GOOD GOVERNANCE CASE STUDY

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Advancing Your Digital Health Strategy

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The Governance Institute provides trusted, independent information, tools, resources, and solutions to board members, healthcare executives, and physician leaders in support of their efforts to lead and govern their organizations.

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Introduction

Healthcare boards must be involved in the digital transformation of their organizations. The quality, safety, and efficiency of care is increasingly being determined by how well an organization's technology works. Much of the chronic disease care that currently involves hospitalizations and visits to doctors' offices or ERs is being conducted increasingly through virtual care at home.[1] Digital interaction is becoming the norm as consumers engage in online searches to obtain health information before engaging with healthcare organizations.[2] Furthermore, COVID-19 has proven the critical need for virtual care (and reimbursement for this type of care) on a mass scale. Essentially, digital health will be a key aspect of any organization's outpatient growth strategy.

What Is Digital Health?

While telehealth or "virtual care" tends to dominate much of the digital discussion, it represents only one of five key care delivery capabilities that must be considered collectively when developing impactful digital solutions:

- **Virtual care** (communications-enabled care delivery at a distance, like e-visits, video consultations, and telehealth)
- **Patient self-service** (technology that empowers patients to manage their own health and treatment, such as direct scheduling, virtual triage, and patient-directed referrals)
- **Connected solutions** (smart devices that drive decision support, remote patient monitoring, and interventions, including wearables, smart diagnostics, and care environment sensors)
- **Personalized care** (tailored, effective treatments and customized experiences, like genomic data and patient interaction preferences)
- **Automation, artificial intelligence, predictive analytics, and machine learning** (technology that automates entire processes and/or business functions)[3]

This collection of case studies showcases how leading organizations have advanced on their journey towards integrating digital health solutions into their care delivery models in order to:

- Improve consumer access
- Enhance consumer experience
- Make care more affordable
- Extend geographic reach and new sectors

Please refer to the accompanying toolbook, *Advancing Your Digital Health Strategy*, for considerations and specific action steps your board and senior leaders can take to expand and integrate digital health solutions in your care delivery model.

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1   Robert M. Wachter, M.D., "How Information Technology Will Change Everything in Healthcare" (special section), *BoardRoom Press,* The Governance Institute, April 2015.
2   Thomas Kiesau and Brian Silverstein, M.D., "Health System Planning in a Disrupted Future" (special section), *BoardRoom Press,* The Governance Institute, April 2019.
3   *Ibid.*

Marshfield Clinic Health System

Kori Krueger, M.D., M.B.A.
Chief Quality Officer
Melissa Breen
Chief of Staff

Marshfield Clinic Health System in Wisconsin was an early adopter of telehealth in the 1990s. The organization's large geography, in mostly rural Wisconsin, and patient demographics, which include a large Medicare/Medicaid population, required its leadership to take a proactive approach to implementing new technologies. Getting patients to specialists' offices resulted in long, difficult journeys or was just not feasible given their locations and conditions.

The Traditional Clinic-to-Clinic Telehealth Model

In the beginning, the system took advantage of grant opportunities provided by HRSA (Health Resources & Services Administration).

"We were prime candidates for these early grants because of our rural service area, and our state has been reasonably proactive with regard to adopting telehealth. We recognized there was an opportunity," said Dr. Kori Krueger, Chief Quality Officer.

Without prior infrastructure in place, the grants allowed Marshfield to build out a core telehealth strategy over time to include:

- A Director of Telehealth and Virtual Care Services to oversee and orchestrate the new care delivery model.
- A staff manager to work on technology selection and training.
- Staff to build and maintain telehealth carts (which normally would have cost $20,000–$25,000 each; today, there are several vendors in the market that supply prebuilt carts at a much lower cost and provide technical experts to train staff).

With clinic-to-clinic telehealth, a telehealth presenter (nurse) who is trained to present patients for multiple specialties is required. This can create scheduling challenges—for any particular specialty at Marshfield, scheduling is unpredictable due to the geographic distance of the patients. Presenters had to be scattered throughout the system with special time slots. Marshfield eventually overcame this challenge after several different staffing iterations by establishing dedicated telehealth schedules with nurse presenters reserved exclusively for this purpose.

In the early years, many of Marshfield's clinical locations did not have broadband and Internet access, so it worked with HRSA to put in dedicated lines with higher speeds to support telehealth. The system partnered with Head Start to conduct early childhood screening for dental disease, and integrated dental centers into their practices.

"We've been in a partnership with HRSA over multiple cycles now to build up infrastructure over the last several decades. Clinical site-to-clinical site was the main way it was originally done, focused largely within the health system due to payer restrictions. It was difficult to get [payers] to look at doing this for patients in other environments," said Dr. Krueger.

Virtual Care for Patients at Home

A decade ago, the clinic implemented a program called Care My Way, powered by American Well, for provider-to-patient virtual care at home. It was staffed by Marshfield providers using the system's EMR. As a comprehensive wrap-around service, it can be used to diagnose and treat approximately 50 different health issues such as upper respiratory infections, coughs, urinary tract infections, tick bites, rashes and more, for an affordable flat fee. Some payers (such as the system's own health plan) reimburse this service at no charge to the patient.

"We have seen a lot of growth in that program over the last eight to nine years," said Dr. Krueger. "It benefits our patients to have that coordinated approach with the medical record available for prescribing and documentation."

