



Digital Transformation  
*15 Must-Read Articles*



# Contents

- 4 The most dangerous trend in health IT from 5 execs
- 6 Cleveland Clinic, Brigham, Stanford & others name healthcare's most promising tech
- 10 The role of IT In Providence St. Joseph's growth strategy – key thoughts from CIO B.J. Moore
- 11 Why Microsoft is saying goodbye to passwords
- 11 Mayo Clinic, Leidos collaborate to create health tech accelerator
- 12 The strategy behind building a top innovation team at 7 health systems
- 15 Mayo Clinic innovation leader Dr. Douglas Wood: 'There is no innovation without action'
- 17 It's time for hospitals to get smart with data
- 19 How AI can impact 7 areas of healthcare
- 20 4 key quotes about how AI will transform healthcare
- 21 5 new hospital applications for machine learning: AWS Textract, an algorithm predicting ICU outcomes & more
- 22 Houston Methodist innovation VP's advice to healthcare organizations: 'Disrupt or be disrupted'
- 23 The promise of digital health: Key thoughts from Partners HealthCare's Chris Coburn
- 24 Healthcare leaders debunk 3 myths about machine learning
- 24 Who should lead your digital transformation? Teams of growth-minded, high-potential hybrid workers



## Introduction

The widespread adoption of the EHR ushered in an era of digital transformation in healthcare. Digital technologies are being used by provider organizations across the nation to drive innovation that can support higher quality, personalized care and streamlined operations.

Emerging digital solutions are poised to revolutionize care delivery for the better. However, keeping apprised of the latest developments in healthcare's digital transformation can be a challenge for today's busy hospital and health system leaders. And, as most healthcare organizations are experiencing a period of significant margin pressure, it's important for leaders to make the most of their organization's technology budget.

Discerning which technologies to invest and which to forgo is not a simple endeavor. Leaders tasked with navigating their organizations journey through healthcare's digital transformation need to be apprised of the latest industrywide technology developments and the innovation initiatives being conducted by their peer organizations.

This ebook comprises 15 must-read articles that cover emerging healthcare technology trends and digital innovation strategies.



## The most dangerous trend in health IT from 5 execs

By Laura Dyrda

Between cybersecurity threats and building robust IT teams, CIOs and C-suite executives focused on health IT for hospitals and health systems face several challenges today.

However, the biggest danger for hospital and health system CIOs could be latching onto a fleeting fad or becoming distracted from their core mission.

Five health IT leaders from around the nation answer this question: What is the most dangerous trend in health IT today?

**Tom Andriola, Vice President and CIO of University of California System (Oakland, Calif.):** One need only go look at Gartner's Hype Cycle slide to get a good picture of this. But I'll point to my top two items. First is cybersecurity. There is risk to CIOs that if they let it consume their time and attention, they get branded a risk executive and not an opportunity executive. We've spent 30 years working our way out of that image. Cybersecurity is a risk to the progress we've made. Second is managing the dynamics of hype-versus-reality around artificial and augmented intelligence.

AI is really a collection of technologies and approaches that can bring transformational change to the way healthcare organizations work, interact with patients and partner with the ecosystem. But much like the era of digitization of healthcare that we're nearing the end of – the EMR Era – there is a huge spread

between early adopters and laggards, not just in terms of when they adopt, but also in terms of when the organization realizes real value. CIOs have to help their organizations manage through hype-versus-reality cycle, which will likely last a decade.

**Peter Marks, PhD, Vice President and CIO of WakeMed (Raleigh, N.C.):** I am optimistic about the opportunities in both healthcare and health IT. In healthcare, organizations are all working to change the paradigm to value-based care as the predominant model. The change is not easy, but it is coming. This will be an opportunity to reward providers and payers for keeping patients as healthy as possible. The model is working in many ACOs and other organizations. For health IT, we need to catch up to our business contemporaries in the use of data as a business driver for keeping people healthy. The two opportunities go hand in hand. The future is bright.

**Kolaleh Eskandarian, PhD, Vice President and Chief Innovation Officer of Children's National Health System (Washington, D.C.):** A 'fad' is the most dangerous phenomenon in any industry, but particularly in healthcare. I think trend is fine, and we have to be sure to differentiate between fad and trend. For instance, in healthcare, we should strive to use data to improve patients' outcome by diagnosing diseases more accurately and early, and to treat diseases with more precision. Use of data also plays a big role in the meaningful engagement of patients. Now, I have been

around long enough to see lingos and buzzwords come and go. For example, big data (until not too long ago) and now artificial intelligence, machine learning and digital transformation are tossed around to the extent that some places create positions with these titles. I am a big believer of the architectural principle of 'form follows function.' We can use fad lingos, but we should not lose sight of the intended function.

**Evan Jackson. CIO and Vice President of Planning and Business Development at Middlesex Health (Middletown, Conn.):** The most dangerous trends in health IT are the countervailing forces which are at the same time: a) facilitating seamless data exchange; and b) the growing mistrust the public has in healthcare providers and payers as stewards of that data. If we cannot convince the public that we are careful with the data and taking thorough steps to protect it, all of the vision, hard work and promise of true data exchange will be for naught. You cannot have a market-driven private system and effect coordination of care and

rationalization of care without data sharing. One of those will have to go if we don't satisfy the privacy and security concerns.

**Mike Cottle. IS Director at Newton (Kan.) Medical Center:** All the hype surrounding blockchain. Blockchain promises are being overstated, and real uses are not getting the attention they deserve. All of this serves to create unnecessary distractions from a CIO's already overflowing plate of tasks and responsibilities. ■





## Cleveland Clinic, Brigham, Stanford & others name healthcare's most promising tech

By Kelly Gooch

Technology continues to change the way healthcare is delivered. For instance, [artificial intelligence](#) is helping physicians examine medical records, while [telemedicine](#) is giving organizations opportunities to save money and improve access to healthcare.

*Becker's Hospital Review* asked healthcare professionals to share what healthcare technology they believe offers the most promise to transform care delivery at their hospital or health system. Read their responses below, presented alphabetically.

*Note: The following responses were lightly edited for length and clarity.*

**Paul Fowler, MD**  
**Radiation Oncologist with MedStar Health Cancer Network (Baltimore)**

New cancer cases continue to increase, and the ability to efficiently and precisely deliver radiation therapy is as important to us as physicians, as to our patients.

