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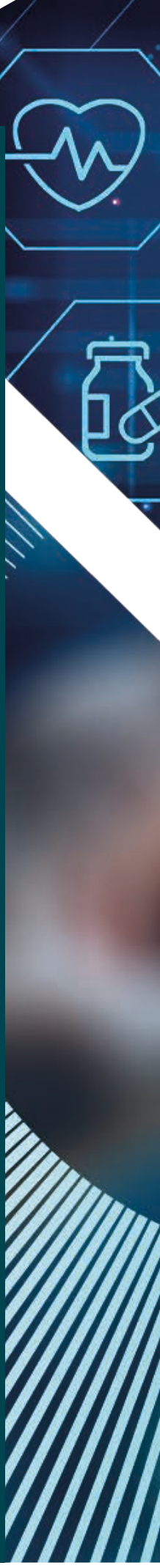
Accelerating the future
Intelligent healthcare and the democratisation of health data

Life sciences and healthcare predictions 2030

Deloitte Centre *for* Health Solutions

Intelligent healthcare and the democratisation of health data

Delivering 5P healthcare and the quintuple aims of health



Prediction 2030

Virtual care, community hubs, and digital-first triaging and access, have reduced the demand for reactive hospital care. This has enabled 'smart' hospitals to focus more on specialist care, separating complex and non-complex care pathways and providing virtual access and follow-up. Groups of providers share automated back office functions such as HR and finance and technology-enabled ancillary functions (like laboratories, pharmacies, and linen and food services), aimed at optimising care delivery. A renewed focus on population health management (PHM) has led to a shift to cost-effective home care for older people and those with long-term health conditions. This shift was driven by AI-enabled command centres, always-on biosensors/wearables and the collection and integration into electronic health records (EHRs) of biometric data, patient reported outcomes, and other relevant health related data. Health data is democratised, digitised, secure and readily available to all care providers. GenAI-powered data insights enable the delivery of 5P (predictive, proactive, personalised, participatory and precise) healthcare, provided by an agile, adaptable and collaborative healthcare professional (HCP) workforce. These changes are helping to realise the quintuple aim of healthcare: better patient experience, better patient outcomes, lower costs, improved clinician well-being, and health equity.


AI

The world in 2030

- AI is integrated into the fabric of healthcare technologies, from radiology to routine consultations and clinical decision-making.
- Hospitals operate or share centralised digital command centres that automate activities such as admissions and discharge, workforce recruitment, and scheduling.
- AI-enabled scheduling of patient transport, food and medication, and blood and tissue sample logistics have improved productivity and patient satisfaction with services.
- Health systems have shifted more resources to prevention, using connected care and community hubs and real-time monitoring (including digital biomarkers), to identify population health risks and intervene early to mitigate these risks.
- Always-on sensors and digital technologies have improved the monitoring of patients across all places of care, detecting problems such as falls or changes in vital signs and alerting HCPs in real-time.
- Smaller portable diagnostic and surgical equipment, and targeted therapies, have made local care more accessible, precise and personalised.
- Hospitals are largely modular, facilitating conversions of space to meet changes in demand while minimising disruption (e.g., during flu season, more areas can be converted to respiratory support facilities).
- Hospitals prioritise meeting environmental, social and governance (ESG) targets, with improved energy, water and waste management, circularity in the use of resources, and a focus on health equity.
- Digitally-savvy leaders and mature, cohesive multidisiplinary teams (MDTs) have led the digital transition, prioritising workforce agility and flexibility, and other drivers of job satisfaction.
- GenAI-bots enable clinicians to automate the creation of clinical summaries, with secure, convenient and accurate charting of all relevant information needed to provide safer care and reduce the risk of adverse incidents.

Conquered constraints

Skills and talent

Data scientists operate AI-enabled workforce planning and scheduling and obtain insights into the drivers of job satisfaction in real-time, helping to improve the allocation and productivity of staff. MDTs facilitate collaboration amongst the different clinical groups and functions working successfully across organisational boundaries to deliver care in the most appropriate settings. All HCPs are trained in the use of AI and genomics data, AI/virtual reality (VR)/augmented reality (AR) technologies, and in undertaking virtual consultations, with an emphasis on problem solving and effective communication and engagement.

