THE REIMAGINED HOSPITAL

Exploring the road map for real-time, connected care delivery of the future

American Hospital Association™

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Health system leaders are reimagining the hospital of the future to address the changing environment and demands for clinical connectivity, patient experience, data security and virtual care. To support clinical innovation and operational objectives, new technologies like real-time asset tracking, artificial intelligence (AI) and applied virtual/augmented reality are integral to delivering next-generation, interventional care with real-time insights at the point of care. New technologies hold great promise for clinicians and patients, but an infrastructure transformation is necessary to deliver those capabilities and power innovation road maps. This executive dialogue examines how health leaders are building their digital transformation framework to accelerate and advance better care coordination and outcomes with emerging technologies.

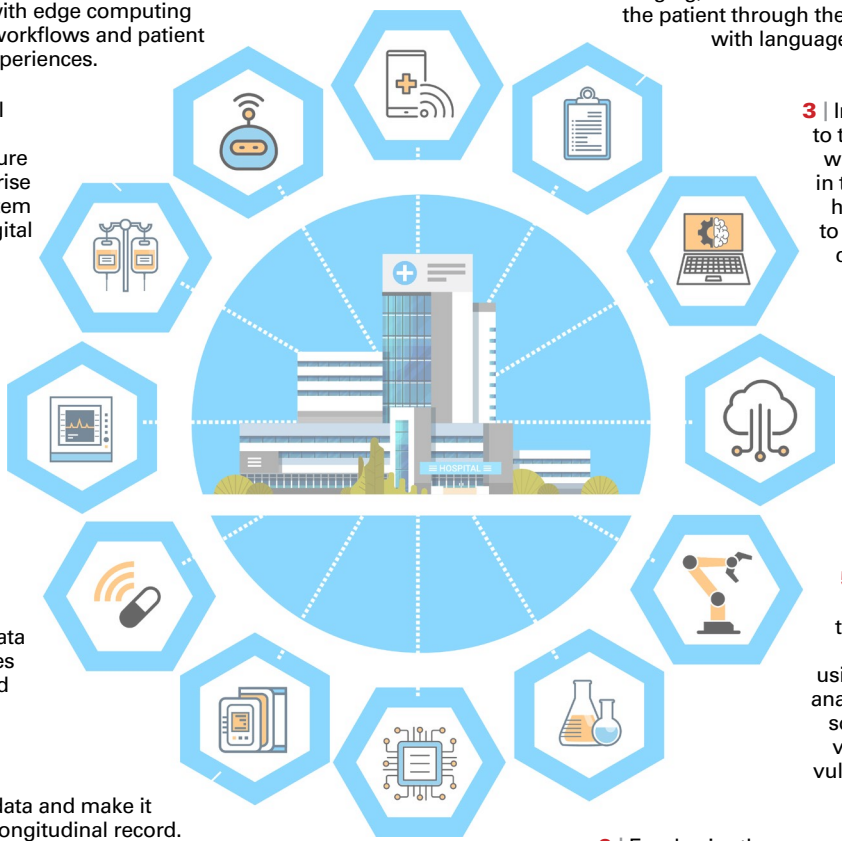
12 priorities on health executives' innovation transformation road maps

12 | Build new hospitals based on your digital strategy: Like an Apple store, have a tech bar, as well as a 5G ultra wideband infrastructure combined with edge computing for different workflows and patient experiences.

1 | Build an innovation-driven ecosystem to connect, inform and delight.

2 | Reach out digitally to provide patients with the right care at the right time and in the right place, including remote nurse triaging, home monitoring and navigating the patient through the continuum of care with language services.

11 | Ramp up digital acceleration with a technology infrastructure overhaul of the enterprise resource planning system and the EHR before digital transformation.



3 | Innovate care models to take care of patients with chronic disease in their home to avoid hospitalization and to reduce emergency department visits.

10 | Move to a single-use platform and a viable ambulatory health record across the health system.

4 | Tap into affordable connectivity in health-equity programs to address digital deserts.

9 | Use real-time data to drive efficiencies in throughput and operations.

5 | Create holistic, patient-centered treatment plans for high-risk patients using AI and predictive analytics with high-level social and economic variables to identify vulnerable populations.

8 | Invest in data and make it actionable as a longitudinal record. Leverage the data warehouse to ingest claims data, other electronic health records (EHRs), and application programming interfaces for a long lens view of the patient.

