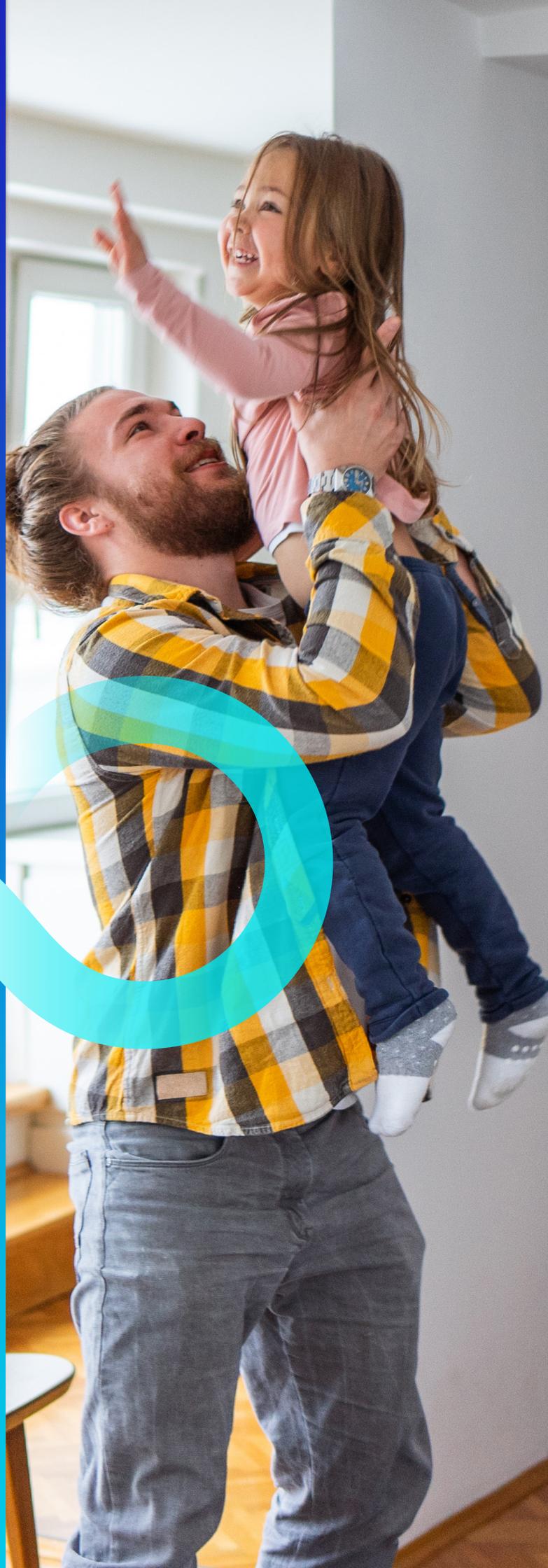


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The Fujitsu Virtual Connected Care maturity model

