Telehealth and Virtual Care: A remote lifeline for the world

Deliver modern, accessible virtual care solutions with the cloud

aws healthcare

Notes

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Section 1: Introduction

Telehealth has been critical to the COVID-19 pandemic response. What was once an aspirational goal for healthcare providers became commonplace within weeks. Providers and patients are now delivering and receiving virtual care quickly—using the cloud's on-demand IT resources and pay-as-you-go pricing model.

One challenge for healthcare providers is getting accurate, trusted, and real-time health information to and from large patient populations and communities. Patients are looking to healthcare providers for the latest information about coronavirus, clinical guidance on when to be tested, and instructions on what to do if they have a confirmed positive result. Healthcare providers therefore need round-the-clock access to ground-level data as it changes.

The cloud enables faster access, compared with having data stored and processed on limited IT hardware maintained on site. For example, with cloud-based solutions, patients without known coronavirus exposure or symptoms might be directed toward general prevention information via mobile alerts, whereas a patient with known exposure and respiratory symptoms would be directed toward further screening. In another example of real-time data sharing, citizen science applications allow individuals in a location to relay health information via their cell phones, with all user data aggregated in real time to accurately detect shifts in infections.

Another challenge providers face is ensuring non-COVID-19 care continues at appropriate levels, both for new issues and for long-term conditions. How do clinicians continue supporting these patients while minimizing their risk of exposure? This care must be delivered in a scalable way, so there's capacity to manage spikes in demand and add new records and systems while minimizing risk of provider downtime. With the AWS Cloud, providers simply pay for the IT and solutions as they're used, preserving budgets while enabling speedy innovation.

In other words, the cloud is enabling providers to deploy telehealth and virtual care rapidly— helping boost efficiency in delivery and provide better outcomes for patients. Let's dive into four use cases that demonstrate different ways these solutions can support the patient journey.
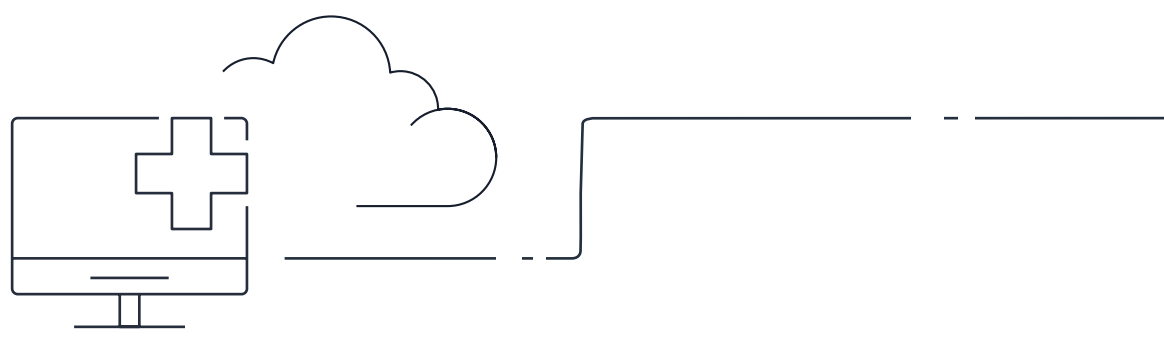
Telehealth across the patient journey

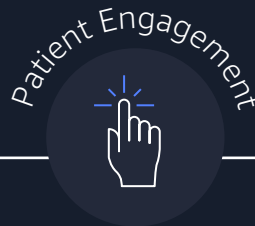Using multiple digital touchpoints to boost communication, engagement, and care quality.

