Introduction

A recent study among physicians revealed there are new opportunities for mobile devices and applications, as well as for associations that serve physician members. The key findings include the following:

1. There are many impressive mobile applications, devices, and uses already out there.
2. The role of mobile technology is seen as both a convenience and an intrusion.
3. There are mobile needs and opportunities that are nearly universal to physicians.
4. There are common barriers to implementing mobile solutions.
5. Health care associations can do much more to serve their constituents using mobile technologies.
6. The next big thing is still waiting to happen.

The Massachusetts Medical Society, American College of Rheumatology, and ICF Ironworks worked together this fall to poll their physician members and learn more about their current use and future expectations of mobile technologies. In addition, the survey revealed the driving factors and major barriers for using mobile devices, primarily smartphones and tablets.

Impressive Use of Mobile Solutions by Physicians Today

Applications

The market landscape includes a number of widely used and high-quality mHealth applications. The Pew Internet and American Life Project recently showed that while about 88% of U.S. residents have a mobile phone, half (50%) of those are now smartphones. One in 10 smartphone users have now downloaded a health-related app. The number of health-related apps in the Apple Store topped 13,000 earlier this year.

The number of physician-oriented apps is also rising, and physicians are also beginning to embrace mobile technology as part of their working environment.

Devices

Since the survey was conducted online, we were not surprised to find that nearly all (95%) responding physicians use a desktop or laptop computer for work, including 79% who use a desktop computer, and 61% a laptop (with 45% using both and 5% using neither). However, three in five (63%) say they use a tablet or smartphone for work instead of or in addition to their desktop or laptop device, including 56% who use a smartphone and 25% who use a tablet (with 18% using both and 37% using neither).

Personal use of mobile devices is even higher, with three-quarters (77%) using smartphones and nearly half (46%) using tablet devices. Only 56% say they use a desktop computer for personal use, though 78% use a laptop. The broad use of multiple devices indicates a level of comfort and acceptance of technology among physicians. Indeed, three in four (77%) indicate a high level of comfort with technology (rating their comfort a 4 or 5 on a 1-to-5 scale where 5 is “very comfortable”).
Among physicians who report using desktop and mobile devices for work, desktop and laptop computer users are likely to say they use them for a greater portion of the workday. Three in five (64%) who use a desktop computer for work use it “pretty much all day,” compared to 47% of laptop users, 32% of tablet users, and 32% of smartphone users.

**Common Tasks**

The most common tasks across all devices include accessing patient records; accessing drug and clinical references; accessing electronic medical/health records (EMR/EHR); and reading news, articles, or abstracts.

The device-specific task access varies. Tasks performed on desktop and laptop computers are generally similar, with the most frequent tasks being accessing patient records; accessing EMR/EHR; and reading news, articles, or abstracts. Desktop computers are used more often, however, for fast access to test results and medical imaging and for showing patients images, video, or other information.

Tablets and smartphones are used at about the same frequency to read news, articles, or abstracts; access drug reference database; and use clinical references.

Areas where mobile devices are used as much or more than desktop devices include reading news, articles, or abstracts; consulting a drug reference database; checking clinical references; looking up formulary information; receiving updates about new products; using a prescription dosage calculator; receiving appointment reminders; and accessing professional social networks.

When we look closely at the nature of these activities, mobile devices tend to be used more for tasks that involve information consumption or look-up, while desktop devices tend to be used more for tasks related to imaging, test results, coding, billing, and monitoring patients.

*Figure 1. Use of Devices for Work and Personal Use by Type*
### Figure 2. Task Completion by Device Type