Funding and business models

Integrated care budgets prioritise PHM, prevention, screening and early interventions, with associated incentives and penalties based on improving outcomes and reducing health inequalities. Funding models and the sharing of risk between providers and payers are value-based. Government investments and incentives have helped level-up digital maturity across health ecosystems. Public/private collaborations, including social impact bonds, have been used to bridge investment gaps and promote prevention.

Regulation

Ethical AI frameworks alongside robust governance provide high levels of assurance over healthcare organisations compliance with the financial, quality and safety regulations that apply to all aspects of integrated care delivery. Robust audit processes ensure compliance with regulatory requirements governing the use of AI-enabled medical devices and chatbots.

Digitalisation and data

Data science, cloud technologies and distributed ledgers have improved interoperability and the cyber-resilience, quality and completeness of health data. Fast Healthcare Interoperability Resources data standards together with 6G, cloud and edge computing support the scale, speed, capacity and capability of data-driven healthcare.

Imagine the world in 2030*

How community care hubs are helping older people stay independent for longer

Over the past five years people have become more confident accessing a wide array of options to support their healthcare needs, such as digital platforms, wellness hubs, and virtual wellness coaches. There has also been much more investment in prevention and support to improve well-being. Lira, although retired, considers herself a very fit, 70-year-young person. She uses a skin patch to monitor the impact of her diet on her health and a digital watch to track her activity and vital signs. However, a fall while walking has left her with chronic back pain. Following a virtual consultation with a physiotherapist she was referred to her local community health hub, where an initial consultation with a virtual agent provided her with a one-stop appointment schedule for imaging and treatment assessment. The health hub enables patients to log into a booking calendar with details of up-to-date waiting times and which clinicians are available and provides real-time access to test results. Lira opted for a fully virtual at-home treatment plan guided by a GenAI coach. Her adherence to the treatment plan is monitored via sensors and her performance outcomes are collected in real-time and shared with her therapist, who adjusts her treatment as and when needed. She is prompted by her GenAI coach if she forgets a session and can enjoy her lifestyle confident in the knowledge that her ongoing treatment and support is customised to her needs.

How clinicians are using multiple data sources, analytics and AI to deliver better patient reported outcomes

Clinicians increasingly see themselves as health partners, not just providers. José is an oncologist. Like many of his colleagues he has received training in the use of AI and genomic technologies. He is part of a MDT that includes data scientists specialised in multiomics, who have helped him improve the speed and accuracy of diagnosis and create precise, personalised treatment plans for his patients. He spends part of his day at the hospital command centre working with a GenAI co-pilot to track patients' health in real-time. This tool analyses data from multiple sources, such as patients' wearable devices, patient reported outcomes and lab results, enabling José to make accurate medical decisions more quickly. José is passionate about keeping up to date with advances in cancer research. He uses the same GenAI co-pilot to direct him to the latest oncology research and training opportunities and uses AR/VR systems and the metaverse to interact with local and international colleagues. He prides himself on being an advocate for health equity, and he has pioneered the use of data on the social determinants of health to identify the specific needs of his patients based on their social circumstances. He also works with the hospital management team to tackle the barriers they face (such as access to convenient appointment times and transport). José has recently written a research paper evidencing the significant improvements in patient reported outcomes that his approach has helped to deliver.

