will be difficult for regulators to adapt to a way of thinking where one, not only monitors for compliance with rules, but also monitors for the ability to adapt and respond. There are people around the world who have taken up this challenge. They're trying to find ways to reconcile traditional regulation with the concept of Safety-II and the resilience thinking that we talked about.

Conflict of Interest

None. ■

Watch the full interview here.

Enterprise
Imaging

Transformation of Ziekenhuis Oost-Limburg Hospital

Bruno De Peuter I Head of Medical Imaging and Musculoskeletal Radiology Specialist I Ziekenhuis Oost-Limburg I Belgium

Dr Bruno De Peuter, Head of Medical Imaging and Musculoskeletal Radiology Specialist at Belgian hospital Ziekenhuis Oost-Limburg, explains how the hospital transformed itself into a modern, well-respected, tertiary care centre.

Image Credit: Ziekenhuis Oost-Limburg Hospital

Over the past few decades, the medical imaging department at Ziekenhuis Oost-Limburg (ZOL) has experienced a major transformation. With 30 radiologists on-site and four sites across Belgium (Sint-Jan in Genk, André Dumont Medical Center in Waterschei, Campus Sint-Barbara in Lanaken and Campus Maas and Kempen in Maaseik), the department has demonstrated exponential growth, having undergone numerous renovations. The hospital's on-staff radiologists have become specialists in various disciplines. With the help of Agfa HealthCare, ZOL has implemented advanced solutions, including Enterprise Imaging for Radiology, Enterprise Imaging for Cardiology, Business Intelligence module and the XERO Viewer.

Investing in People and Technology

The medical imaging department at Ziekenhuis Oost-Limburg is one of the largest in Belgium. However, the department does not only focus on quantity but is strongly committed to quality. According to Dr. Bruno De Peuter, "we have always been very committed to quality. That means we strive to attract the best people in all disciplines – both in terms of their personality and their skill sets."

Dr De Pueter explains how the primary driver for the renovations in medical imaging is to provide everyone with a pleasant work environment. The hospital has invested in the latest equipment and is one of the first in Belgium to install a dual-source CT scanner. The medical imaging department works with the latest and the most advanced systems for data storage and viewing. While this has required investment by the hospital, this investment has allowed the overall system to work much faster.

Centralised Worklists for Efficient Teamwork

ZOL has successfully collaborated with Agfa HealthCare for its PACS and RIS and was one of the first hospitals in Belgium to upgrade to the Enterprise Imaging Platform. Enterprise Imaging offers many advantages and has enabled the medical imaging department to create a comprehensive departmental structure that is more efficient.

"Based on queries, we can create separate, cross-site worklists for each of the subspecialties. Regardless of which ZOL site performs the exam, everything ends up in the central list, nice and tidy. If I, as a musculoskeletal radiologist, am working with MRI, I simply open the appropriate list, and I can start reading. I know exactly what to do, without having to open four or five different lists," explains Dr De Peuter.

He points out that with the new system in place, the imaging team can read many more exams and complete them much faster. This has resulted in a more equitable division of the workload.

Standardised Work and Priorities

Dr De Peuter highlights that with Enterprise Imaging, images for each subspecialty are displayed in a standardised manner and are also available quickly, with fewer technical issues that require intervention from the IT Department. In addition, the ability to prioritise exams within the work lists is a handy functionality. For example, patients in the Emergency Departments are colour-coded red while those in the ICU are coded orange. Outpatients whose GP needs a report immediately are coded yellow. Implementing this standardised system makes it easier for radiologists to know which exams to do first without losing valuable time.

Smooth Upscaling to Four Sites

During the COVID-19 pandemic, ZOL merged with the Maas and Kempen hospital in Maaseik. This resulted in the addition of a fourth site which has had far-reaching consequences for the hospital's imaging department.

"We were able to quickly scale up our Enterprise Imaging installation in order to integrate the site in Maaseik into our environment," says Dr De Peuter. "The radiologists in Maaseik found it relatively easy to master Enterprise Imaging and to work within the larger ZOL environment. After a few afternoons of training, they were on their way. We were very satisfied with the training and the guidance provided by Agfa HealthCare."

Dr De Peuter also points out that during the implementation phase and the change process, the hospital has focused on communication, transparency and team-building. This has helped prevent resistance to change. He also highlights that Enterprise Imaging is very intuitive to work with and superior to the former PACS.

