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Digital Health
most wired.
Survey 2022
Digital Health
Most Wired
Infrastructure
Trend Report
Modernizing IT Infrastructure
for Untethered Healthcare
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Introduction

For successful growth in a market distinguished by ever-changing tech innovations and increased digital health demands, health leaders need to ensure their organizations have robust, modern IT infrastructures. Healthcare organizations (HCOs) with a solid IT foundation are well positioned to implement and support new technological capabilities for better care and operations. Unfortunately, pockets of health systems continue operating on "patchy" foundations which are less than optimal in supporting the digital services today's healthcare stakeholders seek.

The challenges of operating an HCO with a subpar infrastructure were evident during the recent pandemic. The demands to accelerate the shift of legacy technologies to implement innovative tech solutions, albeit to support expanded virtual care, hospital operational restrictions or vaccination deployments, present as an organizational stress during the best of times. Exponentially so during a pandemic. Yet HCOs girded on a flexible, stable, and secure infrastructure tended to fare well. This was perhaps most evident in the rampant use of telehealth during the start of the pandemic.

"Telehealth showed everyone that not only could digital transformation speed up, but it could accelerate within the framework CIOs already had," said Peyman Zand, Chief Strategy Officer of CereCore. Executives noticed the possibilities and pushed organizations towards those digital goals, he added.

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The steady progress of digital health projects during the pandemic was perhaps one of the most significant (and surprising) insights from the 2022 Digital Health Most Wired (DHMW) survey. Despite the challenges and distractions presented by the pandemic, more than 68% of the 38,800-plus HCOs represented in the survey declared they were "ahead" of or "right on track" with their digital transformation goals. The resiliency and fortitude of HCOs to "soldier" their digital health plans ahead under such conditions not only points to the understood criticality a robust digital health infrastructure plays to an HCO's survival, but strongly suggests the demand for supportive IT infrastructure services should continue unabated (e.g., 80% of DHMW participants deemed "Infrastructure" an essential or high priority to support the flood of new digital health technologies and solutions featuring in modern care models).

In this report, we extract key findings from the Infrastructure section of the 2022 DHMW survey and leverage the CereCore team to offer a few thoughts regarding the projected impact of these observations.

Pandemic Urgencies Spark Digital Progress

The devastation wrought by the pandemic stimulated HCOs to advance their digital capabilities and processes in an effort to effectively tackle COVID-19. Challenged to share data with a myriad of stakeholders as well as adopt "social distance" practices, HCOs responded by leveraging digital health solutions.

Commenting on the data sharing demands, Zand observed, "Providers were required to submit a lot of information to CMS and other regulatory bodies relative to COVID, including patient status, number of ill patients, deaths, and more. This increased interoperability and integration, which accelerated much faster than in the prior 10 years before the pandemic."

In a likewise manner, "social distance" demands suddenly challenged providers and their patients in the way healthcare was delivered. Working around the limitation patients faced with in-person care visits, HCOs were able to provide a continuity of care via a digital environment, which included telehealth and patient portals.

With customers suddenly interacting with HCOs in a new way, patient portals and third-party applications became crucial to patient communication. These portals improved by leaps and bounds, Zand said. "Patients were increasingly able to schedule and manage appointments in the portals, as well as find their way around the hospital."

Portal capabilities and digital applications were adopted very quickly, said Clay Posey, Assistant Vice President of Technical Services at CereCore. HCOs might have taken a lot longer to implement such portal capabilities and digital applications had they not faced these pandemic-related customer experience challenges.