<table>
<thead>
<tr>
<th>Task</th>
<th>Desktop</th>
<th>Laptop</th>
<th>Tablet</th>
<th>Smartphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read news, article, or abstracts</td>
<td>83%</td>
<td>73%</td>
<td>61%</td>
<td>64%</td>
</tr>
<tr>
<td>Accessing patient records</td>
<td>86%</td>
<td>78%</td>
<td>57%</td>
<td>13%</td>
</tr>
<tr>
<td>Drug reference database</td>
<td>62%</td>
<td>51%</td>
<td>52%</td>
<td>59%</td>
</tr>
<tr>
<td>Electronic medical/health records (EMR/EHR)</td>
<td>83%</td>
<td>70%</td>
<td>56%</td>
<td>14%</td>
</tr>
<tr>
<td>Use clinical references</td>
<td>67%</td>
<td>57%</td>
<td>44%</td>
<td>42%</td>
</tr>
<tr>
<td>Physician decision support tools and guidelines</td>
<td>54%</td>
<td>46%</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>Faster access to test results</td>
<td>71%</td>
<td>52%</td>
<td>35%</td>
<td>8%</td>
</tr>
<tr>
<td>Record clinical notes</td>
<td>67%</td>
<td>57%</td>
<td>39%</td>
<td>2%</td>
</tr>
<tr>
<td>Fulfilling prescription refills</td>
<td>63%</td>
<td>54%</td>
<td>35%</td>
<td>6%</td>
</tr>
<tr>
<td>Medical imaging</td>
<td>64%</td>
<td>40%</td>
<td>28%</td>
<td>3%</td>
</tr>
<tr>
<td>Look up formulary information</td>
<td>43%</td>
<td>33%</td>
<td>24%</td>
<td>2%</td>
</tr>
<tr>
<td>Receive updates about new products</td>
<td>37%</td>
<td>35%</td>
<td>22%</td>
<td>27%</td>
</tr>
<tr>
<td>Use prescription dosage calculator</td>
<td>30%</td>
<td>28%</td>
<td>20%</td>
<td>38%</td>
</tr>
<tr>
<td>Appointment reminders</td>
<td>35%</td>
<td>30%</td>
<td>15%</td>
<td>30%</td>
</tr>
<tr>
<td>Show patients images, video, or other information</td>
<td>44%</td>
<td>26%</td>
<td>19%</td>
<td>9%</td>
</tr>
<tr>
<td>Coding</td>
<td>36%</td>
<td>30%</td>
<td>20%</td>
<td>5%</td>
</tr>
<tr>
<td>Billing</td>
<td>33%</td>
<td>28%</td>
<td>20%</td>
<td>3%</td>
</tr>
<tr>
<td>Monitoring patients (remote)</td>
<td>26%</td>
<td>27%</td>
<td>17%</td>
<td>5%</td>
</tr>
<tr>
<td>Use professional social networks</td>
<td>18%</td>
<td>19%</td>
<td>9%</td>
<td>14%</td>
</tr>
<tr>
<td>Use screening algorithms</td>
<td>20%</td>
<td>15%</td>
<td>7%</td>
<td>11%</td>
</tr>
<tr>
<td>Measuring treatment compliance</td>
<td>12%</td>
<td>9%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Live video with colleagues or staff</td>
<td>7%</td>
<td>11%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Using telemedicine</td>
<td>5%</td>
<td>5%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

### Figure 3. Top Tasks Most Performed on Desktop or Laptop Devices

- Accessing patient records
- Read news, article, or abstracts
- Electronic medical/health records (EMR/EHR)
- Use clinical references
- Faster access to test results
- Record clinical notes
- Fulfilling prescription refills
- Drug reference database
- Medical imaging
- Physician decision support tools and guidelines
Both a Convenience and Intrusion

The survey uncovered a strong tension between the conveniences provided by mobile devices and the possibility that the devices could intrude on the personal lives of physicians. This tension is so powerful it was expressed even though the survey did not specifically seek to measure it. Nearly 1 in 10 responses included some reference to the “intrusive” nature of mobile technology, a need for separation from work, or a resistance to the omnipresent nature of mobile. “I don’t want to take work home with me,” said one respondent. “I don’t want to be working 24/7. I don’t want my phone to be my office. I want there to be some separation for my sanity and happiness.” Another noted: “A busy signal on my phone means that someone cannot reach me; different than constant contact by e-media.”

Not all respondents were negatively predisposed to the always-on functionality of mobile devices. Many cited the ease of accessing information promptly (particularly from electronic health records), the ability of more systems to communicate securely, more ability to share information, real-time access to data such as test results, the ability to send/refill prescriptions, and, interestingly, the ability to accurately capture dictation. “I just got my first smartphone a few weeks ago and already find it invaluable, if a bit intrusive,” said one physician who works at a hospital.

Universal Needs and Opportunities

Most physicians see their practice moving away from paper and desktop and toward mobile and digital tools and materials over the next three years. On a scale of 0 to 10, where 0 is “desktop/paper” and 10 is “mobile,” physicians on average rated their practice today 3.9 on a continuum between desktop/paper and mobile and said they expected three years from now to be at 6.4.
About 16% indicated that they did not anticipate any movement away from desktop/paper or toward mobile/digital, 19% expected to only move one step on the scale, and 20% expected to move two steps. The remaining 45% expected to move three or more steps on the scale.

In addition to the expectation, there is also interest in mobile devices to perform work-related tasks. Three in four (73%) indicate a high level of interest in mobile (4 or 5 on 1-to-5 scale where 5 is “very interested”) with 50% saying they are “very interested.” This interest in mobile device use has a strong positive correlation to comfort with technology. Conversely, technology comfort and interest in mobile technology decrease with age.

Among physicians currently using a tablet or smartphone for work use, nearly all indicated that they anticipated maintaining or increasing their level of mobile use for most of the tasks for which they currently use these devices.

