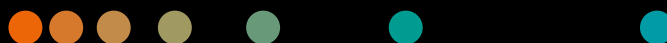


Case study

Scaling up and sustaining the digital transformation of US hospitals brought about by covid-19

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Foreword by Siemens Healthineers

Siemens Healthineers strives to understand the broader changes taking place through hospitals and how they may bring in changes to improve working practices, and to share these insights with our community.

One of the transformative developments changing every facet of the healthcare sector is digitalization. Digitalization has been redefining our lives for several decades now, and the recent pandemic has served to accelerate many of these changes. It is essential that healthcare providers, patients, and all stakeholders understand the scope and breadth of these changes, and learn how to use them for their benefit – to expand precision medicine, transform care delivery and improve patient experience.

In the article below, part of a series, written by the Economist Intelligence Unit and based on extensive, first-hand research, we are exploring how US hospitals quicken their digital transformation: having a cloud-first data strategy and integrated digital infrastructure is key for a quick reaction in times of crisis. But technology is nothing without people. The article highlights how staff need to be trained properly to enable digital transformation sustainably for improved patient care.

This article is the second in a series that will present original insights based on exclusive research and interviews with global healthcare leaders. Complementing this, Siemens Healthineers has analyzed survey data, prepared by The Economist Intelligence Unit, to further explore future digital transformation in hospitals. For more information on Siemens Healthineers Insights, please visit: [siemens-healthineers.com/insights-series](https://www.siemens-healthineers.com/insights-series)

**Dr. Ralph Wiegner,
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Executive summary

Opportunities

- The necessity of using digital technology to deliver care during covid-19 is akin to a pilot scheme. It has created the opportunity for hospitals to understand how best to utilise digital technology in the short, medium and long term.
- Covid-19 has disrupted not just healthcare delivery, but attitudes. Hospital executives anticipate that the changes made in response to covid-19 will lead to long-term changes to healthcare delivery. Attitudes have shifted, with digital technology now perceived as core to service delivery, rather than an add-on.
- Many hospitals had digital systems in place prior to covid-19, but these had not been widely utilised. Those hospitals able to scale up their systems, for example using cloud-based solutions, have seen rapid and large increases in use.
- Communication and understanding between hospital digital teams and the rest of the workforce is key to bring everyone along with the digital transformation.
- Innovative partnerships within and across organisations including hospitals, academic centres and public health entities have been implemented during covid-19. These include data-sharing partnerships that have facilitated decision-making and response planning. These reactive and short-term partnerships could provide a technical and attitudinal basis for long-term partnerships.
- To realise the opportunities that have arisen in the wake of covid-19, hospitals should seek to understand how, where and when digital technology has (and has not) worked during the pandemic. Capitalising on the shift in attitudes amongst stakeholders and using these experience-based insights could see these temporary changes translate to long-term service transformation to the benefit of all stakeholders.

Challenges

- Strategic direction is needed to ensure that scaling up existing systems or investing in new systems is guided by the organisation's long-term vision and ensures sustainability.
- Scaling up digital systems requires an IT workforce with the knowledge to understand and define the needs of the various organisational stakeholders and patients.
- The workforce delivering care to patients needs training and support to use new systems that is not just technical in nature, but also recognises that delivering high quality digital care requires a different approach to delivering face-to-face care. Training creates a logistical challenge and requires investment of time and resources.
- The digital divide should be acknowledged – not all patients own a compatible device, have suitable internet or telephone connectivity, or have the digital skills to use the technology. Supporting patients through training and technical set-up has been helpful during covid-19, but new delivery models combining face-to-face and digital services need to ensure that they are inclusive.

Scaling up and sustaining the digital transformation of US hospitals brought about by covid-19

As the covid-19 pandemic spread across the US, one of the world's worst-affected countries, hospitals faced an unprecedented dual challenge: coping with the surge in patients with a novel disease while continuing to care for the many non-covid patients whose needs could not be ignored.

From ensuring prompt cancer diagnosis to regular management of chronic conditions like diabetes – itself a covid-19 risk factor – treating non-covid patients during the early heights of the pandemic required a far-reaching reimagining of technology and data, and the systems and mindsets needed to apply both to achieve optimal care. Out of the wreckage of the pandemic, there is evidence of long-term positive changes to US hospitals across all aspects of their services.

Chief information officers (CIOs) and chief technology officers (CTOs) played a critical role in guiding technology adoption and fitting short-term pivots into an already-existing imperative to transition hospitals into the digital era. In the short term, data dashboards helped hospitals to manage scarce resources, from personnel to masks and intensive care unit space, while new partnerships with outside partners brought new levels of service agility, such as the production of 3D-printed facemasks. But leading CIOs believe that the covid-19 crisis has created an opportunity to deploy digital technology across the care spectrum in ways that could permanently re-shape how hospitals operate.