How a smart hospital is enabling staff to work differently improving productivity and job satisfaction

Dr Shah is a senior manager with responsibility over the past five years for the development of a new 'smart' hospital alongside a system-wide shift to value-based primary care, prevention and well-being services. This shift has reduced the number of patients requiring acute care, enabling the hospital to pivot towards providing highly productive surgery and trauma services alongside complex care. Most services (including recovery after surgery) are now provided in out-of-hospital locations or virtually, transforming the hospital into a 'hospital without walls'. Dr Shah and his team of data scientists have also focused on patient data provenance, curation, integration and governance, including ethical data privacy and security considerations. This forensic focus on patient data has enabled the successful implementation, three years ago, of an integrated EHR system. This has had a measurable impact on system productivity and efficiency. Dr Shah has also changed the hospital's operating model, and in partnership with disruptors has integrated a wide range of AI-enabled software and technology assets into clinical and non-clinical workflows. This has freed up clinician time and enabled the hospital to provide a seamless treatment experience for patients (including hospital onboarding, patient flow and in-hospital patient monitoring). This AI-augmented environment has helped increase staff job satisfaction. Dr Shah is now focused on redesigning the hospital spaces for optimal healing (with attention to lighting, bed positioning, temperature, green spaces and colours).

* Note: All elements on this page are from a perspective of 2030 and are fictional

Evidence in 2024

The rise of smart hospitals

The smart hospital market is estimated at US$60.35bn in 2024 but is expected to grow to $148.36bn in 2029, at an annual rate of nearly 20%. Europe is currently the largest market, but Asia Pacific is the fastest growing.[1] Smart hospitals integrate a wide range of technologies, such as Internet of Things, 6G, Cloud, robotics, 3D printing, AR/VR, genomics, and telemedicine. **GE HealthCare Korea**, **LG Electronics** and **Microsoft Korea** have announced a collaboration to build smart hospitals. Microsoft Korea is helping to build a platform for using digital solutions in healthcare, including Azure OpenAI for hybrid cloud, GE HealthCare will leverage its digital medical solutions (command centres and digital twins), and LG Electronics will provide smart monitors, medical robots, displays and communication networks. The three businesses will develop joint operating models for next-generation medical equipment, AI medical solutions, and digitalisation of work.[2]

Booming remote patient monitoring (RPM) market

The global market for RPM software and services is expected to reach US$78.4bn by 2032, up from $6.7bn in 2022 (average annual rate of 29% during this time period).[3] A study by **Imperial College London** found that patients who had a heart attack and were followed by telemedicine (i.e., had devices installed at home that allowed them to send their vital signs to specialist cardiology teams and call them for a remote consultation) were 76% less likely to be readmitted to hospital within six months than those on standard care (i.e., those taking medicine, and consulting their GPs or attending hospital if they had cause for concern).[4]

Command centres in healthcare

An extensive survey by **Philips** for its Future Health Index 2024 report found that 92% of healthcare leaders believe that automation of repetitive tasks and processes is critical for addressing staff shortages, an equal percentage think it will save HCPs time by reducing administrative work, and 89% are seeing a positive impact of virtual care in easing staff shortages and enabling them to spend more time with patients.[5]

Tan Tock Seng Hospital (Singapore) and its Command, Control and Communications (C3) system, implemented in 2019.[6] The C3 system is seen as the brain of the hospital, monitoring situations across different departments through data and video feeds, supporting decision-making based on this information to optimise patient flow via prescriptive analytics and 'self-learn and self-execute' standard operating procedures. The C3 system was crucial during the COVID-19 pandemic for managing bed and lab testing capability, and for the deployment of human resources.[7]

GE HealthCare's Command Center software is a real-time and predictive control system designed to optimize patient care operations and impact clinical and financial outcomes. In the US, **Tampa General Hospital** partnered with GE Healthcare to develop an AI-powered Command Centre named CareComm. CareComm has reduce average length of stay hospital by half a day, cut excess days by 20,000 and save US$40mn in first two years.[8] **AdventHealth** also partnered with GE Healthcare to build the AdventHealth Mission Control. With this Command Centre, patients in the emergency room (ER) have had a bed assigned 15 minutes faster, ER admission to bed placement times decreased by more than 23 minutes, lateral transfer of patients from one hospital to another due to overcapacity increased by more than 600% with transport times among interhospital transfers decreasing by more than 15 minutes, and the phone call abandonment rate for AdventHealth's Transfer Center decreased from 8% to 3%.[9]

