HiMSS *Analytics*®

3rd Annual HIMSS Analytics Mobile Survey

February 26, 2014

2013 HIMSS Analytics Mobile Technology Survey
Final Report
February 26, 2014

For the first time in 2011, HIMSS explored the use of mobile technology to improve access to the information needed on a day-to-day basis in a healthcare setting. The study was designed to collect information on an array of items related to mobile device usage. This year, to more closely align with the HIMSS strategic initiatives in the area of mobile technology, the questions in this year's study were modified to closely align with the mHIMSS Roadmap, originally released at the 2012 mHealth Summit and updated in 2013[1].

This strategic framework is a guideline for providers to implement mobile and wireless technologies. The Roadmap highlights six key areas of focus:

- New Care Models
- Technology
- ROI/Payment
- Legal & Policy
- Standards & Interoperability
- Privacy & Security

In addition, to fully explore this shift in questions, the audience to this study was broadened to include a wider variety of IT and clinical personnel. As such, results to last year's study will be presented if applicable, but they should be interpreted with caution.

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[1] mHIMSS Roadmap. http://www.himss.org/mobilehealthit/roadmap

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1. Executive Summary

Over the past several years, the United States government has taken a more active role in the adoption of technology in the healthcare industry, including the use of mobile technology. In 2010, the Federal Communications Commission (FCC) announced the country's first National Broadband Plan[2], which identified ways in which expanded access to broadband technology has the potential to foster innovation and enable a better healthcare system. That same year, the FCC and the U.S. Food and Drug Administration (FDA) entered into a partnership to advance investment in wirelessly-enabled telehealth devices[3]. In June 2012, the FCC assembled a group of the nation's leading wireless healthcare technology experts to assess the opportunities and challenges facing the adoption of wireless health technologies and offer recommendations for the government to move forward to promote adoption of mobile technology[4].

The federal government's interest and efforts in mHealth, particularly changes to HIPAA and Meaningful Use are, impacting the way in which healthcare organizations are implementing mHealth solutions. This is clearly evident in the findings from the 3rd Annual HIMSS Analytics Mobile Technology Survey, particularly as it relates provision of solutions to patients and consumers. To illustrate, slightly more than one-third (35 percent) of the 170 respondents participating in the study indicated that their organization offered apps for patient/consumer use. This finding is up from 13 percent a year ago. Respondents also reported that their organization offers other mobile tools for patient/consumer use, including access to patient portals, telehealth services and remote monitoring devices to patients.

The HIMSS Analytics Mobile Technology Survey covers a wide array of topics impacting the use of mobile technologies in healthcare organizations. Key findings from the study revealed that nearly all of the survey respondents supply mobile technology to clinicians, most often laptops and workstations on wheels. However, use of tablet computers is expected to increase in the future. The majority of respondents, 83 percent, reported that physicians use mobile technology to provide patient care. Clinicians are most likely to use mobile technology to either look up patient information or looking up non-PHI health information.

Other Key survey results include:

Legal & Policy

- **Mobile Technology Policy:** More than half of respondents (59 percent) reported their organization has a mobile technology plan in place. Another 29 percent reported their organization is presently developing a mobile technology plan. Securing data is a key component of organizational policy.

Privacy & Security

- **Means for Securing Data on Mobile Devices:** Most respondents offer a variety of methods for securing data on mobile devices at their organizations. Passwords are the most widespread security device in place.

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[2] National Broadband Plan webpage. http://www.broadband.gov/plan/
[3] FCC, FDA Partner To Advance Telehealth. InformationWeek, Healthcare.
http://www.informationweek.com/healthcare/leadership/fcc-fda-partner-to-advance-telehealth/226300045
[4] FCC to Act On Key mHEALTH Task Force Recommendations to Spur Adoption of Wireless Health Technology
http://www.fcc.gov/document/fact-sheet-mhealth-task-force-recommendations

New Care Models

- **Pharmacy Management:** For the second consecutive year, respondents reported that they would be most likely to leverage mobile technology for pharmacy management, including medication reminders or medication reconciliation.

Technology

- **Development of Apps:** Respondents reported that apps within their organization were most likely to be developed by a third party or by HIT vendors. Half of respondents reported that they would expand their use of apps in the future.

- **Impact of Mobile Technology on Patient Care:** Slightly more than one-third of respondents indicated that mobile technology will substantially or dramatically impact patient care in the future. This is a decrease from the two-thirds that reported this to be the case in 2012.

ROI/Payment

- **Return on Investment:** Approximately half of respondents formally measure return on investment related to their investment in mobile technology.

- **Total Cost of Ownership:** One-third of respondents evaluate the total cost of ownership as it relates to their mobile strategy.

Standards & Interoperability

- **Integration of Mobile Devices and Electronic Medical Records:** Nearly one-quarter of respondents (22 percent) indicated that at least three-quarters of the data captured by mobile devices was integrated into the organization's EMR.

- **Mechanisms for Accessing Data from Clinical System via Mobile Device:** The majority of respondents reported that their organization offers clinicians the ability to access their key clinical system via a mobile device. Clinicians are most likely to do this via Internet access using a VPN.

- **Alerts from Remote Monitoring Devices:** More than half of respondents indicated that alerts/notifications that are from remote monitoring devices are via an alert in their EMR/clinical system.

Barriers and Benefits

- **Benefits of Using Mobile Technology:** Respondents were most likely to identify improved access to patient information and the ability to view data from a remote location as key benefits to the use of mobile technology at their organizations.

- **Barriers to Mobile Technology Use:** Lack of funding is widely identified by survey respondents as a barrier to the use of mobile technology at their organization.

2. Profile of Survey Respondents

A total of 170 individuals completed this survey. Data was collected via a web-based survey in December 2013 and January 2014. Individuals representing a wide variety of positions at their healthcare organizations, including IT executives, clinicians were sent e-mail invitations to participate in this study.

In order to have the opportunity to participate in this research, respondents had to play a role in their organizations mobile environment. Most respondents answered "yes" to at least one of the questions below.

- I am responsible for developing the organization's policy on mobile technology (27 percent);
- I am a member of a committee that is responsible for developing the organization's policy on mobile technology (38 percent); or
- I am responsible for ensuring that our mobile technology is implemented and operational (22 percent).

However, because the survey population was more diverse than in previous surveys, another 14 percent of respondents indicated their role as "other". As long as their role ensured they had an awareness of the mobile environment at their organization, their responses were included in the study. Other responsibilities identified by respondents included responsibility for cabling and connectivity, acting as an internal analyst, and supporting apps that run on mobile technologies.

Individuals indicating they played no role in the utilization of mobile technology at their organization were excluded from the data collection process. These individuals are not included in the 170 responses on which the analysis in this report is based.

Nearly two-thirds of respondents (62 percent) indicated that they were an IT professional. The specific titles identified by the survey respondents are listed below. The remaining 22 percent of respondents included a variety of other executives, informatics professionals and project managers.

Title	Percent
Director of IS/IT	20.00%
Chief Information Officer	15.29%
Staff Level IT/IS Professional	11.76%
Clinician	11.76%
Manager of IS/IT	11.18%
CMIO/CNIO	4.71%
VP of IS/IT	3.53%
Other	21.76%

Table One. Respondent Titles

One-quarter (26 percent) of respondents reported working at the corporate offices of a healthcare organization and another 21 percent reported working at a hospital that is part of a delivery system. Seventeen (17) percent of respondents work at a stand-alone hospital and 14 percent of respondents work for a medical practice/ambulatory facility. The remaining respondents work for a variety of other organizations such as nursing homes, military care facilities, government healthcare providers, insurance companies

and pharmacies. Compared to previous studies, this sample includes a higher percent of respondents from non-hospital based organizations.

Among the respondents working for a hospital-based organization, nearly two-thirds (61 percent) indicated their organization included at least one community hospital and nearly half included an academic medical center (46 percent). More than one-third (38 percent) have at least one general medical/surgical facility as part of their organization, while 33 percent reported that a critical access hospital was part of their organization. Twenty percent (20) of respondents noted their organization included a specialty hospital, such as a pediatric hospital or cardiology hospital. Twenty (20) percent also characterized themselves as a rural hospital.