Applications

Patient Engagement

Virtual call centers
Facilitating self-service pre-screenings and automating up-to-date information sharing between providers and patients

Pre-visit
Easy-to-schedule appointments with convenient and automated confirmations

Consultation

During consultation
With device-agnostic, user-friendly interfaces, as well as high audio and video quality

Patient Monitoring

Post-visit
Clear tracking and documenting of patient discussions, progress, and next steps

Follow-ups
Real-time results and updates, efficient information sharing, and coordination with other specialists/providers

Solutions

Patient Engagement

Digital front door portals, communications, self-service solutions, virtual call centers, and triaging

How AWS can help
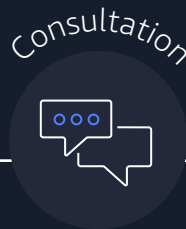Amazon Connect, Lex, Polly, Transcribe, Comprehend (Medical)

Consultation

Remote video consultations, live chat and screen-sharing with clinicians, on-demand or emergency visits

How AWS can help
Amazon Chime Media Services, Chime SDK, Lambda
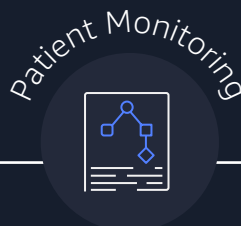
Patient Monitoring

Medical device data streams, machine learning and analytics, clinical observations, prescriptions, billing

How AWS can help
AWS IoT Core, Amazon Kinesis, SageMaker, Redshift, Athena, Quicksights, FHIR Works on AWS

Section 2

# Use cases for telehealth and virtual care

Use case #1: Virtual call centers and self-service

To help address the spike in demand for general health information, many providers have implemented triage chatbots, a technology that lets callers have a human-like conversation with artificial intelligence (AI)-powered bots. This is simple to implement with cloud-based AWS solutions like Amazon Connect (our omnichannel cloud contact center), Amazon Lex (which provides conversational AI for chatbots), and Amazon Polly (our service that converts text to lifelike speech).

Virtual call centers enable patients to self-serve efficiently at the start of their journey, helping them access the right level of care quickly. Because the chatbot integrates with the data management system, it can also log the interaction and any information collected from the patient. Clinicians can then use that information when triaging and determining next steps.

Virtual call centers also provide a mechanism for other requirements. For instance, they can help deliver contact tracing, quickly and at scale. And they can push information out to wider, under-served communities efficiently and cost-effectively.

When designing a virtual call center, it's important to understand patient flow and risk areas within the system. For example, you may wish to have a human-operated front end to check whether the patient is in an emergency or life-threatening situation before routing them to a chatbot. Once that validation is concluded, the chatbot then takes the burden off staff, freeing them up to focus on more complex queries. Any pathways using a chatbot should go through full clinical validation before implementation. AWS can advise providers on how their healthcare peers use similar applications and address similar challenges.
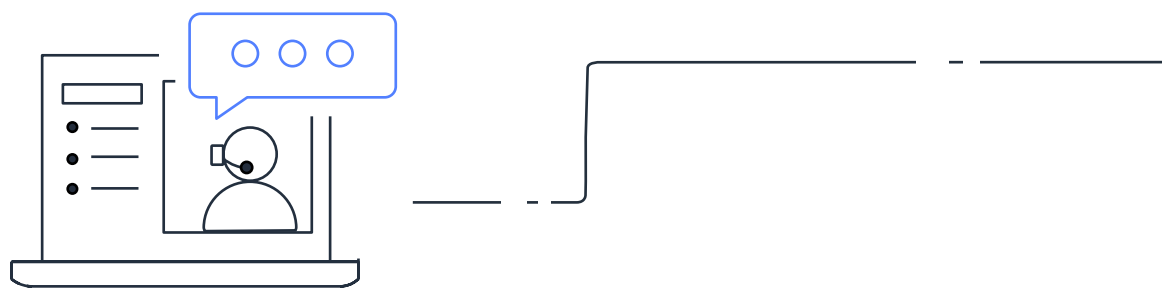
Spotlight

NHS Business Services Authority

In the UK, the National Health Service (NHS) is responsible for delivering healthcare. As part of this mission, the NHS Business Services Authority (NHSBSA) runs contact centers that other NHS organizations and the public can call with questions about services.

The NHSBSA turned to AWS APN partner Arcus Global for help in providing a faster service to callers, delivering accurate answers more consistently, relieving advisors of monotonous aspects of their job, and providing a higher level of service at a lower cost.