7 | Expand telehealth and digital experience for specialized services like digital pathology.

6 | Emphasize the connected experience — bring together key demographic and clinical data to drive insights and action in helping patients as they navigate a complex health system.

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MODERATOR *(Suzanna Hoppszallern, American Hospital Association):* **How does your organization envision care transformation and what role does technology play?**

DEBORAH GASH *(Saint Luke's Health System):* Our organization is focusing on getting patients the right care at the right time in the right place, and we believe that could be the home in many cases. We've been innovating care models in the home to take care of patients who have chronic disease, with a focus on hypertension and diabetes, to avoid hospitalization and reduce emergency department (ED) visits. Our Hospital in Your Home program opened in July 2022 and has been highly successful — the average daily census is about 20 patients a day, primarily those with heart failure, chronic obstructive pulmonary disease or pneumonia. We have seen a decline in repeated admissions because of the focused care we provide. We're in the home, we see what they're eating, how they're living, and where they have social needs and food insecurity. Because we have the opportunity to step in and provide support and additional resources, they're in a better position at the end of their discharge which means they're not coming back to the hospital as frequently. That kind of innovation is the hospital of the future. We're working with the regulators and licensing folks to get them up to speed on accepting these care models.

MODERATOR: **What role does technology play in this type of transformation?**

GASH: Technology is a critical enabler. You need to have the device data feeds just as you do in bricks and mortar. Patient monitors are constantly feeding data to our caregivers. You must have an ability to talk to patients, educate them and see them. Technology can give you early insights of a deterioration so you can intervene to prevent them from needing to go to the hospital. That's what a chronic disease-management program is about. If you can get a patient with hypertension or diabetes under control, statistically they're going to have better outcomes and require a lower cost care.

BRETT MORAN *(Parkland Health):* We have embarked on our new five-year strategic mission and created seven core pillars. One of those pillars is digital health. We are working to develop a digital front door. As a safety net hospital, we're not pushing for digital first with our population, but instead we're taking steps to be digitally equitable. We want them to be able to do things digitally if they want, but we're not going to make that their first and only option. Dallas is one of the biggest metropolitan areas that has a digital desert — more than 40% of our patients do not have a fixed internet connection.

Language barriers are also an issue — more than 40% of our patients speak a language other than English, and many of the digital technologies lack language solutions. When we first went live with video visits, there was no easy way to pull in the interpreters. We had to work with the vendor to create a speed button to pull in the interpreters. More recently, we have received a $10 million grant from the American Rescue Plan Act of 2021 for development of a digital health center, to perform tactical outreach to high-risk populations of patients through pure digital means.

We're trying to be digital in our outreach. If we need to call patients on the phone, we will; otherwise, we text, email or send a patient portal message. We're using medical practice assistants (MPAs) to triage the patients holistically to engage patients to get to the 'why', and then triage up. If the patient is having transportation issues, the MPA would notify a social worker; if they're having knowledge issues, the MPA would send that to a pharmacist or a nurse to understand why they're not taking their medications. Then, if needed, the MPA will arrange for the patient to see a provider to optimize their medication.

To create holistic, patient-centered treatment plans for the tactical navigation of high-risk patients, we use predictive analytics and Know Thy Patient, a novel, advanced analytics process, with high-level social and economic variables to identify the most vulnerable populations and provide insights about the patient to the clinical providers at the time they engage with the patients. Our Parkland Center for Clinical Innovation has created this tool to help us better identify which patients with poor control of a chronic disease also have high health-related social and environmental risks.

GARY LYNCH *(Verizon):* I live in Dallas and understand the technology deserts we have here in Texas. At Verizon, we're doing a lot around health equity and digital inclusion. About 50% of adults with household incomes below $40,000 don't have broadband and 24% of them don't have a cellphone. At Verizon, we've layered a digital inclusion health-equity program on top of the affordable connectivity program where we put devices in the hands of those individuals. I'm curious if, for your health-equity initiatives, you're tapping into affordable connectivity programs?

MORAN: Gary, the biggest hurdle for us is the application process. We're talking to other partners that are creating processes whereby patients will be automatically enrolled based on financial qualifications in our health system. So, if they already qualify for our indigent care or financial assistance program, they would then automatically pre-qualify, and don't have to fill out another application. These are synergies with community partners like what you describe, Gary.