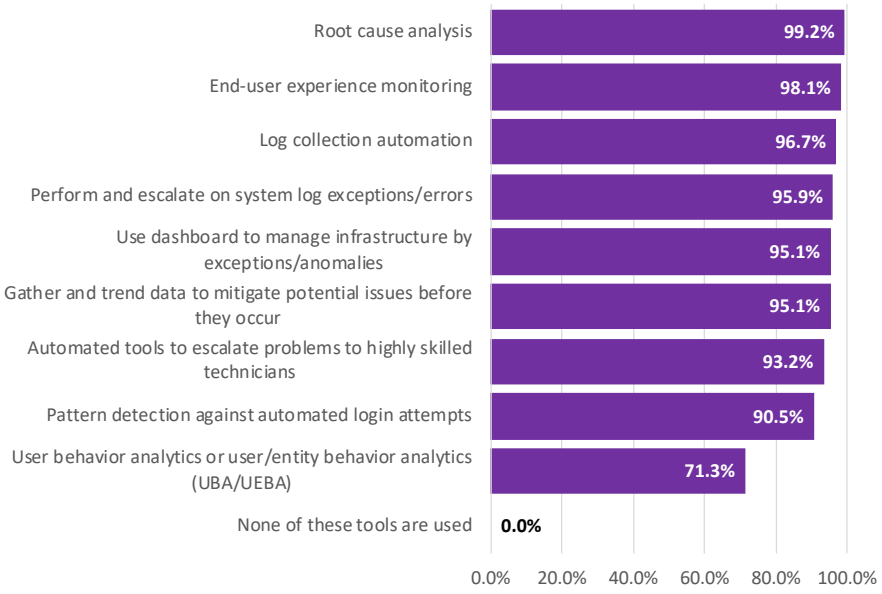
Reliance on data clouds and cloud computing appears to be another IT infrastructure area enhanced by the pandemic. The migration to the cloud allows HCOs needed flexibility and mobility in complementing their traditional on-site IT infrastructure capabilities. **"By migrating some of the applications to the cloud, physicians and patients are able to access data and information much easier,"** Zand noted.

Posey rightfully noted the global supply chain also presented HCOs a challenge during the pandemic. Fortunately, in keeping with the other responses cited, HCOs were able to find some relief by turning to digital solutions.

Infrastructure Management Tools

Having the right infrastructure in place is a critical first step for HCOs to address in progressing towards their digital transformation goals. Evidence from the 2022 DHMW survey clearly suggests organizations are fairly well positioned in this regard. Structured to be both a strategic resource and a recognition program for HCOs, the DHMW survey scores HCOs in several categories of digital health capabilities and usage, including Infrastructure. In 2022, 69% of survey participants scored among the two highest levels, 9 and 10, for their Infrastructure profile.

A deeper dive into the various issues audited in the Infrastructure section of the DHMW survey, uncovers an encouraging profile of HCO's capabilities to monitor and manage their IT systems. More specifically, there were very high adoption rates of key IT management tools including **root cause analysis** (used by 99% of HCOs), **end user experience monitoring** (98%) and **log collection automation** (97%). These findings were consistent across organization size (where smaller HCO = 199 or fewer beds; medium sized HCOs = 200 to 999 beds; larger systems = 1,000+ beds).



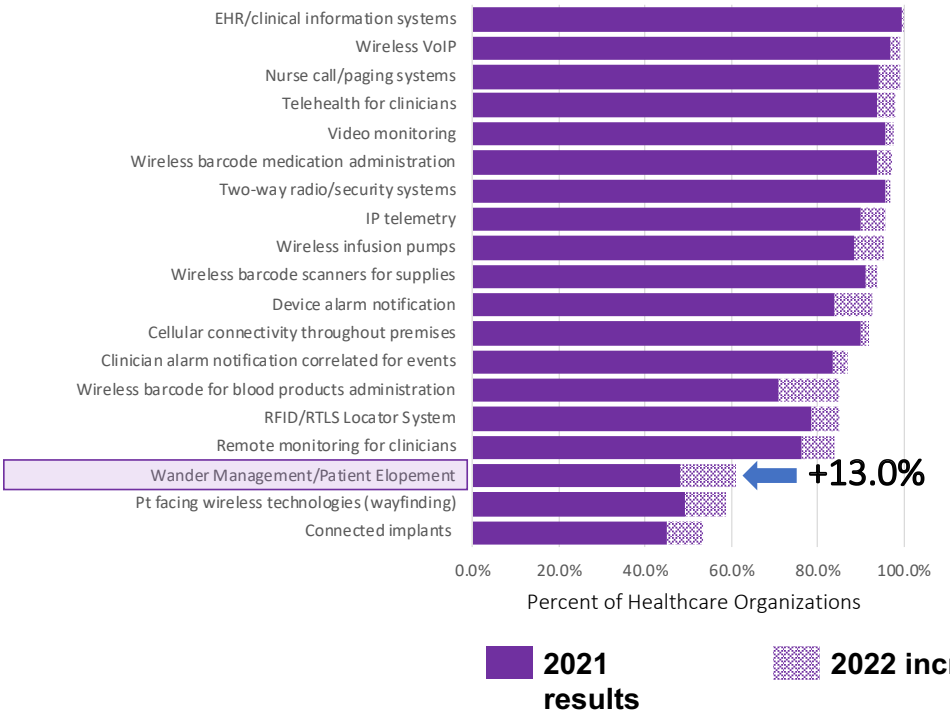
1 to 199 Exam Rooms/Beds	200 to 999 Exam Rooms/Beds	1,000+ Exam Rooms/Beds	HI - LOW
98%	99%	100%	**2%**
98%	98%	99%	**1%**
90%	98%	99%	**9%**
92%	96%	99%	**7%**
90%	96%	98%	**8%**
96%	94%	96%	**2%**
87%	95%	95%	**8%**
84%	90%	97%	**13%**
53%	72%	86%	**33%**

