WIRELESS TECHNOLOGIES IN HEALTHCARE

2011 Trends Survey

Survey Overview and Methodology

The annual Wireless Technologies in Health Care Trends Survey is conducted to develop insights into current practices and objectives in the Healthcare industry with regard to use of enabling wireless technologies.

This is an important and rapidly growing area in the healthcare industry. According to the HIMSS Analytics™ Database, (last survey, 2009) approximately two-thirds of U.S. hospitals reported using wireless technology within their healthcare delivery organization across a broad range of services including electronic medical records / electronic health records (EMR / EHR), computerized physician order entry, medical monitoring and diagnostic imaging, and in virtually every area of patient / clinician / institution interaction.

This survey was conducted in early 2011 with a group of 235 HIMSS members. It demonstrated that an even larger percentage of healthcare organizations currently report using wireless technologies and data applications to enhance their mobile enterprise operations.

In addition, mobile initiatives have been seen to drive overall improvements in patient care and new efficiencies. They were associated with a 31 percent reduction in manual errors, and an increase of 39 productive minutes per worker per day (Motorola Enterprise Mobility Barometer: State of Mobility in HealthCare, 2009). Results from this later survey indicated that many organizations felt there were even more significant improvements in patient care and operational efficiencies.

The survey was conducted online via a series of multiple choice questions. Each question set also allowed the respondents to provide open ended comments in addition to or instead of selecting a multiple choice response. Finally, a section was provided for other responses, enabling respondents to provide specific information that may not have been directly covered in the multiple-choice survey questions.

Survey questions covered a wide range of topic areas – a brief selection includes:

- Respondent Healthcare Sector

- Importance of Wireless Solution

- Increases in Staff Productivity

- Percentage Estimates of Staff Productivity Increases

- Number of Workers Using Wireless Applications

- Types of Applications in Use

- Use of Wireless Devices

- Who Uses Wireless Data Applications

- Reasons for Investing in Wireless Data Applications
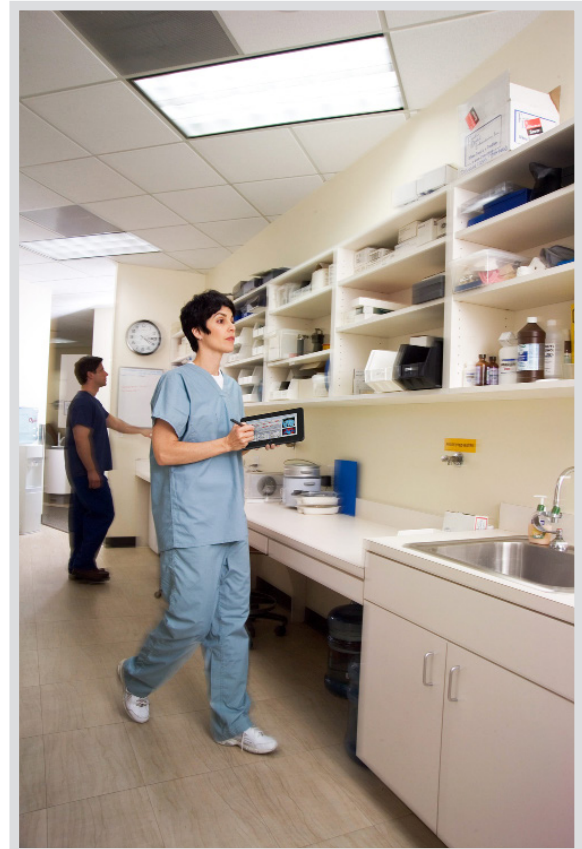
Mobile initiatives have been seen to drive overall improvements in patient care and new efficiencies.

Survey Demographics

The survey was conducted online by inviting a selection of HIMSS members to respond. NetMotion Wireless did not know who the individuals were who received the invitation, as the initial requests to participate were anonymous. Of the 235 respondents, the overwhelming majority (84%), worked in Hospital or Multi-Hospital systems, but there were also significant responses from Outpatient staff (5.4%), and Managed Care / IDNs (2.2%) and other sectors (see later chart for full breakdown).

In addition to responding to multiple choice questions, respondents were offered the opportunity to provide free-form text responses or questions. A number of these free-form responses indicated that security, dropped connections and convenience were of key concern. Again, see the charts following in the full analysis for more detail.

The survey was conducted online and had **235 respondents, the majority of whom worked in Hospital or Multi-Hospital systems.**

Key Takeaways

Productivity and Usage

Almost two-thirds of the respondents indicated that they'd seen an increase in staff productivity due to their adoption of various wireless initiatives.

Respondents indicated a broad use of wireless in multiple applications. Top applications included Electronic Health Records (over 65%), Clinical POC (Point of Care) applications for physicians (45%), Clinical POC applications for nurse clinicians (57%) and CPOE (Computerized Physician Order Entry) (over 45%).

Other responses included Imaging, OB/GYN documentation, BioMedical Devices, and others.

Reach across Clinical and Administrative Staff

Over 85% of the respondents indicated that both nurses and physicians were using wireless enabling technologies in their clinical work. Almost two thirds of respondents responded that wireless enabling technologies were in use amongst their Operations staff, while over half our respondents indicated that wireless technologies were in use

in their Physical / Respiratory and Occupation Therapy staff. Other users included Paramedics/EMTs, Staff That Work from Home, and Pharmacy. This data tends to indicate that wireless initiatives are growing from stand-alone solutions for specific groups to enterprise-scale wireless mobility solutions.

Importance of Wireless Initiatives for Mobile Clinicians

67% of the respondents indicated that their wireless solutions were "Very Important – Must Have", for both their mobile clinicians and their overall enterprise mobility initiatives, while another 26.4% indicated their wireless solutions were "Important – Makes a Significant Contribution. One interesting observation is that no single respondent indicated that wireless solutions were "Not Necessary – Didn't Find Much Benefit".

WiFi Mix, Data Applications and Wireless Devices

Respondents indicated a clear mix between WiFi and cellular WiFi via various mobile network providers. Over 80% indicated they used wireless solutions via WiFi, but 56% also used Verizon, while 45% used AT&T and 22.9% used Sprint. Clearly, applications and enabling technologies must be able to mix seamlessly between a broad range of providers and providing technologies.