The areas in which most physicians anticipated increased use of mobile devices include accessing patient records; showing patients images, video, or other information; having faster access to test results; and having access to EMR/EHR, clinical references, and medical imaging. The inclusion of some tasks and information that do not currently rank high in use suggest a positive outlook by physicians that access to EMR/EHR will become less restrictive and device security will enable better access through mobile devices.

Among those physicians not currently using mobile devices for work, the areas in which they expressed the greatest interest in using mobile devices emphasizes reference and information as well as access to patient records and EMR/EHR. Areas in which they expressed the least interest include video chat, product updates, telemedicine, and professional social networks.

*Figure 5. Mobile User Perception of Increasing Use of Mobile in the Future*  
(Top 10 activities for which mobile users expect to use mobile devices more)
Challenges and Barriers to Adopting Mobile

There are a number of limitations to smartphones and tablets that must be recognized. Despite what one respondent concluded—“iPads have their place, but they are not computers and I often find it frustrating that I cannot ‘compute’ with them”—we are indeed talking about real computers with more computing power than those that helped our astronauts get to the moon.

Our friend, Reggie Henry, the Chief Information Officer for the American Society of Association Executives, is on a mission to prove that he can do everything he needs to do on a computer with his iPad. With the right applications, there is little one cannot do on a tablet or even a smartphone, for that matter. On the other hand, there are times when a larger screen, full-sized keyboard, faster downloads, or additional ports, for example, are very handy. Each user will assess the relative convenience of these tradeoffs for increased portability, touch interfaces and all-in-one features.

Our survey found that the challenges to adopting and using mobile devices are not perceived to be as great by those who have been through the adoption process compared with those anticipated by physicians who have not, as indicated by the results in the chart below. Nevertheless, such factors as cost, privacy issues, lack of training, and limited support remain barriers to adoption for a majority of respondents. One respondent said: “I use a BlackBerry and, other than checking email and Epocrates, the screen is too small to make me even want to do anything else with it.” Certainly, some medical imaging cannot be viewed with sufficient resolution on a smartphone.

Figure 6. Interest in Mobile Device Functionality
(Top 10 activities for which non-mobile users express interest in mobile device use)
Online learning is the most useful association benefit for accessing on a mobile device, according to the survey. More than 70% of physicians say it would be convenient to access continuing medical education on mobile devices. It is readily available when they have a few minutes to consume educational content and take a test, much like an eBook.

Most respondents (69%) said they want mobile-friendly access to their professional association’s website for consuming content that is there. This would include clinical practice guidelines, journal articles, and policy position statements. With so many people using mobile devices to check their email, it is critical that they maintain a good user experience when linking from an email or e-newsletter to the association’s website. Many associations are considering responsive design techniques when they update their websites to allow users to use any device and automatically receive a user experience tailored to the width of the screen. This eliminates the need to maintain content separately for multiple devices.

Associations are increasingly using mobile solutions to assist their members who attend conferences and those who would otherwise be unable to participate in any given year. Attendees can maintain their schedules, network with other attendees, evaluate sessions, back channel with micro-blogging, and check speaker bios. Those individuals not in attendance can participate by tweeting with those in attendance, watching live feeds, and asking questions of speakers. One respondent went so far as to say: “Why do we still have to physically go to major conferences? I think all sessions should be available to watch live over the Internet.”

Several vendors provide off-the-shelf mobile solutions for conferences. However, some associations may prefer to develop their own mobile applications or websites. The decision of whether to offer a mobile app or mobile-friendly website will depend on wireless access at the facility, solution performance, frequency of content updates, and other factors.

Physicians are less likely to want to perform transactions from a mobile device, according to the survey. They are more apt to renew their membership, register for a meeting, or order a publication from their desktop computer. However, mobile commerce is on a steep upward curve as more and more brick-and-mortar retailers move to more efficient online stores and pass along the savings to their customers. Therefore, expectations may soon change.
The Next Big Thing for Mobile

Based on our better understanding of how physicians are using mobile technologies today, it is reasonable to project what may be coming in the next few years. While we must protect health care professionals from unnecessary intrusions, convenience for users and improved patient care is what will drive the next wave of mobile solutions.

Based on the activities that physicians in this survey identified for their use of mobile devices, we can safely conclude that a large part of mobile technology’s attraction during the workday is its impressive utility in point-of-care settings and for just-in-time information searches. But the technology’s convenience may be limited until most electronic health records are interoperable and physicians can update patient records on a mobile device. There is a need for improved methods to input data without the use of a traditional keyboard. Enhancements to voice recognition for both commands and dictation can be expected as well as intelligent, predictive touch screens.