Among those working for medical practices, more than half of respondents (54 percent) classified their organization as a specialty care facility. Approximately 40 percent characterized themselves as a primary care facility. The remaining eight percent identified themselves as "other".

Again, in order to more accurately reflect the concepts included in the mHIMSS roadmap, the audience to this study was broadened to include a wider variety of IT and clinical personnel. Questions were also modified and added. As such, results to last year's study will be presented if applicable, but should be interpreted with caution.

All respondents were based in the United States.

3. Mobile Technology Environment

The wide use of mobile devices by clinicians in healthcare organizations supports the high priority organizations have for the deployment of mobile devices.

Using a scale of one to seven, where one is "not at all a priority" and seven is a "high priority", respondents were asked to identify to what extent deployment of mobile devices is a priority at their organization. The average score identified was 5.25. Indeed, three-quarters of the respondents considered this to be a higher priority in their organization (response options 5, 6, and 7 collapsed together), with 44 percent of respondents identified this to be a top priority[5] at their organization. This question was not asked in the 2012 study.

Respondents were asked the percent of patient care at their organization that is facilitated by the use of mobile technology. This question was broken out across a variety of types of clinician groups. Respondents were most likely (83 percent) to indicate that physicians at their organization use mobile technology to facilitate at least some patient care. Nearly three-quarters of respondents (71 percent) of respondents also indicated that nurses used mobile technology to facilitate at least some patient care.

However, in terms of the volume of patient care facilitated by mobile technology, respondents note that home health workers were most likely to provide at least 75 percent of care via mobile technology. Eighteen (18) percent of respondents indicated that the home health workers at their organization facilitate at least 75 patient care via mobile device. In comparison, 13 percent reported this was the case for nurses and 12 percent noted this was the case for physicians.

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[5] Considered a high priority if the respondent answered this question with a six or seven.

Respondents were also asked to identify their organization's stance on supporting mobile devices. One-third of respondents (31 percent) indicated that they supported only devices provided by their organization and another 21 percent reported supporting only personal devices used for business purposes. Nearly one-quarter (22 percent) reported that they supported devices of both types. Last year, nearly half of respondents indicated they supported both type of devices.

Additionally, using a scale of one to seven, where one is "not at all mature" and seven is "highly mature", respondents were asked to identify the level of maturity of their mobile technology environment. On average, respondents recorded a score of 3.95, which is higher than the 3.33 reported in the 2012 study. While 34 percent of respondents were favorable towards their organization's level of maturity (response options 5, 6, and 7 combined), only 16 percent of respondents indicated that they were a highly mature[6] organization.

4. Legal and Policy

More than half of respondents reported having a mobile technology policy in place at this time, with roughly another 30 percent currently developing one. Respondents' policies were most likely to include provisions to ensure that data accessed on mobile devices was secured.

The current federal landscape includes several policies and initiatives that have a direct impact on the mHealth environment. Respondents tended to consider "changes to HIPAA" as having the greatest impact on how mHealth is implemented[7]. The table below indicates the average scores for each of the items tested for in the study.

Federal Initiative	Average
Changes to HIPAA	5.55
Meaningful Use	5.10
FTC Privacy Guidelines	4.77
Affordable Care Act	4.39
New FDA Guidance	4.35
FCC Regulations	4.34

Table Two. Impact of Federal Initiatives on Mobile Technology Implementation

In addition to understanding the impact of federal policies, respondents were also asked to identify whether or not their organization currently has a mobile technology policy. More than half of respondents (59 percent) indicated their organization has a mobile technology plan in place, a decrease from the 68 percent of respondents who reported this to be the case in 2012. Another 29 percent are presently developing a policy. Only four percent of respondents noted their organization has no plans to develop a mobile technology policy a finding consistent with what was reported in 2012. Eight percent were unsure about the existence of a mobile technology policy.

Respondents with a policy in place were asked to identify what items were covered by that policy. Respondents continue to indicate that device security is a key component of their organizations policies. More specifically, 84 percent of respondents noted that

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[6] Considered highly mature if the respondent answered this question with a six or seven.
[7] Using a scale of one to seven, where one is no impact and seven is high degree of impact.

their policy outlines the process for managing lost or stolen devices and another 80 percent indicated that their organization addresses the means by which devices should be secured. Means by which devices were secured was the most frequently identified issue in both 2011 and 2012. Process for managing lost or stolen devices was added to the study for the first time in the 2013 study.

Rounding out the top three items included in the mobile technology policy is the use of personal devices for work purposes. This was also in the top three in the 2012 study. Respondents continue to be least likely to indicate that their mobile device policies contain information regarding brand and/or version of a device; this was selected by 47 percent of respondents. This item was also least likely to be identified in the 2012 study.

Among the respondents that reported that their organizations are presently developing a mobile technology policy, approximately 41 percent expect that their policy will be in place within the next six months. Another third (35 percent) expect their policy will be in place in the next six months to year and ten percent noted that it would be one to two years before the policy was in place. Six percent noted that the timeframe for development was undetermined.

As with those that already have a plan in place, more than 80 percent of respondents planning a policy expect that guidelines on the means of securing devices will be included in the policy. A full list of the areas being considered is listed below.

Items Included in Mobile Technology Policy	Percent
Means of securing devices (i.e. storing information on device)	81.63%
Use of personal devices for clinical/work use	77.55%
Management of lost/stolen devices	71.43%
Ability to access data from remote locations	71.43%
Types of apps approved for use	63.27%
Brand/version of device	44.90%
Don't Know	12.24%
Other	0.00%

Table Three. Items Included in Future Security Policies

5. Privacy and Security

Most respondents offer multiple methods for securing data on mobile devices at their organizations with passwords being the most widespread security approach in place.

Use of security mechanisms to manage the privacy and security of data on mobile devices used to access clinical information is nearly universal (95 percent) among respondents. This is consistent to what was reported in 2012. Three-quarters of all respondents (78 percent) use multiple methods for securing the data on mobile devices throughout their organization. This represents a decrease from the 89 percent of respondents that reported this to be the case in 2012.

Among respondents reporting use of a security measure to protect data, password protection was most frequently identified approach (94 percent). This was also the most frequently used security approach in the 2012 study. Rounding out the top three are data encryption measures (71 percent) and remote wipe capability (69 percent). These items

were also in last year's top three. The table below shows the data from all responses tested in this study.

Means of Securing Data	Percent
Password protected	93.79%
Data encryption	70.81%
Remote wipe capability	68.94%
Automated data disintegration	15.53%
Biometric authentication	8.70%
Other	4.35%

Table Four. Measures Used to Secure Mobile Devices

Respondents were also asked to identify whether or not clinicians at their organizations used devices that retain patient-specific personal health information. While half of respondents (53 percent) reported that devices at their organization did not retain this type of information, nearly one-third (29 percent) indicated that the mobile devices used by clinicians do retain this information. While these numbers differ from what was reported in 2012, when 83 percent of respondents noted that the mobile devices in use by clinicians do not retain patient-specific personal health information, they are more consistent with what was reported in 2011.

Finally, respondents were asked to identify whether or not their organization had taken additional steps to prevent risk of introduction of malware into medical devices. Approximately half of respondents (52 percent) indicated that they had. This question was not asked in previous surveys.

6. NEW CARE MODELS

Clinicians are most likely to use mobile technology to look up patient information or reference information like clinical guidelines. Respondents were also most likely to indicate that their organization leveraged mobile technology for pharmacy management.

Respondents were also asked to identify the purposes for which clinicians at their organizations use mobile technology. Because this question last year referred specifically to the use of apps, no year-over-year comparison will be provided. Respondents were most likely (69 percent) to indicate that they used mobile technology to view patient information such as a lab result or digital image. Approximately two-thirds (65 percent) also indicated that they used mbile technology to look up non-PHI information, such as clinical guidelines.

Respondents were less likely to report that clinicians use mobile technology to facilitate remote patient monitoring. This was identified by 20 percent of respondents. Table Five below outlines the areas in which respondents noted that clinicians use apps.