Wireless data applications were in use in organizations of all sizes. 39% of the respondents indicated they had more than 1,000 mobile users, 23% indicated 101-500 mobile users and 15.4% indicated 25-100 mobile users in their systems. 4.7% even indicated less than 25 mobile users. This data demonstrates the growth of wireless usage amongst mobile clinicians and the growing utility of wireless in organizations of all sizes – large or small.

Respondents indicated that users were likely to use a wide range of wireless devices. Top responses included 93% using laptops, 66% using tablets, 60% using smartphones, and 48% using handheld devices. This indicates the need for wireless enabling technologies to work securely and seamlessly across a wide variety of devices. It also demonstrates the growing need for standards as shown by the pervasiveness of use across a broad range of clinical and administrative applications, users, and devices.

Key Benefits

One of the key benefits that respondents believed mobile wireless applications delivered was an increase in employee satisfaction – this was the single largest benefit category chosen by our respondents, by over 50% over all other categories. Greater employee satisfaction is a well-known indicator of minimized turnover, less sick or leave time, and more engagement by staff with their primary work – caring for patients and administration in support of that care.

Finally, that the response data demonstrates that security is the critical concern of health care organizations using wireless data applications. As an example of this focus on security, comments across a number of questions showed that many health care operations treat the wireless side of their network as hostile and require mobile devices to go through a DMZ of some kind instead of connecting to the network itself. In addition, high order encryption is an essential element for all wireless transmission.

In computer networking, a DMZ (Demilitarized Zone) is a host or small network inserted between a company's private network and an outside network.

Given the state of today's wireless provider security, using a DMZ for the wireless side of the organizational network would appear to be a prudent and reasonable approach to ensuring security and regulatory compliance, although adding additional complexity and layering on additional management requirements.

Survey Results

This section offers the complete range of survey questions and responses. Each section also offers additional analysis and interpretation.
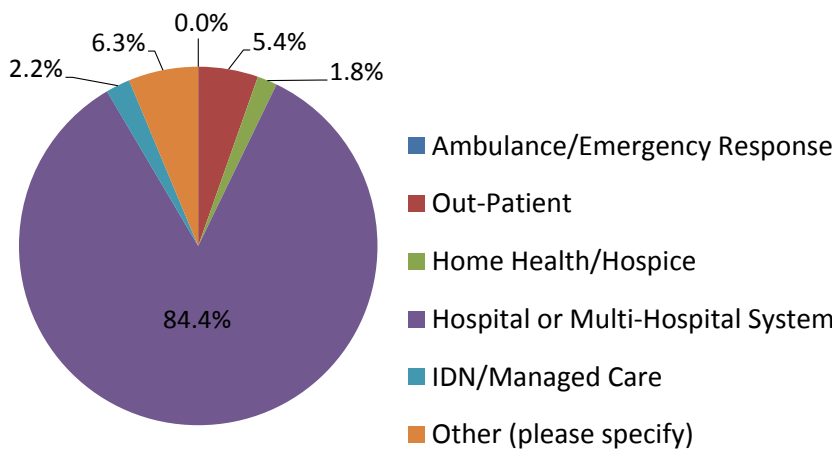
Use of Wireless Devices

Do Your Clinicians or Other Staff Use Wireless Data Applications on Laptops, Tablets, Handhelds, or Other Mobile Devices?

3.1%

96.9%

■ Yes ■ No
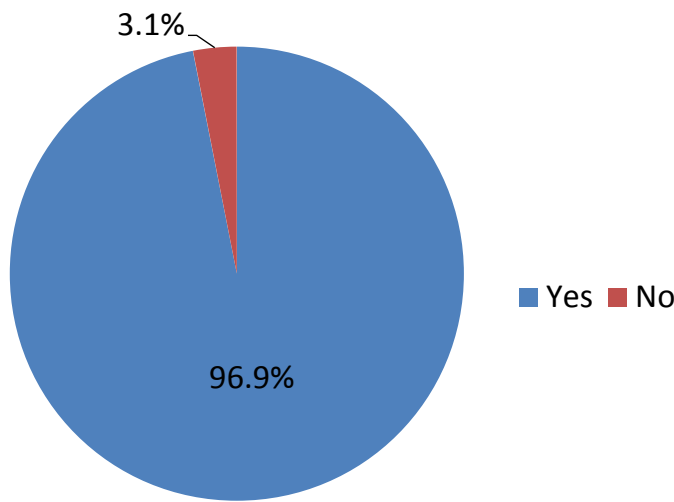
This primary data set shows us that – in our respondent group of approximately 235 – virtually every one of their organizations used wireless data applications. There is no question that wireless data applications are on the landscape of today's healthcare organization and growing rapidly as we look to the landscape of tomorrow.

Healthcare Sector Response

Select the Healthcare Sector that Best Describes Your Company.

0.0%
6.3%
2.2%
5.4%
1.8%
84.4%

■ Ambulance/Emergency Response

■ Out-Patient

■ Home Health/Hospice

■ Hospital or Multi-Hospital System

■ IDN/Managed Care

■ Other (please specify)

Hospitals and Multi-Hospital Systems comprised the majority of responders, but over 15% of the responders came from other areas as shown, indicating the growing pervasiveness of wireless applications in the healthcare industry as a whole.

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Survey Results - Organizational

Organizational Size by Number of Wireless Users

How Many Workers Currently Use Wireless Applications?