Furthermore, improving patient experience and reducing toxicity have always been a primary goal. MedStar Good Samaritan Hospital in Baltimore has become the state's first user of the new Halcyon Linear Accelerator. The innovative technology is the latest system designed to do two important things: Deliver precise, safe radiation therapy, and provide the best possible patient experience.

Its unique way of delivering radiation therapy by imaging the tumor prior to each treatment, and in a fraction of the time required by a conventional

accelerator, is truly revolutionary. It will allow us to treat more patients effectively, comfortably and in less time. This is increasingly important as the number of new cancer diagnoses are expected to increase in the coming years.

**Jonathan Goldberg**  
**Senior Vice President and CIO of Arkansas Children's (Little Rock)**

Speech recognition technology, both in the ability to hear and respond, will have significant impact on healthcare in the coming years. Our ability to create efficiencies for our clinicians will ultimately translate to higher quality and safer care. They will be able to ask for recent test results, order medications, or even get summaries of care over multiple visits just by speaking. Our patient experience abilities will increase dramatically. Whether it be changing the temperature in their room, ordering food, or asking when their next test is scheduled for, all of these will make what is a difficult time just a little better. Patients and families will be able to schedule appointments, ask for prescription information, or maybe just ask to remind them what the physician said at their last visit. Speech technology partnered with machine learning has endless potential for transforming healthcare.

**Stephen K. Klasko, MD**  
**President of Thomas Jefferson University and CEO of Jefferson Health (Philadelphia)**

One killer app will not move us from our current "Fred Flintstone" healthcare delivery system to a seamless "Star Trek" tricorder experience. But a platform that

uses new and existing technologies to allow people to consume healthcare in the flexible manner in which they access every other consumer good will be a game changer and move us beyond "faux transparency." It's not about one technology, but rather a recognition and passion that healthcare is entering a digital ecosystem where most of health will happen at home. In this way, just as automobiles are evolving from manual control to GPS navigation to self-parking to autonomous vehicles, we will move from doctor and hospital to "self-healing humans."

**Adam Landman, MD**  
**CIO of Brigham Health (Boston)**

Voice assistant technology has the potential to transform care delivery. At Brigham Health, we currently have widespread use of speech recognition to help improve the efficiency of electronic documentation. We are working toward a future where AI-powered voice assistants will ambiently monitor a patient interaction and produce documentation with minimal human review. If ambient voice recognition and note generation can be done with high accuracy and reliability, we will potentially see a dramatic reduction in the burden of EHR use. We are also exploring voice assistant technology to improve the patient experience, such as smart speakers in inpatient rooms and voice-enabled mobile apps for visit information and patient reported outcomes entry. [The April 4 announcement](#) that Amazon is offering an initial set of HIPAA-compliant Alexa skills is an exciting step forward to accelerate the use of voice assistant technology in healthcare.

**Patrick McCarthy, MD**  
**Cardiac Surgeon, Executive Director of the Bluhm Cardiovascular Institute at Northwestern Medicine (Chicago)**

We formed the Bluhm Cardiovascular Institute's new Center for AI in Cardiovascular Disease – [where Northwestern's cardiovascular clinical program collaborates with early innovators in AI, creates products and trains physicians] – last June with a generous philanthropic gift. The impetus was that several companies had approached us and presented AI solutions that were ready for clinical trials, and we are completing those trials at Northwestern Medicine now. Initial results look very promising. We also have a team partnered with Northwestern University's Computer Science Department to develop solutions, and to train physicians in AI as they obtain a Master of Science in AI.

For example, Eko is a company that focuses on digital stethoscopes. The breakthrough uses AI to interpret

heart sounds. To detect the murmur of severe aortic stenosis – which has a very high mortality – clinicians need a very well-trained ear to detect and interpret the murmur. That may be hard, especially in a busy practice or a noisy environment like an emergency room. Some studies indicate accuracy as low as 50 percent. But the Northwestern study of Eko's AI enhanced platform – which we will present in June – demonstrated 96 percent accuracy. That's stunning.

**Amy Merlino, MD**  
**Enterprise Chief Medical Information Officer and Maternal Fetal Medicine Staff Physician at Cleveland Clinic**

The time is right for augmented intelligence to transform care delivery. We now have robust data not only from our clinical interactions with patients in a classic healthcare setting. We additionally have patient-generated data (questionnaires, home medical devices, wearables and more) as well as data from various social determinants of health sources. Using these data we can now do amazing things to get to truly patient-centered care.

While these can be used in standard healthcare environments, for example with early warning tools in an inpatient setting, the real transformation in care delivery comes for developing interactions with patients outside the walls of the healthcare facility to help them manage their health and wellness. In addition to the available data and technology, patients expect this personalized experience for their healthcare as they have for other aspects of their lives.

The caveat to this transformation is the understanding that there is no "easy button" for this, we must respect there is art to medicine. It will require the input of the clinical specialist and care teams to develop the solutions for specific diseases or situations. The vision is ongoing interactions with our patients for both wellness and chronic disease management where we partner with the patient to monitor their health, identify risks and recommend modifications in therapy or interactions with the care team appropriate for their specific situation. These escalations of care could be directed to the appropriate care team member and the appropriate venue of care – virtual, office or emergency. These interactions to support our patients' healthy behaviors and proactive disease management should help people remain healthy at home or to identify issues as they arise for healthcare intervention in a timely fashion. Using all of the data we have to help keep patients healthy or to intervene early can transform care delivery and help bring back some of the joy in medicine.

**BJ Moore**  
**Executive Vice President and CIO of Providence St. Joseph Health (Renton, Wash.)**

The technology I feel like has the biggest opportunity for transformation in care delivery is big data – in conjunction with AI and machine learning. As we take a patient record and enhance with internet of things data (smart watch, smart scale, etc.), BioMed devices (electrocardiogram, continuous positive airway pressure, etc.), DNA, medical imaging, and other information to build big data stores for patients, we can then use AI and machine learning to identify precursors for diseases. In advance of today's diagnostic tools, we can lower cost of care while significantly improving care delivery and outcomes.