With the new system in place, the department team can read many more exams than before and complete them much faster, thus allowing a more equitable division of the workload

Home Reporting

The COVID-19 pandemic forced the department's healthcare workers to work from home. But as Dr Peuter describes, the Enterprise Imaging platform provided radiologists with the perfect home working environment. With the help of Agfa HealthCare, ZOL was the first hospital to work out a home-reporting set-up to enable the majority of its radiologists to work from home. Now, almost everyone has a workstation at home. These stations are identical to those in the hospital and have the same specifications and functionalities.

"We are still working partly from home today," says Dr De Peuter. "We have noticed that working from home increases our efficiency significantly. It used to take six to eight radiologists to read 250 MRIs over the weekend; now, we can do it with only five."

Strengthening Ties to Referrers

A major objective of implementing and upgrading the system at ZOL was to ensure the satisfaction of

referring physicians, both internal and external. With the new system in place, each physician now has access to the results (images and reports) of the exam performed on their patients and receives quick assistance for any questions.

Even when radiologists have to work remotely from home, they can still communicate with colleagues and remain accessible and approachable. The imaging department at ZOL has also focused on developing subspecialties. "We must continue to prove that we are more skilled at looking at images than a surgeon in an academic hospital who only performs hip operations. That is our added value as radiologists," says Dr De Peuter.

Radiologists are encouraged to actively participate in multidisciplinary team meetings, such as oncology consultations. This allows them to meet colleagues who make referrals, thus strengthening their ties with referrers by transparently explaining how their department works.

Management by Business Intelligence

According to Dr De Peuter, his favourite module within Enterprise Imaging is Business Intelligence (BI). He believes it helps him steer the entire department by giving him daily access to figures on the number of exams – CTs, ultrasounds, etc. – that are performed. This data enables the team to study the numbers and determine any bottlenecks.

The monthly reports also provide an excellent overview of the department's overall performance and help identify any deviation in figures from normal usage. This allows the team to determine the cause of the deviation and take measures to correct it. For example, it was observed that only 50% of the women eligible for breast cancer screening were participating at the hospital's Sint-Jan site. But the participation percentage was higher at the smaller sites. This allowed the department to look into whether this participation could be increased by moving breast cancer screenings to small, accessible campuses, like André Dumont.

Similarly, scheduling MRI at night provided another opportunity to improve capacity and reduce waiting times. While this could mean more work for the nursing team and more pressure, the BI module allows the monitoring of waiting times daily. If waiting times improve and are shorter than four weeks, the night exams can be paused for a while. Hence, BI can help the department identify areas of improvement and implement measures that are likely to make the operation smoother and more efficient.

Artificial Intelligence – Added Value for Radiologists

ZOL also plans to start using Artificial Intelligence (AI) on a larger scale since it is a technology that has huge potential that radiology must embrace.

ZOL does not use the cloud for image analysis for data protection reasons but is working with other hospitals to see whether forming a network could reduce the cost of acquiring AI software and paying per analysis.

At the top of ZOL's wish list is AI for chest x-rays and mammography. Currently, mammograms are checked by two doctors at ZOL and then by a third at University Hospitals Leuven. But with a proper AI system in place, it would be possible to automatically identify mammograms that require a second reading. This could save the department a great deal of time. Specifically, Agfa HealthCare's RUBEE packages can be quite useful as they can be completely embedded in the Enterprise Imaging work processes. That would add value compared to other packages that are stand-alone.

Digitising Imaging Orders

ZOL is also in the process of digitising imaging orders. The Belgian government wants radiologists to pre-screen requests to confirm that the appropriate exams have been ordered. This can help eliminate duplicate examinations (e.g., CT and MRI), reducing unnecessary government expenditures. However, there can be delays in making adjustments if patients submit their (paper) requests when they come to the hospital for the exam. At present, only 50% of imaging requests are received digitally via the electronic patient record. ZOL wants to increase this to 90%.

"We encourage GPs to send us their digital requests. We have also built a patient website, where patients can easily book an appointment for a radiology exam and upload a photo of the paper request. They can also specify a time for us to contact them by phone to confirm the appointment and to schedule the most suitable location. This is very handy for the patients and for our team because we have the correct patient data straight away and can provide the right care in the right place," explains Dr De Peuter. ■

Image Credit: Ziekenhuis Oost-Limburg Hospital

Governance & Leadership

The Challenges Facing Healthcare Leaders in 2022

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An overview of the challenges faced by the National Health Service (NHS) and measures that can be used to help the NHS deliver and transform care in 2022.