Another innovation is the Bluetooth Health Device protocol that will allow mobile devices to maintain a wireless connection to various health monitors. In addition to helping the patient monitor their exercise routine, it can be used with blood glucose monitors and other devices to advance the area of telemedicine and improved outpatient monitoring.

For health care associations, members’ expectations for interacting with their professional associations and each other via mobile devices are ever increasing. Mobile adoption is quickly becoming so widespread that associations who fail to implement mobile solutions will appear ignorant to their members’ daily needs or, worse, appear irrelevant. Just keeping up with best practices is a challenge for many associations. However, there is an opportunity here for innovation. By closely examining the professional needs of their constituents, health care associations may also be able to help solve practice issues, clinical care challenges, and communications issues.

One such opportunity pertains to knowledge retrieval and sharing. We need to look for better ways to quickly obtain just-in-time knowledge from a wide variety of sources and yet focus sharply on very specific topics and types of knowledge content. As one respondent put it, it is critical to have unrestricted
easy access to medical information when you need it. There aren't enough hours in a lifetime to collapse the 'bench to bedside' gap for medical innovation to come into daily use without clinicians having OPEN ACCESS to literature. It takes TIME to incorporate new ideas, to discuss them among colleagues, to have time to hear how they've been useful for other patients, and in what situations... and wasting time to GET AT this information is time down the tank.”

Mobile search will likely become the preferred method of accessing research, databases, patient records, professional networks, peer discussions, and so much more. The key will be for advanced and personalized search algorithms that allow the user to find targeted content as well as discover relevant new sources of knowledge to which each individual user has access. This might include such things as a clinical trial in a foreign country, research in progress, articles from unconventional journals, and individuals with specialized knowledge. Think of this as finding that needle in a haystack, along with thread, fabric, and a seamstress.

At the rate that innovation in mobile computing is taking place, we cannot fully anticipate the next big thing. However, it is certain that there will be several mobile innovations that will improve convenience for physicians and quality of care for patients.

Respondent Profile

Respondents included mostly physicians in various practice settings. While 2% declined to answer, 53% identified themselves as male and 45% as female. The median age of those reporting is 52.

**Figure 9. Age**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger than 35</td>
<td>14%</td>
</tr>
<tr>
<td>35-44</td>
<td>17%</td>
</tr>
<tr>
<td>45-54</td>
<td>24%</td>
</tr>
<tr>
<td>55 or older</td>
<td>41%</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Figure 10. Principal Role**

- Physician in private practice: 50%
- Academic: 18%
- Physician at a hospital: 17%
- Certified Nurse Practitioner: 4%
- Research (hospital or private industry): 3%
- Physician Assistant: 1%
- Practice administrator: 1%
- Administrative (health plan, practice group, consulting, etc.): 1%
- Other: 5%
Survey Method

ICF Ironworks conducted an online survey among physicians as part of this research. The survey was distributed to Massachusetts Medical Society and American College of Rheumatology members via email by their respective organizations. As most of the respondents are physicians (85%), others work in or practice medicine in related fields. In this document, “physicians” is used broadly to refer to all survey respondents.

A total of 372 participants completed the survey, which was available online from September 27 to October 16, 2012.

The results of this study were initially shared by the authors at the ASAE Healthcare Association Conference on November 9, 2012.

About the Authors

Rick Johnston, CAE, is a Principal at ICF Ironworks and leads the organization’s Association Practice. He is a member of ASAE’s Healthcare Community Committee. Rick is a former National Vice President for the American Diabetes Association.

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About ICF Ironworks

Ironworks Consulting became a part of ICF International on January 1, 2012, combining ICF’s strong capabilities of strategic communications and systems integration with Ironworks’ expertise in digital and interactive media, mobile technologies, social media, and portal and content management.

ICF Ironworks combines strategy, technology, and design services to assist clients in the development of large-scale, complex technology projects. ICF Ironworks’ key service offerings are business and IT alignment, portal and content management, and interactive design. Headquartered in Richmond, VA, ICF Ironworks serves national and global clients from offices in the Washington, DC area; Charlotte and Raleigh, NC; and Minneapolis, MN. For more information, please visit ironworks.com.

About ICF International

Since 1969, ICF International (NASDAQ:ICFI) has been serving government at all levels, major corporations, and multilateral institutions. With more than 50 offices and more than 4,500 employees worldwide, we bring deep domain expertise, problem-solving capabilities, and a results-driven approach to deliver strategic value across the lifecycle of client programs.

At ICF, we partner with clients to conceive and implement solutions and services that protect and improve the quality of life, providing lasting answers to society’s most challenging management, technology, and policy issues. As a company and individually, we live this mission, as evidenced by our commitment to sustainability and carbon neutrality, contribution to the global community, and dedication to employee growth.

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