

# COVID and the Rapid Rise of Connected Health

- ▶ COVID-19 has accelerated the adoption of self-care healthcare products, services, and tools, which will continue to transform the landscape of healthcare delivery and innovation beyond 2021.

**G**lobally, governments and health authorities have been putting in place policies to support and enable the delivery of healthcare through digital technologies. Embracing digital is an industry imperative, with data showing that companies that are most advanced in integrating digital into their business models experience twice the revenue growth as their competitors.

There are estimates that more than 21 billion devices were connected to the Internet in 2020, a fivefold increase from four years ago. As digital solutions continue to mature, and as companies seek to transform their practices in response to customer requirements as well as R&D requirements, opportunities for digital innovators will grow.

At a broad level, digital or connected health spans electronic health records (EHRs), healthcare big data, and other digital records, as well as mobile devices and applications, wearables, digital medications, and devices — all further enabled by artificial intelligence, machine learning, and analytics. Its growth has been exponential, with one report noting that the market, which was valued at \$119.39 billion in 2019, is expected to reach \$833.44 billion by 2027.

## The Digital Patient

Growth in digital health is being propelled by a huge increase in the use of healthcare apps. In particular, connected and Internet of Things (IoT) health is transforming how healthcare is delivered. These capabilities are changing the modern hospital, taking care into the community and into people's homes.

So, what exactly is health IoT? According to an academic paper titled "A Survey on Internet of Things and Cloud Computing for Healthcare," health IoT constitutes "any device that can collect health-related data from individuals, including computing devices, mobile phones, smart bands and wearables, digital medications, implantable surgical devices, or other portable devices."

Medical devices and wearable biosensors

that leverage IoT can monitor patients and report findings to physicians remotely, which has multiple benefits — it frees up hospital beds, supports doctor-patient engagement, and improves adherence. For example, biosensors are being used with multiple sclerosis patients to monitor movement and daily activities and improve management of changes in the course of the disease. And researchers have developed an AI-powered sound system that can detect irregular heartbeats.

Even within the hospital setting, wearable sensors have the potential to transform health delivery. One example is a Philips wearable biosensor for early patient deterioration detection, which received FDA approval to manage confirmed and suspected COVID-19 patients in hospital. Doctors can determine risk and intervene earlier to improve care for patients. Other breakthrough digital technologies that have emerged include an app-enabled smart thermometer that detects COVID-19 hotspots by aggregating people's temperature and symptoms data to track where illnesses start.

Patient portals and telemedicine are enabling information to flow freely from patient to doctor and vice versa, enabling better transparency and interactivity. Today, many providers offer patient portals that enable individuals to make appointments, request referrals and prescription refills, complete forms, and ask questions. Some even enable patients to see their test results and medical history.

## Connecting with HCPs

Digital engagement with healthcare professionals has also become an even greater priority since COVID-19, and pharmaceutical companies have been adopting solutions to deliver insights to HCPs through channels and in ways clinicians prefer. While this had been in development well before the pandemic in response to preferences from digitally savvy HCPs, demand accelerated with the arrival of COVID-19. Data from Accenture finds that before the pandemic, 64% of meetings with pharma sales reps were held in person,

## EXECUTIVE VIEWPOINTS



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### Adapting to the Learning Curve

Patients and their support systems are often under immense stress as they navigate the health system. Simultaneously, they're trying to master new virtual or hybrid models. In any new situation, they need to be welcomed into the opportunity with the understanding that this is a learning curve. Timely and specific assistance keeps both the patient and caregiver engaged.

### Sophisticated AI Engines

We're currently tracking the rapid expansion of devices and information that are moving from formal settings to informal settings like the home or "on the go." It's challenging to sort through the change from isolated points in time to nearly continuous mixed data types. We must present only the most relevant information to patients and clinicians. This is a primary driver behind the need for more sophisticated AI engines — once these are commonplace, they can work hand-in-hand with connected devices and workflows.

which shifted to 65% of meetings held virtually during the pandemic. Furthermore, 87% of HCPs want either all virtual or a mix of virtual and in-person meetings even after the pandemic ends.