Within one week of setting up a virtual call center in the AWS Cloud, NHSBSA was able to provide 24/7 call support beyond standard business hours. Within one month, they received 10,194 calls, of which 42% were resolved via the Amazon Connect system without returning to an operator. This delivered a better experience to citizens and led to improvements in employee retention and satisfaction.

MetroPlusHealth

When the COVID-19 pandemic hit New York, MetroPlusHealth, a wholly owned subsidiary of NYC Health + Hospitals, the largest municipal health system in the United States, launched a chatbot program reaching 54,000 members over 3 weeks, contacting as many as 10,000 people per day at its peak. Throughout development, AWS Solutions Architects met with MetroPlusHealth staff for interactive design meetings about the scripting and order of the chat flow.

"The AWS team members were phenomenal. For example, they linked us up with an expert who could look at the long language we had drafted and reduce it to three clear, helpful words. I really felt like the AWS team members understood our business drivers—what we were trying to do and what the technology needed to deliver. And they didn't tell us what the technology should look like. Instead, they said, 'What do you need it to do?'"
**- Dr. Amanda Parsons**, Deputy Chief Medical Officer, MetroPlusHealth
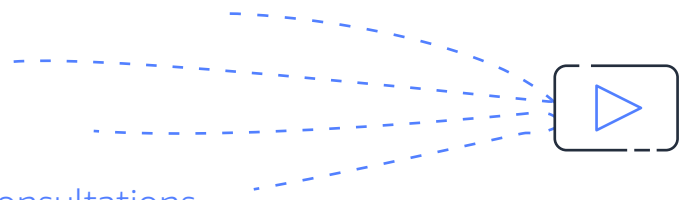
Use case #2: Remote consultations

Due to the large volume of suspected COVID-19 cases, many general practitioner services and outpatient clinics started providing consultations via telephone and video, both to meet growing patient demand and contain the spread of the virus.

Pre-screenings via remote consultation save time in appointments and give patients the opportunity to ask questions. Assessing symptoms virtually has also helped control transmission of coronavirus and other infectious diseases. Patients can use telehealth pre-screenings via phone or video prior to virtual and in-person appointments and surgery, and for mental health therapies and other types of appointment.

Re-admission rates to hospitals and follow-up visits are a leading cause of unnecessary healthcare spending. Virtual care solutions can reduce them. Video consultations are not only successful in addressing new issues, but they also provide an effective way of delivering follow-up care. Often, if a physical exam is not needed, a video follow-up is more convenient for both patients and clinicians. Patients avoid unnecessary trips to the clinic or hospital, clinicians can work more efficiently, and providers reduce the cost of care. Telehealth also extends the availability of medical experts in specialty fields. Having access to providers that may be out of the area or even out of the country is a major benefit to patients. By securely exchanging data across health systems, records can be shared on calls while ensuring patient privacy.

Spotlight
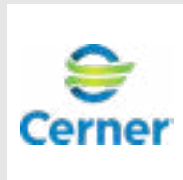
Cerner

"As a global healthcare company, Cerner provides a broad set of technology and services to our clients. A particular area of focus has been enabling care at a distance through telehealth solutions. In the early stages of the COVID-19 pandemic, our clients were rapidly deploying and scaling telehealth solutions to meet the needs of their communities and deliver medical services amidst stay-at-home orders across the globe. Many clients saw rather modest utilization of these capabilities grow by over 800% in a matter of days. In anticipation of the continued need to deliver virtual visits, Cerner needed a rapidly scalable, elastic approach to meet surging utilization and global demand for scheduled virtual visit capabilities. Amazon Chime was a natural answer to solve that challenge. Cerner rapidly engaged with the Amazon Chime team to implement the service and provide a simple, seamless virtual visit solution for our clients."