Marshfield maintains a comprehensive medical record, so physicians can document right in the record during the telehealth visit; care plans can be seen easily in the notes. If patients have more care needs during the visit that can't be met virtually, physicians arrange for them to come in for further evaluation, perform lab visits, and so forth.

Until recently, Marshfield's telehealth program had been very limited based on few payers willing to reimburse (there were no Medicare or Medicaid contracts outside those already contracted with Marshfield's health plan). "But we will take anyone eligible as long as they are located in the states where our nurse practitioners hold a license," said Dr. Krueger.

Rapid Expansion Due to COVID-19

COVID-19 initially caused a 60 percent decline in ambulatory volume. Telehealth has enabled Marshfield to recover about 15–20 percent in the clinic's first weeks of expansion, and that volume is growing each day. Expanded telehealth was rolled out over a three-week period for all primary/wellness care, longitudinal chronic care, and specialty care. "We moved very quickly to understand what resources to leverage," said Dr. Krueger.

Marshfield implemented a Cisco WebEx platform for telehealth after attempts with Skype and FaceTime proved problematic for patients. The WebEx platform uses a cloud-based solution where patients can click on a link from an email that brings them into a secure meeting room with their provider; the patient doesn't need any special software.

Appointing, check-in, and the provider interaction process is more secure and streamlined, according to Dr. Krueger. Ten days in, the clinic provided over 5,000 visits with patients that would have otherwise resulted in unmet needs.

Marshfield was already using Cisco WebEx for virtual meetings, so Dr. Krueger's team worked with Cisco to expand the number of licenses in order to provision each of their providers to a dedicated WebEx link and a dedicated meeting room.

"It was a quick solution to implement—we didn't have time to go to market and vet alternatives. Care My Way is more labor intensive and overall a better experience for providers, but expansion to its current scale requires some build out with the vendor," said Dr. Krueger.

WebEx is working well as an intermediate step right now, and Dr. Krueger will look at whether it can continue post-COVID or if they will need to move practices over to the American Well platform.

"We continually try to think outside of the box about how to do virtual visits," Dr. Krueger added. "It's an adjustment for providers to become more comfortable with not being in the same room as the patient—there is a learning curve. We have encouraged them to think innovatively."

Dr. Krueger also cited a reluctance among some physicians, as they are trained to "expect the worst" until the diagnosis becomes clear, which can make the concept of telehealth difficult. Dr. Krueger reminds them that it's ok to fail as telehealth isn't the solution for every problem. The physicians have become more comfortable with it over time.

Physician-to-patient virtual care at home requires technical support for the patient. Most often the breakdown is related to microphone or video settings, which can prohibit the visit from occurring efficiently or at all if problems occur. Marshfield has a tech support team within the IT department with a dedicated telephone line, so a provider can call the patient on the phone if necessary, and if the patient isn't able to troubleshoot the problem with the physician's help, an IT person can join the call.

If deemed necessary, visits are rescheduled, but often visits can be done via audio only with a simple telephone call. Of course, video is more personal and provides much better ability to conduct a high-level cursory physical exam.

Marshfield's IT staff also purchases hardware and installs broadband for its physicians' offices and clinics to support telehealth.

The Role of the Board and Senior Leadership

The Marshfield board and senior leadership have been very supportive of telehealth expansion and building overall digital health capabilities. Dr. Krueger meets regularly with the CMO and COO to provide progress reports on removing telehealth barriers. "In fact, we have so much support from senior leadership that they want us to move faster than we can sometimes," Dr. Krueger said.

"Innovation has always been a cornerstone of who we have been from the beginning," said Melissa Breen, Chief of Staff at Marshfield, which was founded by six physicians over 100 years ago. Digital health goals are integrated into the organization's strategic plan under the service excellence pillar, and progress is reviewed and discussed at every meeting. To support all innovation efforts, Marshfield has an innovation department that works very closely with the Director of Telehealth. "We aren't stuck in one paradigm," Breen continued. "We are always willing to look at and talk to other organizations and learn about other new technology that is up-and-coming."

Marshfield's CEO, Dr. Susan Turney, has placed a particular focus on innovation, seeing it as her personal responsibility to invest time in researching new technologies and vendors and learning from other health systems, to discover all of the possible options and then bring recommendations to the board. "She has always kept a firm vision on what the future will hold and brings back the possibilities for tomorrow," said Breen. "The board follows her with that vision as well."

Being a rural health system has been key to creating a sense of urgency for the board and senior leaders to embrace new ideas and innovate in the digital health

space. But it hasn't been for the sake of technology itself or to be on the cutting edge, but from the focus of how to best help their patients. "We save patients over 1 million miles of travel every year because of telehealth," said Breen. "We give out gas cards because our patients can't afford to come to some of our clinics. They have to take off work and they have no paid time off, so for us it has always been about being innovative around how to serve our population. The most important question is what is going to work for our patients."

> "We like to say, 'augmented intelligence.' It really needs to be part of who we are and what we do."
>
> —*Melissa Breen, Chief of Staff*

Lessons Learned and Looking to the Future

Dr. Krueger emphasized the following important lessons Marshfield learned on its telehealth journey:

- Clinic-to-clinic telehealth needs a dedicated staffing model to maximize efficiency and availability for patients.
- Have systems in place to be able to provide technical support to patients receiving virtual care at home.