- Less than 25
- 25 to 100
- 101 to 500
- 501 to 1,000
- Over 1,000
- None
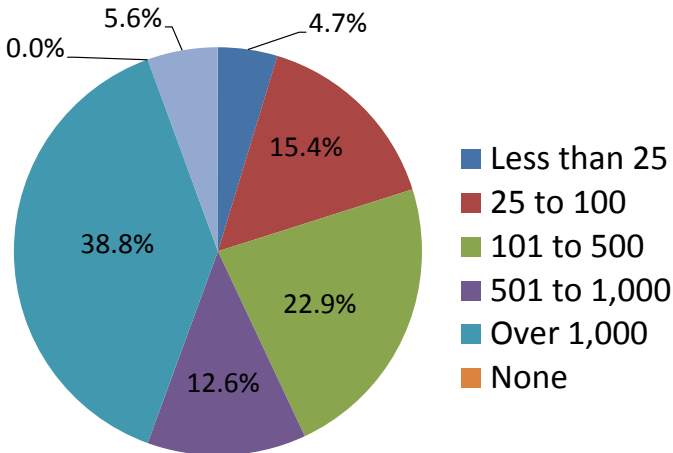
This set of responses shows that organizations of every size are involved in a variety of wireless initiatives. The large organizations (more than wireless 1,000 users) are clearly leading the way, but it's interesting to note that even very small organizations (less than 25 wireless users) are solidly represented.

Importance of Wireless Solutions in Your Organization

How Important is Your Wireless Solution?

- Very Important - must have
- Important - makes a significant contribution
- Helpful - offers several useful benefits
- Not necessary - didn't really find much benefit
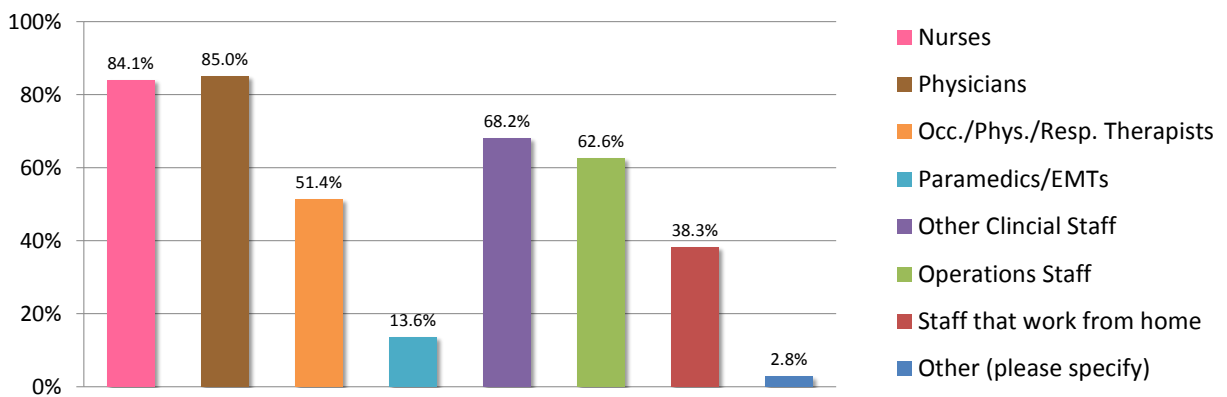- Other (please specify)
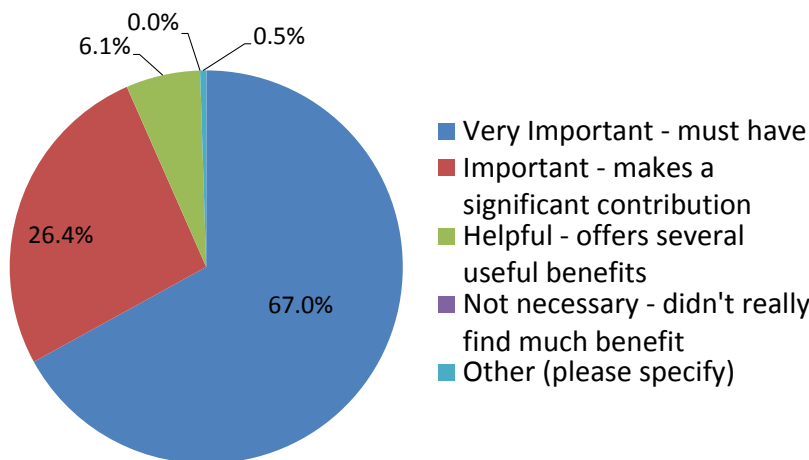
67% of the 235 survey respondents indicated that wireless solutions and Enterprise Mobility were a "Must Have" in their organization, while 26.4% said they "Made a Significant Contribution". This data speaks for itself. Over 90% of the respondents see wireless as an increasingly important feature in both their clinical and administrative IT mix, while over two thirds of the respondents see wireless solutions as a proposition to significantly enhance their operations.

Use of Wireless Data Applications in Clinical and Administrative Staff

Roughly 85% of all doctors and nurses in responding organizations currently use wireless data applications, but this data also demonstrates interesting high use levels by clinical and administrative staff. This not only speaks to the pervasiveness of enterprise mobility and wireless data applications in healthcare, but to the need for integration, as it's clear that virtually all types of clinicians and administrative workers are adopting wireless mobility solutions.

In other areas of this survey, a lack of standards was selected as one of the key problematic issues – the broadness of reach across all clinical and administrative categories makes mobility standards development even more imperative.

What Workers Currently Use Wireless Data Applications?
(Choose All That Apply)

Legend:
- Nurses
- Physicians
- Occ./Phys./Resp. Therapists
- Paramedics/EMTs
- Other Clincial Staff
- Operations Staff
- Staff that work from home
- Other (please specify)

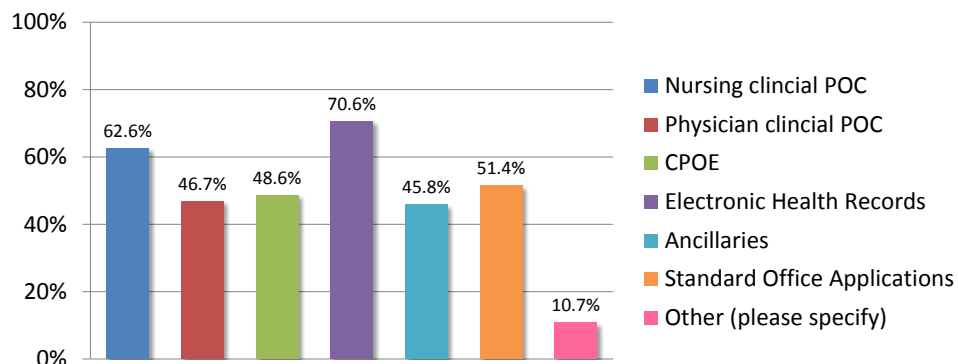Values: 84.1%, 85.0%, 51.4%, 13.6%, 68.2%, 62.6%, 38.3%, 2.8%

Types of Wireless Data Applications in Use Today

The close grouping of the data here demonstrates that enterprise mobility is growing in acceptance and use, not just amongst mobile clinical staff, but in EHR and back office functions as well.