Use of Mobile Technologies by Clinicians	Percent
View patient information	69.41%
Look up non-PHI health information	64.71%
Use for education/training purposes	48.82%
Clinical notifications	41.76%
Secure communications regarding patients	39.41%
Tracking worklists	38.82%
Collect data at the bedside	36.47%
E-prescribing	32.94%
Use bar code reader on mobile device	28.24%
Monitor data from medical devices	25.88%
Capture visual representation of patient data	25.29%
Telehealth	24.71%
Refer patients to the use of apps for health-related items	23.53%
Management of chronic care diseases	22.94%
Analysis of patient data	21.18%
Facilitate remote patient monitoring	20.00%
None of the above	7.65%

Table Five. Use of Mobile Technology for Patient Care

Additionally, respondents were asked to identify the extent to which organizations leveraged technology to impact patient care. Using a scale of one to seven, where one is no benefit and seven is high degree of benefit, respondents were most likely to indicate that mobile technology was leveraged for pharmacy management, which includes tasks such as medication reminders and medication reconciliation. This item received an average score of 3.73. This item also received the highest average score in 2012, at 4.10.

The lowest average score was recorded for pharma research validation, which includes items such as clinical trials recruitment or execution of clinical trials. This item received an average score of 2.63. This also received the lowest score in 2012, at 2.50

A full list of the items tested in this study is included in the table below.

Areas in Which Mobile Technology Is Leveraged to Impact Care	Average
Pharmacy Management	3.73
Preventative Support Care	3.48
Care Continuum	3.48
Telehealth Interventions	3.42
Close Gap in Providing Care for Health Disparities	3.40
Resource Utilization	3.19
Facilitate Discharge Management	3.04
Pharma Research Validation	2.63

Table Six. Benefit of Mobile Technology on Patient Care

7. Technology

While, laptops computers and computers/workstations on wheels (COWs/WOWs) continue to be the most widely used mobile technologies, use of tablet computers is projected to grow in the future. Furthermore, the number of healthcare organizations that are providing apps to consumers continues to increase.

Devices Provided to Clinicians

In order to facilitate the provision of care using mobile technology, the majority of respondents (95 percent) reported their organizations supply clinicians with access to mobile devices. For the third consecutive year, laptop computers were most widely reported as the technology that was provided to clinicians. The list below identifies the most common technologies organizations provide clinicians with to support their day-to-day activities:

- Laptop Computers – 87 percent;
- Computers/Workstations on Wheels – 81 percent;
- Smart Phones – 69 percent;
- Pagers – 67 percent;
- Cellular Phones – 56 percent;
- Table Computers NOT Designed for Healthcare – 44 percent; and
- Tablet Computers Designed for Healthcare – 43 percent.

Respondents were also asked to identify the areas in which they would either add to or expand the use of mobile devices at their organizations. Less than half of respondents (43 percent) indicated plans to provide clinicians with additional tools in the future. Purchases among these respondents are noted below.

- Tablet Computers Designed for Healthcare – 63 percent;
- Table Computers NOT Designed for Healthcare – 49 percent;
- Smart Phones – 30 percent;
- Laptop Computers – 15 percent;
- Computers/Workstations on Wheels – 14 percent;
- Cellular Phones – 14 percent; and
- Pagers – 8 percent.

Respondents were also asked to identify the type of apps clinicians used at their organization; three-quarters of respondents reported that clinicians at their organization use apps. These respondents were most likely to indicate that the apps used by clinicians were developed by third parties (77 percent). This was also the most frequently type of app used in the 2012 study. Additionally, more than half of respondents (52 percent) also indicated that clinicians used apps developed by the organization's HIT vendor and one-third of respondents (32 percent) indicated that clinicians used apps developed internally.

More than half of respondents reported that their organization plans to update or launch new apps in the next year. Among the respondents who reported plans in this area, nearly two-thirds (64 percent) reported they would update an existing app. Another 55

percent reported that their organization would launch a new app that was developed externally and 52 percent will launch a new app that was developed internally.

Patients/Consumers

Respondents were also asked about their use of apps for patients/consumers. One-third of respondents (35 percent) indicated that their organization supplies at least one app for patient/consumer use. The remaining respondents either reported that they do not provide this (59 percent) or do not know (seven percent).

Among those who do provide apps for patient use, slightly more than half (56 percent) provide a single type of app. The specific types of apps made available to patients are identified below.

Types of Apps Made Available to Patients/Consumers	Percent
Monitor Chronic Conditions	52.54%
Monitor Physical Activity	38.98%
Monitor Nutrition Intake	35.59%
Portal/Organization EMR	18.64%

Table Seven. Apps Provided for Patient/Consumer Use

This question was expanded from what was reported in the 2012 study. In 2012, respondents were asked to identify whether or not their organization has created an app for patient/consumer use. Thirteen (13) percent of respondents reported that they created an app for patient/consumer use.

Additionally, respondents were asked identify which of several tools their organization uses to engage patients and consumers in their healthcare today. Two-thirds of respondents (62 percent) indicated that they used at least one of the tools identified in this research. Among these respondents, the tool most likely to be provided to patients and consumers were app-enabled patient portals (56 percent). More than half of respondents reported that their organization offers this to patients and/or consumers. At least half of respondents (52 percent) also noted that they offer telehealth services. A complete list of tools healthcare organizations use to engage patients and/or consumers is listed below. This question was not asked in the 2012 study.

Tool	Percent
App-Enabled Patient Portals	55.66%
Telehealth Services	51.89%
Provide Remote Monitoring Devices	35.85%
Prescribing Apps	22.64%
Discharge Kit with Mobile Technology	13.21%
Other Apps	5.66%

Table Eight. Tools Used to Engage Patients/Consumers in their Healthcare

With regard to tools that will be offered in the future, approximately two-thirds (67 percent) will add to or expand upon the tools that are presently offered to engage patients and/or consumers. Respondents were most likely to report that they would expand or add to their use of app-enabled patient portals. Nearly three-quarters of

respondents (71 percent) with plans reported future plans in this area. Offering telehealth services was identified by 46 percent of respondents. A complete list of the areas in which respondents have plans is listed in the table below.

Tools Used to Engage Patients/Consumers in Healthcare	Percent
App Enabled Patient Portals	70.18%
Telehealth Services	45.61%
Provide Remote Monitoring Devices	38.60%
Prescribing Apps	31.58%
Don't Know	28.95%
Discharge Kit with Mobile Technology	28.07%
Other Apps	4.39%
None of the Above	21.05%
Don't Know	28.95%

Table Nine. Tools Used to Engage Patients/Consumers in their Healthcare in the Future

Lastly, respondents were asked if they had created an "app marketplace" to distribute apps to providers and consumers. Eight percent of respondents noted that they have this type of marketplace at this time, while another 22 percent are considering the development of this type of marketplace in the future. A majority (45 percent) reported that they do not offer this, nor do they have plans to offer in the future. These numbers represent an increase from what was reported in 2012.

Impact of Mobile Technology on Patient Care

Finally, respondents were asked to identify the extent to which mobile technology has changed the way in which patient care was provided at their organization. Nearly half of respondents (45 percent) indicated that mobile technology has had only a minimal impact on the way in which healthcare is provided at their organization. In contrast, one-third (34 percent) identified a substantial impact and four percent note a dramatic impact. Ten percent do not believe that mobile technology has changed the way that healthcare was delivered at their organization.

In 2012, respondents were asked to identify how mobile technology would change healthcare delivery in the future. Two-thirds of respondents in the 2012 study believed that mobile technology will either substantially impact or dramatically change the delivery of healthcare in the future.

8. Standards and Interoperability

Only 23 percent of respondents indicated that a large percent of their mobile device data is integrated into their EMR. Respondents are most likely to use wireless LANs to integrate mobile devices into their organization's networks. Furthermore, clinicians are most likely to accessing clinical information via mobile devices using a VPN over an Internet.

Respondents were asked to identify the extent to which data captured via a mobile device was integrated into their organization's electronic medical record (EMR). Approximately one-quarter of respondents (23 percent) indicated that at least 75 percent of data captured by mobile devices was integrated into the organization's EMR. A similar percent (22 percent) indicated that none of the data captured by mobile devices was integrated into their organization's EMR and 27 percent indicated that less than 25 percent of data was integrated into the EMR. In 2012, 22 percent of respondents noted that all data was integrated into the EMR, while 21 percent indicated that none of the data was integrated into the EMR.