Today, health systems do not need to invest nearly as much to build out clinic-to-clinic infrastructure because the technology is more readily available at a much lower cost, depending on the scope of services and how many access points are needed. For physician-to-patient virtual care, providers can get up and running very inexpensively. However, many vendors charge a per-use fee over and above the base, up-front fee. In these kinds of arrangements, more utilization could mean more cost, so providers may need to adjust their vendor contracts going forward to enable long-term expanded virtual care without adding to the cost structure.

Like most other providers, Dr. Krueger now believes patients and providers alike will not be willing to go back to pre-COVID restrictions on telehealth. Ultimately there may be some middle ground where telehealth will be used more broadly for certain types of care or situations that are most conducive to it in the long term.

Beyond maintaining expanded telehealth, Marshfield's digital health strategic focus post-COVID will be on AI. "We like to say 'augmented intelligence,'" Breen explained. "It really needs to be part of who we are and what we do." Marshfield's Chief Transformation Officer and Chief Information Officer are spearheading this initiative. One example of how they are using AI already is via an automated nurse triage line. "When COVID hit, our nurse line was getting hundreds more calls than normal, and we put in a service called GIANT to help point our patients in the right direction without having to have a human first." There are countless other applications and potential for AI, both with predictive analytic capabilities as well as for smarter care delivery capabilities.

UC Davis Health

Peter Yellowlees, M.D.
Chief Wellness Officer, UCD Health

*Alan Stoudemire Endowed Professor of Psychiatry,
Department of Psychiatry, University of California, Davis*

Launched in the 1990s, the UC Davis telemedicine program gives more than 80 sites in Northern California, many of them in rural areas, access to academic medical specialists. While most of the consultations are with outpatients, an increasing number of inpatient consultations are taking place, including in pediatric critical care, cardiology and, now, infectious disease.

Due to COVID-19, UCD Health expanded telemedicine to 100 percent of patients in psychiatry and 30–40 percent in other specialties, a goal the system has been working to accomplish for some time but were unable to do with the barriers that were only recently removed due to COVID.

Dr. Peter Yellowlees, Chief Wellness Officer at UCD Health and Professor of Psychiatry at UC Davis, cited four historical barriers to virtual care/telehealth adoption:

1. **Technology,** which is no longer a barrier because there is no longer the need to invest in expensive equipment.
2. **Patient/consumer attitudes,** which also are no longer a barrier because patients now have very high satisfaction rates with telehealth, often higher than when being seen in person.
3. **Regulations** restricting telehealth and reimbursement have been removed for the time being to enable providers to care for patients safely during the COVID-19 pandemic. Many providers (and patients) are hoping that telehealth will be allowed to continue in this manner for the long term.
4. **Physician attitudes/reluctance**, which had been a significant barrier, is also melting away very rapidly due to COVID-19. In the past, physicians had the point of view that it was "second-class treatment" or a "second-class way of assessing people," or that it is easier to care for patients in person. As the younger generation comes through, they are much more in favor of using virtual care platforms; they are more amenable and accustomed to using these types of technologies on a daily basis.

"Every health system must now have a video visit strategy as part of their longer-term approach to providing care," said Dr. Yellowlees. "COVID has led us past a tipping point."

In order to achieve such rapid, large-scale telehealth expansion, a permanent, 10-person EMR training team that normally helps physicians with the EMR (as it is constantly being updated) was converted to provide training for physicians on virtual visits. Training took about one hour per physician on average, but was conducted

in groups whenever possible, supported by written materials. "Training was not a significant barrier to telemedicine for us," said Dr. Yellowlees. "The barrier we encountered was attitude-related—some people didn't want to invest the time or were reluctant to change what they were already doing."

Physician training on virtual care technology is pretty straightforward, according to Dr. Yellowlees, who is normally involved in psychiatry resident training. The main area of focus is on interpersonal and media skills, which are slightly different on video rather than in person. Physicians need to be more expressive, use more facial expressions and more body language, speak in a more modular way, and make themselves sound more engaged so that their intention, tone, and bedside manner can carry across their screen to the patient's. (The American Psychiatry Association APA Telepsyhciatry Toolkit includes several short videos on this that are available to the public [here]).

> The long-term view is that patients will be seen in a hybrid manner. Maintaining interpersonal connections will be important. Ultimately, virtual care will be a seamless piece of the overall care delivery experience.

Advantages of Virtual Care

Dr. Yellowlees cited the primary advantages of telemedicine being more flexibility and more efficient workflows, improving everything from surgery to psychiatry.

Virtual care at home allows physicians to be more flexible in providing patient care hours, including after hours, in exchange for the ability to take time off during the week. This has obvious advantages for both physicians and patients. Physicians find it easier to talk while typing during virtual visits and maintain eye contact, which saves at least five minutes per patient, which, added up over the course of the day is significant. Additionally, virtual care eliminates the "rooming process" in doctor's offices, where patients are led into a room, they speak to the nurse, and wait until the physician comes in. Every step of this process takes several minutes out of every consult. For a 15-minute consult, this makes a significant increase in the amount of time the doctor can spend with the patient, and/or better allows the physician to keep on schedule. These advantages of virtual care can help alleviate many of the stresses that contribute to physician burnout.