- Andy Penn, Vice President, Cerner

Watch the re:Invent 2020 session: AWS re:Invent 2020: Embed video conferencing in any app with the Amazon Chime SDK with Jennie Tietema, AWS Principal Product Manager and Mike Antonelli, Cerner, Lead Platform Management Engineer.

Babylon

Babylon is a subscription health service provider that enables users to have virtual consultations with doctors and healthcare professionals via text and video messaging through its mobile application. Babylon leverages AWS to innovate with artificial intelligence and scale globally. It is using one of the largest medical AI systems to triage down the workload on doctors and hospitals and still maintain day-to-day healthcare and advice.

"It is time to change the way we've been delivering healthcare. It is possible to do so when organizations like AWS make the cloud so widely available—to mobile networks, to the technology companies out there that have provided so much of the infrastructure we need."

- Dr. Ali Parsa, CEO and Founder, Babylon Health

Click here to watch this webinar with Babylon CEO and founder Ali Parsa talking about "Rethinking patient engagement with a digital COVID-19 case assistant."

Use case #3: Remote patient monitoring

With highly infectious diseases, minimizing face-to-face interaction through virtual care becomes critical. Remote patient monitoring (RPM) allows patients to use mobile medical devices and technology to gather patient-generated health data (PGHD). Through cloud-based solutions, patients can then share at-home health metrics with providers and hospitals digitally. Remote monitoring can also help patients living with chronic conditions, as well as aging and at-risk populations. Solutions can notify providers of potential issues and track data between appointments. They also support post-discharge follow-up, helping improve outcomes.
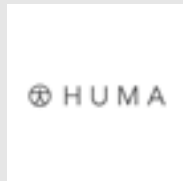
Spotlight

⊕ H U M A

HUMA

With COVID-19, many vulnerable people were developing symptoms and there was limited capacity in hospitals and a poor understanding of which patients were likely to deteriorate. This caused an urgent need to be able to monitor cohorts of patients remotely, in their own homes.

Huma established virtual wards of patients in several regions of London. Clinicians were able to monitor the vital signs of these patients from a single dashboard, allowing them to care for 50 percent more patients at a time. The patients, now in control of monitoring their own vital signs, also had the confidence that they were under constant review by healthcare professionals.

"Thanks to partners like AWS, we launched our COVID-19 remote patient monitoring platform across hospitals in Germany and the UK in a matter of days and weeks (enterprise-level deployments that normally take years). The platform enables the concept of 'hospital at home,' helping hospitals and governments hit three key priorities: isolating and monitoring patients immediately; treating early; and localizing and hospitalizing severe cases as early as possible.
COVID-19-positive patients receive an iPad and are prescribed medical devices to collect vital signs like oxygen saturation. They are then monitored and looked after remotely, so there's less COVID-19 exposure for healthcare staff. Patients stay at home so they're more comfortable, but they're still connected to their healthcare system. If patients deteriorate, vital signs are flagged automatically and clinicians can intervene early, changing treatment to prevent complications. If patients continue deteriorating, clinicians can then get them to the hospital earlier. Thanks to AWS, we were able to go live in new countries and with new languages with the security and data protection, high availability, scalability, and reach we needed."

- Dan Vahdat, Chief Executive Officer, Huma

Click here to hear more from Dan from HCLS Web Day 2020 business track:
"Huma -Technology for a Resilient Future Saving Healthcare Systems and the Economy"

