mHealth: Prescription for an ailing health care system

Despite a tendency to be viewed as a technology laggard, the health care industry is embracing mobile health at a clip even Steve Jobs could have been proud of. Indeed, it's thanks in part to Jobs and his Apple OS that the concept "mHealth" has emerged so quickly to take a lead role in defining health care transformation.

As mHealth continues to define the industry, the market continues to grow, estimated to reach a value of $4.6 billion by 2014, according to the 2012 report, "Open Mobile: The growth era accelerates," by consulting firm Deloitte. Within that value are the hopes that wireless networks, mobile devices, new applications, and innovative approaches to care delivery and reimbursement can tackle the pressure points in a fragmented health care system. Mobile health techniques could help alleviate issues from an aging population and growing numbers of chronically ill patients to anticipated physician shortages.

Driving the demand behind increasing mHealth is the new crop of tech-savvy patients, according to Deloitte. People are using social media to interact with their peers and discuss medical conditions, and a wave of new applications is helping patients monitor prescriptions, receive appointment reminders, and send information to their caregivers. And that, in turn, is driving more sophisticated care and communication among providers and patients. Tech-savvy physicians equally are happy to use their own devices if it means productivity increases. But challenges remain in aligning mobile growth with the unique needs of health care.

With all the pieces coming together, it's easy to see why mHealth holds so much potential as an industry game changer.

We see the same thoughts reflected in the results of our own mHealth survey, which includes responses from more than 230 CIOs, providers and other IT professionals. Mobile devices and applications are growing tremendously inside health care organizations –somewhat to the reluctance of managers, who understand the drive for new technology, but are struggling to upgrade costly infrastructure to support wireless networks and find new ways to ensure sensitive data remains protected and secure.

That said, the growth will continue as health care organizations face increasing demands from federal initiatives to bolster information exchange and meet meaningful use criteria, such as patient engagement requirements, our respondents say.

With all the pieces coming together, it's easy to see why mHealth holds so much potential as an industry game changer. That convergence of technology, the easy flow of information and deeper patient-provider relationships all point to the health care goals of reducing waste and costs, while improving quality and care. Read through our mHealth report to see how IT experts hope to foster that convergence and meet health care goals.

- Jean DerGurahian, Editorial Director
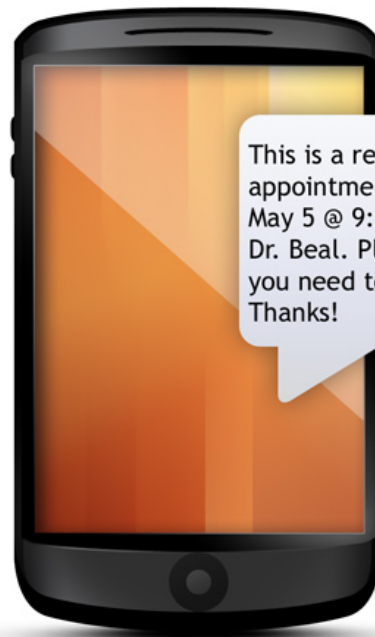
mHealth: Enabling meaningful use in clinical workflow

The buzz around mobile health (mHealth) technology seems to have been about its potential to make health care cheaper and more efficient while perhaps improving outcomes. But potential doesn't pay the bills. Instead, health care providers are considering how mHealth technology is beginning to enable meaningful use compliance in their workflows.

Professionals believe such tools could enable meaningful use compliance in several areas, from computerized physician order entry (CPOE) to clinical decision support.

How many mobile devices do you estimate will be part of your network by the end of 2012?

27%
39%
34%

■ Between 100–500
■ 100 or fewer
■ More than 500

That includes e-prescribing, according to Sanjay Pingle, president of Physicians Interactive. "One of the challenges to further adoption is that you'd think a majority of [prescriptions] would be done via mobile…but the vast majority that we see are written via desktop and the Web," said Pingle, citing Allscripts Healthcare Solutions Inc. research showing that 25% of prescriptions were filed electronically in 2010. Though low, this represents a "huge increase" over 2008 and 2009. Physicians love new technology, he said, but only when it works well. However, vendors will have to overcome usability issues plaguing many current applications. These include poor data-entry mechanisms and slow list-loading on mobile devices, he said. Once that happens, robust data systems such as e-prescribing can work well on smartphones.