Digital twins

Digital twins (digital copies) of potential and actual physical assets, processes, people, places, systems and devices can mimic healthcare systems or settings, patients, their organs and how their metabolism interacts with drugs.[10] In the era of predictive, precise and personalised healthcare the digital twin market is expected to increase in size at an average annual rate of 61% between 2023 and 2028.[11] For example, **Atlas Meditech** provides a collection of multimedia tools for brain surgeons to prepare themselves ahead of an operation. The tools include a medical imaging framework and 3D development platform providing AI-powered decision support and high-fidelity surgery rehearsal platforms. Accelerated computing and digital twins create a patient specific model of the brain allowing surgeons to rehearse using a highly realistic simulation. Practice can be either onscreen or in immersive VR using a virtual brain that matches the patient's in size, shape and lesion position. To create a digital twin of a patient's brain, the Atlas Pathfinder tool for radiologists automatically annotates MRI and CT scans to segment normal structures and tumours.[12]

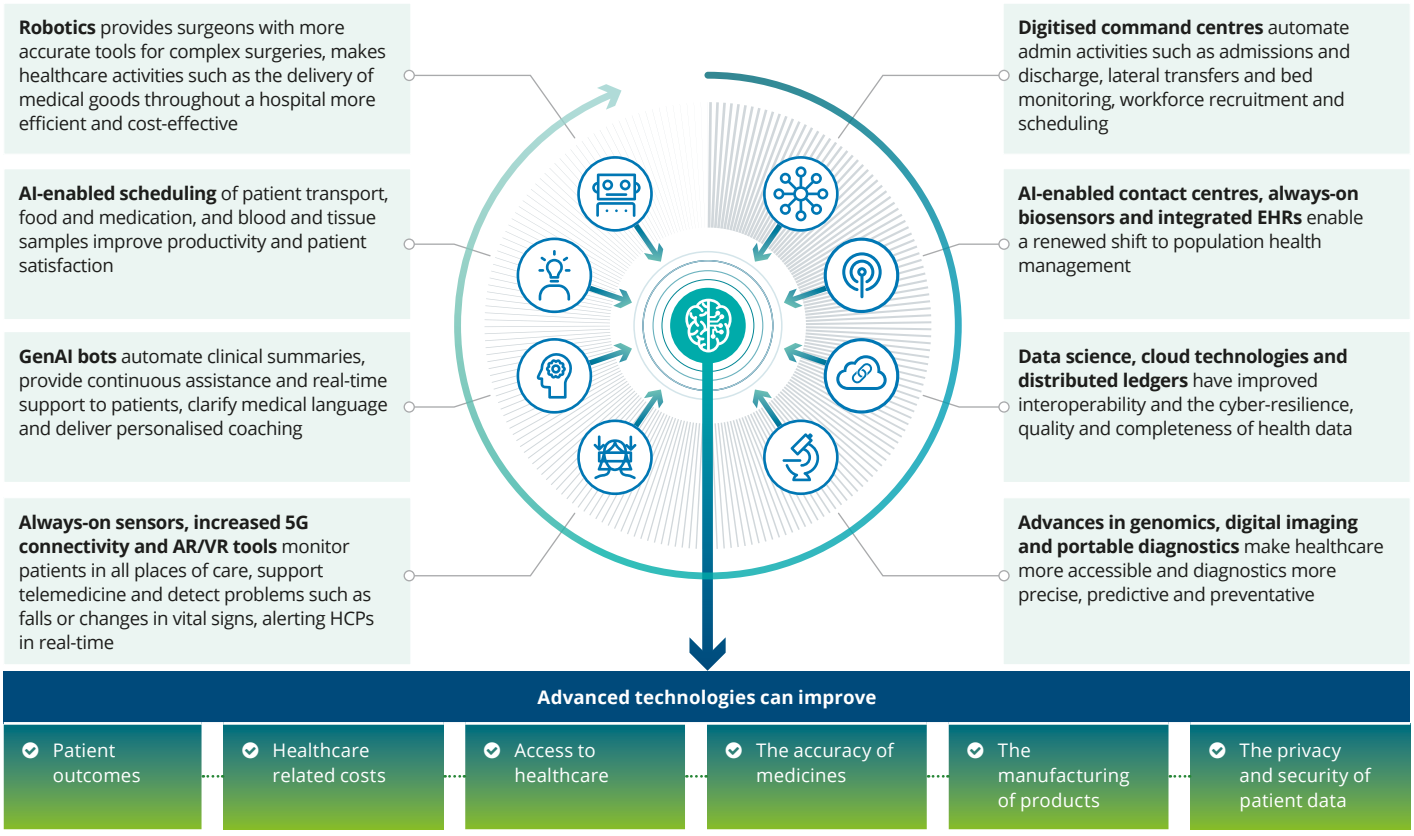
Artificial intelligence and the transformative power of GenAI