A smaller, but still significant number of respondents indicated that their wireless mobility applications had been extended to such things as barcode readers and mobile carts (shown as Other in the survey)

What Types of Data Applications Do You Currently Use?
(Choose All That Apply)

Legend:
- Nursing clincial POC
- Physician clincial POC
- CPOE
- Electronic Health Records
- Ancillaries
- Standard Office Applications
- Other (please specify)

Values: 62.6%, 46.7%, 48.6%, 70.6%, 45.8%, 51.4%, 10.7%
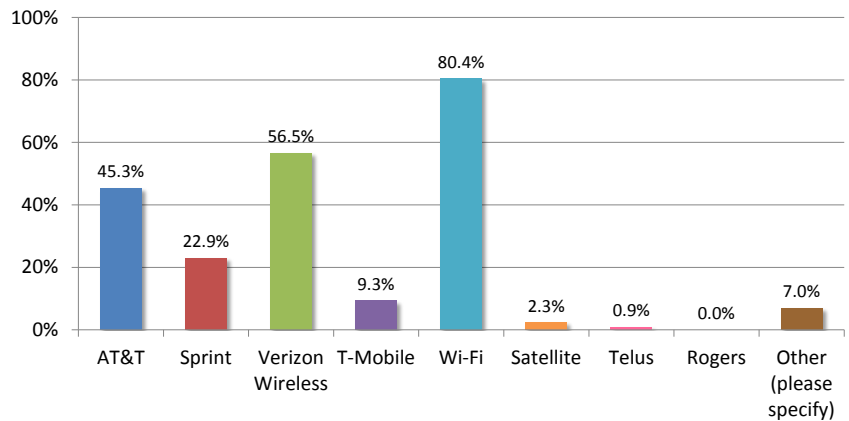
Survey Results - Applications and Devices

Mobile Data Network Usage

Wi-Fi remains the primary network for mobile usage, but the responses to this question indicate that Wi-Fi is being overtaken by a variety of mobile carriers, including Verizon Wireless (56.5%), AT&T (45.3%) and Sprint (22.9%).

While the healthcare industry is still heavily invested in Wi-Fi solutions, they have begun to make equivalent investments in enterprise mobility via wireless networks and soon will use a mix of Wi-Fi and wireless providers.

In another section of this survey, respondents indicated that coverage was a critical area of concern. Wireless providers and applications running across wireless networks can clearly do much to mitigate this concern.

What Mobile Data Networks Do You Use?
(Choose All That Apply)

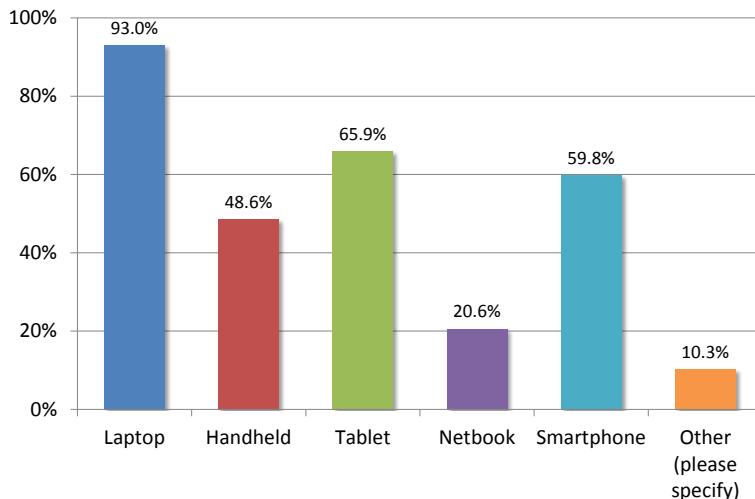| Network	Percentage
AT&T	45.3%
Sprint	22.9%
Verizon Wireless	56.5%
T-Mobile	9.3%
Wi-Fi	80.4%
Satellite	2.3%
Telus	0.9%
Rogers	0.0%
Other (please specify)	7.0%

Types of Wireless Mobility Devices in Use

Responses to this survey question revealed a significant amount of overlap. While it is clear that virtually all mobile clinicians / staff use laptop computers, very large numbers of the respondents use more than one device.

The majority of these other devices are tablets (65.9%), smartphones (59.8%), and handhelds (48.6%).

What Type of Wireless Devices Do Your Mobile Clinicians/Staff Use?
(Check All That Apply)

Device	Percentage
Laptop	93.0%
Handheld	48.6%
Tablet	65.9%
Netbook	20.6%
Smartphone	59.8%
Other (please specify)	10.3%

It can be inferred that while the healthcare industry continues to make extensive use of laptop solutions, they have begun to make equivalent investments in enterprise mobility via a variety of handheld devices such as tablets and smartphones, typically (based on the responses to the previous survey question), running on a wireless network.

Just as tablets, smartphones and handhelds are becoming the data device of choice for retail consumers, the healthcare industry likewise appears to be moving towards these smaller, smart devices to further enable their enterprise mobility initiatives.
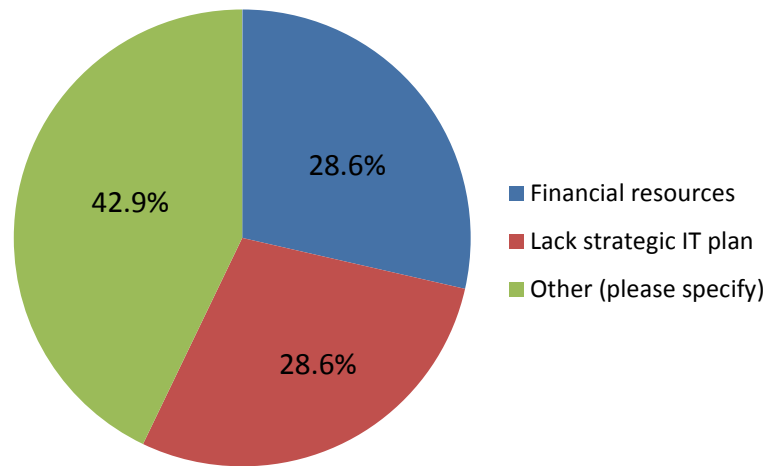
Primary Reasons for Non Implementation

Note that of the 235 respondents, only 7 completed this section of the survey.