Interoperability is a key function for mHealth, especially as more devices are integrated into health care organizations. The market penetration of devices running the Apple Inc. iOS operating system -- the iPad, iPhone and iPod Touch -- is increasing among physicians and nurses.

Hospital IT staffers might cringe at the idea of adding an iOS EHR implementation to a long list of regulatory-spurred technology implementations, but those mobile devices can actually be used as an incentive to promote EHR use, said United Health Services CMIO Afzal ur Rehman, M.D.

"A lot of physicians said to me, 'I always wanted a reason to buy an iPhone, and this is it,'" Rehman said, in reference to his upstate New York health system's iOS EHR rollout. An iPhone or iPad can consolidate several devices physicians or nurses might carry into one, increasing their satisfaction with new workflows.
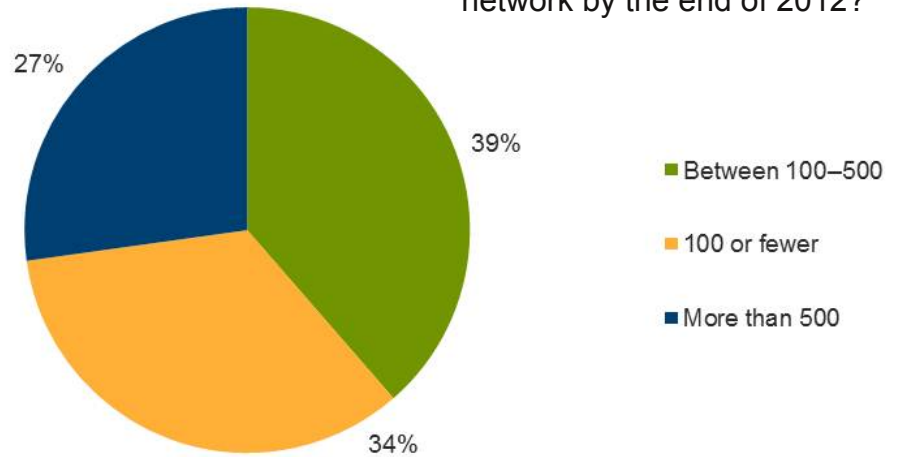
What percentage of those devices will be issued by your organization?

40%
25%
17%
18%

■ 25% or less
■ 25%–50%
■ 50%–75%
■ 75% or more
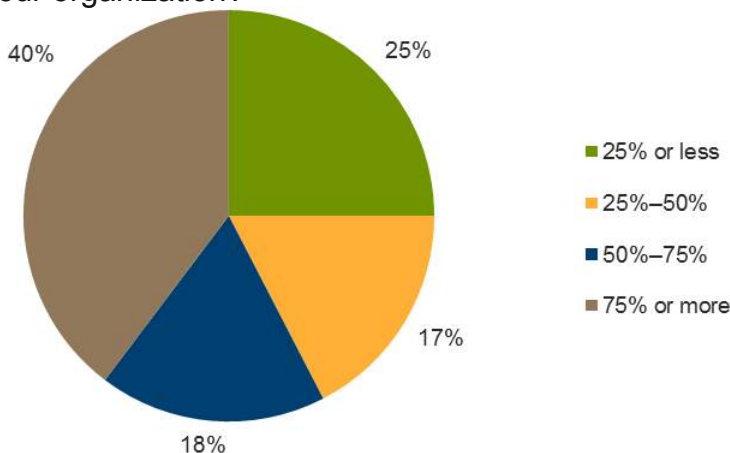
Health care (reluctantly) embraces BYOD policies

Hospitals might be driven to incorporate more devices on their networks because their medical staff want to use them, but many US CIOs are still reluctant to allow employees to access company networks using personal computing devices, according to a recent Robert Half Technology survey.

Only a third of 1,400 CIOs polled by the IT staffing services firm said they support bring your own device (BYOD) schemes.