**David Rich, MD**  
**Chief Medical Information Officer for WVU Medicine (Morgantown, W. Va.)**

As I think about how can we make things a little easier in healthcare from day to day, I see patients as being part of the solution. One of the things that has the greatest potential to transform the way we deliver healthcare is enabling patient data entry – patient data entry from the waiting room, hospital bed, home or elsewhere. There is a great opportunity to leverage our patients and lay caregivers to capture key information directly into the record. We are doing some of this with e-visits and pre-visit questionnaires, but I think there is a great amount of untapped potential out there.

At WVU Medicine, we are beginning to experiment with tablets for patient data entry in the waiting rooms. We have e-visits and use some electronic questionnaires through our patient portal, but I think we are just scratching the surface. There is still a lot more potential to use these and other related tools to advance healthcare and improve efficiency.

**Rich Roth**  
**Chief Strategic Innovation Officer of Dignity Health (San Francisco)**

One of the great opportunities that a health system has is blending the medical-based world – physicians, clinics, medical care – and the community services world, which. That food insecurities or housing insecurities or other types of issues that prevent healthy communities. I think the most exciting technologies are ones that blend and connect these two worlds and facilitate the ability for patients to co-travel between these worlds, so that truly the best care can be given to the patient, whether it's from the medical world or the community world. The most exciting technologies

– and many can be built over time – are ones that are going to connect the community-based world and the medical world and offer that as one experience for patients.

**Kathy Sanford, RN, CNO of CommonSpirit Health (Chicago)**

I think the one thing that is going to transform healthcare the most with technology is telehealth and the ability to use telehealth across this country, especially in rural areas where people can't get to offices, physicians and specialists. Also, it'll spread the ability of people from all over the country to be able to get to specialists and people who really know about their illness, because telehealth is going to connect everybody to everybody.

Like others, we're already doing virtual behavioral health, in palliative care and on-demand primary care and a variety of places. It's already happening across many health systems – and the future expansion and enhancement is exciting.

**Christopher Sharp, MD**  
**Chief Medical Information Officer at Stanford (Calif.) Health Care**

At Stanford Medicine, as an academic organization, we see a lot of the newest opportunities that are being driven through innovations, research, partnerships with industry and forward-thinking opportunities that come to our faculty. There are many core capabilities that are paramount, like interoperability, increasing patient engagement and enhancements in usability of our infrastructure and our primary service engines: our EHRs. Under many of those, we're recognizing that the creation of advanced capabilities with AI and application of machine learning to fundamental capabilities is going to be tremendously important. We have leaders in machine learning and AI at Stanford. We have partnerships with Google and Amazon and others where we're exploring novel capabilities that really start to lay the foundation for how we'll be able to do the things we want to do.

I would put these in a couple of buckets that are really critical. When we think about usability of systems and what the experience is both from the provider and patient standpoint, there are huge gaps today that lead to clinician burnout and patient dissatisfaction. This happens because our software and services are not at the level that our users expect and need. Whether you're looking at voice enablement, clinical decision-support assistance or getting to the patients over paperwork thinking as [CMS Administrator] Seema



Verma espouses. All of those are going to need to have some new underlying capabilities and technologies that we don't have today. We definitely see that AI is a critical component as we're advancing in that direction.

**Lisa Stump, MS, RPh**  
**Senior Vice President and CIO of Yale New Haven Health and Yale School of Medicine (New Haven, Conn.)**

Big data analytics and AI will transform care delivery profoundly in the coming years. The ability to understand an individual patient's genetic make-up coupled with a broad understanding of their environment, medical conditions and social surroundings creates a profoundly powerful data set. Analyzing those data, the combination of genotypic and phenotypic data, will enable us to design truly individual and wholistic care models and plans. From the ability to more precisely select therapy plans that minimize side effects and more quickly reach therapeutic goals to finding the individual genetic basis for disease, precision medicine is transforming the care we deliver.

At the same time, aggregating such data across broad populations can generate insights that further inform treatment and care. Complementing the ability of our clinicians and researchers with AI and machine learning will both enrich and accelerate these efforts beyond what humans could accomplish alone. And the ability to disseminate these findings in the context of an individual's care, through the EHR, brings the right information to the right people, at the right time to create the right outcome.

This is an incredibly exciting time in healthcare and in healthcare IT as we create these data assets and platforms and translate them into direct care decisions that positively impact health.

**Angela Yochem**  
**Executive Vice President and Chief Digital and Technology Officer at Novant Health (Winston-Salem, N.C.)**

Broadly speaking, there are three transformational advances in technology that will affect care delivery. The first is an unprecedented abundance of data. This includes not only a tremendous amount of health and wellness data, but also behavior data from social media and other sources. With this data, we can achieve remarkable personalization in how we engage our patients, both in and out of a clinical setting. This extraordinary availability of data would be less interesting without the second transformational advance: the rapid evolution of computing power. It's this ubiquitous compute capability that creates an opportunity for very sophisticated solutions we see emerging in the delivery space to leverage on all this data we now have. This where you see the AI-based tools and the like coming into play.

Finally, we can't talk about transformational technology without mentioning the advent of 5G. As virtual care channels are used for increasingly sophisticated patient engagements, the future proliferation of 5G will be a game-changer for care delivery in rural areas. Taken together, data abundance, advanced computing power and nearly unlimited network access to even the most rural areas we serve will radically transform our care delivery over time.

*Editor's note: This article has been condensed for the purpose of this ebook. The full story can be found at [beckershospitalreview.com](https://beckershospitalreview.com). ■*



## The role of IT In Providence St. Joseph's growth strategy – key thoughts from CIO B.J. Moore

By Laura Dyrda

B.J. Moore is executive vice president and CIO of Providence St. Joseph Health, an innovative health system based in Renton, Wash.

Earlier this year, Providence St. Joseph Health partnered with Microsoft to create a high-tech hospital of the future in Seattle, first targeting the system's EMR and communication functions to help providers share information more easily. The 51-hospital health system is also focused on connectivity and access to information systemwide, aiming to boost quality of care for its hospitals, 829 clinics and 119,000 caregivers.

Here, Mr. Moore discusses the technology his system is using today to become more connected and where he sees big opportunities in the future.

