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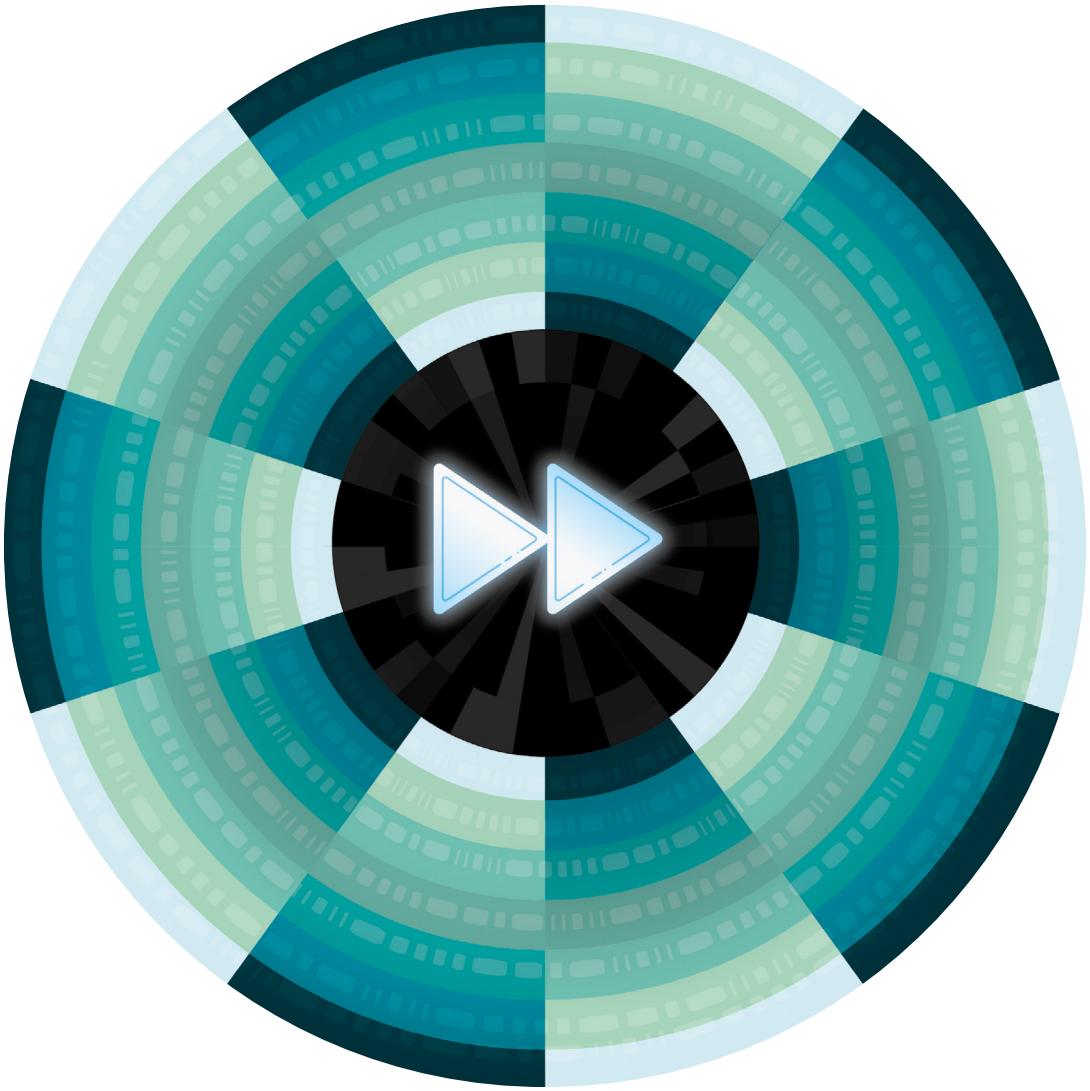

The future unmasked

Predicting the future of healthcare and life sciences in 2025

Prediction Five
Care is designed around people not place

Deloitte Centre *for*
Health Solutions

Foreword

Welcome to our fifth prediction *Care is designed around people not place* from our report, *The future unmasked: predicting the future of healthcare and life sciences in 2025*. This is the fifth of ten predictions, all of which have been informed by emerging evidence of the impact of the COVID-19 pandemic on society and the health ecosystem. They have also been shaped by our research insights including our global 2040 Future of Health campaign. This fifth prediction looks at what we expect healthcare delivery models to be like in the world in 2025.

Since the start of the COVID-19 pandemic, healthcare providers have implemented a major transformation programme, reorganising services and training staff to work in new ways in unfamiliar teams. Moreover, the rate of the adoption of virtual healthcare technology has accelerated across the world. Healthcare teams have developed and implemented new ways of working while keeping patients safe. Digital working is becoming the 'new normal'.