Among the CIOs whose firms do allow workers to access the company network using their own devices, 66% said their firms offer limited technical support to these individuals, while 6% offer no support. Just 28% offer full support.

"Companies are balancing the desire to provide flexibility to employees with potential security risks, as well as logistical issues such as providing support for non-standard devices," said John Reed, senior executive director of Robert Half Technology.

Although most CIOs surveyed do not allow employees to use their personal devices to access company networks, Reed said this may soon change, particularly with the rise in telecommuting and remote working arrangements.
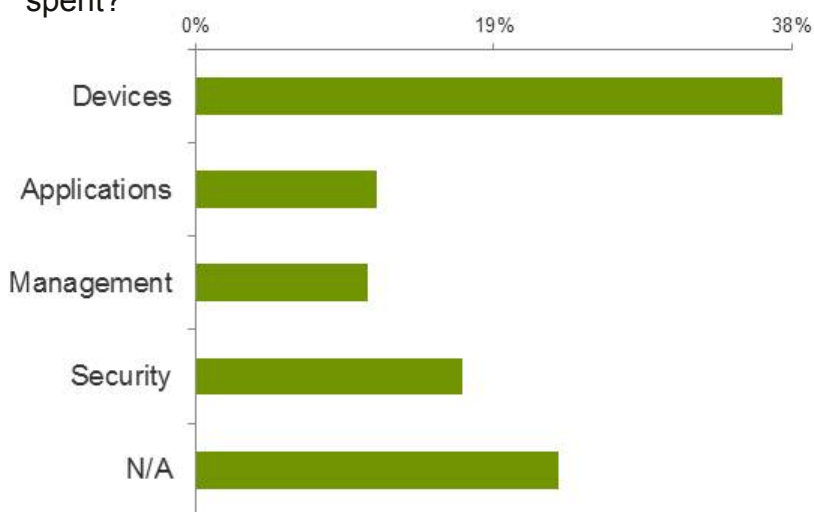
That said, the bring your own device (BYOD) era is in full swing and IT departments are scrambling to handle the new mobile technology trend. It looms large in the world of content management, where vendors now need to figure out how to work with multiple operating systems and platforms without losing documents in the shuffle.

What factors are driving mobile device use?

Where are increases in mobile health budget being spent?
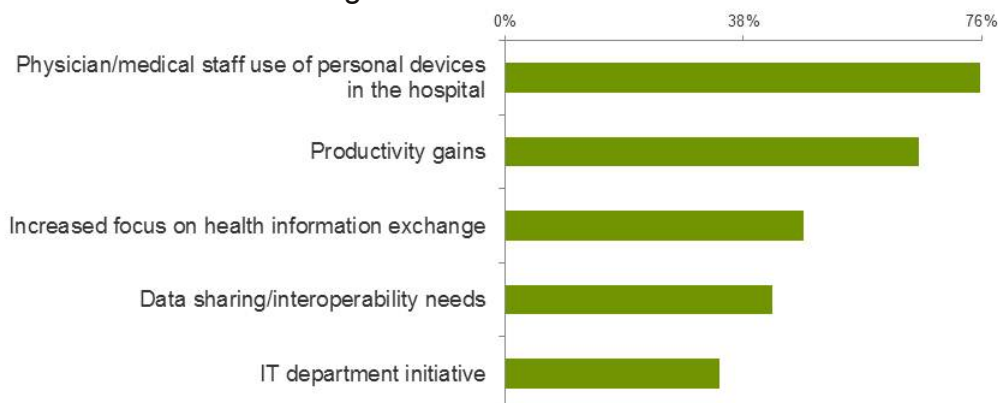
"Since the floodgate has opened, IT organizations have faced a very different challenge than just a couple of years ago," said Lubor Ptacek, vice president of strategic marketing at Ontario-based enterprise content management company OpenText. "[Homogeneity in IT] is out of the window today, because now everyone has a different device and they have no choice but to support them. There are a lot of new challenges and disruption in how IT operates."