Use case #4: Patient and government information portals and communications

With secure, compliant, cloud-based portals and communications, patients and providers can conveniently share information and complete questionnaires before virtual visits. The portals and communications tools and technologies can integrate with clinician systems, pulling in health guidance specific to their situation, delivering test results, and updating referrals in real time. Patients can also provide updates on symptoms, concerns, and health data (for example, blood pressure or peak flow readings), giving clinicians one-click access to information that informs treatment plans.
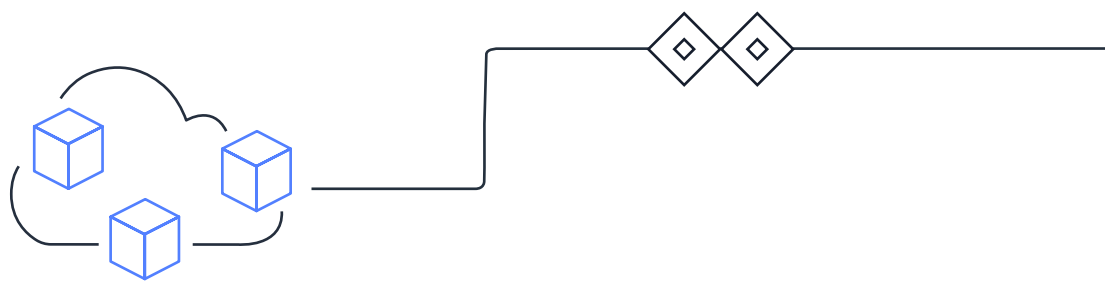
Spotlight

CareMonitor

"We built the telehealth audio and video calling capability in our CareMonitor app using Amazon Chime in under a week. In the CareMonitor app, COVID-19 patients are asked daily symptom questions. It also collects biometric data like temperature, heart rate, and oxygen saturation to gauge their current health status. If the patients deteriorate during the course of the day, they can use the app to send a message, which is picked up immediately. The team can use the built-in video calling functionality to contact the patient and assess the situation. We can scale our telehealth app to support over 7,000 clinics and are getting good feedback from participating clinics so far. The CareMonitor telehealth application is making it easy and safe for patients and healthcare providers to connect for one-on-one or group consultations of up to 100 participants."

- Deepak Biswal, Chief Executive Officer, CareMonitor

NSW Health

NSW Government Health in Australia drastically reduced the amount of time taken to return negative COVID-19 pathology results to patients using an SMS bot engine that automates the contact process. With priorities focused on returning positive results to patients and public officials quickly so they could isolate and take the right medical steps forward, negative results could take days to communicate, causing great anxiety.

eHealth NSW Chief Information Officer Zoran Bolevich told the AWS Summit in Sydney that the "really clever work" had "cut down the waiting time from days to hours" for patients. It has also saved "thousands of hours of productive time" for NSW Health Pathology and other healthcare workers.

"Given that we did have that sharp increase in the use of digital tools, it was incredibly useful to be able to birth some of that increased traffic into the cloud. And this is where partnership with AWS has been critically important for us and enabled us to move the scale and ensure performance very quickly. We are actively developing plans and strategies to really embed and take to the next level virtual care and telehealth in NSW Health," Zoran said.

Section 3

Telehealth around the world

The four use cases in this guide illustrate how cloud-based telehealth and virtual care solutions are being used across the patient journey. Healthcare providers worldwide are utilizing and combining them in creative ways to improve overall patient experience and deliver efficiency.

AWS Partners work with healthcare providers and government agencies around the world to adopt the latest technologies and deliver virtual care and telehealth quickly and cost-effectively at scale. Here are some AWS customer telehealth examples from around the globe.

Managing the patient journey during COVID-19

In Italy, Exprivia is supporting the COVID-19 response in the community and in hospitals. In the community, its equipment (built on AWS) monitors COVID-19-positive patients quarantined at home. In hospitals, radiologists use Exprivia II, a cloud-based radiological information system, to share results and observations after they conduct X-rays and CR scans of COVID-19-positive patients. This solution, developed for The Italian Society of Medical Radiology (SIRM), tracks the illness' advancement. It allows doctors to forecast how many days it will take for COVID-19 to evolve by using machine learning applied to medical imaging.