The impact on intelligent healthcare

The ability of GenAI to analyse complex and unstructured verbal and written information and use large language models (LLMs) to update EHRs without the need for clinician/nurse transcription, is expected to improve clinical decision-making, improve patient flow and efficiencies in healthcare settings, and create predictive models for crisis preparedness. To prepare for AI integration, HCPs will need to build their data fluency and technical skills and learn the applications of AI in their field of interest or expertise. They will also need to be aware of best practices and standards such as data quality, privacy, security and ethics. More specifically:

- GenAI can accelerate the dissemination of relevant, timely medical information for education/training.
- GenAI-enabled staff help desks can provide continuous assistance and customised responses to employees across a range of services (such as HR, Finance and IT), improving staff experience and productivity.
- GenAI-enabled HR systems can improve the efficiency of recruitment and retention practices.
- GenAI chatbots can support patients by clarifying medical language and helping them to navigate healthcare settings, including visit scheduling, treatment and payment processes.[13]
- Human-like GenAI assistants can interact in a personalised manner with patients (e.g., navigating hospital setups, symptom monitoring, pre-intervention queries and post-intervention discharge and follow-up) releasing time for clinicians to spend on care.

Disruptive technologies have revolutionised the delivery of healthcare, empowering the workforce and transforming patient care



Source: Deloitte analysis.

Examples in 2024

Philips has launched an ambulatory cardiac monitoring service across 14 healthcare providers in Spain, pairing its unique wearable ePatch with its AI-driven Cardiologs analytics platform. This extended wear monitor detects life-threatening heart arrhythmias (HA), providing cardiology and neurology teams with continuous data for up to 14 days and detecting 2.5 times more clinically significant HAs than its conventional 24-hour monitor. It enhances patient comfort, improves care access and clinical outcomes and reduces costs by integrating an analysis program with AI-based analytics. It also expedites hospital discharge and reduces the average length of stay.[14]

Medtronic has launched a new Live Stream function for its Touch Surgery system which features AI capabilities. Fourteen new AI algorithms enhance its digital capabilities within post-operative analysis and deliver AI-powered surgical insights for laparoscopic and robotic-assisted surgery.[15]

China Medical University Hospital and Microsoft Taiwan have developed a Generative Healthcare Intelligent (gHi) System that captures and recognises verbal input from HCPs, and generates medical records using the Microsoft Azure platform, which reduces time spent on the manual maintenance of medical records by 75%. The gHi system allows clinicians to record medical information verbally, and uses LLMs to summarise and analyse text and generate medical recommendations.[16]

The Mayo Clinic has entered a strategic collaboration with **Clarapath**, a medical robotics company transforming the way pathology laboratories process tissue, propelling a new era of laboratory automation. Clarapath's SectionStar provides an automated tissue sectioning, transfer and quality control system that combines robotics, computational AI, and integrated histopathology workflows, resulting in standardised slide outputs and quantitative quality metrics. This significantly accelerates sample processing and reduces human involvement and errors.[17]