Percent of Healthcare Organizations

This cohesion across system size held true for many of the methods explored in the survey, including using **dashboards to manage infrastructure, trend data to mitigate potential issues, and automated tools to escalate problems to highly skilled techs.**

The disparity between small and large organizations reared its head on **user behavior analytics/user entity behavior analytics (UBA/UEBA)**, where adoption among the smallest providers was only 53% compared to an 86% adoption rate among large HCOs.

Wireless Capabilities



1 to 199 Exam Rooms/Beds	200 to 999 Exam Rooms/Beds	1,000+ Exam Rooms/Beds	MAX-MIN
99%	99%	100%	**1%**
95%	100%	100%	**5%**
99%	98%	100%	**2%**
95%	98%	99%	**4%**
95%	98%	98%	**3%**
93%	98%	99%	**6%**
92%	98%	98%	**7%**
94%	95%	99%	**5%**
90%	96%	98%	**8%**
82%	96%	99%	**17%**
82%	95%	97%	**15%**
86%	93%	96%	**10%**
66%	91%	96%	**30%**
69%	87%	95%	**26%**
61%	91%	93%	**31%**
71%	84%	94%	**23%**
47%	62%	71%	**24%**
30%	61%	77%	**47%**
29%	57%	66%	**37%**

Electrifying genius Nikola Tesla, predicting the wonders of wireless in 1926, would surely be pleased with today's health systems. The DHMW survey found high adoption rates (>90%) for an array of wireless capabilities to include access to **EHR/clinical information systems**, a slew of internal communication and monitoring systems **(VoIP, nurse call/paging systems, etc.)**, as well as patient care solutions **(e.g., telehealth, video monitoring, IP telemetry and barcode medication administration)**. These adoption rates were consistent by organization size.

Wireless adoption rates started to fall off, especially among smaller HCOs, for **remote monitoring for clinicians, RFID/RTLS locator systems**, and **wireless barcoding for blood products**. Among this group of solutions, **clinical alarm notification correlated for events** had the biggest gap in adoption rates (small providers = 66%; medium sized HCOs = 91%; large HCOs = 96%).

Smaller hospitals, including rural facilities, often serve larger populations of older patients, noted Lorren Pettit, Vice President of Digital Health Analytics (DHA) for CHIME. "There is a big disconnect here for smaller organizations," he said. **"Using wireless apps to alert clinical staff of patient movements and other changes would be a boost to care, but for a myriad of reasons to include financial considerations, the smaller, less IT-scalable HCOs tend to be less likely in implementing these type of solutions."**

