mHealth Trends and Strategies 2013

A special report by **netcentric strategies**

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Table of Contents

Executive Overview

Today books are becoming ebooks, DVDs are giving way to streaming video, album sales have morphed into single song sales online, classified ads have transferred from the local newspaper to Craig's List, bank branches are losing their relevance as mobile banking apps gain in popularity, product research is done on mobile devices, college degrees are being earned online and consumers are self-diagnosing their illnesses via mobile and online research. All of these market and behavioral changes are due to what is termed *digital transformation*.

All industries will be impacted to some degree by the digital transformation that is happening in 2013, however, industries that are driven primarily by information, such as healthcare, education, financial and public services will experience some of the most profound changes.

This digital transformation is happening as a result of technology innovations, cultural and population shifts, evolving societal behaviors, and changing market expectations. Even traditional industries not generally associated with leading edge technologies are experiencing the effects in their interactions with employee, partner and customers.

Leading these digital transformations are developments around SMAC (social, mobile, analytics and cloud) technologies. These developments change our interactions, communications and expectations on how people, organizations and businesses should engage with each other.

The process of digital transformation and the impact of SMAC technologies on the healthcare industry are and will be enormous. For the purpose of this report, we will focus most of our attention on the mobile component. In this report, we will refer to the developments and use of mobile technologies in the healthcare industry as mHealth.

Mobile technologies, including smartphones and tablets in particular, are transforming healthcare. Today when people want answers they search the Internet or a connected data source. When they want to remember an upcoming event they add it to a calendar supported by their mobile device. When they want to save information, they write a note, record an audio memo or take a digital photo and save it to their mobile devices and connected personal cloud storage services. When they want to communicate with friends, family members or healthcare providers they use their mobile devices, apps and social media technologies.

In this report we identify the major healthcare trends, mobile technologies and market behaviors that are transforming the healthcare industry today.

Paths for Growth

The mHealth market is growing globally as the global population, healthcare providers and insurers increasingly adopt smartphones, tablets and related mobile apps, and both expect and demand more mobile app use and support from their service providers. In addition, healthcare providers and insurers increasingly recognize these technologies can benefit their businesses by helping improve services while reducing costs. According to Research2guidance's Global Mobile Health Marketing Report 2013-2017, the mHealth market will grow to be worth $26 billion by 2017.

While we are seeing explosive growth in most mHealth technology and application areas, we have identified several overarching trends that are symbiotically building the foundation for the future.

- The recognized need by providers, insurers, and governments to improve services and reduce the costs of caring for those with chronic illnesses.

- The emergence, and proliferation of smartphones, broadband internet access, dedicated remote patient monitoring devices, and patient-centric applications

- Patients increasingly understand how mHealth technologies can help them better communicate with providers and manage their health.

- The rapid movement toward standards that will form the backbone for interoperability.

Factors Shaping the Trend

Four factors are coming together to push healthcare into an alliance with mobile technology:

1.) New Technologies

New technologies such as smartphones, broadband internet access, M2M wireless embedded chips, dedicated remote patient monitoring devices, patient-centric applications, and even social media are connecting patients to providers in new and profound ways. Their reduced cost and increased acceptance by the consumer is a major driving force of this mobile and wireless transformation.

2.) Population Age

The demographic fact is that our global population is growing older and the median population age is increasing along with the attendant increases in chronic illnesses. In the past century, the world population has quadrupled, now surpassing seven billion people. Current population growth is not being fueled by new births. Rather, it is due to increases in life expectancy. Asia, for example, has seen life expectancy increase from 40 to 70 years

over the past six decades alone.[1] As public sector healthcare tries to assure access and maintain quality standards for an ageing population, it is looking to the private sector for innovations and efficiencies. mHealth improves access and appears to be effective in meeting or improving quality of care. Its innovations also promise to offer measurable cost reductions.