AI enables remote queues

In Latin America, Whyline is working with hospitals and governments to reduce hospital overcrowding using AI. The solution allows patients to view live wait times and join queues remotely from home. This increases satisfaction and helps limit the risk of COVID-19 transmission.
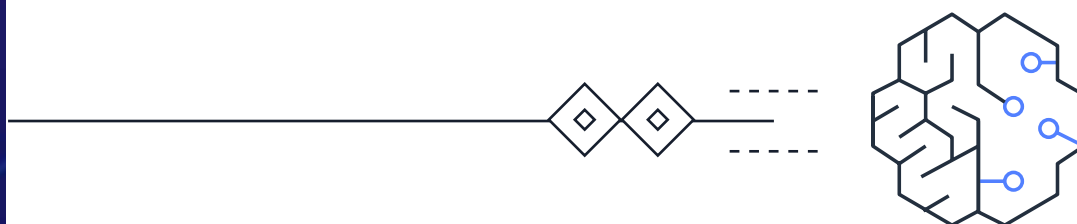
Scaling video, accessing patient data

In the UK, QDoctor provides a video consultation service to general practitioners, hospitals, and patients. It gives the doctor on duty a managed workflow along with access to patient records to help during the consultation. Services like these, powered by AWS technology, can respond rapidly when demand starts to rise because the underlying cloud infrastructure scales seamlessly in line with demand.

On-call, anytime, anywhere

In Singapore, Doctor Anywhere provides video consultations with a locally licensed doctor anytime, anywhere. Patients can connect to a physician in less than five minutes and get medication delivered to their doorstep within three hours.

Helping the aged stay connected

Juniper manages care facilities across Western Australia. In response to the COVID-19 pandemic, they needed to protect residents from the virus and comply with Federal Health Department directives—while maintaining contact with clinicians and patients' family and friends. The organization built video conferencing capability using Amazon Chime to distribute recorded health information updates. They also enabled remote work with Amazon WorkSpaces, which provides contingent employees with fast and secure desktop access from their homes.

Streamlining lab work

In the US, Telemedicine provider Doctor on Demand is working with Change Healthcare to give telehealth patients more power over their lab work. In the past, providers told telemedicine patients to go to a specific place at a specific time if any lab work needed to be done. Now, through this collaboration, Doctor on Demand providers can order tests and refer patients to labs nearby—and patients can pick the lab that works best for them. After the testing, the clinician can send the results to the patient through the Doctor on Demand platform.

Access to information for remote communities

Healthdirect Australia operates Australia's National Health Services Directory, which quickly connects patients to providers and specialists nationwide through an online database. It relies on AWS to host its websites, delivering up-to-date information to doctors, clinics and hospitals, and consumers. The organization uses AWS to deliver services quickly across the entire country and expand its reach into remote areas. AWS servers—accessed in the cloud, on demand—have helped Healthdirect continuously increase the number of citizens they can reach at the lowest cost possible. This has enabled publicly-funded providers to reduce costs while growing unique website visitors by 300% in one year. In addition, AWS allows providers to keep data secure while quickly and cost-effectively rolling out the latest services to the most Australian citizens.

Changing healthcare delivery with video collaboration

Visionable, a video collaboration tool built on AWS, is being used to run multidisciplinary team (MDT) meetings in more than 30 UK hospitals and care settings. It's designed with functionality including multi-view cameras, simultaneous data review, radiology investigations, and even video from diagnostic devices to ensure stakeholders have all necessary material. For example, using Visionable, stroke patients are being assessed by a stroke physician while still in the ambulance. This is helping improve outcomes because getting an expert opinion as soon as possible is critical in these scenarios.

Visionable is also looking at next-generation appointments. Currently, most care happens across several appointments. For example, a patient suffering with back pain may see a family doctor, a specialist, and maybe another therapist. "Imagine if you could complete a back pain pathway all in a single day, seeing each professional remotely, one after the other," said Alan Lowe, the chief executive of Visionable.