Primary selected reasons were a lack of financial resources and a lack of a strategic IT plan around enterprise mobility.

The "Other" category included "no wireless infrastructure at this time," "Don't use them" and "No need".

All responses in this area came from slightly less than 3% of the respondents.

What Is The Primary Reason You Have Not Implemented Wireless Data Applications?

- Financial resources
- Lack strategic IT plan
- Other (please specify)

Other Reasons for Non Implementation

This survey question probed further for any other reasons that might play into healthcare organizations not implementing wireless initiatives.

Again, only 7 respondents replied to this question, or slightly less than 3% of the total of respondents.

What Are the Other Reasons You Have Not Implemented Wireless Data Applications?

- Financial resources
- Lack top management support
- Other (please specify)
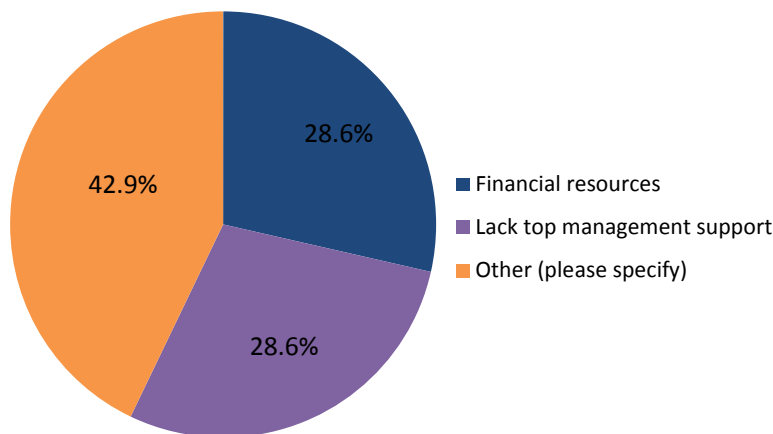
Reasons cited here added issues with financial resources, a lack of support from top management and, in the "Other" category, the same reasons, almost verbatim, from the previous question.
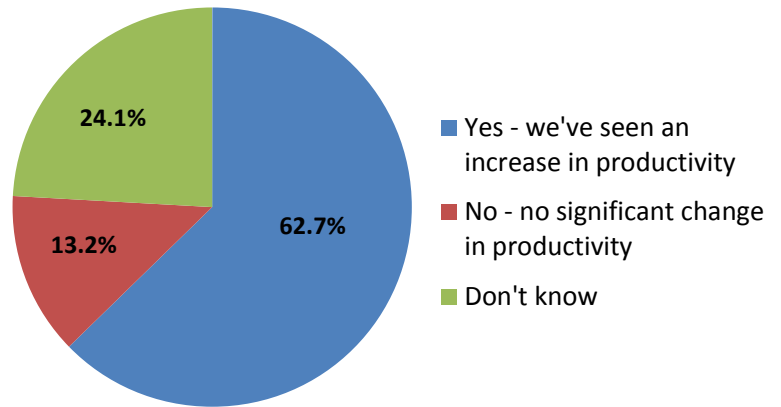
The primary take away from the responses to both this survey questions is that only a very small percentage of respondents have not yet implemented some form of wireless mobile initiative in their organization, and of those, at least half would like to but have constraints including financial constraints, planning restraints, and sponsorship restraints.

Survey Results - Benefits

Clinician/Staff Productivity Increases Following Wireless Data Application Deployment

Clearly an important metric, 62.7% of our respondents said they had seen productivity increases in clinicians and administrative staff following wireless application deployments. Based on the responses to other questions and other data (such as HIMSS reports), it is possible that many of the 24.1% who indicated they "Did Not Know" if there were productivity increases may simply not yet have developed metrics to assess the impact of wireless applications on staff productivity.

Since Deploying Your Wireless Data Applications, Have You Seen an Overall Productivity Increase for Mobile Clinicians/Staff?

- 24.1%
- 13.2%
- 62.7%

- Yes - we've seen an increase in productivity
- No - no significant change in productivity
- Don't know

## Productivity Percentage Increase Estimates

This question was asked in the form of an estimate with broad ranges. The percentage of respondents who "Didn't Know" correlated with the percentage of respondents who "Didn't Know" in the earlier and broader "Were there any gains" question.

38.1% of the respondents believe that they experienced productivity increases in the 5-20% range, while 29.1% believed their increases in productivity were in the 25-40% range.

Over 10% of the respondents believed their productivity increases were in the 45-60% range — an extremely high number, and a key data point.

Potential reasons for this finding include such things as stronger executive buy-in and support, a culture that is more flexible and takes to using newer technologies more readily, a more sophisticated IT department that is able to deploy wireless solutions in a more seamless fashion, use of differing technologies, some of which provide a better productivity gain.

Roughly What Percentage Increase in Overall Productivity Have You Experienced?