With regard to the communications standards used to integrate mobile devices into your organization's network. Two-thirds of respondents (65 percent) indicated that they used a wireless LAN (WLAN) to integrate mobile devices into their network. One-third of respondents (35 percent) indicated that their organization used digital cellular communications, such as GSM, EDGE or 3G/4G. A complete list of the communications standards tested in this study is included below. This data was not collected in 2012.

Communications Standard	Percent
Wireless LAN	64.71%
Digital Cellular Communications	34.71%
Short Message Service (SMS)	22.35%
Body Area / Personal Area Networks	13.53%
Near Field Communication	8.82%
No Mobile Devices	3.53%
Don't Know	24.12%
Other	0.00%

Table Ten. Communications Standards Used to Integrate Mobile Devices into Organization's Network

In addition, respondents were asked to identify the means by which clinicians access information from their healthcare organization's key clinical system via mobile devices. More than half of respondents (52 percent) indicated that they log in via Internet using a VPN. One third (34 percent) noted that clinicians at their organization use a vendor's app to access key clinical systems via mobile devices, and 12 percent noted that clinicians used an app that was developed in house. Six percent of respondents indicated that clinicians cannot access key clinical data via mobile devices. This question was not asked in 2012.

The final question asked in this area was regarding how clinicians receive alerts or notifications from remote monitoring devices. Approximately half of respondents (57 percent) indicated that their organization uses remote monitoring devices. These respondents were most likely to report (58 percent) that clinicians received alerts and notifications from their remote monitoring device as a message/alert posted in the EMR or clinical system. A full list of responses is listed below.

Method of Receiving Clinical Notifications	Percent
This information is posted as an alert in the EMR/clinical system	57.9%
This information is sent directly to their mobile device via SMS	44.2%
This information is sent as an e-mail	41.1%
This information is sent via another individual	29.5%
Don't Know	32.6%

Table 11. Mechanisms for Alerting Clinicians of Notifications from Remote Monitoring Devices

9. Return on Investment/Total Cost of Ownership

Approximately half of respondents (48 percent) indicated that their organization formally measures return on investment (ROI) that resulted from an investment in mobile technology. One-third of respondents indicated they measure total cost of ownership.

A new series of questions was added to the study this surrounding return on investment and total cost of ownership of mobile devices

Return on Investment

Approximately half of respondents (48 percent) indicated that their organization has formally measured return on investment (ROI) that resulted from an investment in mobile technology. Among these respondents, 83 percent measure ROI across multiple areas. Respondents were most likely to report that they measured ROI in the area of improved efficiencies. They were least likely to indicate that they measured ROI in the area of improved billing. A full list of areas in which respondents reported that they measure ROI are listed in the table below.

Items Included in ROI Assessment	Percent
Improved Efficiencies	54.88%
Cost Savings	53.66%
Improved Clinician Satisfaction	53.66%
Improved Patient Satisfaction	52.44%
Patient Safety	37.80%
Revenue Generation	32.93%
Improved Billing	32.93%

Table 12. Areas in Which ROI is Measured

Respondents who reported that their organization does not demonstrate ROI in any area identified above at this time were asked to indicate the areas in which they anticipated demonstrating ROI in the future. Respondents were most likely to anticipate they would demonstrate ROI with respect to improved clinician satisfaction; this was identified by 49 percent of respondents. Rounding out the top three areas for expected demonstration of ROI were improved efficiencies (47 percent) and improved patient satisfaction (46 percent). Respondents were least likely to note that they would demonstrate ROI in revenue generation in the future (15 percent). Ten percent of respondents do not believe that they will demonstrate ROI in any of these areas in the future.

Total Cost of Ownership

Respondents were also asked to indicate if they evaluated the total cost of ownership as it related to their mobile strategy. One-third of respondents (36 percent) indicated that they measured total cost of ownership. Another third (37 percent) do not measure this, while 28 percent were not sure of their organization's stance in this area.

Those respondents that measure total cost of ownership were asked to identify the variables that they take into consideration in this measurement. More than half (59 percent) indicated they take more than seven items into consideration when measuring total cost of ownership.

Nearly all respondents (95 percent) indicated that reported that they software license costs in their TCO strategy. At least 90 percent of respondents also include initial purchase of the device when they evaluate total cost of ownership. Respondents were least likely to report that they include the costs of consultants in their total cost of ownership assessment. A full list of the items measured is included in the table below.

Items Included in Total Cost of Ownership	Percent
Software License Costs	95.08%
Initial Purchase of Device	90.16%
Maintenance Costs	86.89%
Cost of Replacing Device	75.41%
Staffing/Personnel	72.13%
Third Party Costs	70.49%
Training Costs	65.57%
Networking Considerations	60.66%
Consultants	40.98%

Table 13. Items Evaluated in Total Cost of Ownership

10. Benefits of Mobile Technology Use

Respondents most frequently identified improved access to patient information and improved access to reference information as the key benefits identified by clinicians.

Respondents were asked to identify the benefits that clinicians at their organizations shared with them about the use of mobile technology use. They were most likely to indicate that improved access to view only patient information was of benefit; this was identified by 66 percent of respondents. This was also the top benefit identified in the 2012 study. Rounding out the top three responses were improved access to reference information and ability to view/interact with data from a remote location. Each of these was identified by 59 percent of respondents. Respondents were least likely to indicate additional return on investment was a benefit to using mobile technology. A full list of the benefits areas tested in this research is shown below in Table 14.

Benefit	Percent 2013	Percent 2012
Improved Access to View Only Patient Information	66.47%	82.20%
Improved Access to Reference Information	59.41%	76.10%
Ability to View/Interact with Data from Remote Location	59.41%	72.80%
Ability to Enter/Modify Patient Information	41.76%	59.40%
Ability to Access Clinical Decision Support Tools	38.82%	53.90%
Improved Patient Safety	28.24%	47.20%
Ability to Streamline Number of Devices Used by Clinicians	19.41%	42.80%
Return on Investment or Other Financial Impacts	7.06%	21.10%
No Benefit	1.18%	N/A
Don't Know	13.53%	6.70%

Table 14. Benefits Realized From Use of Mobile Technology

11. Barriers and Concerns to Mobile Technology Use

The biggest barrier to adopting mobile technology is lack of funding. Top clinician concerns include the privacy and security of data and the speed of data access.

Respondents continue to identity lack of funding as the top barrier to the use of mobile technology (56 percent). This was also the top response in 2012. Rounding out the top three barriers are immaturity of vendors on the market (41 percent) and limited incentives for use (39 percent). Relative to other concerns, respondents continue to be less likely to identify inadequate privacy and security solutions as a barrier to use of mobile technology. The percent of respondents identify this as a barrier continues to decrease from a high of 60 percent in the 2011 study.

Respondents were least likely to indicate that technology does not fit into organizational workflow. This was identified by 12 percent of respondents. A full list of barriers is shown in Table 15 below.

Barrier	Percent 2013	Percent 2012
Lack of Funding/Budget	55.88%	71.10%
Immaturity of Vendors/Solutions Available in Market	41.18%	49.49%
Limited Incentives for Use	39.41%	41.70%
Inadequate Privacy/Security	38.24%	42.80%
Lack of Expertise on Staff	32.35%	38.90%
Lack of Standards/Interoperability	32.35%	42.20%
Lack of IT Staff	31.76%	51.70%
Challenges Regarding Wireless Capabilities	31.18%	32.20%
Clinician Resistance to Technology	24.12%	30.00%
Lack of Executive Support	22.35%	18.30%
Doesn't Fit into Workflow	12.35%	18.90%
Don't Know	4.71%	2.80%
No Barrier	1.76%	N/A

Table 15. Barriers to Using Mobile Technology

Respondents were also asked to identify the areas in which clinicians at their organization have expressed concern about the use of mobile technology for patient care. Using a scale of one to seven, where one is "no concern" and seven is a "high degree of concern", respondents were most likely to indicate that clinicians were concerned about the privacy and security of patient data (4.81). They also indicated a fairly high degree of concern about the speed of accessing data (4.62). Respondents were least likely to indicate that devices are not medically durable (3.41) as a concern for clinicians at their organization. Responses were similar to what was reported in 2012. A complete list of concerns tested in the study is included below.