**Question: What steps are you taking today to improve interoperability between locations within the health system? What type of resources does it take to integrate a newly acquired hospital or system into the Providence St. Joseph system from an IT perspective?**

**B.J. Moore:** As we move out of our data centers and into the cloud, it will become easier to increase interoperability between our locations across our health system to ensure a common integration point regardless of location. We need to lead with business strategy and processes. What is our integration strategy? Do we move to a common EHR, ERP, domain, identity system, etc. Only then does IT have the

mandate and systems' strategy to achieve goals.

**Q: What role does the IT department play in the health system's efforts to improve population health?**

**BM:** IT is central and pivotal to a health system's population health effort. Through a sound big data strategy, patient record, demographic, and other system strategies and the application of advanced technologies like machine learning/artificial intelligence, IT can be the foundation for population health strategy and infrastructure.

**Q: How do you think your role will change in the next three years? What are you doing to prepare?**

**BM:** IT's role is changing from just being an infrastructure and application provider, to also being an innovator in areas like big data and machine learning and artificial intelligence. What we are doing to prepare for this evolution is to do the basics right and well, to free up IT resources and to provide the foundation as we build these more advanced tools and applications in the coming years.

**Q: What do you see as the most dangerous trend in healthcare or health IT today and why?**

**BM:** Risk aversion to change and slow to embrace new technologies like cloud, big data, and machine learning/artificial intelligence. ■



## Why Microsoft is saying goodbye to passwords

By Mackenzie Garrity

Although Microsoft is one of the most-attacked companies globally, the company allows 90 percent of its employees to log on to corporate network without a password, according to [CNBC](#).

Microsoft's Chief Security Officer Bret Arsenault called this a reflection on the "passwordless future" the company has been talking about for years. To eliminate the need for passwords, Microsoft has developed products to remove the need to memorize a string of confusing terms and phrases.

Rather, the technology company has employees choose between different options, including Windows Hello and the Authenticator app, which provides alternatives for logging into a

computer network, such as facial recognition and fingerprints, CNBC reports.

"We all sort of declared years ago that identity would be our new perimeter. People are very focused on taking advantage of identity, it's become a classic: hackers don't break in, they log in. I see that as a huge, huge thing for us to work on," Mr. Arsenault told CNBC.

Microsoft is not the only company looking to leave passwords in 2019. Google is testing alternatives to passwords along with Cisco.

*Editor's note: This article has been condensed for the purpose of this ebook. The full story can be found at [beckershospitalreview.com](#). ■*

## Mayo Clinic, Leidos collaborate to create health tech accelerator

By Anuja Vaidya

Rochester, Minn.-based Mayo Clinic and technology company Leidos are entering into a strategic collaboration to advance the research, development and market adoption of tools and technologies for patient care.

The organizations will create an accelerator on Mayo Clinic's campus in Jacksonville, Fla. Together, they will identify, help develop and commercialize products, services and solutions

aimed at improving care delivery and patient experience. They will use Leidos' systems integration solutions and applied public health applications.

"The clinical knowledge of the Mayo Clinic combined with our technical expertise has the potential to truly transform the quality of healthcare in the future," said Jon Scholl, president of Leidos' health group. ■

# The strategy behind building a top innovation team at 7 health systems

By Laura Dyrda

Health systems across the country are building their innovation teams with an eye toward more efficient and effective healthcare.

Each health system has a different strategy for recruiting and retaining great innovators, sometimes from within healthcare and sometimes from wildly different backgrounds.

Here, seven executives and innovation leaders from hospitals and health systems across the U.S. answer these questions: How have you recruited and built your innovation team? Who are ideal candidates or team members and what are their backgrounds?

**Chris Coburn. Chief Innovation Officer of Partners HealthCare (Boston):** By philosophy, they are all business developers in one way or another. By training, we principally have MDs, PhDs, and MBAs on our team. They are all uniformly committed to executing their work at the highest standards. There is a requisite capability on the technical, operational or deal-making side. Our entire team is energized to be an element of moving innovation between the academic and commercial sectors. They live at that point of interface where they have the ability to help take an academic insight and see it deployed on the industry side. They all contribute in one fashion or another and derive great satisfaction from contributing to the health of patients by translating innovation from our faculty into products that will improve lives.

**Rich Roth. Senior Vice President and Chief Strategic Innovation Officer of CommonSpirit Health (Chicago):** Innovation is a word that can mean so many things to different people –for example, it can relate to new processes, products, or design thinking.

Several years ago, CommonSpirit Health began to use the term 'strategic innovation' to provide a focus within our organization for what our team does, while also opening up clear avenues for other internal areas to innovate in their own path.

Today, our strategic innovation team continues to discover the best novel technologies, services, partnerships, and programs from within and outside of our industry that we believe will drive the future delivery of healthcare over the long term. These valuable collaborations help our organization better provide the right services at the right time in the right place across the spectrum of the care continuum.

Before we incorporate these programs and technologies widely across our system, we first bring these novel capabilities in-house and use a rigorous program to test and determine how we can best integrate them into our clinical workflows; then we take them to scale. Our partnerships can take many forms such as customer contracts, published peer-reviewed studies, investments, joint ventures, or risk share agreements.

**David Sylvan. Vice President and Executive Director of University Hospitals Ventures (Cleveland):** That is a material differentiator for us. We set out very purposefully to find individuals who didn't necessarily have a clinical background. We wanted to avoid the potential blinders that might handcuff us when building an innovations' team. We wanted people who had innovative track records from other industries and who were captivated by our mission and mandate. We have to remember at all times that there is a patient at the end of every conversation and a provider who is responsible for their treatment, well-being and recovery.

Many of the team members have some element of design in their background, whether that be human-centered, product, experience or industrial.

Of course, there are many facets of our activities where specific expertise, such as business development, commercialization, intellectual property management, amongst others are also critical. We also want people who have the capacity to work beyond the narrow definition of their designations. The cross pollination of skills is



important for projects, investment decisions and the ability to really begin to tackle the breadth of our opportunities from a variety of lenses. This is a differentiator in our minds.

**Matthew Fenty. Director of Partnerships and Strategic Alliances at St. Luke's University Health Network (Bethlehem, Pa.):** We have a combination of external team members, coming from user-design and pharma, to internal members who moved from completely different roles, but showed a passion for creative and innovative thinking. We view innovation as a consulting and advisory service for our health system so team members who are good at client facing work, crafting the art-of-the-possible, and being practical in solution identification with a combination of people/process/technology are the best candidates.