Data partnerships and a spirit of collaboration

The pandemic has catalysed new alliances and deepened partnerships between public and private sectors, and across institutions. Data-sharing initiatives helped hospitals team up with each other – and other stakeholders such as hotels and residential facilities – to share equipment, space and resources.^{1, 2} Now hospitals are playing a role in helping to ensure a safe post-lockdown return to, if not business as usual, a “new” normal.

In San Diego, for instance, county health orders required UC San Diego Health, a private health system affiliated with University of California, San Diego, to screen employees on-site. It later made its screening resources available to others in the local area, with anyone displaying symptoms able to self-schedule a test. The hospital also partnered with its affiliated university and its 15,000 students – in August UC San Diego’s Student Health Services and its Counselling and Psychological Services became the first student health services in the University of California system to share an interoperable electronic health record system with the hospital. This allowed the streamlining of test ordering, result notification and patient care, and enabled faster turnarounds of imaging studies by radiologists, as well as rapid communication of health information for students referred for speciality care.

By integrating health systems, UC San Diego Health allowed an efficient testing and tracing initiative to enable the Return-to-Learn programme, which aims to ease the resumption of attendance and study at the university. “Tools built to support patient care and hospital employees are now being leveraged for the entire student body,” says Christopher Longhurst, the chief information officer (CIO) at UC San Diego Health.

The academic excellence of university-linked hospitals has proved valuable to public health agencies struggling to grapple with the pandemic. The expertise in public health epidemiology of UT Health, which is affiliated with the

University of Texas, helped to inform decisions at the city level, according to Aaron Miri, chief information officer at Dell Medical School and UT Health Austin. “We were able to build data models to produce predictive analytics showing the projected curve if we don’t start enforcing social distancing. We worked with the City of Austin to make sure the mayor had that information so that, as Austin made its decision, UT was feeding in the data models.” This was not just based on the university’s own experience but also the first-hand data that it was collecting as people presented with covid-19, which is translated into “commonspeak which allowed business leaders to make their decisions about the city”.

Hospitals also forged new, on-the-fly partnerships with different teams within the organisation to make creative use of their capacities. “We leveraged our technology colleagues in biomedical engineering to make 3D-printed face shields, which we deployed to the workforce to protect them at a time when face shields were not easy to get,” says Jeffrey Ferranti, chief information officer for Duke Health. UT Health Austin also worked with engineering teams to build customised facemasks that helped them to get through the “pinch” until more PPE was available, recalls Mr. Miri.

Mr. Miri predicts that the pandemic experience has changed the nature of partnerships – especially those involving sharing data – fostering more openness and a spirit of collaboration, which will be useful for dealing with future pandemics. The shock of covid-19 should institutionalise new levels of data collaboration between hospitals, academic centres and public health entities to enable faster, more effective decision-making during a future outbreak.

Bridging physical and virtual care

Hospitals cannot leave behind patients requiring help for other conditions, especially for diseases like cancer where delays in access to care can have significant impacts. Over the past year this has forced hospitals to scale up virtual care, an experience that, while not without challenges, has been in the main so successful that providers are now exploring ways to permanently shift the care model towards virtual consultation.

As the pandemic took hold, hospitals ramped up virtual care, helped by government regulatory reforms allowing them to use consumer-grade video-call platforms like Zoom, consult with patients in other states and receive reimbursement. Although some had virtual care platforms in place before the pandemic, uptake had been limited. UC San Diego Health reached 50% virtual care within a week of the pandemic's outbreak and held more virtual care visits in the first three days than in the entire previous year, according to Dr. Longhurst, the CIO.

Dr. Ferranti recounts a similar experience at Duke Health. "We built our virtual care platform before covid-19, but adoption was slow. We had around ten to 20 visits per week. Since the pandemic we've seen exponential growth in virtual care, with almost 260,000 virtual visits between January and June." The process has gone smoothly from a care quality standpoint, he says, with 94% of patients reporting their needs as having been adequately addressed. The environmental benefits and greater patient convenience are also not trivial, with 6.4m miles of travel saved.

Dr. Ferranti believes that this experience poses fundamental questions about what hospitals are for. "We traditionally think about our services as ambulatory and inpatient. I think in the next five to ten years we have to think about digital services as a core part of what we do," he says. "People are looking for a more convenient care experience that aims at keeping them healthy rather than just dealing with their illness. My hope is that progress we've made

in digital and virtual care for covid-19 – and the legislative changes that have been temporarily enacted – become permanent."