Area of Concern for Clinicians	Average
Privacy/security of data	4.81
Speed of accessing data	4.62
Screen resolution/fidelity	4.24
Ability of IT to support device	4.21
Devices are not medically durable	3.41

Table 16. Barriers to Using Mobile Technology

12. About HIMSS Analytics

HIMSS Analytics collects, analyzes and distributes essential health IT data related to products, costs, metrics, trends and purchase decisions. It delivers quality data and analytical expertise to healthcare delivery organizations, IT companies, governmental entities, financial, pharmaceutical and consulting companies. Visit www.himssanalytics.org.

HIMSS Analytics is a part of HIMSS WorldWide, a cause-based global enterprise that produces health IT thought leadership, education, events, market research and media services around the world. Founded in 1961, HIMSS WorldWide encompasses more than 52,000 individuals, of which more than two-thirds work in healthcare provider, governmental and not-for-profit organizations across the globe, plus over 600 corporations and 250 not-for-profit partner organizations, that share the cause of transforming health and healthcare through the best use of IT. HIMSS WorldWide, headquartered in Chicago, serves the global health IT community with additional offices in the United States, Europe, and Asia.

13. How to Cite This Study

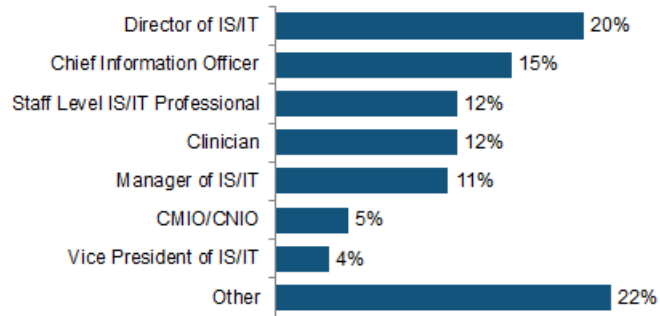Individuals are encouraged to cite this report and any accompanying graphics in printed matter, publications, or any other medium, as long as the information is attributed to the 3rd Annual HIMSS Analytics Mobile Technology Survey.

14. For More Information, Contact:

Joyce Lofstrom
Senior Director, Communications
HIMSS
230 E. Ohio St., #500
Chicago, IL 60611
312-915-9237
jlofstrom@himss.org

Appendix

Participant Profile – Title

Title	Percentage
Director of IS/IT	20%
Chief Information Officer	15%
Staff Level IS/IT Professional	12%
Clinician	12%
Manager of IS/IT	11%
CMIO/CNIO	5%
Vice President of IS/IT	4%
Other	22%

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N=170

Participant Profile – Facility Type

Facility Type	Percentage
Corporate Offices of Healthcare System	26%
Hospital that is Part of Delivery System	21%
Stand Alone Hospital	18%
Ambulatory Facility	14%
Other Provider Organization	9%
Other	12%

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N=170

Participant Profile – Hospital Type

Hospital Type	Percentage
Community Hospital	61%
Academic Medical Center	46%
General Medical/Surgical Facility	38%
Critical Access Hospital	33%
Rural Hospital	21%
Specialty Hospital	21%
Indian Health Services Facility	3%
Military Treatment Facility	2%
Veterans Healthcare Facility	1%

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N=115

Participant Profile – Ambulatory Facility Type

Facility Type	Percentage
Specialty Care	54%
Primary Care	42%
Other	8%
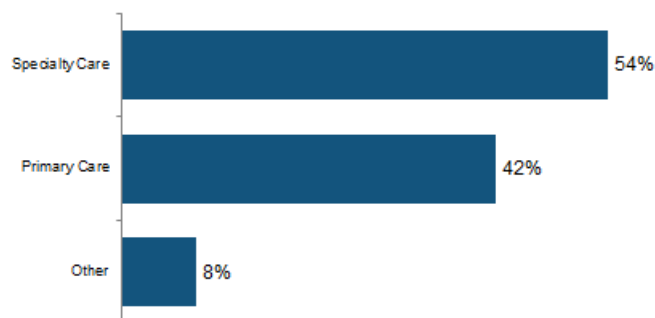
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N=24

Role in Mobile Technology Environment

Role	Percentage
Develop Mobile Policy	27%
Part of Committee that Develops Mobile Policy	38%
Implementing Mobile Technology	22%
Other	14%
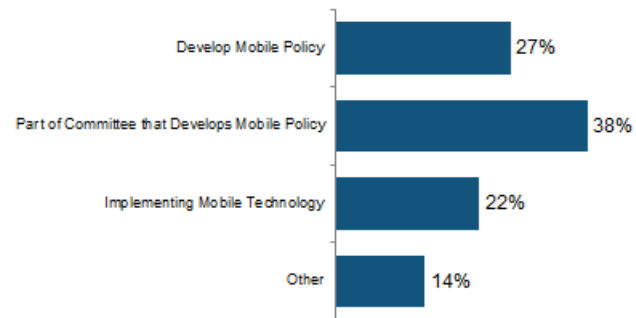
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N=170

Organizational Stance on Supporting Mobile Technology

Stance	Percentage
Devices are Provided/Owned by Organization	31%
Both Owned Devices and Personal Devices	22%
Personal Devices Enabled for Work Activites	21%
Neither	4%
Don't Know	5%
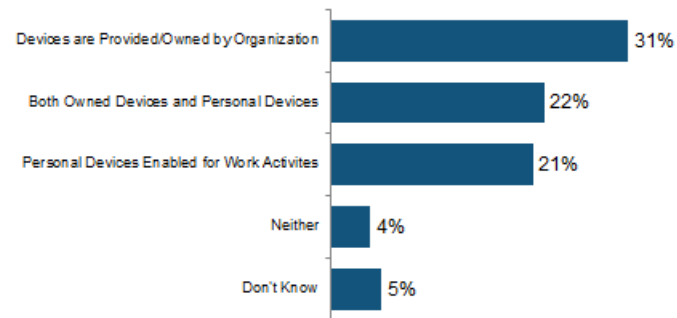
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N=170

Mobile Technology Policy
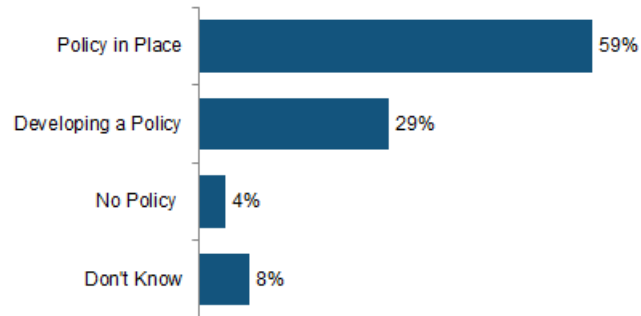
Policy in Place	59%
Developing a Policy	29%
No Policy	4%
Don't Know	8%

N=170

Items Covered in Current Mobile Technology Policy

Management of Lost/Stolen Devices	84%
Means of Securing Devices	80%
Use of Personal Devices for Work Use	76%
Ability to Access Data Remotely	76%
Type of Approved Apps	51%
Brand/Version of Device	47%
Other	1%
Don't Know	8%
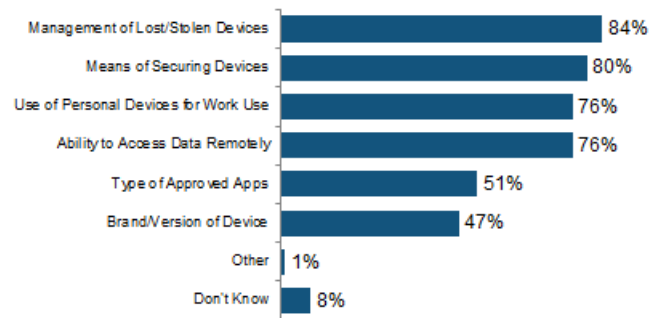
Slide includes only those respondents with a mobile technology policy.