- 0.7%
- 3.7%
- 17.9%
- 38.1%
- 10.4%
- 29.1%

- 5% - 20%
- 25% - 40%
- 45% - 60%
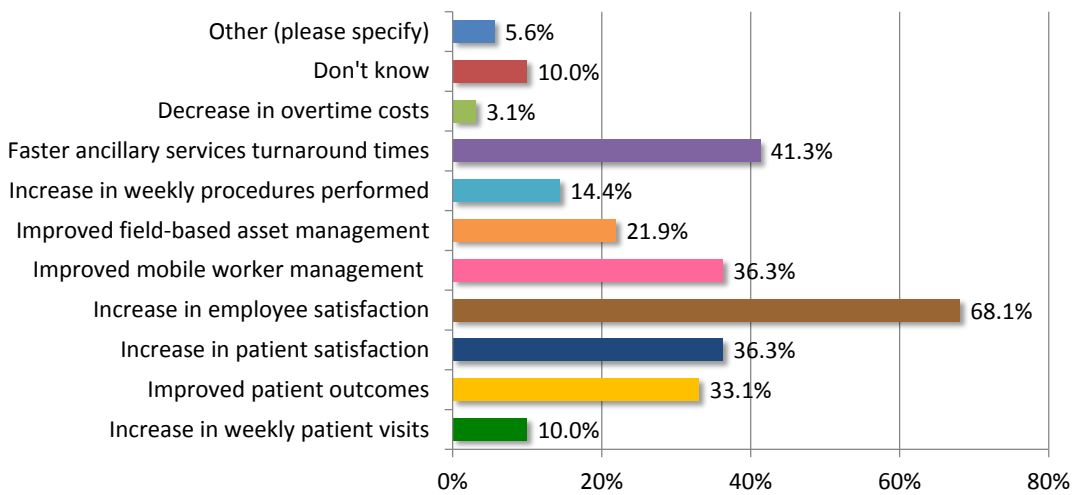- 65% - 80%
- 85% - 100%
- Don't know
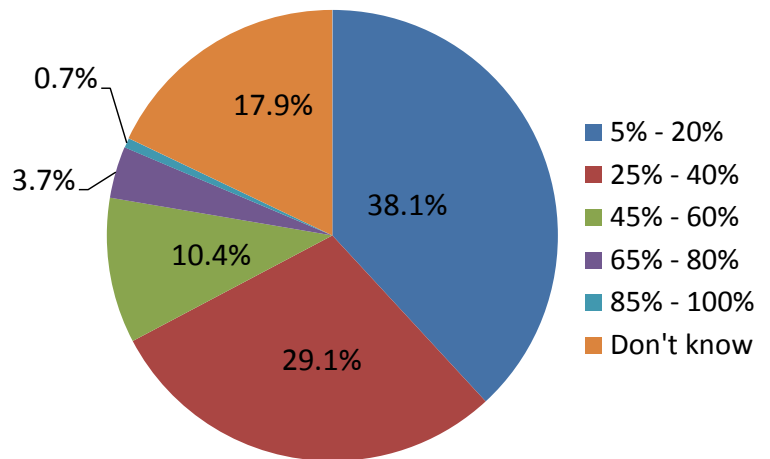
Other Benefits From Wireless Deployments

It is important to note that by far the single greatest benefit the respondents noted was an increase in employee satisfaction. This is one of the key takeaways from this survey, as employee satisfaction, particularly in complex and demanding environments such as healthcare, is an indicator that correlates with lower turnover, more investment by clinicians and staff in the job, as well as increased ability for clinicians to provide the best possible patient care, and administrators to manage that care in the most efficient fashion.

Other benefits specified by respondents included faster turnaround times on ancillary services, increases in patient satisfaction (another critical metric that is more and more being inc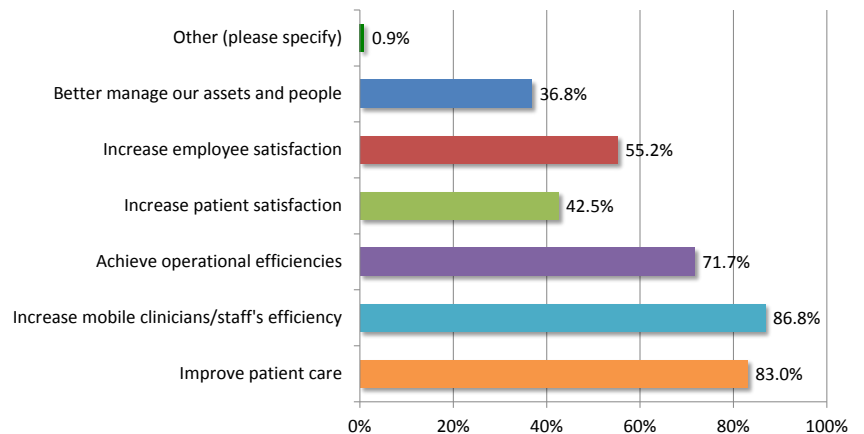orporated into reports of hospital and health plan quality). For a third of the respondents, "Improved Patient Outcomes" was seen as a benefit. Patient outcomes are not only important for the obvious reasons – but they are also linked tightly with a broad range of regulatory and accreditation areas.

What Other Benefits Have You Experienced? (Check All That Apply)

Benefit	Percentage
Other (please specify)	5.6%
Don't know	10.0%
Decrease in overtime costs	3.1%
Faster ancillary services turnaround times	41.3%
Increase in weekly procedures performed	14.4%
Improved field-based asset management	21.9%
Improved mobile worker management	36.3%
Increase in employee satisfaction	68.1%
Increase in patient satisfaction	36.3%
Improved patient outcomes	33.1%
Increase in weekly patient visits	10.0%

Why Invest in Wireless Data Applications – Multiple Selection

The majority of respondents wanted all the benefits they could get, indicating wireless mobility is becoming an enterprise-wide initiative. Comparing this set of responses against the set of benefits responses indicates that – in many cases – the benefits healthcare organizations sought from their wireless data application investments were benefits they believed they were attaining.

As an example, the top reason selected was "Increase the efficiency of mobile clinicians / staff". Looking at the earlier chart of productivity increase estimates, a substantial percentage of respondents believed this objective was being met to one degree or another.