Key Points

- As the immediate demands of the pandemic response diminish, the NHS continues to face unrelenting pressure.
- The vaccination programme and management of increased demands from COVID-19 are expected to continue.
- Staffing will continue to be a critical issue and will require more than just deployment.
- A second critical pressure on the NHS will come from the formation of integrated care systems (ICS).
- Another growing issue on the agenda is the requirement on the NHS to meet its net zero commitments.
- There will be a need to use more proactive models of care and maximise the use of scarce capacity.

Even if, as we all hope, the immediate demands of the pandemic response diminish, the National Health Service (NHS) faces another year of unrelenting pressure. The pressures will come from many different directions and will require all the capacity, resources, ingenuity, and strong leadership within the NHS to meet them.

The vaccination programme and management of increased demands from COVID-19 will clearly continue to dominate the early months of the year. The demands on the workforce and on leadership time will impact all other key activities, especially efforts towards elective recovery where we can expect waiting times to get worse before they get better.

Stemming the growth in waiting lists is a huge task, but not an impossible one, with the right pathways, technology, and collaboration across systems. Extra money will help but it is important to recognise that throwing money at short term capacity will not be an effective sustainable strategy. The availability of additional staffing capacity will be one major constraint. Equally, while staffing is a critical issue, just deploying more staff without the right supporting models of care, infrastructure, technology and data will not solve the problem which already existed prior to COVID-19. What will make the difference is action to support more proactive models of care and maximise the appropriate use of scarce capacity, whether that is staff, beds, scanners, or operating theatres. That, in turn, will require better use of insight across the system to support management of demand, effective scheduling, avoiding cancellations, and ensuring safe and timely discharge.

We will need a more forensic understanding of who is waiting for treatment, and exactly what their needs are, both to manage resources and to address the growing inequalities. This will require careful planning, new ways of working and data sharing. Advanced insight from population health management approaches can play a part in understanding people's needs and risk factors, as well as prioritising waiting lists, remodelling of patient engagement and communication, and

helping to predict patient flows to manage demand.

The other resource that the NHS can draw on is the lessons learnt over the past two years. The NHS has shown extraordinary ingenuity and flexibility, and collaboration across health and care, from creating new COVID-19 rehab centres from scratch to deploying technology to help vulnerable people shielding at home. These new approaches will be just as vital in meeting the current and future challenges.

A second critical pressure on the NHS and its leaders will come from the formation of integrated care systems (ICS). While their go live date has been postponed until July, there is a huge amount to do to establish new organisations and enable new teams to work together. Managing that change, at the same time as the ongoing operational challenges, will place major demands on NHS leaders.

It is possible though, that precisely because of these pressures, there will be a greater commitment to securing the benefits of ICSs and breaking down organisational barriers, both within health and between health and social care. Supporting GPs, community services, hospitals, and social care services to share data and work together more easily could have a real impact in reducing admissions and speeding up discharges, and therefore relieve pressures on the system.

None of this will be easy, given the scale of the legal, organisational, administrative and cultural changes required across multiple organisations, but it will be important to make it happen quickly and effectively. Some early benefits will need to be evident by the end of the year to demonstrate that the changes have been worthwhile.

Another growing issue on the agenda is the requirement on the NHS to meet its net zero commitments. Sustainability strategies are needed, and these will need to take a different approach to understanding and addressing waste to the more traditional approaches around energy management and recycling.

In particular it will require a new approach to waste. The NHS generates about 590,000 tonnes of clinical waste every year, of which about a quarter is plastic. Recycling policies can help, as can education of staff. Great Ormond Street Hospital ran a staff awareness campaign on inappropriate glove usage which reduced the number of gloves used by four million people in a year. But there are more innovative approaches emerging from other industries.

For example, there are increasing options for the NHS to raise revenue from its plastic waste. The high-grade polymers used in medicine can be recycled by other industries and prices are increasing. However, again, this will require the leadership team to give this focused attention and investment to do things differently.