GASH: We've addressed that equity issue with grants to help cover the cost of acquiring devices. Basically, they're the health system devices and we put them on the responder network, which has given us good coverage.

MODERATOR: What innovative care transformation use cases is your organization prioritizing?

MICHELLE McCLURG *(Reid Health):* We have care navigation. For the first 30 days post-discharge, care transition coaches use a predictive tool from the hospitalization to perform a medication-reconciliation process in the home to avoid readmission or to come back to the right location within our organization.

"Technology is a critical enabler. You need to have the device data feeds just as you do in bricks and mortar. Patient monitors are constantly feeding data to our caregivers. You must have an ability to talk to patients, educate them and see them."

— Deborah Gash—
St. Luke's Health System

In the last year, we have been doing more with remote nurse triage, which is 24/7, and we're not contracting that out anymore. We're in an Epic Refuel project and trying to maximize the use of the Care Companion, an interactive, mobile health assistant that helps with a personalized care plan. In the oncology area, it helps us to identify things quickly, to save appointments for those in the greatest need at the acute level and prevent hospitalization for those patients.

ALPA VYAS *(Stanford Healthcare):* Within my purview are traditional patient experience programs and operations, including contact centers for patients as well as members and clinical contact centers. This includes our nurse advice line that supports after-hours and discharge follow-up, and navigating patients through the continuum of care with language services and community partners of mental health education programs.

From an innovation technologies perspective, we are working on a strategy that we call the connected experience. The intention is how we are going to bring together key data from an experiential demographic and clinically appropriate context

to drive insights and, more importantly, action on how to intervene and help patients as they try to navigate a complex health system, not only in terms of their care, but also from the billing and financial experience.

We have an abundance of data outside of our formal surveys. How do we listen to the feedback that's already within existing data structures and translate that into actionable insights to engage our operational and clinical leaders? That's our bigger strategy over time, and what we're working on now are the requisite components or foundational elements to help us move toward that.

MODERATOR: With so much data, where is real-time data a priority to support operational efficiency, clinical innovation or clinical workflows?

PRAVEEN CHOPRA *(Bellin and Gundersen Health System):* Our priority is building an innovation-driven ecosystem to enable three capabilities: connect, inform and delight.

We talk a lot about digital user experience. People want to start their care journeys with a mobile device.

How do we focus on being empathetic to people when they engage with technology and not just put things out there and expect people to figure it out? We test the system usability score before we release a digital solution. 'Connect' is not only about connecting with people who want our care, but also for the people who are providing the care.

'Inform' is all about actionable insights. There's so much data overload and information overload. How do we provide not only a capability, but also the ability to provide actionable insights as close as possible to where the decision needs to be made? With our enterprise analytics and data sciences capability, we can display close to real-time information for people to view: Where are they with the visit? Where are the staffing challenges? How do we match the supply and demand?

'Delight' is about building an attractive place for people to work. We are leading the agile transformation for the organization and pivoting as to how we provide the solutions. A solution team focuses on outcomes to solve a problem; a cross-functional team may include a clinician, a data analyst, a digital user experience person and an operational expert working together. The turnaround time for us is to release a minimal viable product in a matter of weeks rather than months. We've started using artificial intelligence (AI) capabilities for smart renewals of prescriptions to elevate the human and let machines do repetitive and mundane activities.

"As a safety net hospital, we're not pushing for digital first with our population, but instead we're taking steps to be digitally equitable. We want them to be able to do things digitally if they want, but we're not going to make that their first and only option."

— Brett Moran —
Parkland Health

JAMES MATERA *(CentraState Healthcare System):* Where real-time data can make a big difference is in the transition when the patient is going from hospital to home; so we don't lose patients on the handoff. Our hypertension program, which was featured in a Centers for Medicare & Medicaid Services video, was underutilized in our community. Epic has changed that for us. Our hospital system doesn't have many employed physicians. Small physician practices in the community are still admitting patients and rounding first thing in the morning. Now secure chat allows us to reach them to be able to send the referral to our community health center for the chronic disease-management programs.

Another area in which real-time data help is in sepsis alerts that indicate when the patient is starting to deteriorate and you may want to intervene.

We have an elderly community. It's not that they don't have the resources; they simply don't know how to use them. In the health center, we offer training for basic things: for instance, in our congestive heart failure program, we teach patients how to text their weight to the manager for that day. We must instruct our community in technology.