Dr. Yellowlees has learned so much more about his patients during virtual home visits. He asks them to show him around their house on their mobile device, which gives him a glimpse of their personal passions and interests. He can better address social determinants of health such as the quality and quantity of food in the refrigerator and pantry, and whether there is any outdoor space for fresh air, exercise, and gardening. For psychiatry, the capacity to do home visits is extensive, and this level of background information is invaluable and might not be understood to the same degree during in-person visits at the doctor's office.

Main Uses of Telehealth Post-COVID

Longer term, Dr. Yellowlees believes that telehealth will bring the most change in primary care, enabling triage assessments to be done at home. In Dr. Yellowlees's experience, most consultations require only video. For example, he has his patients buy a blood pressure cuff from their local pharmacy; they take their own blood pressure and record the numbers to him.

Other areas that have natural translation to telehealth and could be conducted virtually in the long term include dermatology, ophthalmology, cardiology, and pathology, all areas where Dr. Yellowlees expects to see telehealth expansion as well.

Some "traditional" clinic to clinic telehealth will need to continue post-COVID. For example, many Native American reservations don't have broadband, so patients must come to the clinic. In rural areas, this type of telehealth is helpful when needed specialists are located far away.

The long-term view is that patients will be seen in a hybrid manner, and will still need to see doctors in person as well as via video. Maintaining interpersonal connections will be important. Providers will determine the decision criteria for when patients will have virtual vs. when they need to have in-person visits. HIPAA compliance is necessary, and cybersecurity will become a larger concern as telehealth is more widespread. But ultimately, virtual care will be a seamless piece of the overall care delivery experience.

The Role of the Board and Senior Leadership

Questions for leaders to consider when developing a long-term virtual care strategy, before considering vendor(s) with which to partner include:

- What are the use cases for virtual care?
- What is the communications technology for? Do they need to transmit video, heart samples, physical exam data, scopes, etc.?

Beyond setting strategic goals for digital health, Dr. Yellowlees emphasized that boards need to work with local and state government agencies to retain the changed regulatory environment as much as possible. "Let's take advantage of this crisis and get rid of some of the adverse regulatory consequences that we have been trying to get rid of for 20 years," he said. Additional goals boards can advocate for include parity reimbursement and removal of state licensing barriers.

The Future of Virtual Care and AI

In the long run, virtual consults will be recorded (when privacy concerns related to this have been addressed), according to Dr. Yellowlees. "Then we can apply AI technologies such as facial and language recognition to develop screening tests for depression, for example. The AI can create transcripts and pull the information into the EMR. Essentially, the videos themselves will become data, greatly expanding analytic possibilities."

Jefferson Health

Judd Hollander, M.D.
Senior Vice President for Healthcare Delivery Innovation

Jefferson Health in Philadelphia has been an early adopter of digital health technologies, as part of its focus on innovation as a main strategic pillar for the rapidly growing health system. An important aspect of Jefferson's decision to focus on digital health is that its leaders and the board began with questions around how to improve the consumers' experience—how they access and navigate care at Jefferson and what are the barriers or bumps in the road that hinder their experience. So, rather than starting with digital solutions (e.g., digital for the sake of digital) and trying to fit the problems to those solutions, they identified the problems from the ground up, and then sought vendor partners who would build solutions together. This is helping the system work swiftly towards its ultimate goal of building a consumer-centric health system where patients can receive care when, where, and how they need it. Jefferson Health CEO, Dr. Stephen Klasko, calls it "healthcare with no address." Today, the health system integrates EHR and real-time and predictive analytics with dashboard and app technology to enhance patient safety, engagement, and experience.

Dr. Judd Hollander, Senior Vice President for Healthcare Delivery Innovation, shared advice on how healthcare leaders should go about selecting vendor partners, and what to look out for. Dr. Hollander is responsible for identifying, developing, implementing and measuring the success of innovative healthcare delivery opportunities across the enterprise. These initiatives have included JeffConnect (Jefferson's virtual care platform of on-demand video visits), the National Academic Center for Telehealth, and Jefferson Urgent Care.

Digital Care Strategy

Virtual care platforms should ultimately connect to the organization's EHR and other databases to enable comprehensive data analyses. Dr. Hollander advocates that vendor contracts should include a requirement that the vendor will integrate its platform with the organization's EHR within six months. Dr. Hollander's stance is that if this goal is not reached, the licensing fee should be cut in half. "Money drives all business decisions. Vendors should be contractually held to it. The time it takes to switch vendors is complicated and time consuming," said Dr. Hollander.

Teladoc is their vendor partner for JeffConnect and many of their scheduled visit programs, all of which are being integrated into the system's Epic EHR. Jefferson

also has a shared-risk partnership with GE Healthcare for predictive data analytics and patient management solutions that aggregate and analyze data from disparate systems and translate that information to a transparent, user friendly and interactive experience where clinical staff can target interventions to reduce debilitating and life-threatening episodes.[4]

A virtual visit platform called EmOpti handles teleintake/triage for the ED, allowing incoming ED patients to see a clinician on screen before seeing one in person. Known as "tele-triage," the platform helps diagnose and direct non-critical cases to the next step in a person's care journey. By speaking via secure video chat, with patient wait times averaging nine minutes, a doctor or advanced practice provider can gather information and even approve a discharge without needing to go to a bed or treatment room.