The disruption, initially caused by the rise of the iPad and now exacerbated by the proliferation of smartphones, is forcing IT departments to have frank discussions about how they will work in the future and how they will maintain security in a world where homogeneity is becoming impossible. Users demand access to work materials on their various
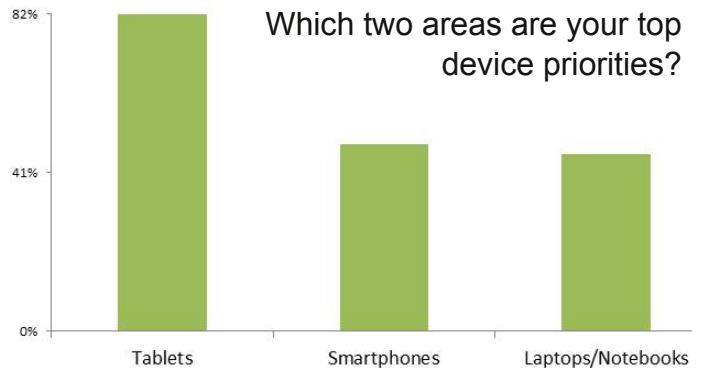
BYOD, cont.

productivity devices and a lack of that turns employees off inside the company and out.
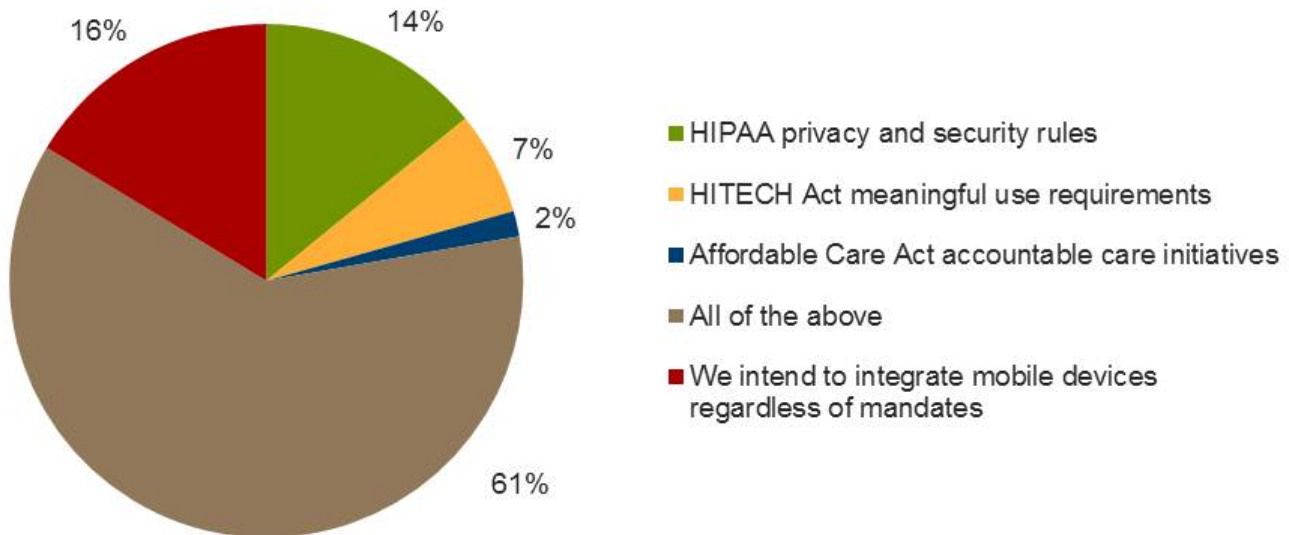
But disruption isn't all bad, according to David Edelheit, who sees both sides benefitting from a BYOD strategy and opportunity for business benefits in the future.

"I actually think it's both a want and a need. To the employer, they are seeing this as an opportunity to start lowering costs," said Edelheit, principal with New York-based consulting group Pricewaterhouse Coopers. He added that employers also foresee productivity gains from employees having their personal device be their

work device as well. "The employees are seeing it as an advantage that they can now have the latest and greatest technology."

Which two areas are your top device priorities?

