KORE

The Complete Guide to Connected Health

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Connected health is undoubtedly one of the most exciting sectors of the IoT industry. With the global connected health and wellness devices market expected to reach $612 billion by 2024[1], healthcare companies are reimagining the way healthcare is delivered and managed. In addition, consumer demand is driving innovation as people are looking to technology to help them proactively monitor their health, age in place, and manage chronic conditions.

Connected health generally refers to a healthcare management model that relies on technology for remote delivery of healthcare services or management of health conditions. Some examples of Connected Health include telemedicine, remote patient monitoring (RPM), decentralized clinical trials (DCTs), and mobile personal emergency response systems (mPERS).

How it Works

While each Connected Health use case differs in its unique technological and operational needs, most have the same general components: a patient, a provider, a device, connectivity, and cloud services/platform. The most common connected health devices fall into a few primary categories: consumer-grade health monitoring devices, medical-grade wearable technology, and wireless implantable medical devices.

These devices are equipped with sensors and connectivity to take biometric readings and transmit those readings to cloud-based platforms and APIs where they can be viewed and analyzed by healthcare providers. Connectivity varies by device and may include either cellular connectivity, Bluetooth®, or proprietary wireless protocols — or any combination of these. Medical devices that rely solely on Bluetooth connectivity require a hub for cellular transmission to the cloud, such as a smartphone, tablet, or another connected device such as a home health hub.

Some examples of personal connected medical devices are:

- insulin pumps
- blood pressure monitors
- glucose monitors
- pulse oximeters
- personal electrocardiogram (ECG) monitors
- personal emergency response systems (PERS)
- mobile personal emergency response (mPERS)
- smart pill dispensers

Consumer wellness products and health monitoring devices include:

- smartwatches
- pedometers
- GPS sports watches
- heart rate monitors
- sleep monitors
- and more
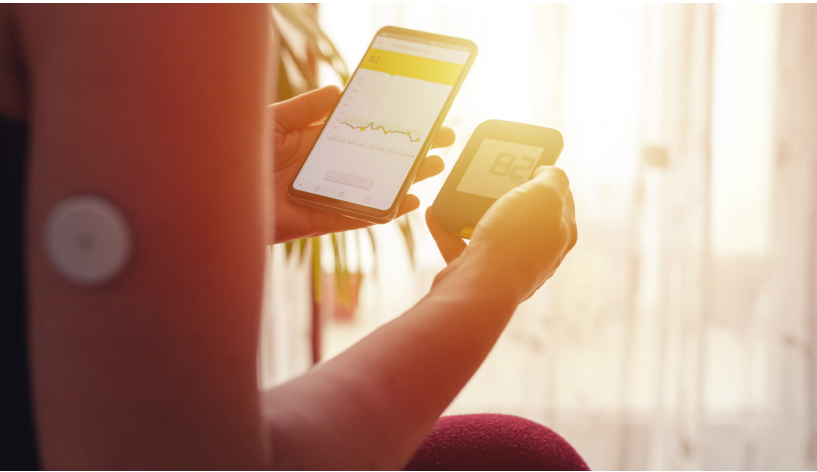
Benefits of Connected Health

Connected health promises a myriad of benefits to providers, payers, and patients alike — which is certainly helping drive adoption. While some of the benefits may be specific to certain use cases, such as PERS/mPERS versus connected clinical trials, there are a number of broad benefits that can be seen across the spectrum of connected health use cases.

Cambridge Consultants and MassMEDIC conducted a study that included conversations with providers, patients, payers, and the technology industry and published the most commonly reported benefits of connected health technology. Among the top benefits were better management of diseases, reduction of medical errors, and patients and caregivers taking more responsibility for their health[2].

Some of the other value drivers in connected health are clinical impacts such as health outcomes; non-clinical patient impacts such as patient experience and patient economics; revenue and cost impacts; and the impact on public and population health[3]. The benefits of connected health are multi-faceted from the provider, payer, and patient sides. Patient outcomes improve, the collection and availability of data create a more robust monitoring solution, and the financial benefits are clear — resulting in significantly improved ROI.

Market Trends and Opportunities

The demand for wearable medical devices and connected health solutions is expected to increase significantly because of the shifting consumer preferences towards living a healthier lifestyle. Additionally, an uptick in chronic diseases that require continuous monitoring is contributing to the steady growth of IoT-enabled remote patient monitoring technology solutions[1].