Such efficiencies had already cut untreated ED walkouts to fewer than 1 percent in recent months, said Dr. Hollander. The ability to separate caretakers and possibly contagious individuals has since become a critical defense. "We get their orders written, [patients] get their X-ray taken and get their labs done, they get their EKG done," Dr. Hollander said. "Sometimes they even get their CAT scan done before they get into a patient room, depending on how backed up we are. It's a major, major advantage."[5]

To Build or Partner? Working with Vendors

Early on, Jefferson leaders determined that they didn't have the option to build digital health platforms from the ground up because they lacked the experience. Another downside to creating the technology in-house is that it becomes dated over time. "You effectively are funding an internal company that will need to devote all their time [to constantly updating the technology], which is difficult," said Dr. Hollander. "Companies you are contracting with need to hit the points important to you."

But, "when you're buying, you need to know first what you want to accomplish," advises Dr. Hollander. "[The digital health technology vendors] are really good at selling you stuff you might not need," he cautioned. "The board needs to set the strategy—what are you trying to accomplish?" To successfully select the right vendor partner, senior leaders need to start with a list of considerations around digital health strategy connected to patient needs, to help connect to the board's future vision, while taking into consideration budget and compliance (including payer contracts) and privacy concerns. Questions to answer include how to get there, and then once there, how to sustain the vision. At that point, the organization is ready to shop for vendors.

Dr. Hollander advises against shopping on vendors' terms, demonstrating their platforms on their own networks. Rather, he said, "Make them come into your

4   "Jefferson Health Recognized by IDG as Digital Edge 50 Award Winner for Improving Patient Safety and Experience" (press release), December 15, 2016 (https://hospitals.jefferson.edu/news/2016/12/jefferson-health-IDG-digital-edge-50-award.html).
5   Kevin Joy, "How 'Tele-Triage' Models Work to Keep Patients and Clinicians Safe," *HealthTech Magazine,* April 30, 2020 (https://healthtechmagazine.net/article/2020/04/how-tele-triage-models-work-keep-patients-and-clinicians-safe-perfcon).

hospital and get behind your firewall, on your devices and browsers, to show you how well their technology works with your devices on your network. Get as deep into the weeds with the vendors as you can, but make sure you are the one specifying what you want to see."

Dr. Hollander has seen vendor demonstrations in which the vendor is driving, "showing screenshots and pictures from their own devices." In his experience, often after those types of demonstrations, when you begin to use the product, many of the features don't end up working the way they were expected to, or at all.

> "Make them come into your hospital and get behind your firewall, on your devices and browsers, to show you how well their technology works with your devices on your network. Get as deep into the weeds with the vendors as you can, but make sure you are the one specifying what you want to see."
>
> —*Judd Hollander, M.D.,*
> *Senior Vice President for Healthcare Delivery Innovation*

Jefferson's vendor partners were selected because they match up with everything Jefferson wants to accomplish. During the selection process, Dr. Hollander's team goes through each of their goals with the vendors to assess what they will agree to in the contract, and then they choose the best product for the dollar based on those internal goals, purpose, and intent.

One important factor to consider is whether the vendor partner is interested in building a business, rather than making a quick exit or IPO. Dr. Hollander recommends prioritizing companies in the customer retention phase of their business rather than customer acquisition phase (generally avoiding start-ups unless there is a symbiotic development deal). Vendor selection should center around long-term customer retention, rather than the minimal viable product (MVP). "The fruitful relationships are where they are doing real development. They will listen to what we want to develop, or we know they are trying to be the long-term player in the market and develop the best possible product," said Dr. Hollander. "If I want to change the splash page to Jefferson colors, sure, charge me for that because I'm customizing. But if you need to build a workflow to bill Medicare, you shouldn't charge me for that because every customer would be using that. Stable, long-haul vendors will approach things this way."

Geisinger Health System

Matt Walsh
Executive Vice President & COO

Geisinger Health System, a large, integrated academic health system with a health plan serving over 3 million patients throughout Pennsylvania and southern New Jersey, has been an early adopter of digital health technologies, implementing an EMR in 1996, and then increasing data collection and analytic capabilities out of the EMR with a big data warehouse and AI applications in 2006. It began a more intense focus on digital strategy about one and a half years ago, leveraging opportunities to create efficiency and effectiveness with virtual care, AI, CRM (customer relationship management) implementation, and bot technology for its call center, for example.

Historical Barriers to Digital Healthcare

According to Matt Walsh, Executive Vice President and COO, three key constituents for virtual care and other digital health capabilities have never previously aligned to enable widespread adoption:

- **Patients,** who in the past weren't comfortable with virtual health
- **Providers,** who were concerned about what clues they might miss without seeing the patient in person and too busy to receive the necessary training
- **Payers,** who were unwilling to reimburse this type of care in the past, in part due to lack of profitability

Almost overnight, due to COVID-19, all the barriers dissolved. The three constituents came into alignment: providers had time on their hands and were eager to see patients, when they could no longer conduct in-person visits; patients who needed to be seen but couldn't go to the clinic and became interested in accessing the technology; and payers willing to reimburse at fair rates for care provision (along with government regulations relaxing to allow it to happen on a much wider scale).