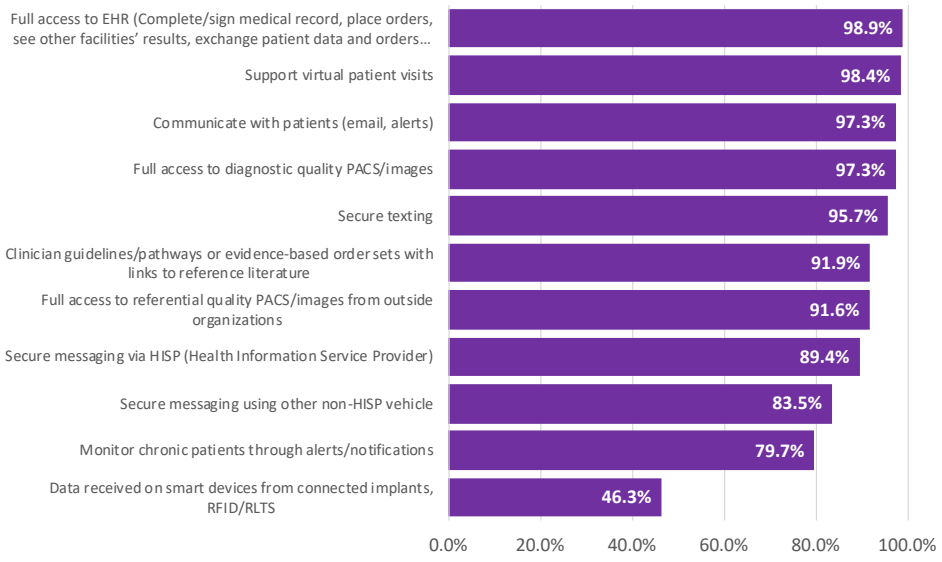
Posey noted health systems are increasingly using wireless for bed and room technology, with fall prevention being a key driver. This is especially for those HCOs serving older populations.

Another wireless capability important to elderly care is **wander management/patient elopement**. DHMW charted a 13-percentage-point increase in adoption rates for these types of solutions when comparing the 2021 and 2022 survey results. Still, only 61% of HCOs reported implementing this wireless technology in 2022.

Providers face a huge reputational cost from patient elopement. An increasingly significant issue as the population ages and HCOs care for an expanding patient population with Alzheimer's and other forms of dementia. This cost incentive is likely one of the factors driving the increased use of this technology.

It should also be noted that in some cases, an HCO's EHR or other systems already in place may be offering HCOs new capabilities for wireless solutions. As such, these present systems maybe sparking jumps in implementation rates as seen in **wander management and patient wayfinding** (a 9.5 percentage point increase year-over-year).

Beyond the Wall for "Care Anywhere"



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92%	96%	98%	**6%**
92%	90%	95%	**5%**
89%	91%	95%	**6%**
83%	91%	91%	**8%**
72%	86%	88%	**16%**
58%	83%	92%	**34%**
22%	51%	58%	**36%**

Percent of Healthcare Organizations

Increased wireless capabilities and migrations to hybrid cloud IT systems contribute to the movement toward "care anywhere" that was accelerated by the pandemic. This means people — patients and clinical staff — and devices need to connect from outside the provider's firewall.

Nearly all DHMW organizations across all organizational sizes have enabled **full access to EHR from outside the firewall** (99% adoption) and support **virtual patient visits** (98%). Likewise, 98% communicate with patients **(email/alerts)** through the firewall, and 97% offer **secure texting** and **full access to diagnostic quality PACS** (picture archive and communication system).

Posey posited most providers are sending radiology images outside the firewall, so high PACS implementation rates would be expected, and could possibly be even higher than reflected in the DHMW survey.

Among the functions with less access outside the firewall, DHMW found a gap in **monitoring chronic patients via alerts/notifications** between smaller HCOS (58%) and large systems (92%) — a 34 percentage point difference.

The rising influx of tech disruptors in healthcare is also expected to boost access to a myriad of resource functions outside the provider firewall. **"These disruptors are bringing relatively inexpensive IT solutions, including chronic patient monitoring, to the healthcare market that even smaller and resource-limited hospitals can use,"** Zand reported. He also noted Walmart and Sam's Club are testing some innovative digital health solutions in several markets right now (e.g., their Virtual Care Diabetes and Care Accelerator programs) which promise to offer their customers cost-effective care options. "C-suite leaders might not approve a $200,000 patient monitoring proposal, but having third party solutions that cost relative pennies changes the whole calculus of whether to implement such monitoring solutions."