Which health care mandate most impacts your mobile health integration plan?

- HIPAA privacy and security rules
- HITECH Act meaningful use requirements
- Affordable Care Act accountable care initiatives
- All of the above
- We intend to integrate mobile devices regardless of mandates

Policy continues to drive adoption

Federal initiatives factor high into health care executives' mobile health integration plans, with no one mandate holding greater significance over others. Toward the goal of fostering mobile development, the National Broadband Plan spells out how Congress, federal agencies and state and local governments can promote the deployment of broadband infrastructure and the adoption of broadband-enabled technologies. The Federal Communications Commission estimates that such technology could reduce health care costs by $700 billion in the decades ahead.

Traditionally, the FCC's role in health IT would be limited to network connectivity. However, the National Broadband Plan's recommendations for health care go well beyond connectivity to address the challenges involved in persuading providers to use health IT. The

commission is expanding its purview in this realm because, in its own words, "it is the ecosystem of networks, applications, devices and individual actions that drives value, not just the network itself."

The federal government sees widespread broadband deployment, coupled with the adoption of health IT, as key to facilitating three objectives in health care reform:
- It would make the collection and exchange of health related data more efficient by facilitating the use of EHR technology.
- It would support video consultation, remote patient monitoring and other aspects of telemedicine to improve rural health care.
- It would lay the groundwork for future innovation.

Which operating systems do you use?
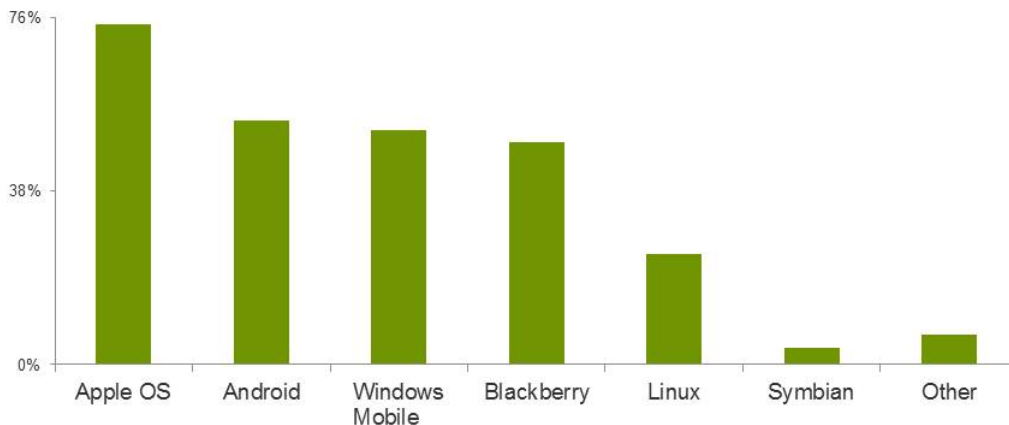
If your organization wanted to standardize OS use, which top two are your preference?
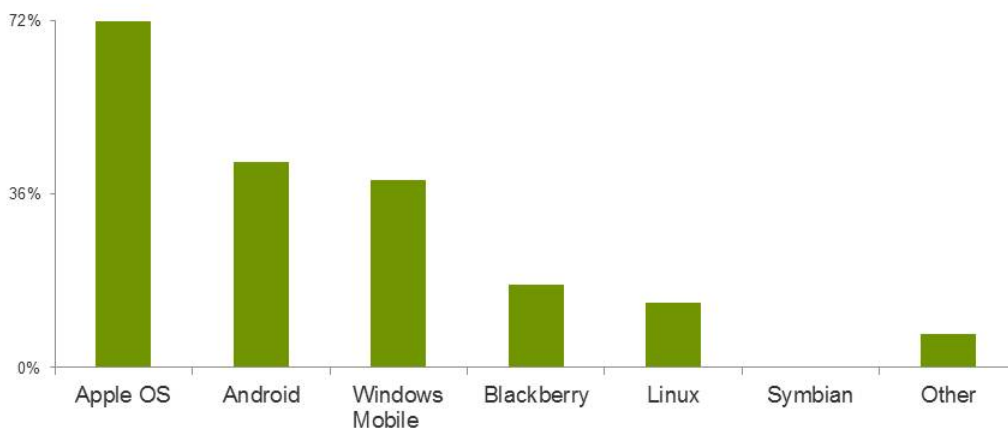
Apple maintains dominance