Social determinants of health, diversity, equity and inclusion are key. I teach my medical students that it's not just your genetic code, it's your ZIP code. In the heart of Freehold, we have a large indigent population and when you geographically map them, their A1C numbers are out of control.

I like to talk about transitions and drop points. We've all seen instances when a patient is in short-term rehab, long-term care and they bounce back. I just saw some live AI data from one of our nursing homes that risk stratifies their patients every day, picking up changes in their vital signs. One patient moved from 13 on the list on Thursday to three on the list on Friday. That's when you get the doctor at the nursing home to intervene, to see what you can do to prevent a readmission. Real-time data are so important and that's really the only way we're ever going to bend that cost curve.

"How do we focus on being empathetic to people when they engage with technology and not just put things out there and expect people to figure it out? We test the system usability score before we release a digital solution."

— Praveen Chopra — Bellin and Gundersen Health System

CHARLES CALLAHAN *(Memorial Health Hospital Group and Springfield Memorial Hospital):* The topic of the conversation is the reimagined hospital. We're all hospital people. [Peter] Drucker says, 'What's your theory of your business? You ought to test it constantly, revise it frequently, and frankly toss it out the window intermittently.'

There are people who aren't hospital people who are saying, 'The reimagined hospital? — frankly, you're looking at the universe like those who felt the earth was the center of the galaxy… here you are asking what the hospital should do to get all this information about things that really happen outside the hospital.'

For example, let's talk about preventing readmissions to the hospital. We can do a pretty good job for the first seven days, but over the next 23 days of the 30-day readmission period, a lot more happens out in the world than ever happened in the hospital. We've talked about the social determinants of health that have a lot more to do with your ZIP code than what happened during the hospital stay. Part of this conversation ought to be about the redesign of our theories for the hospital universe to address these problems. What are the payment and expense structures needed to support the theory of the business that we're evolving?

One of our challenges is that we're a Cerner shop, and we've absorbed hospitals in the last several years that weren't on the Cerner EHR. Converting them over to a new technology system, that integrates with a viable ambulatory health record is a vital part of having data to manage health outcomes. But doing so is expensive at a time when a lot of hospitals just don't have the margin they used to.

GAY WEHRLI *(University Hospitals Samaritan Medical Center):* We are in the midst of an EHR transition, close to our health system's go-live. I would distinguish two parts of the data, first the real-time data and access to this real-time data for providers as they are creating care plans in the ambulatory setting, the inpatient setting or during a patient's transition. Using the data from what's happened in the past for this patient or similar patients helps plan for the next steps. How do we access this real-time data? How we expand this opportunity

per the example of an extended care facility being able to see information and try to intervene before the patient comes back to the ED would be a huge win for patient care. Second, the bigger data picture from which broader and deeper analyses are needed to develop and adapt new strategies for enhancing the quality and safety of care. The EHRs provide tremendous opportunity.

There are some confounding factors. There is a huge amount of data and different ways those data are being gathered. We have many different platforms, which is one of the challenges. I've pulled up two different data platforms on the same day and found two different average lengths of stay for my location. Somehow, we must get to a single-use platform, at least for a single institution or health system. We are now moving in this direction.

Our system has been proactive and successful with Hospital at Home. This option is not as robust in rural settings. These programs need health care providers such as nurses to see patients in their locations. In rural settings, finding these providers becomes even more complicated. Where do we need them the most, in the hospitals or in the Hospital at Home settings? We have also learned that some patients prefer to be in person rather than have a telehealth appointment. Sites have been set up, where a patient comes to an office for a telehealth visit and thus the information technology (IT) system is ready.

Finally, I want to highlight that there's more to telehealth and the digital experience beyond direct patient care. If an anatomic pathologist cannot be on-site for a surgery requiring frozen sections, there are digital pathology platforms. With an established workflow including the IT infrastructure, the pathologist based at an alternate site can read the slides and provide input in real time from the digital pathology review. The future is bright for clinical innovations, which enhance health care.

MODERATOR: As an executive team, how are you prioritizing your infrastructure transformation to support the digitally connected capabilities in your hospital of the future road map?

JITENDRA BARMECHA *(SBH Health System):* We are in our digital acceleration phase. Last fall, we started an entire technology infrastructure overhaul to look at our enterprise resource planning (ERP) system and EHR. This was important, especially post-pandemic. How do we pursue our digital health strategies? The Oracle go-live is on Oct. 2. We are moving to Epic with a go-live date of Oct. 28 and parallelly our ERP with our financials and supply chain. It's a huge undertaking for the resources we have in the South Bronx. It is important for us to accelerate before we transform ourselves. We hope that in 2024 or early 2025, we will not only optimize, but we'll be able to transform the care we provide.