N=101

23

Items Covered in Future Mobile Technology Policy

Means of Securing Devices	82%
Use of Personal Devices for Work Use	78%
Management of Lost/Stolen Devices	71%
Ability to Access Data Remotely	71%
Type of Approved Apps	63%
Brand/Version of Device	45%
Other	0%
Don't Know	12%
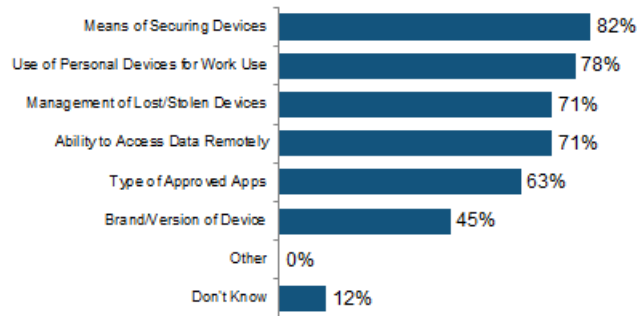
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Only those respondents without a mobile technology policy.   N=49

Mechanisms for Securing Data on Mobile Devices

Password Protected	94%
Data Encryption	71%
Remote Wipe Capability	69%
Automated Data Disintegration	16%
Biometric Authentication	9%
Other	4%
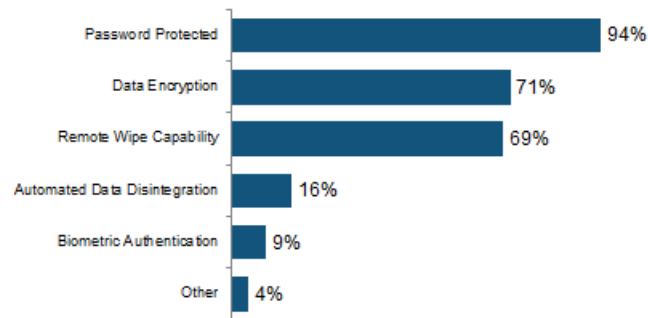
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Only those respondents who have formal security mechanism in place   N=161

Additional Steps Taken to Prevent Introduction of Malware to Devices

Yes	52%
No	25%
Don't Know	23%
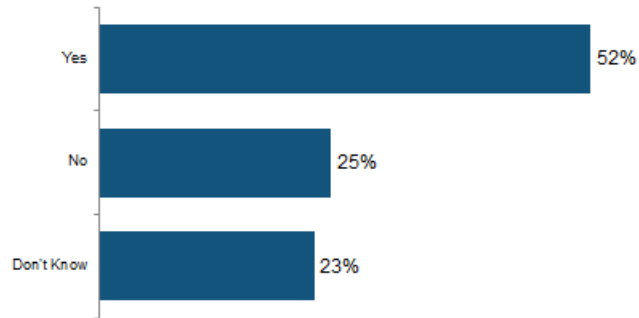
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N=170

Mobile Devices Retain Patient Specific PHI

Yes	29%
No	53%
Don't Know	18%
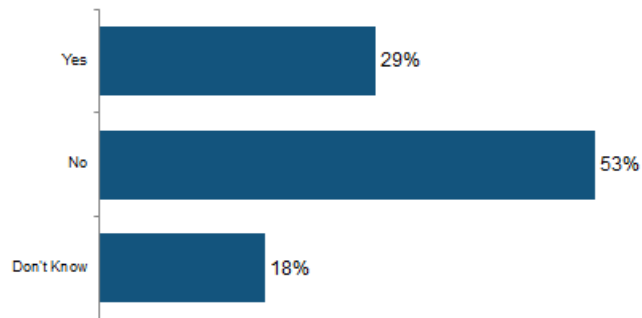
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N=170

Clinician Use of Mobile Technology – Top Ten

View Patient Information	69%
Look up Non-PHI Information	65%
Use for Education/Training Purposes	49%
Clinical Notifications	42%
Secure Communications Regarding Patients	39%
Tracking Worklists	39%
Collecting Data at the Bedside	36%
E-Prescribing	33%
Use Bar Code Reader	28%
Monitor Data from Medical Devices	26%
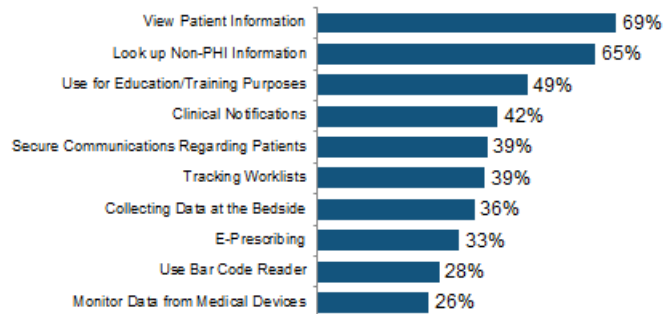
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N=170

Impact of Federal Landscape on Implementation of mHealth
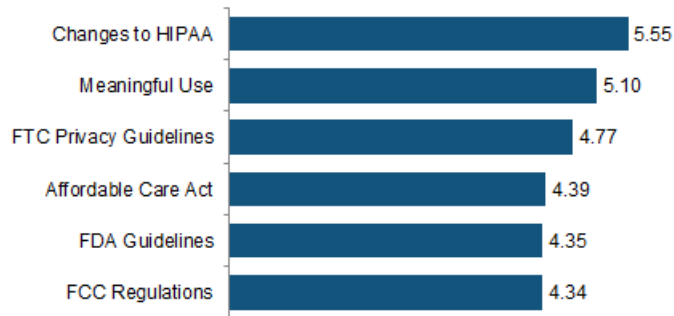
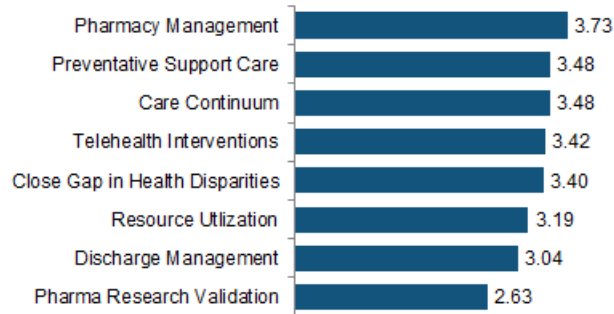|	
Changes to HIPAA	5.55
Meaningful Use	5.10
FTC Privacy Guidelines	4.77
Affordable Care Act	4.39
FDA Guidelines	4.35
FCC Regulations	4.34

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One to seven scale, where one is no impact and seven is high impact.

N=170

Areas in Which Technologies Can Impact Care

Pharmacy Management	3.73
Preventative Support Care	3.48
Care Continuum	3.48
Telehealth Interventions	3.42
Close Gap in Health Disparities	3.40
Resource Utlization	3.19
Discharge Management	3.04
Pharma Research Validation	2.63

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One to seven scale, where one is no impact and seven is high impact.   N=170

Mobile Devices Presently Provided to Clinicians

Laptop Computers	87%
Workstations on Wheels	81%
Smart Phone	69%
Pager	67%
Cellular Phone	56%
Non-Healthcare Tablet	44%
Tablet Computer Designed for Healthcare	43%
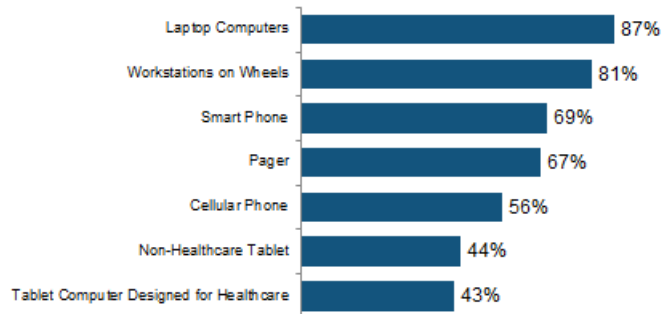
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Only those respondents who have supply devices to clinicians   N=162

Mobile Devices Provided to Clinicians in the Future

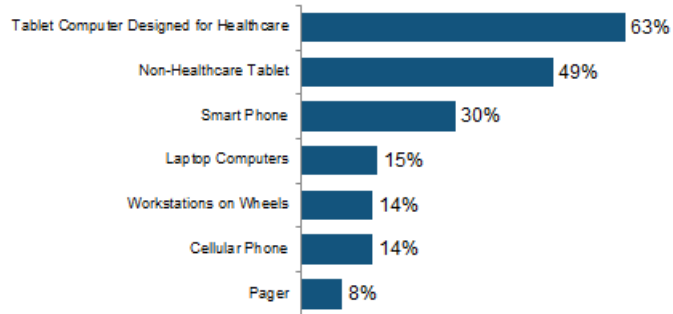| Device	Percentage
Tablet Computer Designed for Healthcare	63%
Non-Healthcare Tablet	49%
Smart Phone	30%
Laptop Computers	15%
Workstations on Wheels	14%
Cellular Phone	14%
Pager	8%