The hospital at home trend for the aging population is sure to benefit from these disruptions and subsequent implementation increases, Pettit noted.

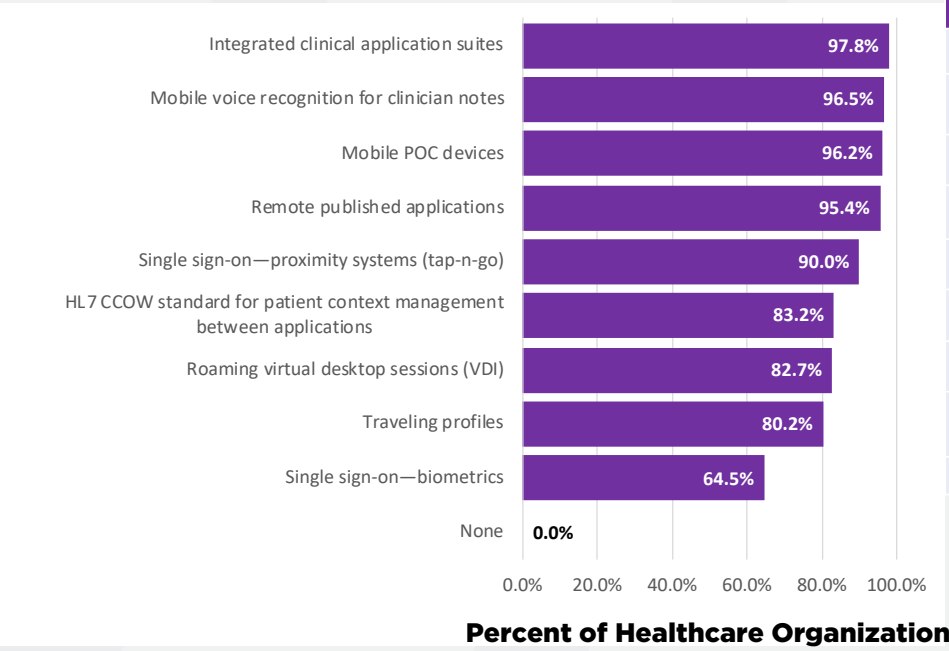
> *"These disruptors are bringing relatively inexpensive IT solutions, including chronic patient monitoring, to the healthcare market that even smaller and resource-limited hospitals can use."*

Caring for the Caregivers

Another glaring consequence of the pandemic has been healthcare staff burnout. While Nursing shortages have been particularly challenging across all types of care sites, overall clinician burnout is a problem. An issue that organizations are aggressively looking to address. Fortunately, the DHMW survey indicates HCOs by and large have supportive IT infrastructure allowing for improved workflow technologies **(e.g., Integrated clinical application suites; mobile recognition for clinical notes; mobile point of care devices; remote published apps)** to ease some of the burden on clinical staff.

Provider size does appear to be a workflow factor when it comes to **single sign-on proximity systems** (tap-and-go). Only 77% of smaller organizations use this technology, far below the 92% and 98% of medium and large providers, respectively, offering this convenience to their staff.

Among the workflow technologies surveyed, **single sign-on biometric** systems have the lowest overall adoption rate across all provider sizes (average 79%).



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89%	97%	98%	**9%**
77%	92%	98%	**21%**
83%	83%	84%	**1%**
72%	84%	89%	**17%**
71%	85%	80%	**13%**
55%	64%	74%	**18%**