"Infrastructure transformation has both a technology and an operational component. Case in point: We're going to online registration this fall, and we have to think differently if we're going to make back-office operations more efficient. In thinking about tighter margins and workforce shortages, you must be prepared to bring your operations along with you and have them change their processes."

— Teresa Andrea —
Silver Cross Hospital

In terms of clinical care, our strategies are more focused on collaborating with our community-based organizations and heavily on behavioral health. We are expanding our bed capacity by more than 40% in our behavioral health inpatient area as well.

During the pandemic, we were fortunate to open up a 50,000-square-foot health and wellness center, which includes our culinary institute or teaching kitchen, rooftop gardens and beehives. This is a

way not only to help the community understand the nutritious aspect of the food, but also how to grow fruits and vegetables. A portion of our land was donated to the developer to create 300 low-cost housing units to alleviate the housing desert in our neighborhood.

We utilize real-time data for our throughput or operations. Whereas for clinical, it is near real time, especially when we are exchanging our data with the health plan, making sure that care gaps are met. I chair our regional health information exchange and we can share our clinical information to identify care gaps to improve quality.

MODERATOR: Whether building or retrofitting, a comprehensive, enterprisewide digital strategy is essential for creating the hospital of the future. How does your organization's road map for digital transformation and network resilience differ for new hospital construction vs. existing hospitals that are being retrofitted?

McCLURG: We are going to be building a new facility as a replacement for one of our smaller hospital locations south of the main campus. We're building a tech bar as you would find in an Apple store so that community members can come in to receive assistance and we can continue to educate them on how to use these remote applications and devices.

TERESA ANDREA *(Silver Cross Hospital):* We are building a premier specialty anchor site. With that, we are designing the building infrastructure with digital strategy influence. Our president has a vision of an Apple store feel. Patient navigators will replace registration desks. Patients will be directed to iPads for registration and scheduling. We have stair-stepped our digital strategy as an organization because workflow and operational change is hard and impacts the patient experience. This building will allow those technologies to come together with operations for a different patient experience while having operations be more efficient. This is where having digital is just as important as being digital.

Infrastructure transformation has both a technology and an operational component. Case in point: We're going to online registration this fall, and we have to think differently if we're going to make back-office operations more efficient. In thinking about tighter margins and workforce shortages, you must be prepared to bring your operations along with you and have them change their processes. This is not necessarily about decreasing full-time equivalents (FTEs), it's about current FTEs being more efficient and facilitating the customer experience.

"Verizon has partnered with the Cleveland Clinic, where they're building a new smart hospital. This is going to be the first hospital in the country built from the ground up with a 5G ultra wideband infrastructure combined with edge computing."

— Gary Lynch—
Verizon

LYNCH: Verizon has partnered with the Cleveland Clinic, where they're building a new smart hospital. This is going to be the first hospital in the country built from the ground up with a 5G ultra wideband infrastructure combined with edge computing. Edge computing is simply computation power from the cloud that we're moving to the edge of the network.

We're experimenting with whether a hospital can be built completely reliant on wireless? They're building the hospital as they would normally build it with all the ethernet cables, and then we're putting a 5G private, wireless infrastructure on this stand-alone.

I've been on a mission to get med tech companies and pharmaceutical companies to help pay for hospitals in our provider community so they can upgrade their infrastructure or to build new hospitals with high-performance, reliable, secure high-speed networks. If you're familiar with the term network slicing, imagine that with

this 5G private network, a medical device or supply company has a lane of the data highway to keep track of their assets. The medical device community is excited about being able to do this, rather than sending reps in to locate these assets. With those insights, they're open to help hospitals pay for that type of infrastructure.

DANIEL JOHNSON *(Verizon):* There is an element of the partnership and the co-innovation that's taking place within the partnership. What we're seeing with our partners — whether within health care or beyond — is that the sooner we can align and talk through the outcomes they are trying to achieve, the sooner we can help to enable those outcomes.

We are seeing that with the Cleveland Clinic. But also, the practical reality is with existing builds and retrofitting, we're finding that where we're deploying these technologies, some of the use cases continue to evolve.

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