3.) Foundation in Place

The foundation for mobilizing healthcare is well established with many technologies available to facilitate widespread adoption. Examples include: electronic medical records (EMR), remote patient monitoring (RPM), bi-directional communications technologies, and mobile platform-as-a-service solutions, like AnyPresence, Netbiscuit, Webalo, etc., that quickly and easily mobile-enable business processes. The concept of "Care anywhere" is already taking root with physicians and patients.

4.) Move to Personalized Care

Like many other industries, healthcare is increasingly using personal data to enhance the user experience. mHealth can draw on this data to offer personal toolkits for predictive, participatory, and preventative care.

> *"mHealth is not a separate industry, but rather it's the future of a healthcare industry that's evolving to care for patients differently, putting them first to deliver services better, faster, and less expensively."*
>
> *David Levy, M.D., Global Healthcare Leader, PwC*
> *(PwC, Analysis and Trends in mHealth)*

Although standard procedures and benchmarks of patient care have remained reasonably unchanged for decades while medical technology has made significant strides, we see a convergence of trends that is revolutionizing the relationship of individual patients to their care. We believe these four trends, for the reasons stated, will profoundly impact and shape the future of healthcare.

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[1] https://www.allianz.com/en/press/news/studies/news_2011-10-14.html

Looking Forward = Looking to Screens

According to Manhattan Research's *Cybercitizen Health® U.S. 2012 study,* smartphone and tablet health activity adoption continues to accelerate. In the U.S. population, consumer use of multiple screens for health activities has increased dramatically: The number of U.S. adults (ages 18+) using mobile phones, including smartphones, for health information grew from 61 million in 2011 to 75 million in 2012. Tablet related healthcare activity doubled from 15 million to 29 million in the same time period.

Globally, analysis shows that mobile hardware penetration is even more dramatic. Using data from the International Communication Union, Price Waterhouse Cooper concluded that entering 2012, the world's seven billion people had nearly six billion mobile phone subscriptions—and that connections would outnumber people by the end of 2013, revealing a market that is well developed yet still has an enormous reservoir of potential growth to come. Moreover, their data suggests that the developing world is increasingly adopting mobile technology, leading us to believe that market potential is still expanding and new markets are evolving.

> *"Smartphones and tablets have improved so much as image capture and display devices, that they permit remote diagnosis with accuracy rates that approach in-person examination,"*
>
> *-Tom Elliott, Director of Emerging Markets, Strategy Analytics*

Patient and Provider Behavior

Consumer Demand Drives mHealth App Development

A recent report by Research & Markets[2] predicts the mHealth application market will grow to more than 3.4 billion smartphone and tablet users, with 50 percent of them downloading mHealth applications.

Among the 15 percent of online consumers who currently have three devices (tablets, smartphones, and desktops/laptops) and use at least one of them for a health activity, 60 percent are using all three devices for online health information and tools.

This is creating a powerful demand for various free and paid apps for smartphones and tablets. The top ten mHealth applications analyzed by Research & Markets have generated nearly four million free downloads and 300,000 paid downloads.

The same Research & Market report observes that the mHealth app market is currently in the commercialization phase, when the market is flooded with competing apps. Regulations, which are one aspect of creating standards, must be adopted to allow the app market to enter the integrated phase. At that point, the report posits mHealth will become more integral in physician treatment plans.


[2] Reported in Healthcare IT News

Moving to Greater Physician and Patient Acceptance

With the basic requirement—widespread smartphone, mobile phone, and tablet use—well-established, attention now can turn to barriers that physicians and patients might have to the adoption of mHealth initiatives as a significant part of their ongoing health care.

Paths to Growth, a recent survey by Price Waterhouse Cooper, reveals that patients believe mHealth offers them easier access to care and more control over their own health; and 59 percent of respondents said mHealth services have replaced some of their visits to doctors or nurses.

The same survey, however, found only 27 percent of physicians actively encourage patients to manage their own health through mHealth applications. Thirteen percent, in fact, report they actively discourage mHealth participation.[3]

While physicians may not be the early adaptors for monitoring, compliance, and other aspects of everyday patient care, we predict the trend and pace for supporting and adopting mobile technologies will only increase in the foreseeable future.