Learn more

Keeping family members informed

Due to the COVID-19 crisis, hospitals had to implement visitor restriction policies. Healthcare providers were challenged with having to keep patient family members informed about their loved ones. US-based EASE Applications developed a HIPAA-compliant video conferencing solution that integrates with their existing iOS and Android messaging applications for standard cell phones (applications that are already in use in hospitals nationwide). Using Amazon Chime, their engineers added the new capability within just one week. Families have been grateful to have reliable remote communication with their loved ones and clinicians, and the user feedback has been overwhelmingly positive.
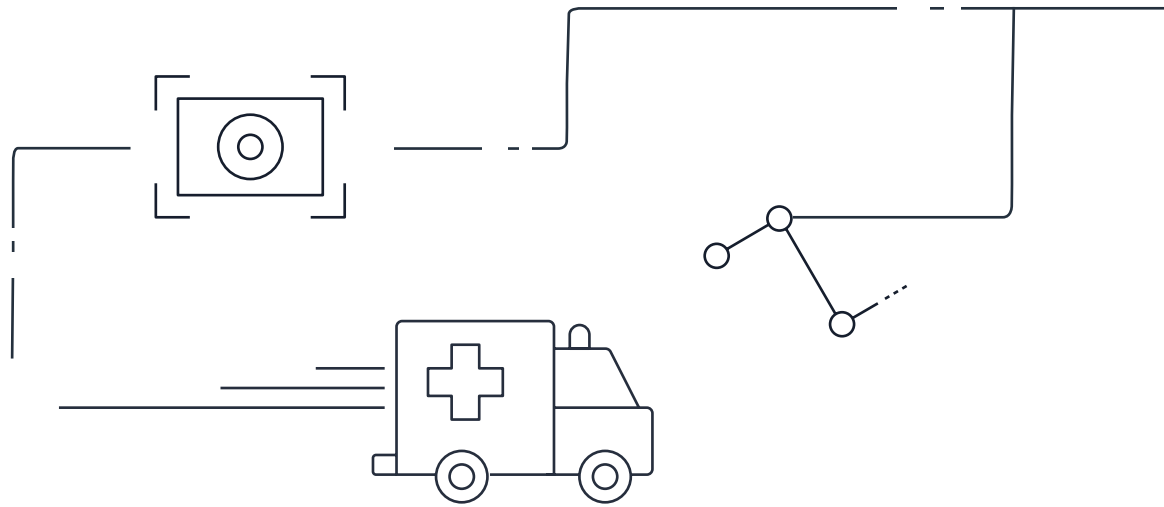
Section 4

Additional resources
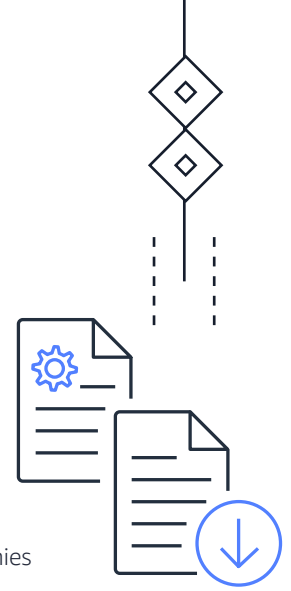
The COVID-19 pandemic changed everyday life in healthcare. But companies using AWS as their cloud platform are changing along with it—becoming more agile, scalable, and innovative—to make life a little easier. While the world spends more time at home, many companies are redefining how they do business. And the ones using AWS are benefiting from the fastest pace of innovation, the broadest and deepest functionality, the most secure computing environment, and the performance needed to build what's required for today and tomorrow.

These additional resources will help you shape your organization's telehealth and virtual care journey.

Websites

- There's Innovation in Numbers: AWS is how
- AWS Public Sector Healthcare: Unlock, connect, and transform data into actionable insights that improve patient outcomes
- AWS Healthcare and Life Sciences: From benchtop to bedside, innovate faster to improve patient outcomes and lower costs
- The healthcare startup team at AWS is working to more rapidly get relevant, production-ready, clinically adopted solutions into the hands of healthcare providers around the world. This site is an evolving effort to match inbound demand from global healthcare organizations with best-in-breed partner solutions
- Add marketplace language: Innovate faster to improve patient outcomes. AWS Marketplace proactively addresses the needs of today's healthcare organizations—improving business outcomes and helping to enhance the care they provide. Through a curated digital catalog of over 100 healthcare specific software solutions from independent software vendors, AWS Marketplace can help healthcare organizations find the software they need to innovate care and simplify procurement. Discover how healthcare organizations are transforming patient care with AWS services and solutions in the Healthcare & Life Sciences AWS Marketplace.

