



HEALTHTRUSTSM

Innovation in Healthcare: Current State & Future Needs

Executive Briefing

OVERVIEW

The potential for innovation in healthcare is virtually unlimited, but the obstacles are also uniquely challenging. Truly “disruptive” innovation—the kind of radical changes embraced and celebrated in multiple other industries—can be antithetical to heavily regulated, real-world operating environments where patient safety, privacy and survival are constant considerations.

Transformative technologies and business models are needed to modify basic human behavior, and make healthcare products and services more affordable and accessible, as well as better gauge their value in improving the health of patients. The enablers will include better data analytics, interoperability between healthcare providers, greater use of robotics, and more “out-of-the-box” thinking about where and how care gets delivered—and ways to truly personalize the experience.

The current process by which healthcare innovations get to market—from idea to prototype and pilot—is very long and laborious. Forward-thinking organizations need someone to champion change lest they remain stuck in their default position (“This is how we’ve always done things.”).

IDENTIFYING THE ROADBLOCKS

Address interoperability problems. One significant roadblock is to get disparate systems to talk to each other, sharing and exchanging data in a way that is useful and meaningful to end users. Consensus among industry

executives is that 75 to 80 percent of the information in electronic health records (EHRs) is unstructured and can’t be stored in conventional databases, limiting the ways the data can be accessed and used. Uniting the many silos of patient data that currently exist into a single patient record will require a significant effort (i.e., standardized communication format), but it will also open doors to discovery about how to reduce medical errors, lower costs and streamline care delivery. Additionally, it should improve uptake of innovative technologies because more people will be operating off the same system.

Leveraging “big data” and the cloud is how leaders in many other industries—including retail, financial services and politics—know who they serve down to an individual’s preferences and personal habits. That level of detail about patients would likely reveal opportunities to improve the quality, cost and experience of healthcare. Fully exploiting all the data collected in healthcare requires that providers combine multiple sources of data using different naming conventions, build advanced analytics capabilities so the data can be used to predict and optimize outcomes, and then use the information to guide patient-focused decision-making.

Eliminating efficiency bottlenecks. If organizations are going to find solutions for lowering stubbornly high healthcare costs, eradicating diseases and epidemics, or delivering effective patient care based on data-driven protocols, they’ll need to be collaborating across the care continuum. Specialization in healthcare has made it a silo-heavy industry, where any one provider can only see a slice of a problem and has no ready visibility to any other provider’s activities or perspectives.

If a hospital’s emergency department adopts pioneering technology to improve patient throughput, for example, the fruits of that innovation won’t be realized unless better tools and processes are addressing bottlenecks all along the care continuum. What if the nursing floors don’t have enough beds for all those patients, or the care team isn’t clear on their discharge criteria? Are patients being sent home prepared for the transition or expecting to go to rehab? Is staffing making all necessary follow-up calls preventing patient readmission? How long is the waiting period for patients who need home health services? Collectively, caregivers at different touch points with patients need a more holistic solution focused on care transitions.

Bridge the divides. In addition to aligning the clinical care team, get all other stakeholders communicating and collaborating to tackle real-world problems. More typically, physicians are solely focused on practicing medicine or trying to publish papers; administrators have no idea what their medical staff is doing, wanting or needing; engineers are developing products that don't solve pressing healthcare needs; and software developers seem wholly unaware of how much physicians and frontline clinical staff are struggling to use their tools. Regularly scheduled time for collaboration can assist in maintaining open lines of communication.

Identify who will champion innovation. This is particularly crucial for initiatives being launched in a hospital or health system. Champions are needed to build and, more importantly, maintain momentum and ensure organizations make changes that are impactful. Here's an example from the private practice world: One physician convinced his partners to each contribute 1 percent of their gross revenue to research—something none of them initially had any interest in—and worked for the next 20 years to build the Foundation for Orthopedic Research and Education. That institution today boasts over 100 employees in a large new facility in Tampa, Florida and is financially self-sustaining.

Breakthroughs most needed in four broad categories

- Innovations with direct bottom-line financial impact
- Solutions aimed at reducing readmissions
- New ways for providers to engage and empower patients
- Technology to make patient information portable and easily accessible

INNOVATIONS WITH IMPACT

Progress has been especially brisk over the past decade in the realm of medical devices, now among healthcare's leading innovation categories. Imaging modalities have been getting updates to make them faster (thanks to gaming technology), less infection-prone (flat screen design) and accommodating of larger patients (beams that better penetrate body fat). While many new devices are only incrementally adding value, a few of them have been truly remarkable—e.g., transcatheter aortic valve replacement (aka TAVR), which allows surgeons and cardiologists to non-invasively put new heart valves in patients. And with the 2.3 percent tax on medical device companies on the road to full repeal, the trend is likely to continue with more play by smaller companies hardest hit by the tariff.

3D printing is also rapidly coming of age—running the gamut from small printers that can make surgical instruments to room-filling printers for manufacturing orthopedic implants out of surgical titanium or stainless steel. Hip and knee replacements, and spinal implants, can be tailored to individual patients based on their CT data for 3D modeling.

Robotics continues to be a high-potential area, and not just to assist physicians with surgery but to also allow them to be remotely “telepresent” with patients. On the home health front, they’re being tested as companions that can remind seniors to take their medications and assist with basic tasks such as getting up the stairs and out of the bathtub.

Software-based products are also making transformative strides, including an artificial intelligence system that manages patient discomfort by dishing out content based on brainwave feedback (showcased at HealthTrust’s 2016 Innovation Summit). It’s currently being piloted in four states and five HCA facilities, and demonstrating a positive impact on HCAHPS scores.