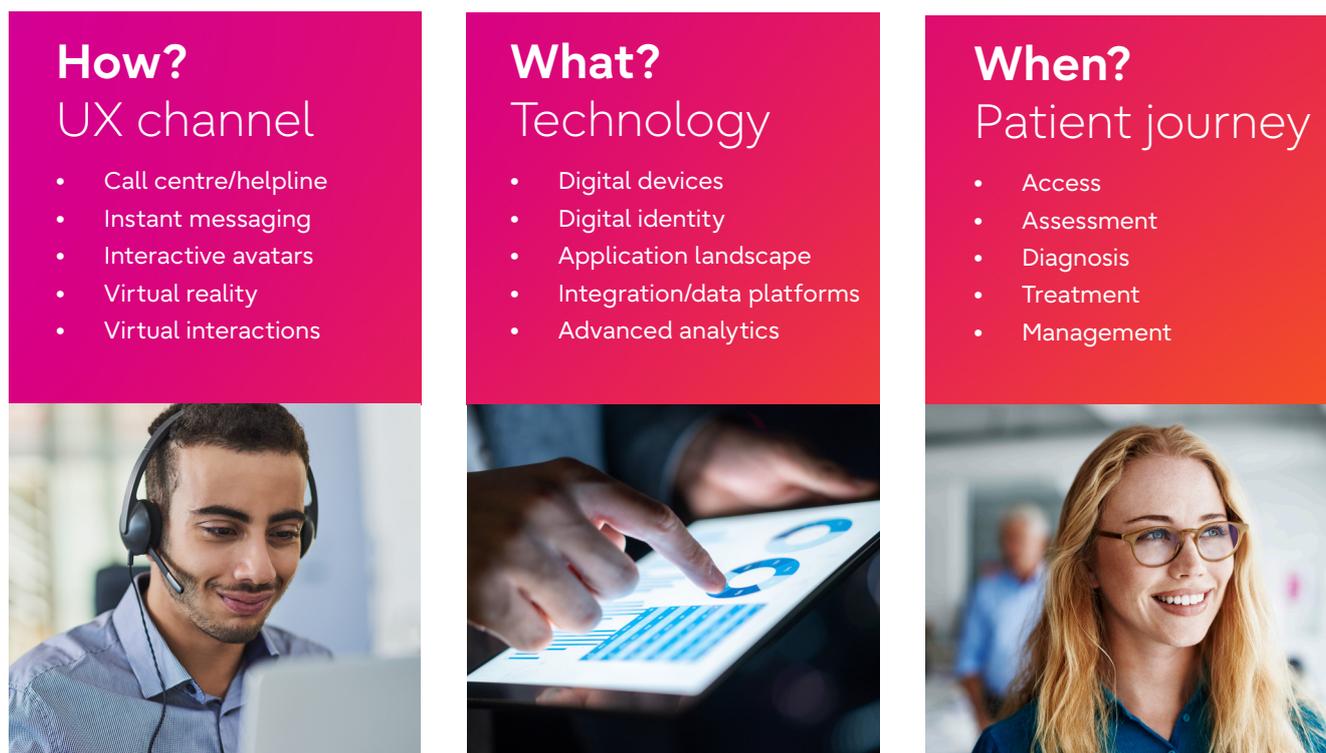


The Fujitsu Virtual Connected Care maturity model

What is Virtual Connected Care?

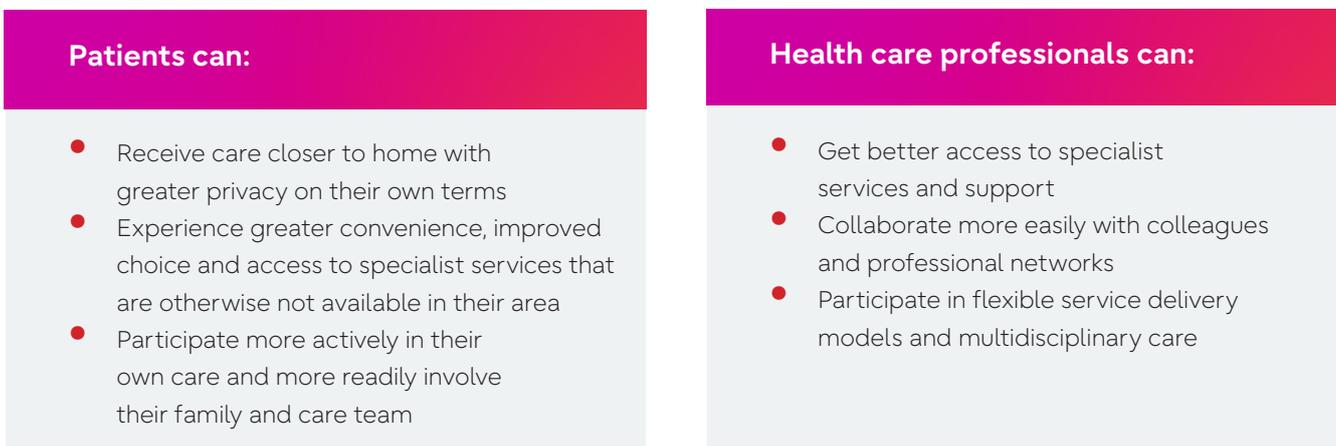
Virtual Connected Care involves the use of technology to improve the flow of information between patients and their health care teams to enable analysis, coordination, decision making and health outcomes.¹ Virtual connected care can be used to support any point in a patient journey through different access channels underpinned by technology (Figure 1).

Figure 1 Virtual Connected Care journey components



Virtual Connected Care is often associated with telemedicine or telehealth and commonly perceived as a virtual way of **providing** health care. However, in Fujitsu's definition, Virtual Connected Care extends to any use of digital technology to provide **or receive** care that is not face to face.