Why Did You Invest in Wireless Data Applications? (Choose All That Apply)

Reason	Percentage
Other (please specify)	0.9%
Better manage our assets and people	36.8%
Increase employee satisfaction	55.2%
Increase patient satisfaction	42.5%
Achieve operational efficiencies	71.7%
Increase mobile clinicians/staff's efficiency	86.8%
Improve patient care	83.0%

Survey Results - Future
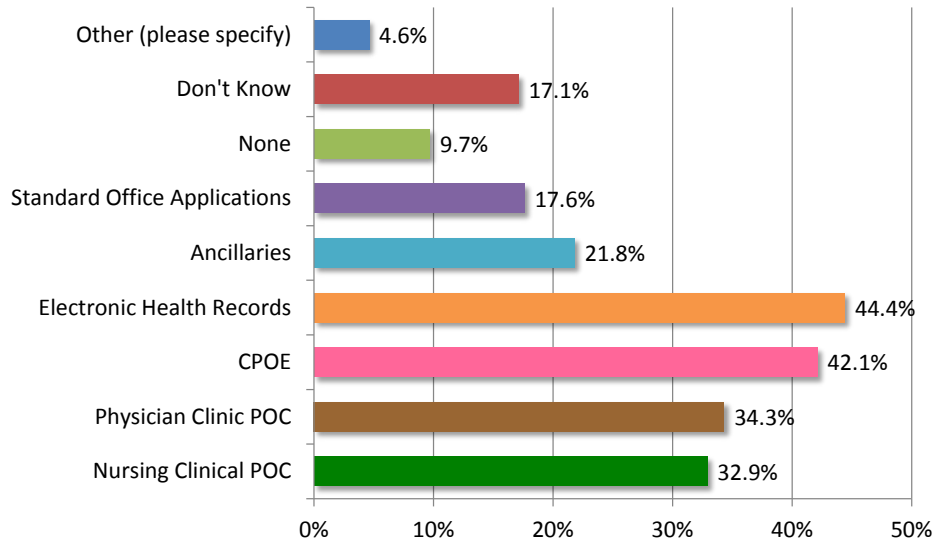
New Mobile Applications Planned

216 respondents replied to this survey question. This represents slightly over 91% of the entire responding group, showing that the use of Mobile applications is continuing to grow throughout the majority of responding organizations.

Leading the way was EHR (44.4%) followed closely by CPOE (42.1%), Physician clinical POC (34.3%) and Nursing clinical POC (32.9%)

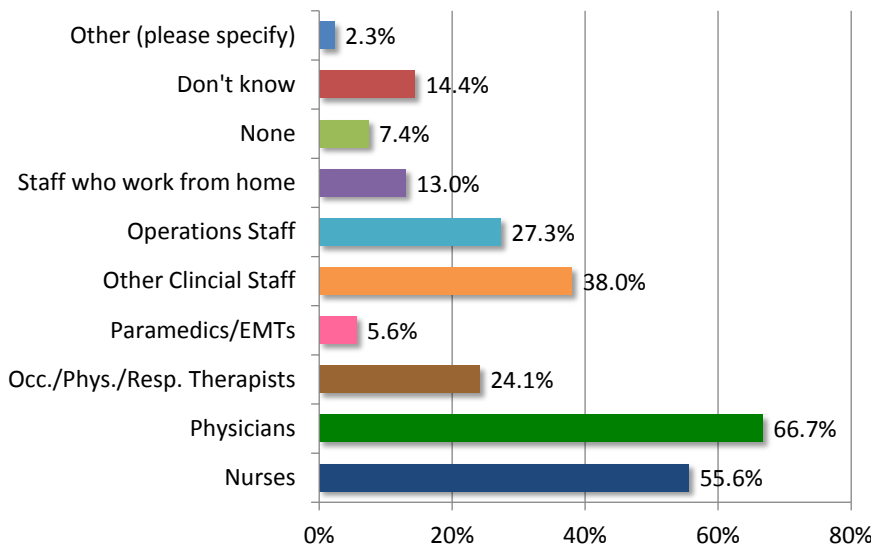In the "Other" category, verbatim responses included BMV, Meds Administration and even e-mail.

These future plans, as well as the very high degree of response to this survey question, indicate that enterprise mobility is not only entrenched in many organizations' planning, but is, in fact, continuing to grow and spread throughout the responding organizations.

During the Next Twelve Months, What New Applications Will be Available On Wireless Devices? (Choose All That Apply)

Category	Percentage
Other (please specify)	4.6%
Don't Know	17.1%
None	9.7%
Standard Office Applications	17.6%
Ancillaries	21.8%
Electronic Health Records	44.4%
CPOE	42.1%
Physician Clinic POC	34.3%
Nursing Clinical POC	32.9%

Mobile Groups Receiving New Wireless Applications

During the Next Twelve Months, What Mobile Worker Groups Will Recieve New Wireless Data Applications on Laptops, Tablets, Handhelds or Other Mobile Devices? (Choose All That Apply)

Category	Percentage
Other (please specify)	2.3%
Don't know	14.4%
None	7.4%
Staff who work from home	13.0%
Operations Staff	27.3%
Other Clincial Staff	38.0%
Paramedics/EMTs	5.6%
Occ./Phys./Resp. Therapists	24.1%
Physicians	66.7%
Nurses	55.6%

Responses to this survey question indicated that growth of enterprise mobility initiatives in the form of new applications provided to clinicians and staff continues to grow across healthcare organizations

Primary planned recipients included Physicians (66.7%), Nurses (55.6%), Other Clinical Staff (38%), Occ/Phys/Resp Therapists (24.1%), and Operations Staff (27.3). In addition, 27.3% percent of the responders indicated that their Operations Staff would receive new wireless data applications for their mobile devices.

Again, over 91% of the respondents chose to reply to this question. This data speaks for itself, as virtually all organizations surveyed plan to improve clinician and staff mobility by deploying new applications.

New Wireless Devices Planned

Combined with the responses to earlier questions, responses by over 91% of the respondent organizations to this survey question indicate that tablets (51.4%), smartphones (39.8%), handhelds (28.7%) and other devices will continue to be introduced at a growing rate into the majority of respondent organizations.