While Apple Inc. may enjoy a head start in some hospitals, Google Inc. Android smartphones and tablets and the Research in Motion Ltd. BlackBerry often contribute to the mix as well. Moreover, if IT shops don't formally provide handsets and tablets, chances are physicians or other staff members will bring them on the job. The number of mobile options hitting the market -- including hybrid "phablet" form factors such as the Samsung Electronics Co. Galaxy Note -- will further cement a multi-platform environment.

"Innovation is happening at an exploding rate in…consumer electronics," noted Gregg Malkary, managing director of Spyglass Consulting Group, which focuses on mobile technologies in health care. "Hospital executives and doctors have the

devices, so there is more pressure to support the next-generation mobile devices."

Mobile device management often crops up in discussions of asserting control over the mobile device population. Products coordinate tasks ranging from application distribution to the remote wiping of wayward devices.

Another take on mobile device support focuses on data rather than devices themselves. This approach, sometimes referred to as containerization, isolates business data and applications from personal data, applications, and cloud services. Organizations may use containerization to lend a degree of control to bring your own device (BYOD)

Apple, cont.

initiatives.

Shands Healthcare, a health system in Florida that operates hospitals and outpatient rehabilitation centers, takes another approach to protecting data -- access to the hospital's electronic medical record system goes solely through a Citrix Systems Inc. gateway.

"I prefer not to have data kept on the devices themselves," said Kari Cassel, senior vice president and CIO at Shands Healthcare.

The health system also employs device encryption as an added layer of mobile security. Cassel said Shands Healthcare requires encryption on laptops, for instance, and is further "working through the issue of requiring any handheld mobile device to be encrypted as well."

Indeed, security systems alone can only do so much. Health care executives emphasized security policies and user education, in addition to technology, as key components of a mobile strategy. The fast-paced world of mobile technology will keep those efforts in a state of flux.

Devices: Security, integration management top industry concerns

Mobile populations are rapidly shifting onto consumer smart phones and tablets that support a multitude of medical applications. According to Manhattan Research, more than 80% of U.S. physicians already own smartphones; about half use them for patient care, education or administration.

As this mobility grows, health care IT and network administrators are being challenged to manage associated risks. These include the following:

• Breaches of protected health information (PHI) due to smartphone/tablet loss or theft.

• Unauthorized access to health care data sent over the air or at rest.

• Inability to ensure or prove regulatory compliance after an incident.

• Insufficient lifecycle control over devices with access to sensitive data.

• Smartphone/tablet compromise by malicious apps and SMS phishing.

The Aberdeen Group estimates that failure to address risks in organizations subject to HIPAA regulations can result in unencrypted data losses at a median cost of $147,485 per lapse.

Health care organizations can manage risks -- including those posed by employee-owned smartphones and tablets -- by implementing four mobile security best practices: using a mobile device manager and device access controls; encrypting and later wiping phones and tablets of data.