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Only those respondents who plan to provide devices in the future   N=73

Types of Mobile Apps Provided to Patients/Consumers

App Type	Percentage
Monitor Chronic Conditions	53%
Monitor Physical Activity	39%
Monitor Nutrition Intake	36%
Access to Organization EMR Portal	20%
Other	25%
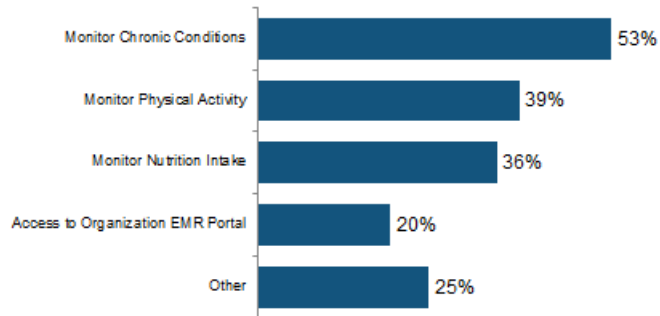
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Only those respondents who provide apps to patients/consumers   N=54

Tools Healthcare Organizations Use to Engage Patients/Consumers

Tool	Percentage
App Enabled Patient Portals	56%
Telehealth Services	52%
Provide Remote Monitoring Devices	36%
Prescribing Apps	23%
Discharge Kit Using Mobile Technology	13%
Other Apps	6%

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Only those respondents who provide tools to engage consumers   N=106

App Development

Development	Percentage
Developed by Third Party	77%
Developed by HIT Vendor	52%
Developed Internally	32%

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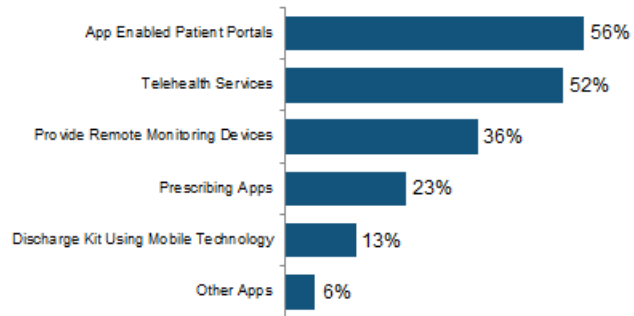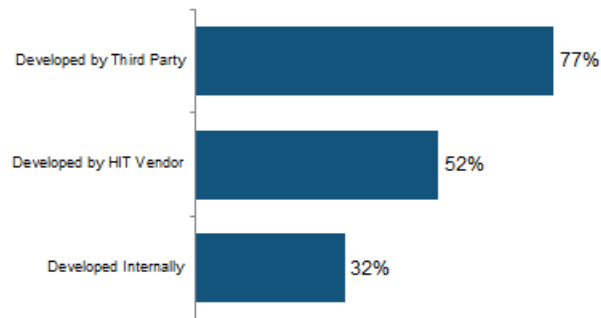Only those respondents who provide apps to clinicians   N=132
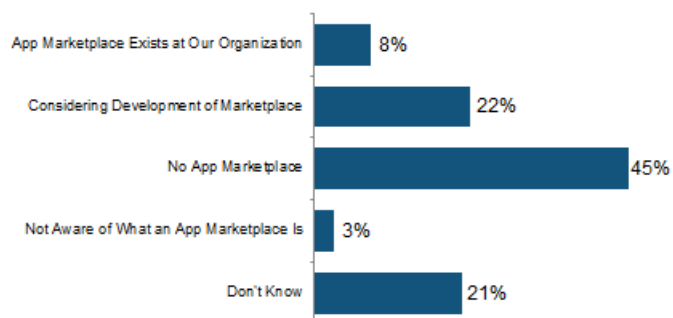
Future App Development

Update Exisiting Apps — 64%

Launch New App Developed Externally — 55%

Launch New App Developed Internally — 52%

Development of App Marketplace

App Marketplace Exists at Our Organization — 8%

Considering Development of Marketplace — 22%

No App Marketplace — 45%

Not Aware of What an App Marketplace Is — 3%

Don't Know — 21%

Areas in Which ROI is Measured as it Relates to Mobile Technology

None of the Above	35%
Improved Efficiencies	26%
Cost Savings	26%
Improved Clinician Satisfaction	26%
Improved Patient Satisfaction	25%
Patient Safety	18%
Revenue Generation	16%
Improved Billing	16%
Don't Know	19%
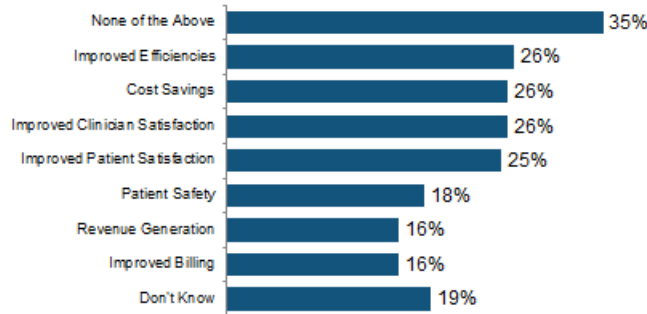
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N=170

Areas in Which Organizations Expect to Be Able to Demonstrate Future ROI
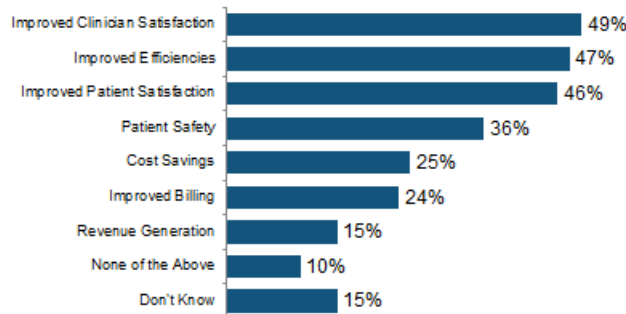
Improved Clinician Satisfaction	49%
Improved Efficiencies	47%
Improved Patient Satisfaction	46%
Patient Safety	36%
Cost Savings	25%
Improved Billing	24%
Revenue Generation	15%
None of the Above	10%
Don't Know	15%

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Only those respondents not currently measuring ROI

N=59

Measurement of Total Cost of Ownership

N=170

Areas in Which Total Cost of Ownership is Measured

N=61

32

Benefits Clinicians Associate with Mobile Technology Use

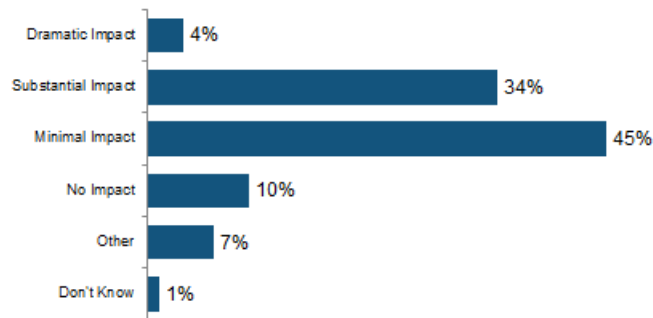| Benefit	Percentage
Improved Access to View Only Information	66%
Improved Access to Reference Information	59%
Ability to View Data From Remote Location	59%
Ability to Enter/Modify Patient Information	42%
Ability to Access Clinical Decision Support Tools	39%
Improved Patient Safety	28%
Ability to Streamline Number of Devices Used	19%
Return on Investment	7%
Other	1%
None of the Above	1%
Don't Know	14%
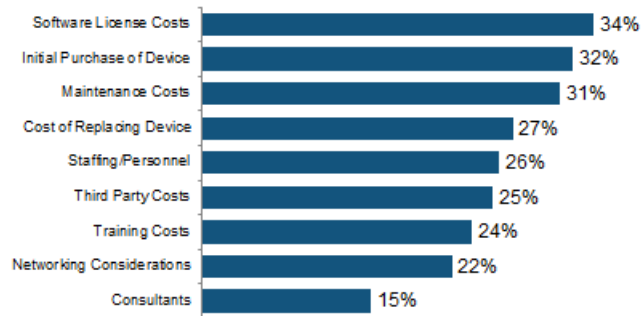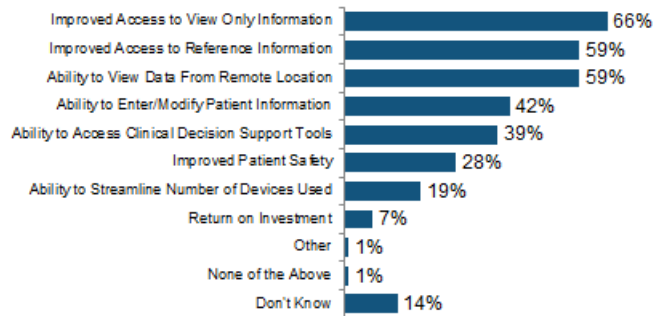
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Only those respondents not currently measuring ROI   N=170