Virtual Care Expansion

Geisinger has a "robust three-year digital health strategy it is currently in the process of implementing, part of that involving transitioning to more telehealth solutions," said Walsh, who has been working on telehealth solutions for at least 10 years. Due to COVID-19, Geisinger is now providing nearly 2,000 video visits per day, using InTouch Health as its video care platform. The system had already been using this platform for clinic-to-clinic specialty visits and call coverage at remote campuses for tele-neurology and tele-behavioral health. Prior to COVID, telehealth direct to a patient at home wasn't reimbursed, so Geisinger only used it in unique circumstances such as for post-surgery checkups as part of bundled payment procedures.

InTouch interfaces with Epic but is a separate application, where the provider schedule can be loaded into the system with direct links for each appointment.

The system was able to pivot rapidly to telehealth expansion over a period of about four weeks, because the technology was already in place and the barriers listed above were removed—the key stakeholders that were previously not aligned suddenly became so.

Post-COVID, Walsh hopes that virtual care visits will still make up at least 20 percent of clinical care at Geisinger.

We've Got an App for That

Over the years, Geisinger has partnered with a number of different companies to create innovative, one-off solutions—various apps that do different things for patients with different issues, such as appointment scheduling, urgent care scheduling, video visits, asynchronous e-visits, asthma care management, and medication adherence—all with different end-point delivery capabilities. This has created some confusion for patients trying to navigate through the various options. "Part of our digital strategy going forward is to determine how to simplify and integrate these capabilities into something more seamless and navigable for the patients," said Walsh. "We are implementing a virtual triage capability, starting on our Web site, so patients can click on virtual triage, answer some questions, and then it drops them into the right model, whether it's urgent care, a video visit, a conversation with their doctor via an e-visit, or a nurse triage line with a direct connection." Patient guidance is a key component of their digital strategy going forward.

Data Analytics using AI

Geisinger has used Epic for over 20 years, which contains a vast amount of longitudinal clinical data for a large set of patients, bringing about many "deep learning" opportunities. Implementing AI/machine learning has helped use the data to make better decisions for patients.

To target the patient experience in a radical way, Geisinger Chief Innovation Officer Karen Murphy believes AI and machine learning will be essential tools—not to replace human interaction, but to make room for it. "We have to leverage technology to where we can so we have the human interaction where we most need it," she said. "When you're telling someone that they have a cancer diagnosis, you want someone there. But we are going to have to leverage the technological resources, so when we don't require human intervention, that we leverage [artificial intelligence and machine learning] technology."[6]

For example, Geisinger has used its AI capabilities to analyze gaps in care for heart failure patients. They put in place an algorithm to scrub the data to find gaps in care that are most influential in addressing mortality with this group of patients, such as blood pressure and medication management. Several layers of analysis have

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6   Jonah Comstock, "Through many small bets, Geisinger aims to radically redesign care," *MobiHealthNews*, February 11, 2019 (www.mobihealthnews.com/content/through-many-small-bets-geisinger-aims-radically-redesign-care).

shown that a key factor for increased risk of death is making sure that heart failure patients receive a flu shot every year.

To improve the care of heart disease patients, Geisinger is using deep learning models to analyze data from electrocardiograms and echocardiograms, two of the most common tests to monitor the heart's function. Harnessing 2 million EKG records from its databases, it is building neural networks to predict future cardiac events.

In another example, a deep learning model employed since January 2017 reads all head CT scans and automatically re-prioritizes the radiology worklist within seconds, moving potential acute cases up on a radiologist's list. This re-prioritization has resulted in an astounding 96 percent reduction in time to diagnosis.[7]

This analytic capability allows clinical leaders to focus on the highest impact gaps in care that can be closed right away, prioritizing outreach, rather than trying to solve every problem at the same time, according to Walsh. This also helps with resource allocation, ensuring that resources go where they are needed most and can make the biggest impact on outcomes and patient success. The system is working with a few different vendors to help with machine learning, which, while not a new technology, is a relatively new application to healthcare and thus a space that continues to evolve.

System leaders are ultimately searching for one solution that can leverage the same architecture across the board for all digital solutions, integrating digital health and data analytics seamlessly into the care delivery model.

The Role of Senior Leadership and the Board

"You have to ignite the imagination," said Walsh, when asked about how Geisinger's board and senior leaders helped pave the way for the system to be early adopters of digital health technologies. "About six months ago, we compared our current capabilities to other healthcare organizations. We looked broadly, including CVS, Pharma, plus other health systems, so that as those constituents started to move upstream and downstream, we knew that we would have to compete digitally from a customer interaction standpoint, with all of those different vendors." The management team conducted a current state evaluation and then created a future state, "perfect world" scenario envisioning how patients would interact with the system, with the help of a consultant to help them build a digital roadmap.

They developed a video to demonstrate the digital strategy to the board. Then they built the roadmap, which went through each stage of how Geisinger would go about getting to the future state, including steps to take, foundational investments to make, and what to add on top of that to create real value for the organization and its patients. Presenting such a high-level

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7   Isha Salian, "How an Early Bet on Digital Enables a Healthcare Network's Suite of AI Applications," NVIDIA blog, March 19, 2019 (https://blogs.nvidia.com/blog/2019/03/19/geisinger-healthcare-system-ai-gtc-2019/).

business plan helped the board understand the vision and long-term thinking, but each individual project has to stand on its own, and they bring those to the board for approval.