During the Next Twelve Months, What New Wireless Devices Will You Introduce to Your Mobile Workers? (Choose All That Apply)

- Laptop
- Handheld
- Tablet
- Netbook
- Smartphone
- None
- Don't know
- Other (please specify)
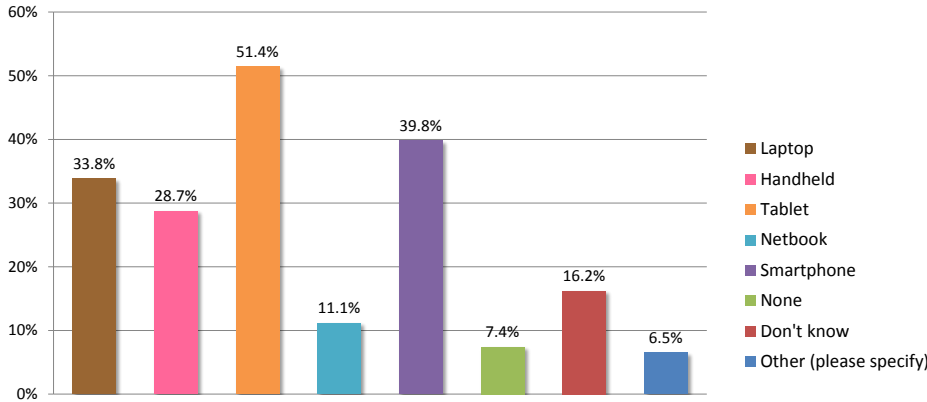
These responses provide additional support to responses to earlier questions, including "What Mobile Groups will be included (in further mobility initiatives)", and "What needed mobile applications are planned for deployment over the next 12 months."

New Wireless Clinicians and Staff

Over 90% of respondents to this survey answered this question. The breadth of response indicates that mobility enterprise initiatives continue to grow as more and more clinicians and staff are introduced to a variety of mobile devices.

The largest response area was "Don't Know" (27.8%), while relatively smaller organizations (25-100 new adds and 101-500 new adds) combined for almost 40%.

These organizations, as well as larger organizations that responded to this survey question, indicate that providing more of their clinicians and staff with mobile wireless tools is seen as a benefit – both in patient care, employee satisfaction, and as a cost savings (based on responses to earlier survey questions).

During the Next Twelve Months, How Many More Wireless Workers Will Your Organization Add?

- Less than 25
- 25 to 100
- 101 to 500
- 501 to 1,000
- Over 1,000
- None
- Don't know
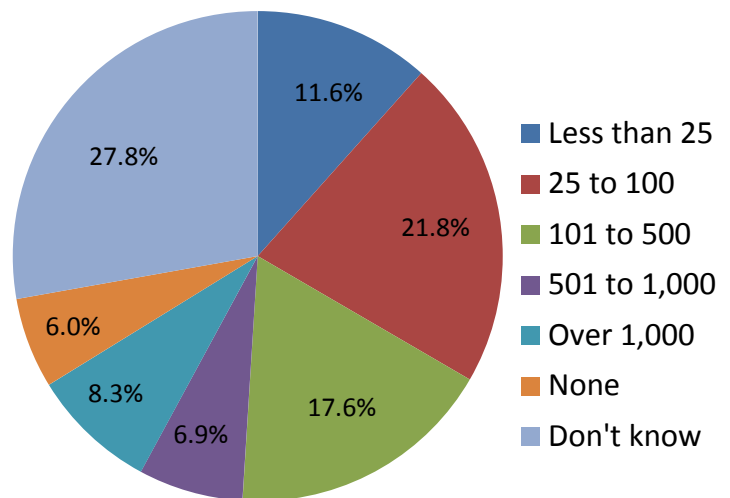
Survey Results

Ad Hoc Comments

The survey offered an open-ended question to gather additional information about issues, ideas and concerns. Approximately 5% of the respondents replied to this question, of which approximately 40% replied, "No additional comments."

Of the comments received, there were two main areas of concern:

Two respondents had security concerns as regards transmitting regulated information over wireless networks.

Security Concerns:
Two of our respondents indicated they had security concerns as regards transmitting regulated information over wireless networks.

Reliable Connectivity Concerns:
Two other respondents indicated they were concerned about losing wireless signal thus forcing their providers and staff to "reboot" into another system as they moved from place to place.

These responses further reinforce the concerns expressed in other areas of this survey.

Conclusions

This is an informal survey, yet the data it reveals is telling. The respondents' answers to the survey questions clearly indicate significant growth of mobile deployments and enterprise-wide mobile initiatives. In addition, these initiatives – perhaps somewhat surprisingly – have had a strong positive effect, not only on patient care and productivity, but on employee morale.

The concerns expressed in this survey were almost exclusively of two kinds. First, respondents were concerned about patient privacy and security. Healthcare is a highly regulated business, particularly as regards patient information. Solving security concerns in a transparent, highly secure fashion will go a long way towards accelerating the growth of this technology to improve patient care, clinician / staff satisfaction, and overall productivity.

Second, respondents were concerned about the frequent disconnects and requirements to log back in as clinicians and staff moved from one locale to another. Managing this issue in a fashion that is entirely transparent to the user will further improve employee morale, improve adoption rates, and help make this valuable technology an even more integral component for many health care organizations.

Finally, as the technology becomes easier to use – as more of the moving parts are hidden from the user – adoption rates will climb even more significantly. Clinicians' job is to provide patients with the best possible care - not to work with equipment that requires a significant investment of their time to manage and whose operation does not instill confidence in its reliability or security.

NetMotion Wireless believes that in the future many healthcare organizations will adopt simple and transparent enterprise mobility solutions that will increase productivity and provide high security for sensitive patient data.

Based on this survey data and through work with many clients in the healthcare field, NetMotion Wireless believes that in the future, across all departments from clinical to back office and EHR, many healthcare organizations will adopt enterprise mobility solutions that are simple and transparent for clinicians and staff to use, that enable a greater degree of productivity across all user groups, and that provide the highest possible level of security for sensitive patient data.

About NetMotion Wireless

NetMotion Wireless develops productivity and management solutions for organizations with mobile workforces to secure and optimize their investment in wireless data networking. NetMotion Wireless customers include more than 1,900 of the world's most respected organizations across multiple industries including utilities, healthcare, communications, public safety, government, transportation, field service and many others. NetMotion Wireless is one of The 50 Fastest Growing Wireless Companies in the country and has earned over 25 industry awards for outstanding technology. Founded in 2001, NetMotion Wireless is headquartered in Seattle, Washington, with offices located in North America and Europe.

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