**Kimberly Russo. CEO of George Washington University Hospital (Washington, D.C.):** We are proud to have nationally and internationally recognized surgeons who are committed to education and research. As an academic medical center, we are constantly looking for ways to enhance care and we are dedicated to a learning environment. As new capabilities become available, we work with our educational partners to evaluate these items and bring them into our

practice. For example, the GW School of Medicine's Clinical Learning and Simulation Skills (CLASS) Center provides one of the most innovative educational environments in the nation. Here, students supplement their classroom learning with comprehensive clinical exposure, feedback and evaluation that prepare them to become both technically adept and compassionate caregivers. The CLASS Center provides state-of-the art high-fidelity patient simulators, robotic training, and surgical simulators to provide hands-on practice of essential skills, procedures and critical care training.

**Jonathan Bandel. Assistant Vice President of Strategic Service Lines at White Plains (N.Y.) Hospital:** At White Plains Hospital, our innovation team started organically and was driven by a physician leader. We have expanded the team as our strategy has evolved and recruited additional talent with vast expertise. An important role within the team is to assign a designated operational lead to spearhead targeted change through the organization based upon specific enterprise needs. We have hired experts from health system-based venture accelerators, private equity and venture capital firms, and start-ups. We have also identified physician champions within the hospital who are interested in working with us as we consider the future of the hospital.



**Mark Coticchia. Corporate Vice President of Innovation for Baptist Health South Florida (Coral Gables):** There are three cornerstones on which we will continue to build our innovation culture at Baptist Health. First is by recognizing, promoting and celebrating innovation. In doing so, we remove the stigma that 'innovation is not for me' and help employees recognize that innovation is a tool to help them better care for patients.

The second is by providing incentives and resources for our innovators to step out of their comfort zones and work on challenging needs. The best innovation cultures reward contributors at both personal and professional levels by incorporating things like employee challenges, innovation fellowships and opportunities to participate in offsite and even global collaborations.

Finally, top-down commitment is required for innovation to permeate the organization. In the most innovative cultures, the C-suite not only endorses innovation, but personally participates in and experiences the impact it brings.

In 2017, under the leadership of Dr. Barry Katzen, founder and chief medical executive of Miami Cardiac & Vascular Institute, Baptist Health launched Innovation Institute Miami as a place where physicians and staff could bring their ideas as part of an effort to develop a culture of innovation in South Florida that will positively impact human health.

We will build upon Dr. Katzen's efforts in the years ahead. ■



## Mayo Clinic innovation leader Dr. Douglas Wood: 'There is no innovation without action'

By Andrea Park

Douglas Wood, MD, has served as the medical director of the innovation and design team within Rochester, Minn.-based Mayo Clinic's Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery since 2013.

Founded in 2008 and previously known as the Center for Innovation, the innovation and design department has launched hundreds of innovative projects to address the challenges of healthcare delivery in the last decade. Its multidisciplinary team includes designers, project managers, IT experts, ethnographers, curators, graphic artists and physicians.

Dr. Wood recently spoke to Becker's Hospital Review about the innovation projects he is most excited about, and how he and the rest of Mayo's innovation team overcome the many obstacles facing healthcare innovators – all with the help of their motto: "Think big, start small, move fast."

*Editor's note: Responses have been lightly edited for length and clarity.*

**Question: What does innovation look like at Mayo Clinic? What are your goals and priorities for the innovation and design team?**

**Dr. Douglas Wood:** We have a diverse approach to innovation at Mayo that represents a combination of the kind of innovation that occurs in the laboratories of our scientists, the kind of sustaining innovation that occurs in our programs in quality management and the kind of innovation that we do in our innovation and design area. It is transformative innovation, and it's

based on human-centered design. In that, what we're trying to do is innovate solutions to the experience of health and healthcare.

**Q: How does the innovation department interact with the Mayo Clinic executive team, and vice versa?**

**DW:** Over the years, our leaders have emphasized to us that we need to work on projects that are highly strategic. The way they've expressed that to us is that about three-quarters of our work should be on projects that will have substantial strategic importance to Mayo, and about a quarter of the projects we do would be more of what are called "grassroots projects." We regularly have discussions with our leaders about the direction that they want to take Mayo, and we then think about what we've heard from them in terms of how we organize our work.

**Q: What have you found to be barriers to healthcare innovation? How do you overcome these challenges?**

**DW:** Quite frequently, physicians will come to us and ask us to implement or create an app, thinking that will be the solution to their problem. We have to go back and ask them to tell us what the problem is that they're trying to solve with their app and recognize that the application may or may not actually solve that particular problem. So the first barrier, frequently, is how people look at innovation. We have to make them aware that when we use human-centered design and observational research, we have to go back and actually understand the needs of the end user – the

patient – rather than to look at it from the physician's perspective.

In healthcare organizations, sometimes the nature of the bureaucracy can be an impediment as well. Often in big organizations there may be a series of approvals that you have to go through with lots of committees, and sometimes that can end up being a barrier. At Mayo, that is a circumstance that we used to run into, but we've found ways that we can simplify that process so that we are not engaged in going through committee approval to do innovation projects.

The advantage that we have is our senior leaders have specific expectations for what they want us to do. And, over the years, we have found within the organization several areas that we can partner with very well, and we've actually gone back and worked on multiple projects with these clinical areas.

Finding the clinical areas that have a high interest in using these methods is the first step toward making it easier to do the work of innovation and to actually implement it. But also, making sure that you incorporate the clinical area in the research so that the observations as well as the experimentation plays a role is really a critical aspect to keeping people involved and making sure the innovation will actually be implemented.

**Q: What is a big mistake you see players in the healthcare industry – whether internally, on the clinical side, or externally, in the tech world – making when it comes to innovation?**

**DW:** One significant problem is to consider that you have to do only big projects. The problem with that is you can easily get distracted and not finish what it is you want to do. We have a saying: "Think big, start small, move fast." It's reasonable to think big, but then you also have to think about how you can make progress by using a series of projects that are building block projects that will result in an endpoint.

