



### About the series

As health care moves rapidly toward a value-based delivery model, a greater emphasis will be placed on care coordination. We must ensure that patients not only get the right care at the right time in the right setting, but also that every part of the delivery system is connected and understands that a patient's need will be critical going forward. Information technology will be instrumental in making sure that these connections take place and in providing clinicians with valuable new decision support tools.

H&HN, with the support of AT&T, has created this yearlong series called Connecting the Continuum to explore how hospitals and health systems are addressing the care continuum in their strategic and operational plans.

Each month, we will examine such topics as health information exchange, mobile health and transitions of care. Follow the series in H&HN, H&HN Daily and on our website.

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## Number of hurdles keep mHealth from hitting its stride

BY JOHN MORRISSEY

Mobile devices in provider settings are packed with potential for good, but their ultimate value depends entirely on factors that have nothing to do with the cool ways they can get data to and from clinical users. If the data fail to get there, or the usage design leads to frustrations or flubs, the future is limited.

Relying on wireless methods to send and receive applications and data carries risks related to performance, says John Norenberg, vice president of information systems, physician services, at Advocate Health Care, based in northeastern Illinois. "Many of the applications are very finicky when it comes to bandwidth, meaning that if there's any latency at all in the network side of the applications, the applications go a little crazy on you. ... They don't perform properly."

Another obstacle is usability, says Sam Brandt, M.D., chief medical informatics and telehealth officer of Catholic Health Initiatives, a health system spanning 17 states. IT vendors started out by saying their apps can be used on mobile devices via Web browsers, "but clearly that doesn't work so well because you really get into designing for a form factor — not only the resolution but how you

scroll, how you select things, how much data you can absorb at one time, the kinds of gestures that bring up cascading dialogue boxes or menus. They don't translate very well" from big screen to tablet or phone, he says.

A mashup of new technology and existing clinical software adapted from different premises is a poor starting point for fluid

### THE UNIQUE PROPERTIES AND ADVANTAGES OF MOBILE-DEVICE TECHNOLOGY ARE BARELY HARNESSSED YET.

adoption and ongoing innovation specific to health care, says Will Morris, M.D., associate chief medical information officer at Cleveland Clinic. "It shouldn't be a solution looking for a problem. It should be the other way around." The basis for mobility-oriented computers is that data are otherwise not available, or they have to be visualized in a way that is actionable, he says.

The unique properties and advantages of mobile-device technology are barely harnessed yet, Norenberg says. Although major vendors of electronic health record systems see mHealth as a growth opportunity, "where they struggle is in presentation," he says [see A Better Metaphor].

If adapted or unchanged from the larger PC or laptop screen displays, "the electronic interface can make it easier to do the wrong thing," says Brandt. Examples are selecting the wrong item from a list, or transposing digits or decimal points using the thumb-it method. "Those are really well-described problems. It's incumbent on the software to detect that; the software ultimately needs to be smart enough to be able to say what makes sense and what doesn't make sense."

Beyond the limitations of manipulating smartphones and tablets, "the obvious hurdle is connectivity," Brandt says. "Simply having the kind of safe, secure wireless connectivity that allows [physicians] to connect when they're in the facility, and then having the kind of wireless connectivity that allows them to 'VPN in' more securely from a remote site."

Those are different undertakings. CHI hospitals run three separate network lev-

els: one inside the IT firewall for devices the system owns and distributes; one outside the firewall for guests of the hospital; and a third spectrum of bandwidth separated from the guest network and reserved for clinicians using their own devices. An Internet-based remote network also is in development separately.

Both main options for wireless connectivity — private infrastructure and public cellphone network — have their limits as well as advantages. "I think the cellular network will be the way we're going to go," Norenberg says. With forthcoming innovations in how mobile phones are connected, "that's going to give us a bandwidth explosion that will allow us to really do neat things with the mobile devices."

CHI is still betting on private Wi-Fi networks. The system has small facilities in many rural states, and they typically pay more for bandwidth and have inferior cellular service. The cost per gigabyte of data is higher even though the bandwidth is lower, says Brandt. Inside facilities, public network reception is universally unreliable. Many have steel rather than wood supports in the walls, which block cell signals.

Recent government policy and funding have pushed for "last-mile" Internet bandwidth improvement in rural areas. But in those areas, "you're also going to see a push for cellular," Norenberg says, "because cellular does not require us to run copper or fiber over the land or under the ground."

### A BETTER METAPHOR

A metaphor in literature is a work of words to construct an image that represents familiar ideas. In health IT, a metaphor technically is a familiar idea of how an image supports works of words — it's a look and feel that's well-recognized. Moving from big-screen computers to mobile devices requires something substantially different.

"For the last 10 years, we've been working on the visual metaphor that is the electronic chart — obviously the first go-around was to try to do the paper chart in an electronic format," says Advocate's Norenberg. "Now you go to handheld and

mobile-class devices, be it tablets or phones, and that's a brand new metaphor. I would say that the vendors that see value in this are trying to figure out the look-and-feel metaphor for that information."

In health care, "That's a difficult problem once you get to the pure-on clinicals. There's only a small amount of screen real estate, and the old metaphors just don't scale down onto that real estate very well." But once a couple of apps get close, other vendors will adapt and improve it, a practice that has been going on since computers were invented, he says. "I think in the next 12 months, maybe 24, we're going to see a mobile clinical metaphor begin to emerge that everybody will begin to copy."

### CONTEXT MATTERS

CHI's Brandt can touch his iPhone once and bring up a map. What happens next is an example of how mobile apps should work in health care.

"If I touch another icon, it will locate me on the map. Then I can type in C-H

and it will find me Chinese restaurants. Then it will show me the Zagat ratings of those Chinese restaurants, and it will offer to dial my telephone or give me directions to them. And in some cases, it'll even offer to make a reservation for me. And all with one or two fingers."

Translate that into the medical workflow — only offering choices within a context, thinking about how all the pieces connect — and it's a different situation entirely from emulating the paper chart or putting papers in a pneumatic tube to send to the lab or pharmacy, he says. But that approach is only scratching the surface of what's possible with mobile devices. "There's an extraordinary opportunity for this continuous connectedness, the ability to be contextual about where I am and what I'm doing, to be able to easily navigate to common and obvious choices."

It took years to move from a paper chart to a point where physicians felt comfortable doing the same thing on a computer screen. Now the IT industry has to start that all over again. ●

### Top worries about mHealth

Security issues comprise the top three concerns when it comes to mobile health devices.

#### % OF HEALTH CARE RESPONDENTS (3 CHOICES PERMITTED)

Employee negligence.....	75%
Use of public cloud services.....	41
Mobile device insecurity.....	40
Cyber-attackers.....	39
Employee-owned mobile devices.....	34
Insecure mobile apps.....	23
System failures.....	16
Malicious insiders.....	13
Identity thieves.....	12
Insecure medical devices.....	5
Other.....	2

Source: Ponemon Institute, 4th Annual Benchmark Study on Patient Privacy & Data Security, 2014

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