Mobile healthcare applications are also proliferating—but, for the most part, they remain overly focused on the technology while sidestepping the trickier issues of motivating behavior change in patients and their engagement with healthcare providers. Apps for secure clinician-to-clinician messaging (to improve care coordination) and those for tracking patients during their hospital stay (to improve efficiency) are among the newest to market. Disease management apps continue to evolve to focus on improving outcomes and reducing readmissions.

Although the adoption of wearable technology has weakened somewhat among consumers,¹ next-generation wearables that adhere to the skin or strap onto the chest to monitor vital signs could help boost demand among providers. Telehealth enthusiasts should also welcome the introduction of smart glasses that allow physicians to access lab test results from an EHR or be “virtually present” from a remote location to perhaps view a patient’s wound or participate in hospital rounds—using a quarter-inch display in the upper right corner of a pair of specialized glasses.

Rapid Prototyping at UK Research Institute

A research institute on the Alder Hey in the Park Campus in Liverpool, United Kingdom, is uniquely positioned to put innovation into practice virtually overnight. In 2016, Alder Hey Children’s Hospital and the University of Liverpool teamed up to open the first phase of their “Institute in the Park” at the hospital with specialist staff for patient-oriented, translational (basement-to-bedside) research.

“We’re trying any and all means to get technology into healthcare,” says Iain Hennessey, clinical director of innovation and consultant pediatric and neonatal surgeon, as well as the featured speaker at the 2017 HealthTrust Innovation Summit. “What has been most effective is partnering with small and large companies to help them understand our problems and rapidly develop solutions. Forming personal relationships and co-creating in a combined space has been the key.”

The focus of the Institute in the Park is less about new product development than delivering care that is more safe, efficient and patient-friendly. The enabling technologies include sensor technology, 3D printing, virtual monitoring systems (for parents of newborns), and artificial intelligence to create a living digital hospital that makes the inpatient experience more comfortable for kids.

“Technology adoption rates in healthcare are simply too slow, primarily because the industry is incredibly risk averse,” Hennessey says. “That’s why it is so important to have a loud clinical voice demanding, encouraging and facilitating companies to develop healthcare technologies.”

“What makes Alder Hey unique is its real-world focus,” says Michael Schlosser, M.D., chief medical officer of HealthTrust. “It sees a very specific problem around care delivery and finds the right entrepreneurs who can fix that problem.”

On the prevention front, worthy mentions include web-based tools designed to increase the adoption of evidence-based care at hospitals. Another (also evaluated at the 2016 Innovation Summit) is an engagement platform that uses psychometric analysis to drive behavior changes with messages tailor-written for specific patient types. Medical education, meanwhile, is benefitting from simulation technology borrowed from the airline industry to streamline and speed up clinician training. Similar to pilot training, clinicians now have the opportunity to train in advance of procedures and also meet CME requirements using simulation-based training.

In terms of improving care delivery, one internal medicine physician is on the right track with a new model of chronic disease management that reverse-engineers the healthcare experience to be frustration-free. It utilizes freestanding kiosks for regular lab work, cuts out the insurance middleman and addresses the problem of medicine non-compliance by having the doctor literally hand patients their medicine as they walk out the door. One of the bigger developmental challenges was calculating exactly how much a minute of the doctor's time cost so services were priced below the industry norm.

Decentralizing care delivery is also the theme of innovative alternatives such as the Duke Heart Failure Same Day Access Clinic, which is improving outcomes and lowering costs via fewer hospitalizations by providing on-demand access to outpatient management.² Market demand has made retail health clinics an increasingly common feature of many drugstores and supermarkets. The push for convenience is also behind the proliferation of freestanding emergency rooms.

PATHS FORWARD

Enabling the kind of disruptive innovation commonplace in other industries may well require health systems to establish formal innovation programs. This is certainly true of larger, more resource-rich organizations such as the Cleveland

Clinic. Its in-house investment division, Cleveland Clinic Innovations, has spun out 76 companies since 2000, typically investing no more than \$50,000 in each. Health Insight Capital, the venture arm of HCA, also looks for promising companies to purchase and incubate—including mobile software company PatientKeeper that provides computerized physician order entry, medication reconciliation and electronic physician documentation. Its informatics approach in the HCA operating environment had already proven to streamline workflow and improve patient care, making it an ideal add-on to HCA's electronic health record.

Innovation can be fostered less formally by finding and nurturing entrepreneurial energy in areas where innovative thinking is already occurring on a smaller scale—possibly the IT department. Creating a culture where new ideas are actively solicited can have huge payoffs. One of the more celebrated examples can be found at the Mayo Clinic, where its Center for Innovation partnered with Blue Cross and Blue Shield of Minnesota to create eConsults, bringing the expertise of Mayo specialists to the community electronically so patients don't need to travel.³

HealthTrust is doing its part as a change agent with its annual Innovation Summit. The 2017 event is focused on supporting start-ups in the earliest stage of development by having them present their ideas to HealthTrust physician advisors and board members for constructive feedback.

Innovation in healthcare takes a fair amount of patience and upfront investment to cultivate—well before the rewards are realized. But there are more than a few hopeful signs. Middle America cities such as Nashville, Cleveland and Pittsburgh are already home to a thriving incubator and start-up community flanked by academia. Several innovators, including Steve Case, co-founder of AOL and chairman and CEO of Revolution LLC, an investment firm in Washington, D.C., expect more technological innovation to start cascading across the healthcare sector.⁴

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