Videos

- What Is Cloud?: A three-minute video
- AWS Connected Everyday life is changing a lot. But companies using AWS as their cloud platform are changing right along with it—becoming more agile, scalable, and innovative
- AWS for Innovation-driven Healthcare
- Embracing Remote Services: Best practices and lessons learned from COVID-19
- Technology for a Resilient Future: HUMA remote patient monitoring solution
- Leveraging Data and Technology to Realize the Full Promise of Virtual Care: FORCE Therapeutics

eBooks

- [Scale and Transform Telehealth and Virtual Care in the Cloud](#)
- [Redefining Healthcare in the Cloud](#): Provider stories
- [The Future of Healthcare in the Cloud:](#) Precision medicine and medical research

Whitepapers

- [Healthcare Data Interoperability: Creating a clearer view of patients](#)
- [Architecting for HIPAA Security and Compliance on Amazon Web Services](#)
- [Accerlating Innovation in Healthcare](#)

On-demand webinars

- [How to Modernize Your Patient Experience with Amazon Connect](#)
- [Healthcare Data Interoperability with AWS Cloud](#)
- [Healthcare and Life Sciences Web Day 2020](#)

Reports

- [Discover what Public Cloud Looks Like in 2020:](#) Gartner report

Glossary

What is telehealth?
Telehealth is more of a broad solution that encompasses the entirety of remote and technology-driven healthcare, focused on servicing patients at a distance. This might refer to a doctor's visit, monitoring a high-risk pregnancy, or managing a chronic condition remotely. Telehealth technology can include telecommunications, video conferencing, or an interactive voice response (IVR) system to gather and exchange information.

What is telemedicine?
Telemedicine is a component of telehealth and is the practice of medicine using technology to deliver care at a distance. A physician in one location uses a telecommunications infrastructure to deliver care to a patient at a distant site. Telemedicine refers specifically to remote clinical services, while telehealth can refer to remote non-clinical services. ([Source](#))

What is virtual care?
Virtual care can be defined as the ability to use technology to enable timely access to healthcare services and support across disciplines provided by doctors, nurses, case managers, etc. It's often used synonymously with telehealth or telemedicine, which indicates how integral virtual healthcare is to telehealth delivery. However, they are not actually the same. Virtual healthcare is a component of telehealth that refers to real-time "virtual visits" between patients and clinicians via communications technology (video and audio) from practically any location.

Section 5

Start your telehealth and virtual care journey with AWS

Amazon Web Services (AWS) is collaborating with healthcare providers, public health bodies, government agencies, and other healthcare organizations around the globe to support their efforts to cope with COVID-19 and beyond.

We are enabling the efficient, rapid, and cost-effective scaling of technology and infrastructure to help maintain clinical and operational continuity.
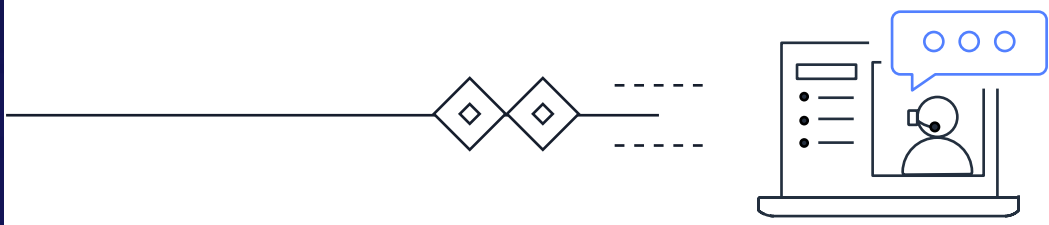
Click here to learn more about how AWS can help your organization. Please complete this form, and an AWS representative will contact you.

Or, **click here** if you're ready to chat.

aws healthcare