In 2025, the integrated healthcare delivery model is adaptive based on digital-first triaging and signposting patients to the most appropriate care setting. Networks of primary care providers manage population health needs in a patient-centric healthcare model. Advanced network connectivity and data interoperability provides an array of opportunities around real-time monitoring combining data from biosensors, health applications and personal health records, including the use of digital twins to predict and monitor responses to disease and treatments.

Our fifth prediction is brought to life through a series of portraits of the experience of individuals in 2025, with reference to the evidence today to predict what the future might look like tomorrow.

Stay tuned for the subsequent predictions in our series of ten.

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Care is designed around people not place

Fully integrated care models are delivering more accessible, efficient and cost-effective patient-centred care

Prediction: In 2025, the integrated healthcare delivery model is adaptive based on digital-first triaging and signposting patients to the most appropriate care setting. Networks of primary care providers manage population health needs in a patient-centric healthcare model. Advanced technologies and data interoperability provide continuous connected care. Digital tools support HCPs in co-developing personalised care plans with their patients. AI-enabled RPM and point-of-care diagnostics collect and interpret real-time data on vital signs, whether in hospital or at home, so HCPs can intervene early. Enhanced HCP-to-HCP communication provides more coordinated, efficient and cost-effective care. Advanced network connectivity provides an array of opportunities around real time monitoring, combining data from biosensors, health applications and personal health records. This includes the use of digital twins to predict and monitor responses to disease and treatments.

The world in 2025

- Healthcare services and clinical pathways have been redesigned with and around the needs of specific patient groups to deliver seamless integrated care.
- HCPs in primary care act as care navigators and co-create patient care plans.
- Widespread use of AI-enabled technologies have enhanced care delivery including pharmacy dispensing, smart ambulance services and radiology and pathology services. Virtual command centres manage customer relationships, including RPM.
- Telehealth services involving continuous RPM at home and in hospitals, transmitted via the cloud and displayed through real-time dashboards alert HCPs to deterioration in a patient's condition.
- Digital hospitals cater to patients requiring urgent or more complex interventions, including robotic critical care and complex surgical procedures.
- Community health hubs in partnership with voluntary, private, health and social care sectors provide a hybrid (virtual and face-to-face) one-stop shop. They deliver high quality preventative clinical services (such as ophthalmology and dentistry), rehabilitation, phlebotomy, diagnostics and minor urgent care.
- Automation and AI algorithms have enhanced pharmacists' responsibilities, including diagnosing and prescribing approved medications and managing chronic diseases.
- Retail pharmacies enhance the consumer experience using 3D printing, self-check kiosks, telehealth, 5G-enabled telehealth, and same-day delivery.

Conquered constraints

- **Skills and talent:** Multidisciplinary teams facilitate collaboration amongst the different professional groups and functions working successfully across organisational boundaries to deliver care in the most appropriate settings. New models of education and training have equipped staff to use digital technologies, AI and genomics to design services around the patient.
- **Funding:** Budgeting in silos has been replaced with integrated care budgets to support population health management. Funding extends to telehealth services and social prescribing to support equality of access to digital solutions. Data-driven funding models have attracted new stakeholders, driving innovation across the health ecosystem.
- **Regulation:** Regulators help support innovation while promoting public and provider safety. They work with provider organisations to develop products and solutions based on a security-by-design mind-set and a trustworthy framework for data exchange. Compliance with robust cyber security standards has reduced risks, despite the increased use of connected medical devices.
- **Data and interoperability:** Data science and cloud technologies have improved the security, completeness and quality of health and behavioural data. Agreed interoperability standards have accelerated data sharing between all stakeholders, enabling insights from these data to inform shared decision-making, and enable real-time diagnosis. The emergence of 5G, cloud and edge computing together with AI algorithms has provided the analytical scale and speed to drive the new virtual healthcare ecosystem, including data simulation and visualisation, with strict protection of patients' data.

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Imagine the world in 2025

Virtual wards and digital command centres optimise hospitals' clinical and operational services

As part of a new partnership, some 50-plus hospitals have aggregated care delivery monitoring into a single digital command centre. Mohammad is the centre director, managing a team of 200 medical professionals on-site and 400 team members off-site who monitor and manage patients remotely using cloud-based, interoperable electronic health records. On their health record, patients have a dashboard showing information on their Health ID, hospital location and vital signs trend line. The patient's risk status is symbolised as a simple green dot for low risk and red for high risk – that beeps intermittently. The team monitors red dots closely and alerts the hospital's own staff or the field force about possible interventions if a patient's risk escalates. Digital real-time monitors track a patient's health in the hospital and at home, and the command centre uses AI and predictive analytics to help with diagnosis and treatment plans. Patient-facing virtual assistants also make direct requests to the command centre (using natural language processing) which the team reviews, allocating support accordingly. Mohammad obtains real-time data on operational efficiency, and his statisticians use predictive analytics on hospital (clinical and operational) and community health data to forecast needs for clinician and nursing staffing, supply chain operations and logistics to ensure efficient use of resources.