The benefit of digital for doctors is that it enables easily digestible information, quick responses to their queries, and interactions that fit with their schedule. Digital interaction with HCPs should extend beyond the doctor-rep encounter and should involve a more tailored approach based on the behaviors, motivations, prescribing habits, and areas of specialty of physicians. Digital interactions might range from webinars, to training interactions or videos, to online marketing, to physician-to-physician engagement.

## Applied Digital Insights

The use of digital and IoT extends into R&D. One breakthrough IoT approach in

R&D is the use of cell-on-a-chip or organ-on-a-chip technologies, which are tiny laboratory trays developed from tissue engineering that have two-way benefits: first, through the conduct of the experiment and second by communicating the outcome of what occurred in the chip after installing the pharmaceutical compound.

In essence, these tiny chips replicate physiological aspects of the human body with real-time reporting through a smart interface.

In clinical trials, digital tools are transforming the patient experience, enabling remote participation and simplifying the experience for patients.

Among the digital tools increasingly being used by trial sites are electronic consent, electronic clinical outcomes assessments (eCOA), and wearables and sensors, and patients are “visiting” sites through televisits. These digital tools have been instrumental in keeping studies going during the pandemic, a trend that is expected to continue long-term.

The digital technologies that will be important for improving support for patients in clinical trials include laptops for virtual visits and e-consent, electronic diaries, and electronic patient report outcomes (ePRO) applications for use on smartphones.

In addition, smart watches are becoming more and more advanced, with some now including devices to monitor and help with patient health. Apple’s Watch Series 6, for example, now has a blood oxygen measuring functionality, and the company is working with research institutes to find out how changes in blood oxygen levels can indicate certain respiratory conditions such as asthma. The company has also worked on and received FDA clearance for a feature on its watch to detect atrial fibrillation.

All these breakthroughs hold huge promise, although, as with any digital or connected health capability, careful consideration must be given to how patients’ data is being used and protected. <sup>PV</sup>

## The Internet of Medical Things

The Internet of Medical Things (IoMT) market consists of smart devices, such as wearables and medical/vital monitors, strictly for healthcare use on the body, in the home, or in community, clinic, or hospital settings; and associated real-time location, telehealth, and other services.

### On-body segment comprises:

- ▶ Consumer health wearables, which are typically not regulated by the health authorities
- ▶ Clinical-grade wearables, including regulated devices and supporting platforms that are generally certified/approved for use by regulatory authorities

### In-home segment comprises:

- ▶ Personal emergency response systems (PERS) - integrates wearable device/relay units and a live medical call center service to increase self-reliance for homebound or limited-mobility seniors
- ▶ Remote patient monitoring (RPM) — comprises all home monitoring devices and sensors used for chronic

disease management

- ▶ Telehealth virtual visits

### Community segment comprises:

- ▶ Mobility services — allow passenger vehicles to track health parameters during transit
- ▶ Emergency response intelligence — assists first responders, paramedics, and hospital emergency department care providers
- ▶ Kiosks — physical structures, often with computer touchscreen displays, that can dispense products or provide services such as connectivity to care providers
- ▶ Point-of-care devices — used by a provider outside of the home or traditional healthcare settings, such as at a medical camp
- ▶ Logistics — involves the transport and delivery of healthcare goods and services

### In-clinic segment comprises:

- ▶ IoMT devices — used for administrative or clinical functions (either in the clinic,

in the telehealth model, or at the point of care)

### In-hospital segment comprises:

- ▶ Asset management — monitors and tracks high-value capital equipment and mobile assets, such as infusion pumps and wheelchairs, throughout the facility
- ▶ Personnel management — measures staff efficiency and productivity
- ▶ Patient flow management — improves facility operations by preventing bottlenecks and enhancing patient experience, such as monitoring of patient arrival times from an operating room to post-care to a ward room
- ▶ Inventory management — streamlines ordering, storage, and use of hospital supplies, consumables, and pharmaceuticals and medical devices to reduce inventory costs and improve staff efficiency
- ▶ Environment and energy monitoring — oversees electricity use and ensures optimal conditions in patient areas and storage rooms

Source: Alliance of Advanced BioMedical Engineering, aabme.asme.org