Virtual Connected Care has untapped potential to deliver benefits for patients and providers:



¹ https://www.womenscollegehospital.ca/assets/pdf/wihw/WIHV_VirtualHealthSymposium.pdf

The emergence of Virtual Connected Care

Virtual Connected Care is becoming mainstream, driven by societal, environmental, and financial factors (Figure 2). Fujitsu expects these drivers to persist until the uptake of Virtual Connected Care achieves equilibrium with face to face care.

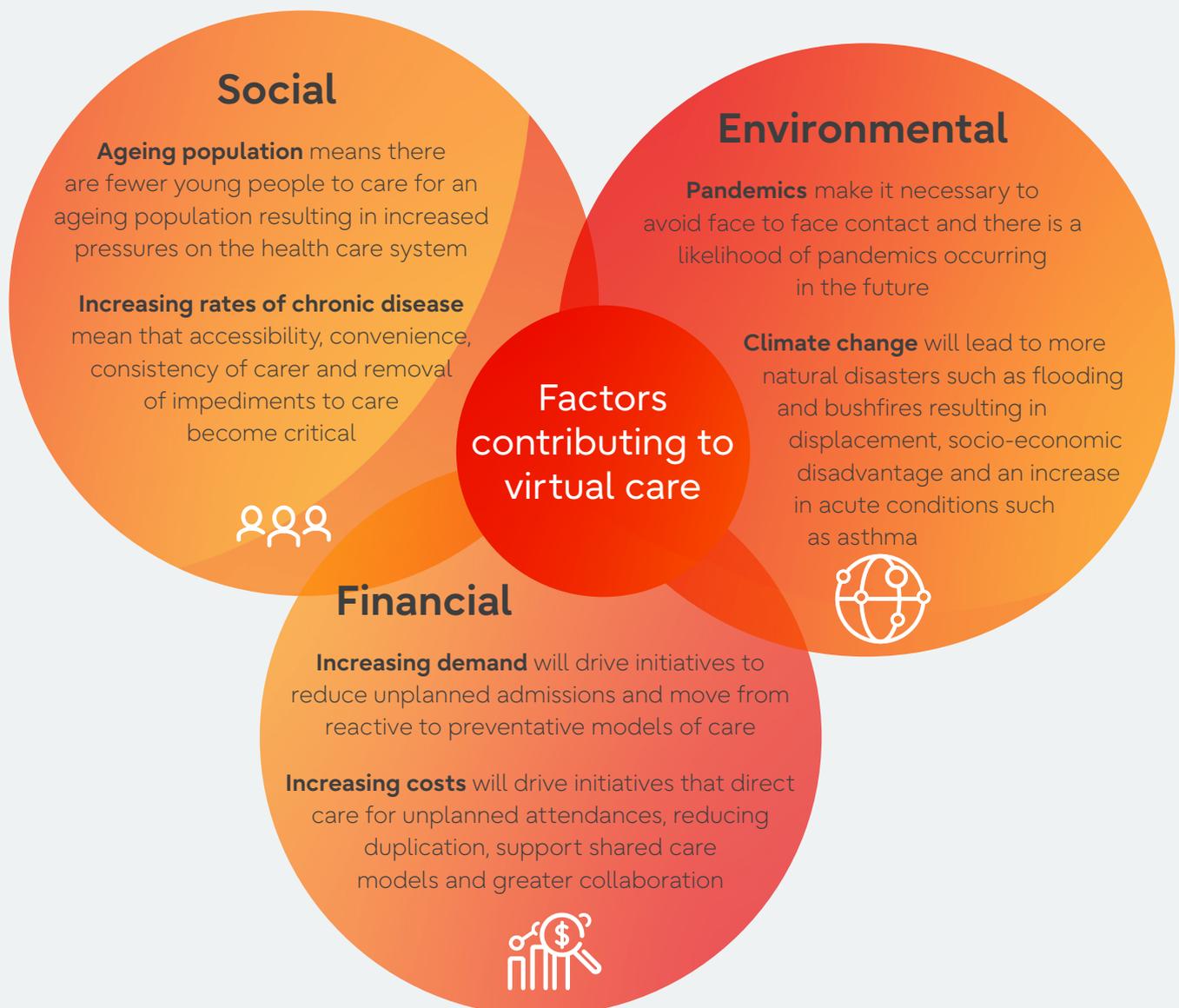
Priority populations such as culturally and linguistically diverse, refugee and Aboriginal and Torres Strait Islander people may benefit from Virtual Connected Care as long as it remains free at the point of consumption.² As frequent users of emergency services and hospitals, these groups are most likely to gain through improved health literacy, better access to supported self-care and decreased reliance on 'bricks and mortar' care providers like medical centres, community clinics and hospitals.