Streamlining the patient's experience of care, from home to hospital discharge

Kate's heart disease has worsened, and in two weeks she will be undergoing a coronary angioplasty at her local hospital to improve blood flow through her coronary arteries. To learn about her condition and what to expect from the surgery, she is using an app prescribed by her physician during her pre-operative assessment. The app includes directions to the catheterisation laboratory where the surgery will take place, parking information, and where her partner can wait during her surgery. Ahead of the appointment, the app prompts Kate to complete pre-operative forms about her health, and when she arrives at the hospital, she is given a smartwatch that monitors her vital signs. This information is fed directly into her electronic health records. Kate's surgeon can access her vital signs data, consent forms and history via her electronic record which he reviews in advance. Before and after the surgery, Kate is provided with real-time information on the progress of her health via an iPad that connects to her wearable. A monitor above her bed also displays the information in real-time for her care team to view. She has access to a health-bot hologram which answers her queries. Once Kates electronic discharge plan is activated, the pharmacy is automatically notified to dispense her prescription, and her smartphone app notifies her partner she is ready to be picked up. The app provides information about her medication, what to expect throughout recovery, diet and lifestyle advice, wound management advice and tracks her progress to support Kate's speedy recovery.

Remote monitoring and delivery of personalised antimicrobial therapy

Sally is experiencing symptoms of a urinary tract infection (UTI). She has a history of recurrent UTIs and her electronic health record includes a history of the antibiotics she has received and found to be effective in the past. She uses her smartphone app to book a virtual appointment with a medical professional. Her doctor, Dr Richards, asks her to use a home testing kit to confirm her diagnosis. The kit is delivered to Sally via her local pharmacy on the same day. The results are immediate: the test is positive, showing that Sally has a UTI caused by Escherichia coli (E. coli), a type of bacteria commonly found in the gastrointestinal (GI) tract. The result is uploaded instantly to her electronic health record, and Dr Richards is notified. Through an AI-enabled clinical support tool that looks at Sally's history and pharmacogenetic profile, Dr Richards sees which antibiotics are most suitable for her, to provide the correct therapy at the correct dosage. Through the smartphone app, Dr Richards arranges for Sally's antibiotics to be delivered to her home via her local pharmacy. She requests that Sally uses a wearable device to assess remotely any signs of intolerance to the antibiotics. Through continuous remote monitoring, Dr Richards can see that she does not have any signs of an inadvertent reaction and Sally reported that her symptoms have cleared.

Note: All elements on this page are from a perspective of 2025 and are fictional

Evidence in 2020

Freenome: Artificial Intelligence Cancer Diagnostic

The Longevity Vision Fund has invested in Freenome, which has developed early detection blood-based diagnostic tests for cancer. In a recent study, Freenome's diagnostic test demonstrated a 94% specificity (patients who do not have the disease) and a 94% sensitivity (patients who do have the condition) for early-stage colorectal adenocarcinoma. The standard genetic diagnostic rate is in a range of 33% to 98% sensitivity and a range of 72% to 99% specificity.[63,64]

Bradford Teaching Hospitals NHS Foundation Trust (BTH) opens a digital command center

In November 2019 the Bradford Teaching Hospitals NHS Foundation Trust (BTH) opened a digital command centre to help a centralised 'control' team see the full picture of hospital activity in real time. The team monitors a 'wall of analytics'– multiple digital screens on the wall–that pulls streams of data from various sources such as BTH's EHR system, patients' vitals sensors, and other scheduling systems to make a real-time impact on all operational, clinical and financial decisions.
With over 96% utilisation and a 40% increase in ER visits in the past ten years, the command centre will help optimise the resources and improve how patients move in and out of the hospital. The 'wall' enables faster ambulance transfer times, faster intra-hospital patient movements, getting home quicker, and even fewer surgery cancellations due to winter pressures.[65]

Israel-based Sheba Medical Center launched the ARC innovation center in 2019

To promote open innovation in the medical arena, the Israel-based Sheba Medical Center launched the ARC innovation center in 2019. ARC (accelerate, redesign, collaborate) is as an incubation hub for start-ups to work with hospital executives in identifying unmet clinical needs through breakthrough solutions. It currently focuses on innovation in six areas – precision medicine, telemedicine, virtual reality (VR), big data and AI, surgical innovation, rehabilitation, each headed by Sheba's senior physicians, along with the start-ups. A major feature of the ARC is the fully digital reality-based departments in the medical centres. Sheba is working with extended reality start-up XRHealth to use a digital reality platform for cognitive therapy, physical therapy, pain relief and other applications throughout the hospital. XRHealth's platforms are particularly useful in helping medical professionals analyse patient data in real time to track their recovery both physically and remotely.[66]