Dr. Ferranti also believes that progress in Internet of Things (IoT) technology provides an enabling environment for virtual care that goes much further than merely consultation. Most notably he sees potential in wearable devices, sensors and home-use digital applications, devices that can monitor indicators like blood pressure or blood glucose and set thresholds, alerting patients and their medical teams if these are exceeded. "We currently take care of patients when they come to our clinics," says Dr. Ferranti. "The future of medicine is keeping them healthy for the 99.9% of time that they are outside our healthcare environment. Remote devices and virtual care technologies let us do that."

However, hospital executives recognise that not all of their functions can be replicated virtually. Mr. Miri highlights that patient preferences must be accommodated as hospitals look to craft a hybrid physical-digital model. "Some people want to come in. There's something about the didactic, tangible experience. Some clinics are in more sensitive areas like women's health. We're going to see a hybrid, bifurcated model in the future." At UC San Diego, virtual care has now fallen to around 25% in the wake of full lockdowns being eased. There is a need to evaluate data from recent months to learn more about how patient experiences have varied across disease categories and individuals – as the team at Duke University's School of Medicine are doing – to translate temporary shifts into permanent, sustainable change.

A digital workforce and worker-friendly technology

Hospital data systems are rarely famed for accessibility, speed or adaptability, but the need to rapidly assemble user-friendly dashboards for covid-19 may have opened a new chapter of healthcare IT systems that are more flexible, user-friendly and transparent.

UC San Diego Health, for instance, made its covid-19 dashboard available to all staff. The creation of real-time situational awareness, from equipment to schedules of virtual visits, brought a level of transparency for all employees that was lacking prior to the pandemic and secured high levels of engagement from staff, according to Dr. Longhurst.

Hospital IT teams have also had to engage with their clinical and physician teams more deeply as they have looked to roll out new systems. In part, this has meant helping healthcare staff to adapt to new technology. "Caring for patients digitally is different than in person," explains Dr. Ferranti. "You have to manage the video conference platform and the electronic health records while still making sure to look at the patient, for instance. There are things you need to understand to deliver high quality digital care." Duke Health trained 3,500 providers over a month to bring its digital programmes to scale.

The process is not just didactic and technical. Hospital executives have also had to work consultatively with physicians who had reservations about shifting to new systems at such speed. Mr. Miri says that physicians need to be closely engaged in the rollout process, to assuage and address concerns about maintaining care quality when using new technology. "It's not just about being savvy with data and tech. You also need a clinical body willing to listen to a technology leader that can talk the talk with them and show the physicians and clinicians and nurses how to move to a digital model without losing any of the precision that they're expecting."

This interchange could be crucial in the longer term. As hospital systems adopt new technologies, from service chatbots to AI-based diagnostics, the role of the human workforce will need to adapt and change. The hope is that digital systems will lighten human workloads, especially in rote tasks. But without appropriate upskilling and engagement, those technologies could complicate existing systems or even face pushback from staff.

In 2018 the Data Literacy Project rated healthcare staff as the least-prepared for the digital era. AI will create new skills and competencies in areas like data governance, human-computer interface and data engineering; this requires redesigns of workforce planning, clinical education and lifelong learning and continuing professional development, which will be crucial to embed digital capabilities across the workforce and avoid pockets of expertise and the siloes this can create.

From reaction to long-term, strategic action

Plenty of hospitals and public health agencies in the US and beyond found themselves technologically under-prepared for covid-19. Hospitals that adapted swiftly to the covid-19 pandemic share at least one denominator: a pre-existing commitment to digital transformation that created both the infrastructures and the management systems needed to quickly shift direction. UC San Diego Health, for instance, already had a cloud-first data strategy that had given it the workforce skillset, technology partners and overarching strategy needed to scale up everything from remote work for staff to virtual care. “You need to be pretty savvy around these technologies and can’t start rolling them out to deal with covid-19 without having some existing knowledge,” says Dr. Longhurst.

Looking to the future, the pandemic is an opportunity for hospitals themselves to put in place a digital strategy allied to workforce skills development, alongside governance structures for transparency data-sharing and user-friendly technology design. Evaluating the experience during covid-19 also provides reams of data on where and why virtual clinical care has worked – and where it has not. There is also an opportunity to think about how all parts of health systems, including government agencies, universities and employers, can be more connected. Doing so could enable data-sharing, enhance technology design, and create a more unified health system that will be more resilient to future shocks.

**This article was edited by Elly Vaughan
of the Economist Intelligence Unit.**

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