The board was focused on ROI initially, which was part of the challenge. "In some ways this is now just the cost of doing business going forward—not just choosing what business to add but to do this in order to stay in business, to be able to deliver these kinds of capabilities," Walsh explained. "Some digital projects will have ROI, but some of it is just necessary to the future of how healthcare will be delivered. Helping the board understand that was essential to moving forward with a lot of this work."

> "In some ways this is now just the cost of doing business going forward—not just choosing what business to add but to do this in order to stay in business."
>
> —*Matt Walsh, Executive Vice President & COO*

Lessons Learned and Next Steps

The digital future is evolving for Geisinger. The current focus on COVID requires digital strategy efforts to take a short sideline while Geisinger leaders create predictive models for COVID. The remarkable transition to virtual care has caused them to take stock of the fact that when necessary, they can pivot incredibly fast into completely new ways of delivering care. They can use this capability to drive other new ways of delivering care using CRM, bots, and finding new ways to automate things that were not previously possible. Walsh sees the system implementing a very different set of capabilities within the next two years or so, to enable patients to access care more conveniently, and he hopes these capabilities can help Geisinger continue to be a differentiator in the market.

Walsh's recommendation for others wanting to expand their digital health strategy is to create a "what's in it for me" business case for each of the three constituents: patients, providers, and payers. "When you can align these three constituents around something, there really isn't anything you can't accomplish."

Ascension Health System

Eduardo Conrado

Executive Vice President and Chief Strategy Innovations Officer

Ascension Health System, based in St. Louis, MO, has been undergoing a slow transformation towards building digital health infrastructure over the past decade. Just under two years ago, the system accelerated its process in earnest to develop a broader set of digital tools with the creation of a specific senior leadership position to oversee its technology and digital teams under a unified structure. We spoke with Eduardo Conrado, Executive Vice President and Chief Strategy Innovations Officer, about Ascension's digital health strategy and where the system is on its journey to creating a healthcare delivery model seamlessly integrating digital health solutions and smart analytics to enable better patient access, experience, and outcomes.

Ascension has three teams working on digital technology, which all report to Conrado:

1. **Essential Technology,** which includes the CIO and main IT infrastructure, and is responsible for running and maintaining existing systems and cybernetworks/security.
2. **Digital Studios Teams** totaling about 400 people, which "look more like a software company," according to Conrado. The skillset is different; the teams are tasked with faster speed to action and are under a separate budget so they don't have to compete with other teams. They focus on creating new applications for patients/consumers as well as new clinical technology. Staff includes ethnographic researchers, designers, product/journey managers, and front-end development staff dedicated to mobile and Web-based app development. They run biweekly sprints on product development.
3. **Data Science Team**, which emphasizes clinical expertise, quality, and population health. This team has a new Chief Data Scientist who looks at the whole infrastructure, as well as computational and mathematical skillsets. This team links to the data engineering team, which makes sure the databases are accessible and continually expanding (combining clinical, claims, and consumer data). The aim is to expand the use cases, going beyond looking at past data and building products that are data-driven.

Conrado emphasizes the importance of beginning with what are the customers' and providers' problems first (rather than starting with the technology and then seeing what problems it can solve). Once those problems are identified and potential

solutions proposed, Conrado's team determines whether the solution could be developed internally or if it is better to source from third-party vendors. Digital solutions the system has implemented or is in the process of implementing include:

- EHR search powered by Google, which lets clinicians use shorthand to search for results that may have typos; jump to different parts of the chart, such as vitals or notes; and search scanned documents, faxes, and handwritten notes
- Telehealth
- Consumer journey-mapping (online scheduling; use of the Web site to navigate consumers to the right care setting)
- On-boarding patients at home via digital registration and expanding other "contactless environments"
- Virtual urgent care and provider offices
- Virtual ED
- Remote patient monitoring

Back-end considerations include whether the technology makes it easier for people to pay their bill (revenue cycle), enables price transparency and family access to billing, and provides an e-commerce-like experience instead of the traditional healthcare "clunkiness."

Virtual Care Expansion in Response to COVID-19

Ascension was able to rapidly expand virtual care from a few thousand visits a month to 50,000–60,000 per week, according to Conrado. (Ascension partners with Vivify Health for its virtual care platform.) His team was able to scale and add unique features for virtual urgent care and provider visits, including remote patient monitoring for acute and chronic illnesses. Providers were able to use such monitoring to lower acuity by remotely tracking oxygen, temperature, and blood pressure. "We saw a lot of potential to grow virtual services several months ago, [but until now we] hadn't grown as fast due to physician and consumer hesitancy," said Conrado. Lack of reimbursement for telehealth services was also a barrier. But, "providers love it now and consumers see the convenience of it. So now we are working on taking feedback from clinicians and consumers about where they are experiencing friction to enhance the platform."

About three years ago, Ascension implemented two telemedicine-equipped kidney transplant satellite outreach clinics in its Indiana market, aiming to make it easier for patients to speak with their transplant surgeons, specialists, and social workers for pre-surgical testing and evaluations. The system has also used virtual care in rural communities that have difficulty recruiting physicians, as well as to leverage specialists in metropolitan communities to provide consultative support for its primary-care clinics.[8]

"Digital healthcare became exponentially more important due to COVID across all fronts," said Conrado. "Patients were looking for convenience and transparency, and on top of that we are now adding reduced contact and safety. It can all be enabled through digital solutions."