Which two areas are your top device integration issues?
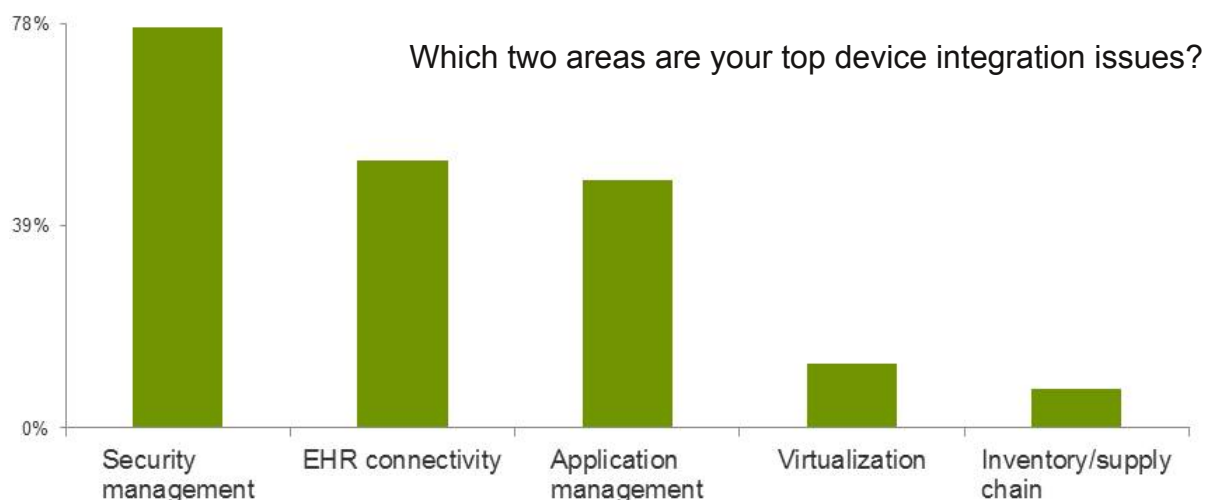
Devices management techniques to protect against theft

Security is the top concern among health IT experts implementing more device hardware and software in their organizations. Health care providers tuning up their HIPAA compliance programs should focus on known vulnerabilities. The biggest culprits are laptops (24%), paper records (22%), desktop computers (16%) and portable computer workstations (14%). To a lesser extent, electronic medical record systems, servers and email messages also are vulnerabilities, according to health care data breach statistics since more stringent HIPAA enforcements began in 2009.

## What technologies are you employing for device management?
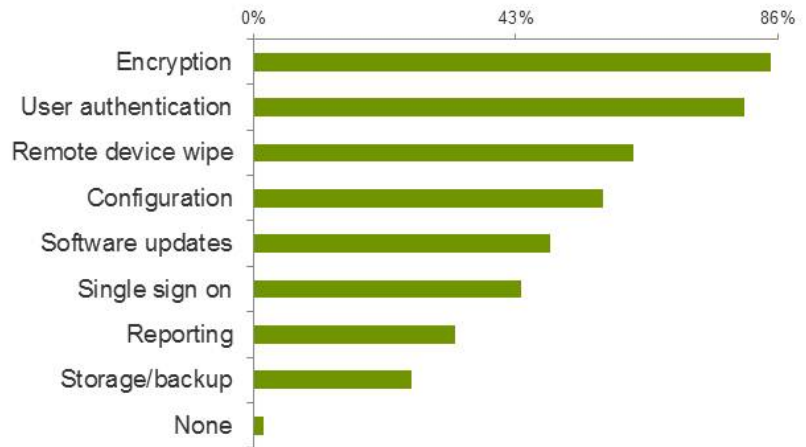
As mobile health technology advances, such devices as smartphones and tablet PCs, many of which fit into coat pockets, will create more -- and more attractive -- targets for thieves. When these devices store patient data locally, theft equals data breach.

Using two-factor, bidirectional authentication could help mitigate fallout from potential thefts. An example of this type of authentication would be checking a password and token at both the device level and the server level. Doing this confirms that the person trying to log onto that Web link to retrieve a message is the actual patient. This authentication method also offers an additional safeguard before HIPAA-protected information is pushed to a smartphone.

The importance of security to health IT organization can't be overstated, according to professionals. "Privacy is what you're trying to achieve," said Herbert Lin, chief scientist at the National Research Council's Computer Science and Telecommunications Board. "Security is what you do to get that."