The future of Virtual Connected Care

Fujitsu has identified patient- and provider-centric routes to Virtual Connected Care maturity. Both routes follow similar steps involving increasing interconnectivity and use of data for analytics, however one leans towards the receipt of care, whereas the other is focussed on the provision of care. These routes naturally converge when technology, care receipt and care provision become holistic.

An excellent example of holistic Virtual Connected Care is closed loop diabetes monitoring incorporating an insulin infusion pump. When out of range insulin levels are used to alert clinicians to poor diabetic control, we begin to see the power of Virtual Connected Care for both patients and care providers.

Figure 2 Drivers of Virtual Connected Care



Virtual Connected Care maturity

Data is the key enabler of Virtual Connected Care. Advances in information technology and data science are coupled with Virtual Connected Care maturity.

We have identified four maturity stages based on the use of data:

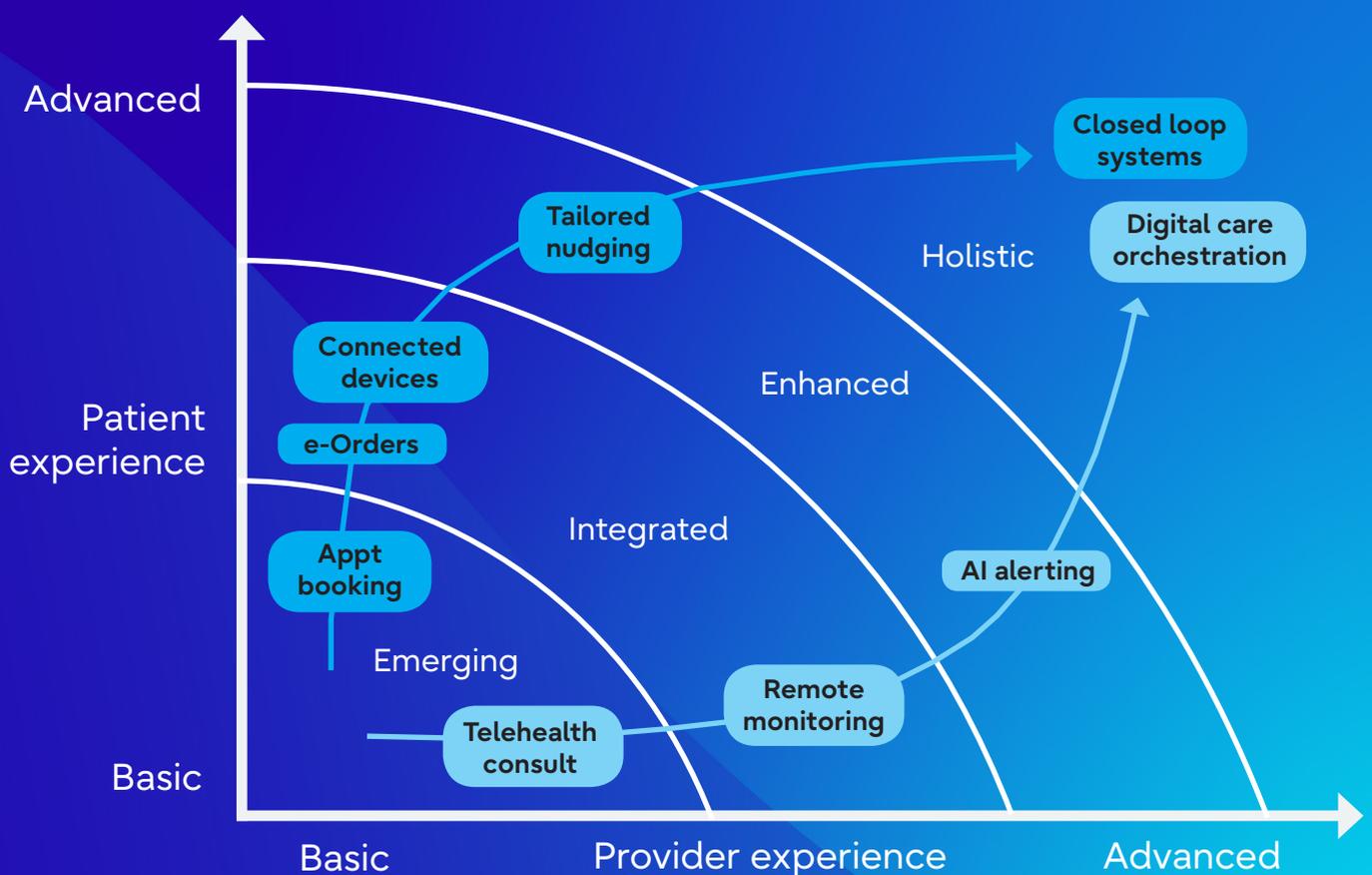
- 1. Emerging:** simple services that require no or simple administrative data integration, such as online appointment booking or telehealth.
- 2. Integrated:** requiring more complex integration of applications and devices and interpretation of clinical data, such as ordering repeat prescriptions or remote monitoring.