8   A. Kacik, "Ascension boosts investment in telemedicine," *Modern Healthcare,* February 5, 2018.

Conrado cautioned that platforms that can be scaled across the system are extremely important, rather than fragmented solutions that don't work with each other. "We felt the fragmentation during this time if we were using anything that couldn't be used enterprise-wide." This will be an area of focus for Ascension's digital teams going forward. COVID dramatically increased the system's need for ensuring providers have robust data engineering to create such enterprise-wide platforms, and to allow data scientists the ability to create actionable datasets within those platforms.

If Conrado could have done anything differently to better prepare for COVID, he would have worked towards having actionable data platforms in place sooner, in a more robust manner. "The Digital Studios Teams gave us agility to build what we needed to at a faster pace. But now what we need to strengthen is the data part."

"We were 'doing' digital, but until you bring a position like [mine] on board, it picks up from traditional IT and accelerates into a broader set of digital tools."

—Eduardo Conrado, Executive Vice President and Chief Strategy Innovations Officer

Data Analytics: Applying AI

Researching and applying artificial intelligence capabilities at Ascension is a joint effort between the data science and engineering teams. Conrado has a senior vice president focusing on consumer expectations and a senior vice president overseeing the clinical component (both of whom report to Conrado), and both teams are looking at where AI could be applicable. "When dealing with patients up front, bots are being deployed to guide people to the right care setting. I think that is where we will see a lot of the traction initially on the consumer front," explained Conrado. "On the clinical side, it will take a bit longer to use AI/machine learning, [because we need] to work with clinical teams on the care models and where it can augment."

Conrado sees initial AI application useful for sifting through the vast amounts of data collected, which will be deployed within the next year or so. AI has been applied elsewhere to read imaging; Ascension is currently tracking that and other potential uses of AI but not yet using them. "It requires some fundamental changes in infrastructure. A lot of the IT systems that have been in place the last 20 years make the data not easily accessible for applying AI," Conrado said. "Data needs to be moved [from the EHR] into the cloud so we can use the computational firepower the cloud provides, which is a process we are going through now. Then we will have to normalize the data and eventually we will start to see more use of that data for clinical applications."
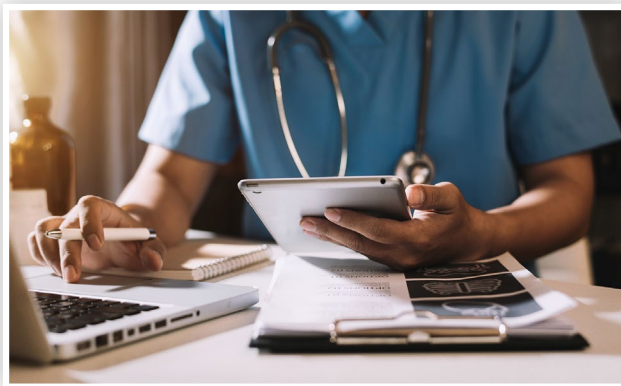
> **"T**he past is application architecture; the future is enterprise architecture."
>
> *—Eduardo Conrado*

Today, Ascension is shifting its point of view away from building one-off apps towards building digital architecture across the enterprise. "We want to be able to use our app[s] across the system, end to end," said Conrado. For enterprise architecture, Conrado's team considers the clinical or consumer journey—the data needs to flow along the journey and the apps need to talk to each other.

Vendor Selection Criteria

For vendor selection, Conrado and his team first looks to make sure the vendor supports an open API architecture (e.g., a software interface that exposes back-end data and application functionality for use in new applications). "No single vendor will be able to provide everything you need," cautioned Conrado. Some vendors do not allow API or bi-directional data, which Conrado considers stifling to innovation. Banking and telecom both require robust innovation and rely on vendors that have open API, so Ascension looks for vendors that "want to play in this kind of ecosystem." This allows them to further develop the enterprise architecture so the data can flow out of the apps and across the system.

Mobile extensions that require collapsing of data from multiple apps or for unique application would have to be built in-house. "Like banking and airlines, we want one app that can do everything, not 10 that do different things. Right now, these largely need to be developed ourselves," said Conrado. He cited the banking and airline industry apps that do "everything" for customers and do it well. Also requiring internal development is the Web site layer, combining a hidden scheduling system on the back end with a consumer layer on the front-end based on how patients want to interact with Ascension.

Effective Management and Governance for Digital Health Enablement

Conrado feels that having both a Chief Digital Officer and a CIO creates undue friction. There should be one person who leads all technology and data efforts, especially for organizations in a transformational stage. Having a single senior leader who reports to the CEO makes it easier to have the necessary discussions at the management level, according to Conrado. Then it becomes a three-legged stool of

management—operations, clinical, and technology—who all talk to each other about how best to work together and maintain the same view of the future.

At the board level, effective oversight includes multiple layers. First, the cyber component must stay top of mind with the board, especially as data moves to the cloud. As the organization is buying and developing apps, the board needs to remain aware of what security and privacy controls are being put in place as data is being moved and IT "ecosystems" are being expanded, especially regarding how to protect them. Secondly, "digital is not a strategy; it's an enabler of the strategy," said Conrado. As the board participates in the strategic planning and future vision, its job is to find the right places and ways for digital solutions to enable that strategy, not hinder or distract from it.

Consumer-centric problem solving is at the core—is technology a solution for the problem or not? That answer will enable the design of an optimal experience.