If you start to think really big – which, again, is not a big problem – but you then become distracted, the project will not come to fruition. So there is a bit of a discipline about taking things in the right order and at the right size, and having the discipline and project management to make sure that everything gets done.

Not infrequently, what can also happen is that things can bog down, and if a project is not progressing as well as it should, you either have to figure out what you

need to do to change that or you simply decide not to go on and you kill the project.

**Q: What's an innovation initiative in healthcare that is still out of reach?**

**DW:** There are a number of different things coming that I think will engender a lot of interest among innovators – artificial intelligence, machine-based learning – but we're going slowly in some of those areas. One reason why is that we have to think about how we're going to protect data; privacy is a big issue.

We also have to think about whether or not we have the right orientation in mind: Whatever it is we do with innovation, we have to make the lives of people better. With artificial intelligence, there's still a fair amount to discover, I would say, in terms of how we can actually make people's lives better. It certainly is full of opportunity, but because it could potentially be expensive, we have to think about all those aspects carefully when we start thinking about innovation work.

**Q: What is an innovation initiative Mayo has launched that you are especially excited about?**

**DW:** We've launched a number of significant things for Mayo: our Healthy Living program, our entire digital health strategy, the population health strategy – all of those came out of the Center for Innovation. We just recently launched a new patient service program for CAR T therapy, and we are engaged in planning some large hospital projects at our campus in Arizona.

We are thinking about how we visualize data and how we can change the way information is presented from the electronic record. We're thinking about how we can change the way people interact with the electronic record and with technology, so that it's less about actual keyboard entry and more about voice control or other ways to interact with technology.

**Q: Do you have a final piece of advice for other healthcare innovators?**

**DW:** The most important thing is to think about the smallest number of big ideas that you want to work on and then make sure you are marshaling your resources carefully to get the result that you need. And you have to be action-oriented, because there is no innovation without action; there's no innovation without incorporating something, doing something or implementing something that will actually solve the problem. ■



## It's time for hospitals to get smart with data

By Mackenzie Garrity

Whether it's a 25-hospital health system or a 50-bed rural hospital, the amount of data collected to ensure quality and efficiency is endless. With computer networks inundated with data, gleaming valuable insights from this surplus of information can be a significant challenge.

Hospitals are looking to data to answer performance-related questions and help direct quality and operational performance improvement initiatives. Does the hospital need to cut its average length of stay? Are outcomes similar to other hospitals in the market or region? How does the organization's readmission rate compare to the national average?

C-suite executives are constantly evaluating these questions, compiling new data at every meeting to improve decisions moving forward. However, it can be difficult to truly understand what the surplus of data is saying.

For example, let's say a hospital's annual opportunity for orthopedic surgery is \$4.5 million – a striking number by itself. However, if the hospital compared this data point to the \$10.3

million of annual opportunity in cardiac surgery, a key performance improvement target emerges – it's time to focus on cardiac surgery.

During a May 1 webinar presented by Becker's Hospital Review and sponsored by Leidos Health, Scott Woodard, Director of Analytics at the information technology and data analysis company, stressed the importance of creating cross-functional improvement using clinically- and risk-adjusted data to get a 360-degree view of an organization's past performance and future opportunity.

### How to gather and assess data

As the healthcare landscape shifts, hospitals and health systems must reexamine the data they have and how they use it. For example, if a 500-bed hospital performs well in cardiac care, transplant, joint, trauma and outpatient surgery, leaders can't measure this success against a 100-bed hospital that is only performing well in outpatient surgery.

Instead, data has to be adjusted for risk and clinical considerations to create apples-to-apples comparative information.

"Let's say I took a 300-bed facility in Iowa and compared it to a 300-bed facility in New York. Those two hospitals are very different. The patients are different. The cost models are different. The cost of living is different. So, there are a lot of things that go into comparing 300-bed hospitals," Mr. Woodard said.

To evaluate performance accurately, leaders need access to clinically- and risk-adjusted data. One possible means of adjustment is applying a binary logistic regression model to determine precise quality, cost, and length of stay information. In this model, hospitals adjust performance relative to patient age, gender, chronic conditions and significant comorbidities to give a complete composite quality score.

What this is saying is that patients have an expected outcome based on age, gender, chronic conditions, and comorbidities for a particular procedure and the observed instance of those adverse events cannot be "blamed" on the sickness of the patient.

Hospitals should also adjust for severity, intensity and complexity to determine an accurate assessment of resources. This allows hospitals to compare to one another on a national level in order to better determine future opportunities and potential savings.

### **Don't overlook performance improvement opportunities**

A 2019 healthcare CFO outlook survey from Kaufman Hall found 94 percent of CFOs have experienced increased pressure to have more insight into how financial results impact business strategy. However, these same executives lack confidence in their ability to utilize data to support actionable, informed decision-making in a quickly evolving environment.

Mr. Woodard stressed that organizations need to give more context and add information to different data points in order to develop meaningful and sustainable solutions. Without discovering clinically and risk-adjusted opportunity, an organization may

deploy resources in areas that will never see improvement. If an organization's length of stay (LOS) in pulmonary care is 5.0 days, they may undertake initiatives to lower that rate 4.5 days, a Geometric Mean Length of Stay (GMLOS) identified by leadership. However, the clinically-adjusted LOS might be 5.3. This is to say they are already above average based on their particular cases ( $5.0 < 5.3$ ) and could focus resources on more impactful areas of change.

### **Conclusion**

To achieve impactful, sustainable change within a hospital or health system, leaders must look at the clinically- and risk-adjusted data to identify opportunity for improvement, Mr. Woodard said. Hospitals cannot just evaluate themselves alone to measure success. Rather, it is imperative for hospital and health system leaders to look outside their four walls to collect appropriate data to improve overall costs and quality standards. With comprehensive data at their fingertips, hospitals can begin aligning their values to strategic initiatives. ■

To learn more about Leidos Health, [click here](#).

To watch the webinar, [click here](#).



## How AI can impact 7 areas of healthcare

By Mackenzie Garrity

Spending on artificial intelligence-related tools is expected to exceed \$8 billion annually across seven healthcare areas by 2022, according to the [Boston Consulting Group](#).