- 3. Enhanced:** where data is analysed in real time to provide insights that inform the user that a change in care is needed, such as nudging patients to alter behaviour or alerting clinicians that the patient's condition is deteriorating.
- 4. Holistic:** where insights from data and analytics are sufficiently robust and self-tuning that human oversight becomes minimised.

Figure 3 illustrates how patient and provider centric routes of Virtual Connected Care mature and converge. The patient centric route will be incentivised by value-based funding models that encourage better outcomes for individual patients. Provider centric routes are incentivised by increasing demand and the need to contain costs, for example using fewer staff to manage more patients.

Incremental evolution of technology and data science will continue to accelerate and stretch what is possible with Virtual Connected Care over time.

Figure 3 Convergence of patient and provider routes to holistic care



Examples of Virtual Connected Care applications

Examples are shown only to help illustrate the maturity stages and are placed based on publicly available information at the time of writing.

Stage 1: Emerging

The start of Virtual Connected Care maturity is where data (including images/video) is exchanged between patient and provider without complex integration or analytics. Examples include:

Beyond Blue

Beyond Blue is an example of Virtual Connected Care's emergence in a patient-centric format. Beyond Blue offers various digital capabilities to connect patients with a mental health provider such as a 24/7 telehealth service and online forums for patients to connect with others suffering from mental health issues.

Healthengine

Healthengine is an application that facilitates online booking of medical appointments and telehealth for varying providers. It provides a patient engagement solution in which patients can book an appointment with the provider of their choice and then have it delivered by telehealth if requested.

Stage 2: Integrated

Integrated Virtual Connected Care links care systems with clinical applications and devices. Examples include:

Speakbox

Speakbox is a Canadian application that allows patients with mental health issues to track their feelings daily and complete journaling, which is then available to view by their mental health care provider. Physicians collect and monitor these data and intervene when necessary. The app integrates third party tools such as Fitbit and Apple Watch to provide further insights into a patient's daily activities that are relevant to their mental health journey.

Lumeon

Lumeon has developed a solution that automates the pre-surgical admission process. It includes both anaesthetic assessment and pathology ordering. It integrates with electronic medical record data and uses rules to determine if an in-person visit is needed. This improves patient experience, avoids unnecessary visits prior to surgery, reduces non-attendance and nursing workload.

Stage 3: Enhanced

Enhanced maturity Virtual Connected Care uses advanced analytics such as Artificial Intelligence (AI) to proactively trigger action when required. Examples include:

Babylon

Babylon's 'GP at hand' app uses an AI enabled chat bot to triage, diagnose and link a patient with a GP for consultation. The application facilitates e-script delivery and makes medical records available to the care provider and the patient. Supplemental devices can be incorporated: Babylon Monitor integrates these data through wearables such as blood testing kits or blood pressure monitors. This exemplifies enhanced care as tailored nudging and AI integration are evident.