Ohio State University's (OSU) Wexner Medical Center uses bedside tablets that act as virtual care assistants for patients and relatives

The tablet, with the OSUMyChart application, allows patients to see their EHRs, ask questions, view test results, and schedule appointments. Patients can set medication alarms, schedule visits by physicians and relatives, view test results, or read educational material about their diagnosis. Patients can also make minor requests for water, snacks, and even for help going to the toilet, without using a nurse call button.[67]

A digital biomarker for diabetes

Given the multifactorial vascular effects of diabetes, researchers hypothesised that smartphone-based photoplethysmography, ((PPG) a simple optical technique used to detect volumetric changes in blood in peripheral circulation) could provide a widely accessible digital biomarker for diabetes. Researchers developed a deep neural network (DNN) to detect prevalent diabetes using smartphone-based PPG from an initial cohort of 53,870 individuals (the 'primary cohort'). Their findings demonstrate that smartphone-based PPG provides a readily attainable, non-invasive digital biomarker of prevalent diabetes.[68]

HBKiCare, home monitoring solution jointly marketed by the UAE and Israel

The first product to be jointly marketed from the United Arab Emirates (UAE) and Israel is HBKiCare a "universal remote healthcare IoT platform" and home-care kit, soon to be released by Dubai's Hamad Bin Khalifa Department of Projects HBK DOP and the Ramat Gan-headquarted healthcare IoT software developer, Sure Universal. The solution enables "continuous patient monitoring with maximum flexibility and affordability," recording electrocardiogram (ECG), temperature, pulse, blood oxygen and pressure measurements.[69]

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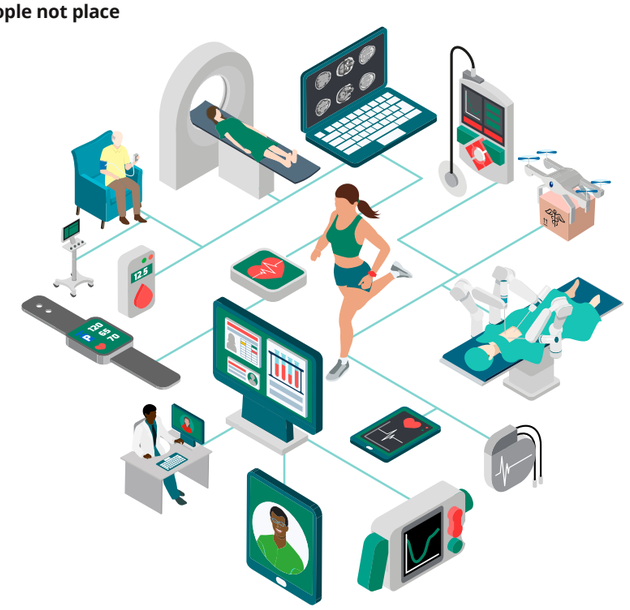
The COVID-19 impact

Deloitte view on the impact of COVID-19
Since the start of the COVID-19 pandemic, healthcare providers have implemented a major transformation, reorganising services and training staff to work in new ways in unfamiliar teams. Moreover, the rate of the adoption of virtual healthcare technology has accelerated across the world. Healthcare teams have developed and implemented new ways of working while keeping patients in a safe, remote environment. This includes the use of virtual consultations, RPM, and the use of apps and wearable devices for disease surveillance and interventions. New business models have been developed at speed with medical leaders, including hospital boards collaborating with private providers to create the right infrastructure including the tools and training to enable a digital-first health ecosystem. As healthcare providers attempt to recover and restore normal activity levels, infection control measures and social distancing rules are being used where possible to help minimise unnecessary interactions between patients and HCPs to help mitigate the spread of COVID-19. Digital working is becoming the 'new normal'.

Rapid deployment of emergency and outpatient ophthalmology video consultation services at Moorfields Eye Hospital NHS Foundation Trust
Moorfields Eye Hospital NHS Foundation Trust is one of the largest providers of ophthalmology services in Europe. Between 2018 and 2019, the Trust handled nearly 800,000 patient encounters, and about 100,000 patients attended the main accident and emergency (A&E) department or an emergency satellite clinic. The COVID-19 pandemic and subsequent UK lockdown in March 2020 created two immediate challenges for the Trust: how to identify and manage the most critical emergencies while minimising hospital visits, and how to provide care to those patients for whom prolonged care disruption could lead to significant harm or loss of vision. The national roll out of video consultations in Trusts across England, led by NHS England and NHS Improvement, enabled rapid roll out of multiple services across the Moorfields network, covering both drop-in and scheduled appointments.[70]

Care is designed around people not place



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Endnotes

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