Below are the seven areas AI will play a significant role in:

- 1. Remote prevention and care:** Virtual physicians are among the AI tools being implemented to treat patients outside hospitals. Wearables and other trigger-alerting devices are being introduced to patients to track health data. These devices all use forms of AI.
- 2. Diagnostics support:** Physicians can use AI to improve medical imaging and other clinical tests. The technology can help physicians identify conditions and diseases, such as breast cancer, brain injuries and heart disease. The consulting group estimates healthcare companies will spend around \$1.2 billion annually by 2022 on AI-related diagnostic support to reduce costs.
- 3. Treatment pathways and support:** Through AI tools, physicians can more easily create individual treatment plans, eliminating potential errors. By developing correct treatment plans, physicians can

lower complication risks and improve outcomes while cutting costs.

- 4. Drug discovery and development:** Total spending on AI-related drug discovery and development applications is predicted to reach \$1.3 billion by 2022. Currently, biopharma companies are spending big portions of their budgets on research and development. With AI, these companies can better identify and develop promising drugs.
- 5. Operations:** Between natural language processing and automated writing, AI tools can reduce the time physicians spend on paperwork. These tools also can be used with biopharma and medtech companies to streamline operations, including global supply chain.
- 6. Marketing and sales:** AI tools can allow healthcare companies to identify providers more likely to be receptive to their products.
- 7. Support functions:** Other AI tools beginning to the merge include computer vision, voice recognition and neuro-linguistic programming. These functions are becoming automated. For example, chatbots are more commonly being used to answer patient questions about billing or passwords. ■



## 4 key quotes about how AI will transform healthcare

By **Andrea Park**

There is still much work to be done before artificial intelligence reaches its full potential in healthcare, but high-tech initiatives have already begun to boost hospital and health system efficiency and improve patient outcomes.

Here are four key quotes from physicians and researchers about AI's transformative potential in healthcare – and the major obstacles keeping the medical field from achieving that potential.

1. "AI will be most effective when it enhances physicians' ability to focus their full attention on the patient by shifting the physicians' responsibilities away from transactional tasks toward personalized care that lies at the heart of human healing." – Steven Lin, MD, a clinical assistant professor of medicine and vice chief for technology innovation in Stanford University's division of primary care and population health

2. "If we can ... allow this technology to be developed at a reasonable pace, with realistic goals, it's possible that we could reach some of the heights we'd always hoped. We need to realize that nothing in medicine ever comes easy, and all of the intelligence in the world, artificial or not, won't change that." – Jason Moore, PhD, director of the University of Pennsylvania's

Institute for Biomedical Informatics at the Perelman School of Medicine

3. "By augmenting human performance, AI has the potential to markedly improve productivity, efficiency, workflow, accuracy and speed, both for [physicians] and for patients ... What I'm most excited about is using the future to bring back the past: to restore the care in healthcare." – Eric Topol, MD, director and founder of Scripps Research Translational Institute

4. "[AI] may well make care more efficient, more accurate and – if properly deployed – more equitable. But realizing this promise requires being aware of the potential for bias and guarding against it. It means regularly monitoring both the output of algorithms and the downstream consequences ... Most fundamentally, it means recognizing that humans, not machines, are still responsible for caring for patients. It is our duty to ensure that we're using AI as another tool at our disposal – not the other way around." – Dhruv Khullar, MD, a physician at NewYork-Presbyterian Hospital.

*Editor's note: This article has been condensed for the purpose of this ebook. The full story can be found at [beckershospitalreview.com](https://beckershospitalreview.com). ■*



# 5 new hospital applications for machine learning: AWS Textract, an algorithm predicting ICU outcomes & more

By **Andrea Park**

Here are five studies and product launches from the month of May that demonstrate the many uses of machine learning artificial intelligence in clinical settings:

1. Amazon Web Services' [Textract](#) service uses machine learning to extract information from any document, including hospital claims, patient forms and more.
2. An [algorithm](#) developed at the University of Copenhagen analyzes an intensive care unit patient's long-term disease history to better predict their chances of survival.
3. An [algorithm](#) developed at the University of California was able to classify amyloid plaques in close-up images of brain tissue with a level of accuracy equal to that of a human neuropathologist.
4. A study presented at the International Conference on Nuclear Cardiology and Cardiac CT described a machine learning [tool](#) with the ability to predict a patient's risk of developing a potentially lethal arrhythmia after experiencing heart failure.
5. A machine learning system called [ARTICA](#) significantly outperformed cardiologists in determining whether further cardiac imaging tests are unnecessary for patients with stable chest pain.

*Editor's note: This article has been condensed for the purpose of this ebook. The full story can be found at [beckershospitalreview.com](http://beckershospitalreview.com). ■*

# Houston Methodist innovation VP's advice to healthcare organizations: 'Disrupt or be disrupted'

By Andrea Park

Though it has since been formally rebranded as the Center for Innovation, Houston Methodist's innovation team can't seem to shake its tongue-in-cheek nickname: the D.I.O.P group, short for "Digital Innovation-Obsessed People."

It's an all too fitting name for the health system's innovation center, where Michelle Stansbury, vice president of IT innovation, works alongside a multidisciplinary team to rapidly develop and implement a variety of tech-based solutions to better serve the entire Houston Methodist ecosystem, from patients and clinicians to prospective employees.

"We either succeed fast or we fail fast," Ms. Stansbury said, explaining that the onus is on healthcare organizations to keep up with the swiftly changing state of healthcare as increasingly more technology and consumer companies move into the sector – lest hospitals and health systems become the Blockbusters of their own industries.

Here, Ms. Stansbury discusses how Houston Methodist takes a dynamic approach to innovation, and why healthcare organizations must learn to look past the "dazzle" of shiny new technology.

*Editor's note: Responses have been lightly edited for length and clarity.*

## **Question: What does innovation look like at Houston Methodist? What are your goals and priorities for your role?**

**Michelle Stansbury:** It comes down to the core of what our CEO has said many times to us: We're trying to take this big, complex health system of ours and make it more accessible to our patients in whatever manner that they may want. Patients are demanding convenience, and they're demanding it like they never have before, because they're already experiencing it in their daily lives, from the airport to the bank – so why can't they have it in their healthcare environment?