CareCentra

CareCentra has a patient engagement system in which AI delivers personalised nudges for patients with heart and metabolic conditions and during pregnancy. The system gathers patient data, such as daily weigh in, blood pressure, glucose checks and activity levels, which are then available to review by the chosen health provider. The CareCentra platform nudges the patient with reminders to take medications or check their blood pressure. These nudges are personalised to each individual's behavioural response and can be in the form of app notifications, phone calls or when necessary, an in person home visit from a care provider.

Stage 4: Holistic

Holistic maturity Virtual Connected Care provides closed loop systems and care orchestration with minimal human intervention. It describes an experience in which a patient can independently manage their own care and only engage physical health care services when absolutely needed. An example is:

Medtronic closed loop diabetes management

Medtronic has developed a closed loop diabetes management app that integrates data from continuous glucose monitoring devices and controls insulin dosing via an insulin pump. It uses algorithms to automatically correct patients' glucose levels. Patients and providers can monitor the patients' diabetes journeys and allow clinicians to intervene when necessary. The system reduces the time patients need to see their endocrinologist and allows them to entirely manage their diabetes at home, it is a prime example of how a holistic approach to Virtual Connected Care can automate care and deliver better patient outcomes.

Fujitsu and Virtual Connected Care

As AI and data science develop further and new technologies emerge, there will be further possibilities in Virtual Connected Care, that we can only postulate about today. Perhaps advances in robotics and computer 'sentience' will allow interventional procedures to be performed safely in people's homes, or the next generation of CRISPR technology combined with 3D printing of pharmaceuticals will enable personalised medicines to be printed at home or mailed in the post. This is not the topic for today, but it does point to the need for health care organisations to prepare for all futures of Virtual Connected Care by building more sophisticated data analytics capability and embracing data technologies.

Progress along the Virtual Connected Care maturity model requires health professionals, payers and provider organisations to consider the role of technology and data to deliver Virtual Connected Care holistic models that go well beyond like-for-like replacement of current models of care, empowering patients to safely take a greater role in their health and wellbeing. Those working within and around health should adopt an open, collaborative and curious mindset and work with patient groups and multidisciplinary teams to understand which Virtual Connected Care technologies are best suited to today's needs and can evolve over time.

Virtual Connected Care has the promise to improve patient experience, workforce satisfaction, population health and reduce the cost of health care, but this can only happen when there is trust in technology and use of data. Trust requires partnerships with tech providers that understand health data and privacy, have respect for clinicians' and patients' needs and concerns, have superior analytics capabilities, can provide highly reliable platforms and ultra-fast computing.

At Fujitsu we strive to make the world more sustainable by building trust in society through innovation. As a technology partner we build trust in Virtual Connected Care because we understand users through our clinical and technological expertise and through human centred design that explores user experience. We deliver advanced analytics and AI through data science, we deliver and support multi-cloud environments and we host some of the world's most powerful computers. Most importantly, we support our customers to deliver safe, high quality health outcomes.

Fujitsu's Virtual Connected Care credentials

Camp Quality kids cancer app



Fujitsu built a kids cancer application for Camp Quality. The app provides health information in an age-appropriate interactive way to educate and support children and families who are impacted by a cancer diagnosis.

Fujitsu pancreatic cancer diagnostics



Fujitsu and Southern Tohoku General Hospital have commenced a joint research project on AI technology for detecting pancreatic cancer from non-contrast CT images. The AI detects early pancreatic cancer features in non-contrast CT scans that identifies normal pancreatic tissue and distinguishes this from cancerous tissue.

Helsinki University Hospital, Gestational Diabetes App



Fujitsu in collaboration with Helsinki University Hospital is currently developing a mobile application that will be able to capture and record a pregnant woman's blood glucose level, activity nutrition, pulse, and daily weight, making the data available to health care professionals in real time. This app leverages AI to improve the detection and treatment of diabetes during pregnancy.

Project Sagasu, in collaboration with GE Healthcare and Macquarie University



Project Sagasu focuses on using AI to detect brain aneurysms and save lives. The project seeks to overcome the issues faced in detecting aneurysms due to the shortage of skilled staff who need to look at these CT scans. Utilising AI, the efficiency and accuracy of brain aneurysm detection is greatly increased.



If you are interested in understanding more about Fujitsu's role in Virtual Connected Care or health care more broadly in Australia and New Zealand contact:



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