Physician Adoption of mHealth Tools 2012

	European Physicians	U.S. Physicians
Adoption	26%	30%
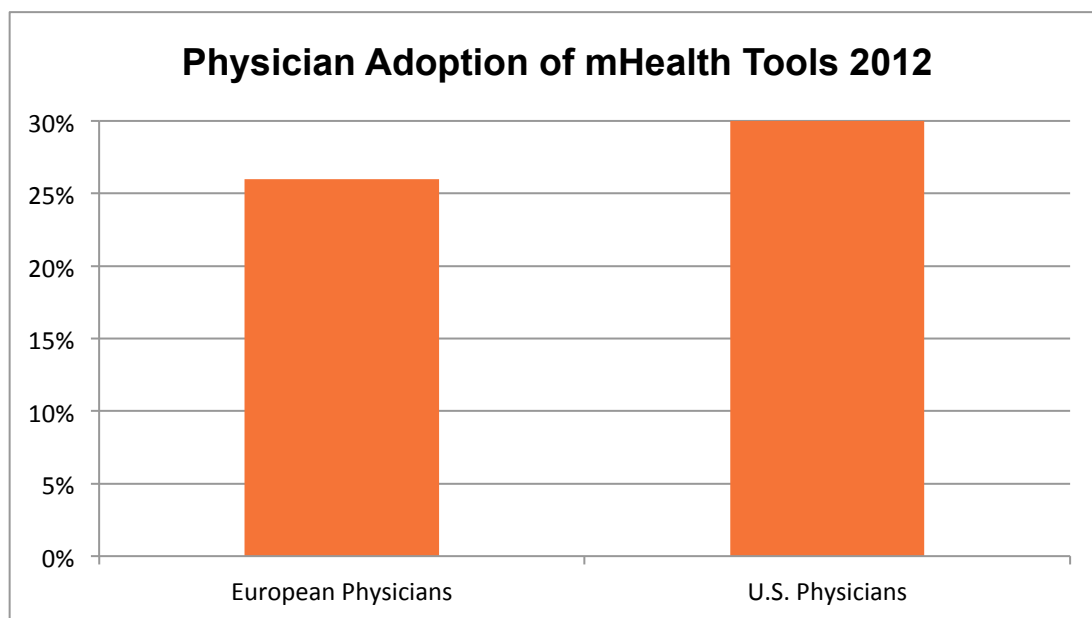
Source: Price Waterhouse Cooper, Emerging mHealth: Paths for growth, June 2012

Still, some mHealth functions are primed for widespread adoption, particularly in the areas of Remote Patient Monitoring (RPM) and Preventative Medicine, such as patient compliance. We believe patient demand will continue to pressure providers to use mHealth solutions, breaking down the barrier to adoption and increasing utilization.

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[3] http://blog.inside-healthcare.com/?p=736

Remote Patient Monitoring

The Population

RPM refers to any technology, or system of technologies, that extend health care to patients outside of traditional clinical settings. Examples include smartphone apps for monitoring or collecting data on patients and equipment sensors that monitor patients' vital signs. The smartphone has the potential to dramatically impact RPM because of its versatility (each phone is a computer that can be programmed to run virtually any software application), low cost, and ubiquity. RPM offers advantages for patients as well as for hospitals, since it can help patients return to their homes while maintaining a connection to health care providers, and it allows hospitals to free up bed space.

According to a report by GBI Research, one of the main drivers for RPM adoption is in the care of the fast-expanding population of chronic disease patients, with diabetes and cardiovascular disease (CVD) prevalent, particularly in developed countries. In the U.S., diabetes is predicted to rise to 29.6 percent of the population by 2030; globally, diabetes patients are projected to reach 552 million by that date. More pressingly, diabetes caused 4.6 million deaths and more than $450 billion in healthcare costs in 2011.