What infrastructure considerations are components of your integration plan?
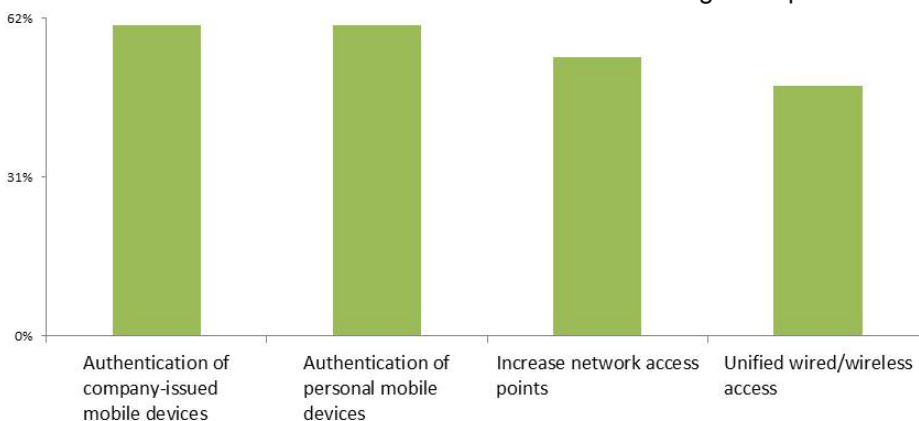
The accidental cloud:

How one hospital's virtualization project became its private cloud model

For the most part health care providers have not embraced cloud storage services, despite expanding needs for data storage from increasing EHR adoption and compliance with state and federal records-retention rules that applied to paper and now also apply to their electronic counterparts. That is changing, according to some experts.

And sometimes it is changing accidentally.

Over time, the more advanced

Please rate the following cloud initiatives as they relate to your mobile health integration plan.

-- and consolidated -- an organization's virtual environment gets, the closer it gets to creating a private cloud.

That's what happened at Beth Israel Deaconess Medical Center. A few years ago, as part of an eClinicalWorks LLC electronic health record (EHR) deployment to roughly 200 affiliated ambulatory physicians, the hospital virtualized servers on VMware Inc. technology. One at a time, one virtual server -- including the EHR software integrated with a practice management app and billing system -- was deployed to each practice. The hospital originally considered building a server farm for the physicians, but opted for a virtualized model instead.

> **Over time, the more advanced an organization's virtual environment gets, the closer it gets to creating a private cloud.**
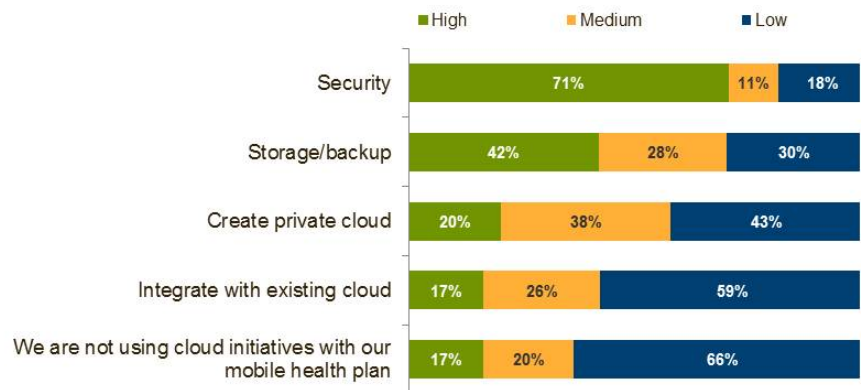
In those days before meaningful use, adopting an EHR system was optional -- so building a server farm would have been tantamount to constructing a grand hotel and risking low occupancy if, for example, only 50 physicians bought in, said Bill Gillis, eHealth technical director at Boston-based Beth Israel Deaconess. Virtualizing made it more like a housing development in which the hospital's IT staff built little houses as needed, he said.

A couple of years into the project, Beth Israel Deaconess realized it inadvertently had built one of the first private clouds in health care. As innovative as it was coincidental, Gillis said, the hospital's virtualized private cloud model has many attributes that are attractive to other health care networks looking for a model from which to crib their own EHR infrastructure: It's scalable but it doesn't require a huge hardware outlay or data center footprint at the start.

"Lo and behold, apparently we built a private cloud. At least that's what everybody told us," Gillis said. "We didn't go into this thinking, 'Hey, let's build a cloud.' It was, 'We want a subscription-type service,'" in which physicians could get rid of their homegrown technology and tap into Beth Israel Deaconess' infrastructure with only an Internet connection and their desktop machines.

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