How are we doing that at Houston Methodist? We have our own Center for Innovation, and we all bring different perspectives, which helps us create change within the organization. We're looking at not just what we can do for patients, but also how we can better know them, and how we can better know our employees or potential employees. We want to be seen as the true innovator in healthcare, which would, of course, help us be able to attract that top talent. So we're looking at innovation in all aspects and not just for the traditional patient – who, of course, is still very, very important for us.

## **Q: What's an example of an initiative the Center for Innovation has launched to improve patient access and convenience?**

**MS:** Recently, we rolled out a product through [WELL Health](#) to replace the old system of receiving phone calls for reminders with whatever a patient's preference is. Nine times out of 10, they prefer to receive a text, and so now, they can get a text for their reminder. It offers two-way communication, so they can text back to confirm the appointment or reschedule, and more of them than you would expect are even sending us emojis to let us know how happy they are with the new system.

Now, we're trying to take that a step further, to figure out how patients can start the very beginning of the healthcare journey with a text – from scheduling an appointment to taking care of questionnaires, all without having to log into a portal. We believe that's where healthcare is really going, and we're trying to get there for our patients as fast as we can.

## **Q: What's an innovation initiative that you'd like to implement but is still out of reach – whether due to a lack of resources or because the technology isn't there yet, for example?**

**MS:** We've done quite a bit in virtual healthcare and quite a bit with chatbots. Now we're looking at natural language processing, and at how we can better utilize voice-enabled technology, because if you look at a lot of households, people are getting used to voice-enabled transactional processes with their Amazon and Google voice assistants. How can you get that into healthcare? That's where it is that we're trying to explore and work through.

## **Q: What are some barriers or challenges to healthcare innovation? How do you overcome those obstacles?**

**MS:** For us, it's just been time and resources. How we are structured in our organization – and I wouldn't call it a barrier, because it's been a true benefit to help us innovate very quickly – is that everyone in our Center for Innovation has a dual role. Our chief innovation officer is also the CEO of one of our largest hospitals; I'm the vice president within IT, but I'm also the vice president of the Center for Innovation. That helps us to bring the knowledge of operations into innovation and to move quickly in bringing the solutions to fruition and determining whether they worked or didn't. We either succeed fast or we fail fast.

*Editor's note: This article has been condensed for the purpose of this ebook. The full story can be found at [beckershospitalreview.com](#). ■*



## The promise of digital health: Key thoughts from Partners HealthCare's Chris Coburn

By Laura Dyrda

Partners HealthCare Chief Innovation Officer Chris Coburn outlines the significance of digital technology in healthcare and why it's important for health systems, especially those with an academic and research mission, to make the right investments in start-ups and innovative technologies for the future.

### **Question: Where do you see digital technology making the most headway in healthcare?**

**Chris Coburn:** We are in the age of digital healthcare – promises made about digital healthcare capabilities that were first made in the 1960s are becoming a ubiquitous reality. It's difficult to identify an activity, unit or function that is not currently being enhanced or enabled by digital technology. While in some cases it is still nascent, the broad arrival of digital in our environment means that care can be personalized in virtually every element, whether it's for example, giving a precise diagnosis to an individual or providing insights for an entire population. The healthcare delivery model is shifting from single interactions to a continuous exchange of information and insights.

### **Q: What headwinds are you preparing for in 2020 related to digital health?**

**CC:** Given the significance of the question for our entire system it might be better posed to our CEO Dr. Anne Klibanski or our senior leaders who are focused full-time on our digital components. From my perspective, the issue most relevant for our area is how can we engage the growing number of essential actors, whether users, buyers, regulators, clinicians, big companies, small ones, investors, developers or others, in relationships that can efficiently validate and grow value for the system. We can maintain, or even grow momentum, if we have focused, multidisciplinary internal teams and thoughtfully dock with external principals – always with an eye for patient and mutual economic returns.

That is one of the reasons we are so enthusiastic about our new \$30 million AI and digital investment fund and its complement our \$50 million translational innovation fund. Our well-crafted partnering and investment approach will combat inevitable shifting market dynamics fueled by transformation pressures, an election year and growing concerns about investment models – of course that is all occurring with the backdrop that non-core revenue growth is a high and growing priority throughout the U.S. provider community. ■

# Healthcare leaders debunk 3 myths about machine learning

By Mackenzie Garrity

Though machine learning has the power to dramatically change healthcare, physicians should not fear being overrun by robots, according to the Harvard Business Review.

Four healthcare leaders – Derek Haas, CEO of Avant-garde Health, Eric Makhni, MD, orthopedic surgeon at Henry Ford Health System, Joseph Schwab, MD, chief of spine surgery at Massachusetts General Hospital, and John Halamka, MD, executive director of the Health Technology Exploration Center at Beth Israel Lahey Health – debunked three common myths about machine learning in healthcare.

**1. Machine learning can do much of what physicians do.** Although machine learning can prevent patients from getting sick and diagnose a patient, the software can't provide care and treatment to patients. Additionally, machine learning lacks the human element in healthcare.

**2. Big data and brilliant data scientists are always a recipe for success.** While having data can be powerful, not all data is sufficient and necessary. Healthcare organizations must collect the right data and fully understand it. Questions to ask are:

- How was the data gathered?
- For what purpose was the data gathered?
- What are potential problems with or limitations of the data?
- Have circumstances changed?

**3. Successful algorithms will be adopted and utilized.** Just because a new software or algorithm is developed, doesn't mean it will be used among physicians. This is often because the tools aren't integrated into the workflows of clinicians. If an algorithm isn't part of the EHR, clinicians won't use it. To read the full report, [click here](#). ■

# Who should lead your digital transformation? Teams of growth-minded, high-potential hybrid workers

By Andrea Park

Implementing an organizationwide digital transformation is difficult enough on its own; adding an incomplete or improperly staffed team to the mix will only create more challenges.

The most effective digital transformations, therefore, include a robust pipeline of digital talent, according to the [Harvard Business Review](#), one that does not require prohibitively high costs to recruit or train, but instead focuses on strategic hiring practices beyond the traditional search for specialized digital experts of the highest pedigree.

Instead, the most successful organizations hire workers with the ability to develop necessary skills, and build an environment to foster that development. Here are four ways to do so, according to *HBR*:

1. Look for potential, not credentials.
2. Value soft skills as much as technical skills.
3. Think about teams, not individuals.
4. Incentivize employees to grow. ■