How has the industry shifted in response to the increased demand for connected health solutions and the need for new models of healthcare delivery and maintenance? According to a 2018 report from the Deloitte Centre for Health Solutions, 51% of connected health companies are implementing new business models to a large extent, such as expanding telemedicine, adopting remote patient monitoring, or decentralizing clinical trials[3].

According to a recent McKinsey report, healthcare professionals (HCPs) now see between 50 and 175 times the number of patients virtually than before the COVID-19 pandemic. With the increase in virtual visits, 74 percent of telehealth users reported high levels of satisfaction and 64 percent of HCPs expressed comfort using the tools and systems[4].

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Barriers to Connected Health Adoption

The 5 Roadblocks to Success for Connected Health Solutions
An IoT infrastructure is comprised of many moving parts that need to communicate optimally to be effective. These are the top five areas within an IoT infrastructure where the greatest challenges are likely to occur:

1. Hardware

Typically, a medical solutions provider will have a medical device they want to bring to market or a packaged solution such as a Remote Patient Monitoring (RPM) kit which includes a medical sensor in the form of a pendant or a watch. The device then needs gateways or routers to transmit the data between the device and the cloud. The data transmission needs to be incredibly reliable and secure, so a purpose-built hardware solution is critical in keeping communications efficient, as well as costs managed. Sensors that support the device also fall under hardware procurement consideration.

2. Connectivity

Communicating health data is critical and gaps in connectivity can either range from troublesome to threatening, depending on the patient or use case. The solution at hand really depends on what kind of connectivity is needed, and therein lies a problem. For many connected health solutions providers, managing the IoT infrastructure is too large a task, because the connectivity ecosystem is wide and fragmented.

First, different solutions might need different connectivity – whether it's short range (Bluetooth or Bluetooth Low Energy [BLE]), low power wide area (NB-IoT, LTE-M, LoRaWAN), or cellular (4G LTE or 5G). Once deciding the network connectivity, solutions providers need to select a carrier, and oftentimes, it's more than one carrier. If it's a global deployment, carrier selection becomes more complicated. Managing multiple carriers results in several contracts; billing and usage systems; and – if anything goes wrong, like an outage – support systems. With global connectivity, roaming and international usage complicate management further.

One other consideration in building the connectivity arm of healthcare solutions is eSIM. Medical devices have a low tolerance for "going dark," so having a connectivity technology that can remotely switch carriers in the event of an outage, or if there are carrier or network changes – such in the case of upcoming 3G network sunsets, can be highly beneficial.

eSIM also helps solution providers achieve out-of-the-box connectivity that helps time to market, as well as make global deployments simpler.

3. Data Telemetry and Mobile Device Management

Transmitting data from patient to provider isn't a simple task. A lot of times, it requires a lot of complex systems integrations that can create significant lag in time-to-market. Connectivity should tie together with pre-integrated, remotely paired sensors and gateways to allow for secure data transmission that uses your own encryption keys. Successfully connecting and deploying hundreds or thousands of IoT devices requires expertise in procurement, certification, mobile device management (MDM), and testing that most companies simply cannot achieve with internal resources alone.

4. Logistics and Solutions Management

The logistics and management side of an IoT infrastructure is not something to overlook when building out solutions. Effective and efficient configuration, kitting, shipping, and returns management are crucial in connected health solutions. Whether it's equipping hospitals, medical practices, clinics, or direct to patient, getting solutions deployed and running out-of-the-box is incredibly important.

5. Regulatory Compliance

If creating IoT solutions wasn't complicated enough, the nature of medical solutions requiring regulatory compliance and adding security and privacy to communication furthers the challenge. Data communications and storage need to be compliant, as well as medical devices and equipment. This regulatory compliance covers handling, shipping, and management.

While connected health adoption is experiencing a period of accelerated growth, thanks in large part to the shifting consumer/patient preferences and the COVID-19 pandemic, there are still a number of concerns in the healthcare industry that are holding back adoption. According to a Future Health Index report from Phillips, the cost of devices is the most perceived barrier to connected technology adoption from healthcare professionals[5].

Other top reported barriers to connected health adoption include privacy/data security concerns, health system bureaucracy, training patients to use new technologies, the attitude of patients to adopt new technologies, trust in the accuracy of data collected by the devices, government regulation, and confidence that patients and providers can understand the data collected by devices.