In managing all these pressures, support to the workforce is critical. Ensuring they have the time and capacity to engage with these changes is hard when many are exhausted. They will also need ongoing provision to recover from the impact of the past two years. Equally, it will be more important than ever to make the NHS an attractive place to work, both to attract new recruits, but also to retain existing staff and make the best use of their talents.

While staffing is a critical issue, just deploying more staff without the right supporting models of care, infrastructure, technology and data will not solve the problem, which already existed prior to COVID-19

Given the magnitude of these challenges, it would be easy to look at 2022 with trepidation. Yet the scale of the transformation and achievements across the health service in the past two years tell a different story. NHS leaders and staff are both innovative and deeply committed, and this is a powerful combination. There is every reason to believe that the NHS will deliver what was previously unthinkable and look forward to getting behind this transformation for what promises to be an undoubtably busy 2022.

Conflict of Interest

None. ■

Efficient Workforce Transformation

What Are the Best Team Building Practices for Healthcare Organisations?

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In an interview with HealthManagement.org, Dr Aneta Schaap-Oziemlak, the Chief Executive Officer of the Bio-inspired Think Tank in the Leiden BioScience Park and Agile Coach, discusses Agile team-building practices as they apply to healthcare organisations.

Key Points

- Creating a better nurturing environment can help alleviate staffing shortages in healthcare organisations. Applying Agile processes to team building can address common team dysfunctions when they occur.
- Good strategic bilateral communication between leadership and workforce teams can promote team engagement, camaraderie, and performance. It is crucial that leadership properly communicates their vision and listens to and acts on workforce input.
- Diversity in building a team can improve performance by introducing a wider range of perspectives and competencies to patient-oriented innovation and patient care, and promoting greater empathy for their colleagues. Inclusion, likewise, also enhances performance.

Staffing shortages in healthcare are a global problem. What are the driving factors for these shortages? How can these be addressed?

There are several problems from a historical perspective when thinking about the shortage of physicians and nurses locally and globally. This has always been a focal pain point of all caregiving organisations. There's no one answer.

First, there is a limited physician talent pool, but why is that? Is it insufficiently nurtured in the working environment? Are there insufficient education and nurturing working conditions? Having these would help attract the talent to healthcare organisations and maintain it. This is one of many answers. 'Corona-time', which is still ongoing, intensified these issues in service and delivery from the perspective of healthcare/caregiving organisations.

Second, it's not just about the talent pool but also about leadership. These are challenging times for healthcare organisation leadership. It's not simply to change the leader for the next one. Change, originating from a leader, can be challenging for an organisation. There must be strong communication from leadership to the workfloor of the healthcare organisation to successfully introduce their leadership mindset and vision to the teams and employees. The most straightforward answers are the leader listening in an adaptable and flexible manner to employees' points of view and daily struggles or simply changing the leader's mindset.

Applying Agile methodology, where there's learning by doing in a stepwise process, could help. This is one answer that could help in applying new team-building techniques. This can make an environment more nurturing, bring more possibilities for nurturing and maintaining talent within organisations, and how to think about leadership and bring in leaders who listen

and are not only driven by their own vision.

How should a caregiver team be constructed? What is a good team size?

Referring to my previous answer, I said that introducing Agile team-building techniques can help build a better work environment in healthcare organisations. If you think about Agile teams now in already established organisations, it's a maximum of 10 members per team. These teams are small because each team member needs sufficient attention to train them into an Agile team player. After all, each member needs to be transformed if they have never experienced working in an Agile environment.

How should individual team member skills match the entire team? What sort of dysfunctions can a team experience? How should they be addressed?

Agile-trained team members are unlikely to be so redundant that they can replace the roles of every other team member, especially if we think about physicians. Having healthcare teams with multidisciplinary members, especially physicians, is very inefficient for personal development and multidisciplinary medical education. The focus should be on skills directly related to the work and those that can avoid broad dysfunction of the team.

When I started to think about implementing an Agile framework in my collaborations and workshops, I came across a book by Patrick Lencioni, which describes the five main dysfunctions of a team (Lencioni 2002).

The first most important dysfunction is a lack of trust. Being trusted in a team is an important skill. In healthcare, gaining high trust on top of high-paced performance could be an important skill in developing trust among the team. Generally, it's tough for individual team members to show their vulnerability. Thus, gaining trust is hugely important for the personal development of each team member.