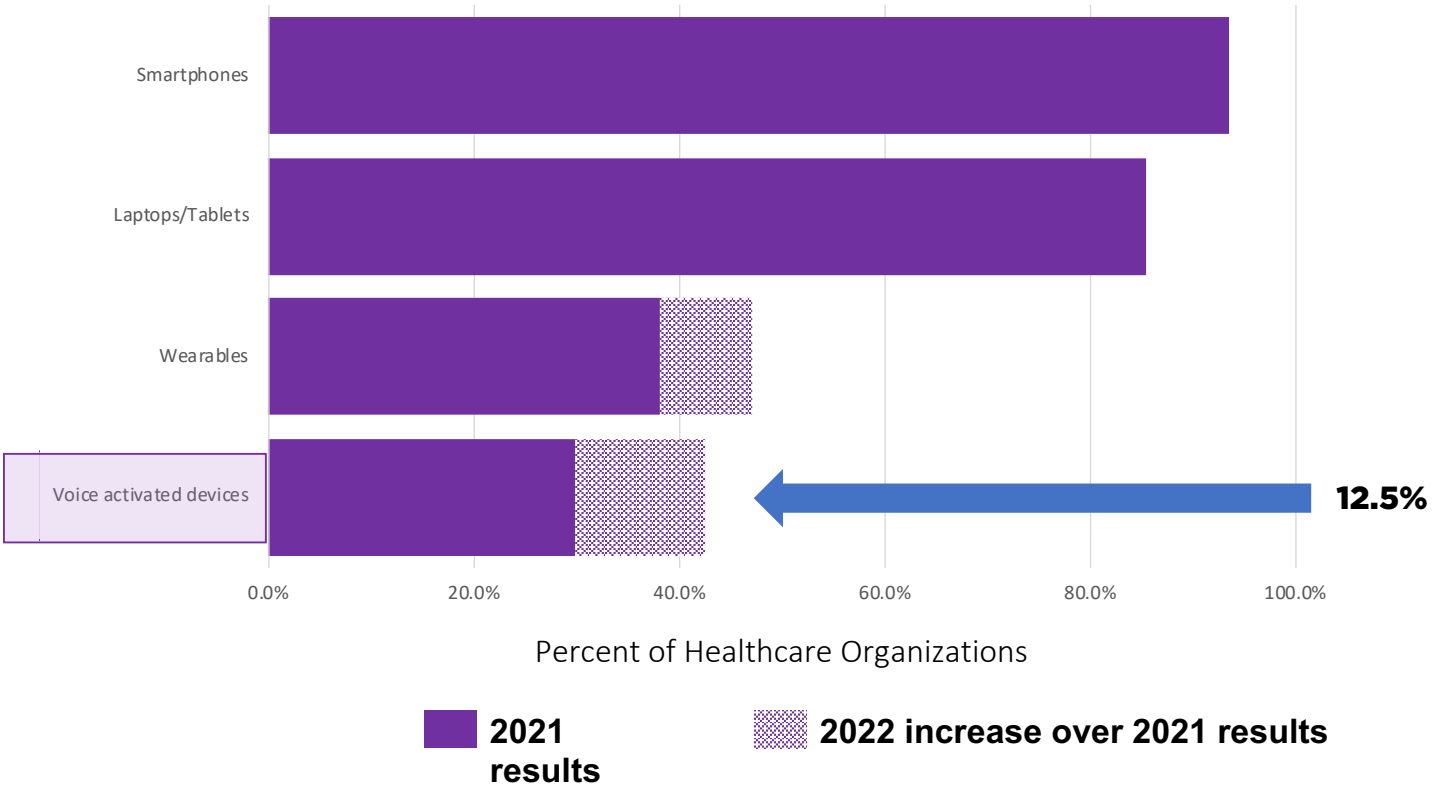
Percent of Healthcare Organizations

Zand and Posey noted that while tap-and-go has been around for around for 20 years now and have high use rates, they see significantly fewer providers using biometric as a single sign-on solution. "For biometrics, drug dispensing may benefit from multi-factor authentication including badges and biometrics," Posey said. "But as a single sign-on in a clinical setting, biometrics like fingerprint and facial recognition may face challenges from the gloves and masks clinicians commonly wear."

Zand relayed that one hospital he was working with invested money in laptops with fingerprint sign-on, so clinical staff didn't have to use their badges. "Nobody used it," he said. **"They just like the tap-and-go. They have their badges, and they are already accustomed to that method."**

Allowing staff to use their personal devices in care settings is another area rife with challenges, especially from a patient privacy standpoint. Most DHMW organizations reported allowing some use of **employee-owned smartphones** (94%) and **laptops/tablets** (86%) in patient care, but significantly fewer HCOs allowed use of employee's wearables like a fitness tracker (47%) and **voice-activated devices** (43%). Yet, wearables and voice-activated devices (which can include wearables, as well as Amazon's Alexa, Google Dot, etc.) have the biggest growth in this category, 9% and 13% percentage points (year-over-year), respectively.