Industry Segments and Use Cases

In the period of rapid innovation brought on by the
COVID-19 pandemic, we are seeing a handful of exciting and
innovative use cases for connected health technology that are
driving positive outcomes for patients and providers alike.
Many of these top use cases are found in three primary
industry segments: decentralized clinical trials, remote patient
monitoring, and mPERS.

Decentralized Clinical Trials

Decentralized clinical trials (DCTs) are those which are
executed using processes and technologies that differ from
the traditional clinical trial model. DCTs can be either hybrid,
which include the use of connected devices for data
collection and onsite clinical visits, or fully virtual, in which all
data is collected via connected devices and visits are
conducted remotely via tele

According to the U.S. Food and Drug Administration (FDA),
decentralized clinical trials "can help clinical trials become
more agile and efficient by reducing administrative burdens
on sponsors and those conducting trials, and can allow
patients to receive treatments from community providers
without compromising the quality of the trial or the integrity
of the data that's being collected[6]." Some benefits of
connected health specific to DCTs are improved patient
recruitment and retention, data accuracy, and faster
time-to-market.

Remote Patient Monitoring

Remote patient monitoring (RPM) typically refers to the use of
connected devices and mobile technology to monitor
patients outside of the conventional clinical setting. The use
of RPM generally increases access to healthcare while
decreasing delivery costs, and in cases such as chronic
disease management often improves the patient's quality of
life through increased freedom and mobility, comfort,
accessibility, timely intervention, and lower costs.

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Some interesting and successful use cases of RPM include
wireless solutions for home dialysis and cardiac rhythm
monitors, continuous glucose monitoring solutions, and even
in-hospital monitoring of COVID-19 patients, which reduces
the exposure of healthcare professionals while limiting the
use of valuable PPE materials. Other benefits for the
providers — beyond just pandemic safety — are evergreen
revenue, lower overhead costs, and access to more patients.

Mobile Personal Emergency Response Systems (mPERS)

Mobile personal emergency response system (mPERS) refers
to wearable, pushbutton devices and call center services that
allow aging adults to signal the need for immediate attention
and call for help regardless of their location. mPERS solutions
are powered by wireless connectivity and are popular among
older populations as it seems less intrusive and complicated
than other commercially available wearable devices, such as
smartwatches.

As the adoption of medical technology, smartphones, and
wearable devices increases among the elderly, solution
providers are looking to stay competitive through innovation
and advancement in technology. Because of this, we expect
to see more attractive device form factors, improved battery
life, advanced sensors for things like fall detection and sleep
patterns, and innovative app development coming in the near
future for mPERS devices. The benefits of mPERS solutions
are ease of use, affordability, immediate response, and ability
for older adults to feel secure while retaining their
independence.

Connected Health Enablement

One thing that is true across all industry segments is that deploying connected health solutions is exceptionally complex. The Internet of Things (IoT) technology that powers connected health is not simple or straightforward, as evidenced by the fact that nearly 75% of IoT projects fail[7]. One way that solution providers are finding success is by partnering with IoT experts and connected health enablers who can handle the entire lifecycle of connected devices.

IoT managed services providers like KORE, who specialize in connected health solutions, handle the majority of steps required for a successful IoT deployment, including hardware sourcing, connectivity, provisioning, kitting, shipping, warehousing, and reverse logistics. KORE holds certifications and registrations that demonstrate a commitment to regulatory compliance, such as ISO 9001 and ISO 13485 quality management, FDA registration, and more. KORE takes care of all of the complex technology and logistical details so that solution providers can focus explicitly on their specific use case and end-user experience.

About KORE

KORE is a pioneering leader and trusted advisor that helps deliver transformative business performance from IoT solutions. We help customer organizations of all sizes navigate the complexities of IoT and improve execution, so they can focus on operational and business results. Our IoT expertise and experience, global reach, independence, and deployment agility accelerate and materially improve our customers' return on their IoT investments.

Looking for more information about connected health?

Reach out to learn more about KORE Connected Health.

[1] https://www.grandviewresearch.com/press-release/global-connected-health-wellness-devices-market
[2] https://www.ehidc.org/sites/default/files/resources/files/2012-03-26_Connected-Health--Can-it-save-the-US-Healthcare-System_0.pdf
[3] https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-medtech-iomt-brochure.pdf
[4] https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality
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[7] https://newsroom.cisco.com/press-release-content?articleId=1847422