Learning that a large portion of medical errors results from poor communication was quite a big surprise to me. Communication skills are critical within a team. With poor communication, the trust falls apart. For example, when a team member miscommunicates, people start to understand that the team member communicates untrustworthy things, so trust decreases. With poor personal communication events between team members, trust becomes very limited. With trust becoming very limited, the team may quickly collapse. Therefore, trust is one of the most important skills and features.

The second feature of a dysfunctional team is fear of conflict. Being assertive as a team member in an Agile team and bringing up the daily patient-related challenges is very important to share within a team. In a team, each member should not be afraid to communicate with other members or the challenges the team/team member faces.

Lack of commitment is another feature of dysfunctional teams. Building engagement and motivation are essential skills. Although it's tempting to think leaders should take responsibility for providing and building motivation and commitment, if the team is truly Agile, the team can build a level of high commitment itself. Commitments can also be very individual. Very goal-driven people can be inspiring to each other and other team members. Within the team itself, there can be strong motivators or motivation builders. These people need to be nurtured because they can be great communicators with leaders and team members.

Accountability, taking responsibility for actions, is a personal skill that dysfunctional teams lack. In the team context, accountability is not only taking personal responsibility but also as a team. In Agile teams, each member is part of the solution or contributes to the final decision-making. This is something that builds this accountability. These are skills sought in individuals but also grow as soon as the team becomes an Agile team.

Attention to results or to details is often discussed in a more personal factor of the team. Egos can bring one to the top as a person, but to build a successful team-oriented healthcare organisation, one needs to think about the team and, ultimately, how healthcare organisation can improve the life quality of the patient. The team`s success is more important than personal success or ego. So definitely, the team-oriented mindset and way of thinking of "I do it as a team member and my team will reach success", is crucial in healthcare where teamwork is essential, especially in the face of high pace requirements or demands.

What metrics should be used to determine the effectiveness of a caregiver team? How should the metrics be used to identify improvement areas?

Metrics are important both for the organisation, leaders, and the team. These three players have to make sure that metrics are performed. Qualitative and quantitative metrics could be considered. That's very general. Many already think that this is certainly something which should be taking place. From a leadership perspective, metrics can be different because leaders usually want to get the metrics done and see the results that have been analysed. But from a team's perspective, each team's experience is very different. Teams could expect that the timing of delivering metrics to the leader is important in an Agile environment.

This is good for the team to understand, but an Agile team could also define their own metrics, especially

in terms of quantification. They can think about how to determine the team's level of trust, commitment, responsibility, the service quality delivered to the patients, and also communication skills.

Qualitative vision can come from the leader's perspective. From a qualitative perspective, leaders can give a team the basic requirements that they would want to see. The team can define how this will be measured from a quantitative perspective.

If the team is not expert enough to collect specific metrics, Agile coaches can be very helpful support to establish quantitative measurements. This is where Agile coaching can be very helpful and very practical.

How can an organisation promote a work culture that respects co-worker dignity and promotes engagement?

Imagining myself working as a healthcare employee, I would like my organisation (from the bottom-up perspective) to understand, listen to me, and have some gratitude for the work I do for patients as a team member. The organisation itself should promote a team-oriented or team nurturing culture, where teamwork is a TOP value for the organisation. All the support that team could be offered should be very visible because sometimes the support for the team is not visible. From the perspective of collaborative effort, which happens in a medical environment, the effort is brought by service providers, care providers, and also patients. If there is no support for the team, the team members' support for the team needs to be visible and well understood.

This is one way that medical organisations can promote a work culture that respects co-workers' dignity and promotes engagement. If the healthcare employees are being listened to and have time to find quick support for their challenges, they feel needed and they matter. If they are rewarded for their great work as a team, that also brings engagement because they feel important and matter in the organisation as a team.

This is something that many organisations need to understand and promote by adopting policies for it. The policy should also be an employee-friendly policy and not a policy that doesn't serve anybody.

What are the best strategies to promote health-care worker safety, mental health, well-being, and prevent burnout?

Well-being and mental health strategies are something we need to give to the general possibilities in team-oriented Agile organisations. Bringing a well-being strategy is crucial for each healthcare employee's daily high pace and performance. From the employee's perspective, one could find a way in the late evening to participate in some sport activities or find a way to bring well-being to one's personal life. However, the organisation's well-being is the well-being of each team. It's not only individuals who should act on how one can take care of their mental health and well-being, but also the team.