> *"They just like the tap-and-go. They have their badges, and they are already used to that method."*
>
> *-Peyman Zand*



"I can envision a nurse who is really busy, so she speaks into her voice-activated watch to set a reminder to give medications to her patient at a specific time, for example," Pettit said. "Of course, this would be a huge HIPAA violation."

> *"There is a lot of scrutiny around the use of these devices to look for potential HIPAA violations."*
>
> *- Peyman Zand*

Zand has seen this type of personal device use by clinicians in pilot projects set up in specific areas. "There is a lot of scrutiny around the use of these devices to look for potential HIPAA violations," he said. "Simple uses such as changing the TV channel, accessing the menu, ordering food, or calling the nurse are easier to allow, but these are not patient health care uses."

Posey added that allowing employee devices for communicating late work arrivals or similar logistics that don't involve patient
information seems reasonable, but concedes clinical uses are problematic. "Unless organizations utilize strong MDM [mobile device management] policies and procedures focused on security for patient care, an employee-owned device represents another vector for potential breaches and privacy issues, compared to facility- or organization-owned devices," he explained. "Allowing use ofemployees' devices in care settings could also create additional, burdensome support calls when the devices experience issues connecting to or functioning on the facility network."

Looking up drug interactions would be patient care and seemingly allowable, Posey noted. But it is a bit of a slippery slope once you allow the use of such devices in clinical settings.

The Need for Maturity and Knowledge

With many DHMW organizations making infrastructure upgrades to increase their flexibility and capability to provide care anywhere and improve workflow and operational efficiencies, the next area of progress may be in maturity.

"It is one thing to have the tools, but it's another thing to have actual maturity," Posey said, advising infrastructure management methods should be built into the process and executed on a regular basis.

He has seen firsthand many smaller organizations that have some of these tools in place, but aren't fully leveraging them because no one on staff has sufficient knowledge of how to use the technology. In situations where only one person in the organization has this knowledge, there is a huge drop off when that person goes on vacation or leaves the organization.

It's important for processes to be well-documented so anyone taking over the responsibility has a roadmap to follow to ensure consistent IT management. The other issue is quality. An organization may perform a root cause analysis (RCA), but it might have been done poorly and resulted in no action on the findings. In some cases, the RCA findings may not be actionable.

Budget struggles amplified by the pandemic and subsequent global economic downturn surely play a role in the ability of organizations to invest in the infrastructure and talent upgrades to keep pace with digital health. "The pandemic, supply chain issues, inflation and recent cost pressures have presented quite a challenge to HCOs, including smaller non-affiliated and freestanding facilities," Posey explained. "Even larger nonprofits have experienced some technical debt."

Smaller organizations can lack the resources to implement and manage infrastructure, which turns the spotlight on attracting top IT talent. "Some providers may have a chief nursing officer or other C-level executive oversee digital projects, but that person often falls short in knowledge on infrastructure and the latest technology trends," Zand advised. Such organizations, especially those located in remote areas, just don't have the right people to carry the infrastructure forward, he noted. "Their ability to attract and retain talent is low," he explained. "And many have not embraced the idea that they can have remote employees."

Without the budgets and locales to attract the best IT staff, these providers are prime candidates to outsource their needs to third-party IT experts. Because no matter how the services are provided, HCOs need the right resources and talent in place to ensure a solid, well-managed infrastructure is available for an HCO to realize their digital transformation goals.

About CereCore

CereCore is transforming healthcare through technology. Healthcare systems of all sizes depend on CereCore for comprehensive IT and application support, technical professional and managed services, IT advisory services, and EHR consulting.

Learn more

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About DHA

Digital Health Analytics was created in 2022 to supercharge your digital health transformation capabilities by moving from a one snapshot in time static Most Wired survey to a 365/24/7 data and analytics resource. Digital Health Analytics is the gateway for provider organizations and companies to better understand how digital technology supports leaders in transforming health and care and delivering data insights that help them make the greatest business impact possible

Learn more

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Vice President
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