Endnotes

1. Smart Hospital Market Size & Share Analysis – Growth Trends & Forecasts (2024 – 2029), Mordor Intelligence, accessed on 09 August 2024, See also: https://www.mordorintelligence.com/industry-reports/smart-hospital-market
2. GE, LG, Microsoft tie up for smart hospital project in Korea, Mobile Health News, 15 April 2024. See also: https://www.mobihealthnews.com/news/asia/ge-lg-microsoft-tie-smart-hospital-project-korea
3. Global Remote Patient Monitoring Software and Services Market, Market.us, October 2023. See also: https://market.us/report/remote-patient-monitoring-software-and-services-market/
4. Remote monitoring of heart attack patients reduced hospital readmissions, Imperial College London, 08 April 2024. See also: https://www.imperial.ac.uk/news/252534/remote-monitoring-heart-attack-patients-reduced/
5. Future Health Index, Philips, 2024. See also: https://www.philips.com/c-dam/corporate/newscenter/global/future-health-index/report-pages/experience-transformation/2024/first-draft/philips-future-health-index-2024-report-better-care-for-more-people-global.pdf
6. How a central command center helped Singapore's National Healthcare Group streamline care delivery, Philips, 10 October 2023. See also: https://www.philips.com/a-w/about/news/archive/features/2023/20231010-how-a-central-command-center-helped-singapores-national-healthcare-group-streamline-care-delivery
7. Command, Control and Communications (C3) system, Synapxe, accessed on 09 August 2024. See also: https://www.synapxe.sg/healthtech/covid-19/command-control-and-communications-c3#about
8. Operational transformation reduces length of stay by ½ day, GE Healthcare, 2024. See also: https://www.gehccommandcenter.com/hubfs/CC2020/docs/Case-Study-TampaGeneralHospital-LOS-JUN2024.pdf
9. AdventHealth Mission Control Drives Improved Emergency Department Outcomes, AdventHealth, 19 September 2022. See also: https://www.adventhealth.com/news/adventhealth-mission-control-drives-improved-emergency-department-outcomes
10. Digital twins: Bridging the physical and digital, Deloitte Insights, 15 January 2020. See also: https://www2.deloitte.com/us/en/insights/focus/tech-trends/2020/digital-twin-applications-bridging-the-physical-and-digital.html
11. Digital Twin Market, Markets and Markets, July 2023. See also: https://www.marketsandmarkets.com/Market-Reports/digital-twin-market-225269522.html
12. Digital Twins are the Future of Brain Surgery, Engineering.com, 27 November 2023. See also: https://www.engineering.com/digital-twins-are-the-future-of-brain-surgery/
13. How AI Is Helping Build Smart Hospitals That Deliver Better Patient Care, PYMNTS, 12 February 2024. See also: https://www.pymnts.com/news/artificial-intelligence/2024/how-ai-is-helping-build-smart-hospitals-that-deliver-better-patient-care/
14. Philips ePatch and AI analytics platform rolled out to 14 hospitals across Spain to monitor heart patients, Philips, 22 May 2024. See also: https://www.philips.com/a-w/about/news/archive/standard/news/press/2024/philips-epatch-and-ai-analytics-platform-rolled-out-to-14-hospitals-across-spain-to-monitor-heart-patients.html
15. Medtronic launches AI platform for robotic surgery, Mass Device, 16 July 2024. See also: https://www.massdevice.com/medtronic-launches-ai-platform-robotic-surgery/
16. China Medical University Hospital, Collaborated with Microsoft Taiwan, Launched GenAI: gHi System, PR Newswire, 02 April 2024. See also: https://www.prnewswire.com/news-releases/china-medical-university-hospital-collaborated-with-microsoft-taiwan-launched-genai-ghi-system-302104047.html
17. Clarapath forms strategic collaboration with Mayo Clinic to advance pathology tissue processing, Med-Tech Innovation, 02 May 2024. See also: https://www.med-technews.com/news/latest-medtech-news/clarapath-forms-strategic-collaboration-with-mayo-clinic-to-advance-pathology-tissue-processing/

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