I will bring something from my environment from the Leiden business ecosystem with one of the global pharma companies focused on patients and developing innovation. Bristol Myers Squibb works in a very intense way for the global improvement of patients' quality of life by developing innovation. As part of their employee well-being strategy, they organise biking teams. This is just an example that could be any sport activity. This could even take the form of power yoga classes each day for the team. So the team does some sport activity to raise endorphins – we know that endorphins are good for the team's well-being. Doing things together also helps to align this team while bringing well-being. Furthermore, training together improves the team's cohesion – there's a feeling like "we are one team" and "we can do everything and face our challenges".

How can diversity (vs homogeneity) in a team benefit performance? What problems does it eliminate?

Regarding the healthcare service chain, what happens when a patient comes and what happens afterwards? A cross-functional team is needed, so there are people who have different backgrounds or are at other points of the service chain or workflow. It helps to have people from very different backgrounds or positions where they feel a different part of healthcare service. Thus, these people would better understand how the global workflow process of healthcare service works for patients. Doing so, you would create a sort of awareness. Thus, diversity helps to increase awareness about each different type of role. In turn, diversity also brings better performance because the knowledge of other people's functions and roles allows them to perform better.

For example, regarding awareness, if a team consists only of haematologists, it might miss an important factor that a nurse or another stakeholder would catch. It creates different perspectives and ways of thinking about issues. These different perspectives are still related to a patient. Ultimately, bringing different people to the same team improves the patient's quality of life. Sometimes among health organisations and clinicians, communication is difficult between the healthcare organisation and the insurance. I always wondered if we should not include that in the process because, in the end, it is an important stakeholder, even if it acts externally.

When talking about diverse cross-functional teams in this perspective of team building, it's beneficial. For example, clinicians start to understand the pain points of the nurse; the nurse understands what the pain points of the leader are. They better understand their colleague's pain points and what challenges each faces from different perspectives – from a more top perspective, a bottom-up perspective, the perspective of the insurance companies, and the regulatory perspective. They better understand the global work chain that ultimately brings a solution to the patient.

When I think about diversity, I also think about gender diversity, which is more relevant to inclusion. Some may define gender diversity as inclusion. But from my Agile team building workshops, which I perform as an Agile coach, I noticed that bringing an element of diversity (building a mixed-gender team) improves the team's performance. This is an exciting phenomenon because it is relevant to addressing the gender gap, building diversity (inclusion), and building better performance.

How can technology solutions help teams in healthcare settings come together and collaborate better? How can Agile methodology help?

Agile is more about learning by its iterative process. From my perspective, the Agile transition for healthcare hasn't yet occurred. I define healthcare organisations as hospital medical centres and clinics. There have been a lot of Agile transitions in different industries and organisations, but for healthcare, it will be challenging to bring Agile changes.

American pharma is already implementing Agile methodology in their work culture. While they are already busy with the process, medical centres are not there yet because the leaders' vision differs and is often less focused on team-oriented work culture or collaboration. That's where the greatest difficulty lies which places the leader of university medical centres in a challenging position.

Let's change healthcare organisations to nurturing ones by applying Agile methodology! However, Agile changes should first be applied in real-time. It needs to be worked out within a particular system before moving to the digital transformations. The more known about the healthcare system, from the bottom-up perspective of health organisations and leaders and the bottom perspective, the more an Agile coach can help perform this nurturing transformation of healthcare organisations.

Regarding remote work, cross-functional teams, and the Agile process, if each team member plays different functions in the healthcare organisation and understands other colleagues' roles, tasks, and responsibilities, they can understand the process better. There can be better engagement – it's not just manager conversations through platforms online.

Agile is based on working in teams and how these teams are. If they can be part of the solution or part of decisions that bring nurturing that maybe Agile teams are the solution for healthcare challenges. I hope that I have expressed this all by answering all these issues.

Conflict of Interest

Dr Aneta Schaap-Oziemlak is the Chief Executive Officer of the Bio-inspired Think Tank in the Leiden Bioscience Park and Agile Coach. However, the author has not received any sponsorship from any private or government body for this article. This article is the author's own independent work sharing her experience and personal thoughts and opinions. Other viewpoints also exist on the covered themes. ■

Watch the full interview here.

REFERENCES

Lencioni P (2002) The Five Dysfunctions of a Team. San Francisco: Jossey-Bass.

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