Impact on Delivery of Patient Care

Impact	Percentage
Dramatic Impact	4%
Substantial Impact	34%
Minimal Impact	45%
No Impact	10%
Other	7%
Don't Know	1%

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N=170

33

Percent of Data Captured by Mobile Devices that is Integrated into EMR

All Data	13%
75% to 99%	10%
50% to 74%	5%
25% to 49%	5%
Less than 25%	27%
None	22%
Don't Use Mobile Devices	6%
Don't Know	11%
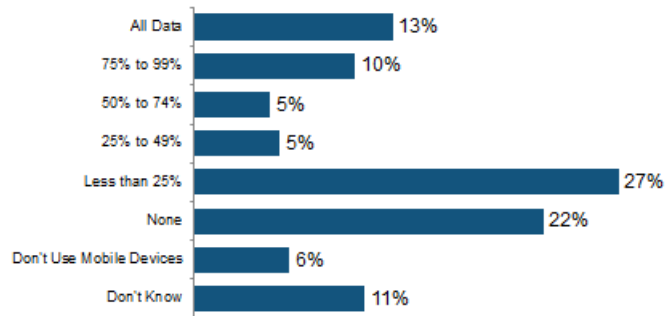
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N=170

Communications Standards
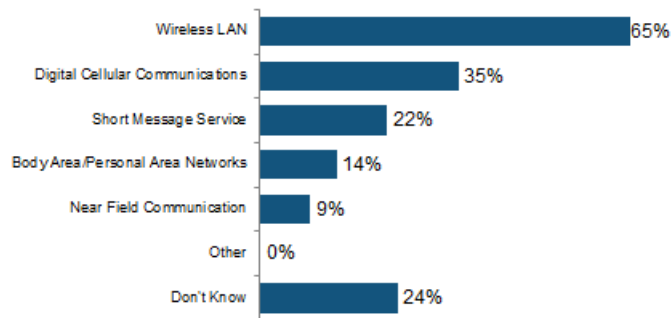
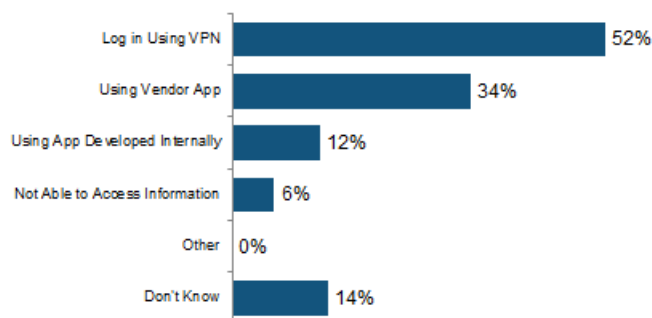|	
Wireless LAN	65%
Digital Cellular Communications	35%
Short Message Service	22%
Body Area/Personal Area Networks	14%
Near Field Communication	9%
Other	0%
Don't Know	24%

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N=170

Means By Which Clinicians Access Information From Clinical Systems Using Mobile Devices

Log in Using VPN	52%
Using Vendor App	34%
Using App Developed Internally	12%
Not Able to Access Information	6%
Other	0%
Don't Know	14%

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N=170

Means By Which Clinicians Receive Alerts from Remote Monitoring Devices

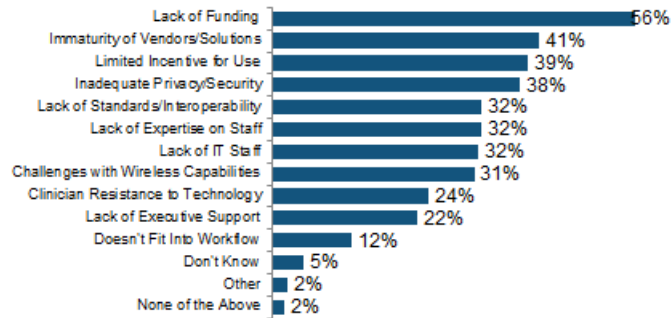|	
Information is Posted in EMR/Clinical System	58%
Don't Use Remote Monitoring Devices	47%
Sent to Mobile Device Using SMS	44%
Sent as an E-Mail	41%
Sent via Another Individual	29%
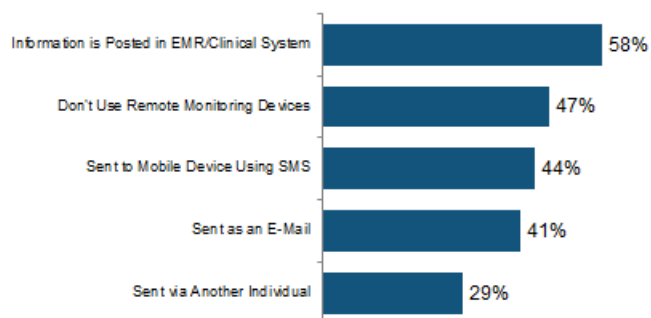
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Only those respondents receiving alerts from remote monitoring devices

N=170

Barriers to Using Mobile Technology
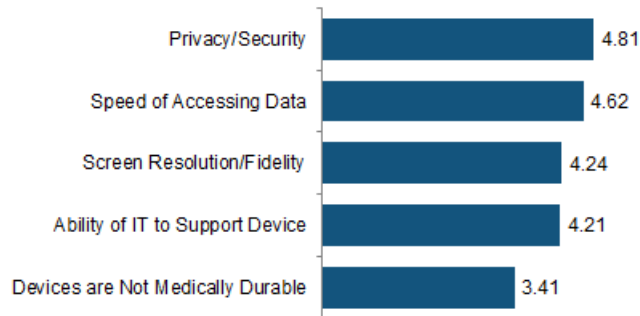

Barrier	Percentage
Lack of Funding	56%
Immaturity of Vendors/Solutions	41%
Limited Incentive for Use	39%
Inadequate Privacy/Security	38%
Lack of Standards/Interoperability	32%
Lack of Expertise on Staff	32%
Lack of IT Staff	32%
Challenges with Wireless Capabilities	31%
Clinician Resistance to Technology	24%
Lack of Executive Support	22%
Doesn't Fit Into Workflow	12%
Don't Know	5%
Other	2%
None of the Above	2%

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N=170

Areas of Clinician Concern

Area	Score
Privacy/Security	4.81
Speed of Accessing Data	4.62
Screen Resolution/Fidelity	4.24
Ability of IT to Support Device	4.21
Devices are Not Medically Durable	3.41

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Percent of Patient Care Facilitated by Mobile Care

Physicians: 3% 9% 11% 15% 46% 8% 9%
Physician Assistants: 7% 10% 11% 39% 17% 13%
Nurses: 4% 9% 11% 19% 28% 20% 9%
Nurse Practitioners: 7% 9% 12% 38% 19% 13%
Pharmacists: 5% 11% 10% 31% 24% 17%
Home Health Workers: 6% 12% 6% 12% 19% 24% 21%

■ All Data ■ 75% to 99% ■ 50% to 74% ■ 25% to 49% ■ Less than 25% ■ None ■ Don't Know

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N=170