The cost of cardiovascular disease treatment is expected to triple by 2030, and deaths are projected to exceed 25 million globally by that date. RPM devices could help alert physicians to a recurrence of systems in discharged CVD patients; implantable RPMs used in at-risk patients can alert medical centers to early warning signs of cardiac arrest.

The System

David Lee Scher, the author of the blog The Digital Health Corner, has thought extensively about the role of RPM systems in the health care universe. He defines them as designed for post-acute care patients recovering from a hospitalization or for patients suffering from chronic diseases. He states that a PRM system should include communication tools, and ways to measure medication adherence and key physiological signs such as:

- glucose measurements for diabetics
- oxygen saturation measurements
- symptom reporting
- vital sign measurements.

Thinking past the basics, Scher suggests five key points for constructing the ideal RPM system:

1. Unified and integrated technologies often available only through a single vendor.

2. Easily implemented and unobtrusive solutions that can be supported by the caregiver. Trust begets confidence.

3. Includes population alerts and personalized alerts.

4. Have a closed loop system: every alert should be responded to with an interaction. "The system must be bi-directional to work."

5. Seamless integration with PHR and HER: make certain that data can be incorporated with minimal clutter and shared with caregivers.

The Financial Case

RPM systems can achieve significant cost savings for state healthcare systems, according to GBI Research. They can reduce the number of clinic visits and hospitalizations and shorten the duration of hospital stay. To put a human face on their impact, RPM systems can benefit chronically ill elderly patients for whom traveling to see clinicians may be a burden. They can also help relieve the healthcare workforce: the U.S. alone is expected to face a shortage of more than 120,000 healthcare professionals by 2025.

With all of these factors, the RPM market is expanding rapidly. It grew 20 percent from 2011 to 2012, to $10.6 billion, and is projected to reach $20.9 billion by 2016 (Kalorama Information). [4] The U.S. market, valued at $104.5 million in 2012, is projected to be worth $296.5 million by 2019, a compound annual growth rate of 16 percent. Moreover, there is a possibility of the federal government playing a more active role in promoting RPM activity.

However, GBI notes there are potential financial obstacles to rapid widespread RPM adoption:

• RPM systems must convincingly demonstrate they can reduce the length of hospital stays.
• Educating patients and clinicians in use of RPM devices is expensive.
• Staff for monitoring and responding to alerts is costly.

Overall, the research concludes the adoption of RPM systems will continue to rise as issues of interoperability, privacy, and security are resolved. It is worth noting that RPM may receive a strong boost from federal involvement in the near future. U.S. Representative Mike Thompson (D-CA) introduced the Telehealth Promotions Act of 2012, which seeks to promote and expand the application of telehealth under Medicare and other Federal health care programs, and is intended to increase access to telemedicine—including telehealth and mHealth—within Medicare, Medicaid, the Children's Health Insurance Program, TRICARE, federal employee health plans and the U.S. Veterans Affairs Department. The bill is currently in the House Subcommittee on Health.

We believe that although they are more sophisticated and costly than smartphone/mobile phone-based apps, changes mandated by the Affordable Care Act as well as legislation now under consideration will give a large boost to RPM.

[4] Reported by Clinical Innovation and Technology

Preventative Technology

Patient Interaction with Apps

As we have seen, experts believe the successful introduction of RPM systems is in large part dependent on the training and comfort level of both physician and patient. Simultaneously, another path is opening up – patients are taking the initiative. We believe patient initiative will have a strong impact on physician adoption fueled by the ubiquity of mobile technology and familiarity with the base technologies: mHealth via smartphone, mobile phone, or tablet app.

In many cases, patients already using mobile technologies download the apps themselves as a way to remind them of basic instructions such as when to take their medicines or when to order prescription refills.

This addresses a significant healthcare problem. According to the National Institutes of Health[5], one in five patients fails to fill new prescriptions and half of those being treated for chronic conditions stop taking their medications after six months. The costs to the healthcare system are severe: the resulting additional treatments and hospital stays cost as much as $289 billion a year and the missed doses result in an estimated 125,000 U.S. lives lost per year (NEHI).

Prescription Drugs in America
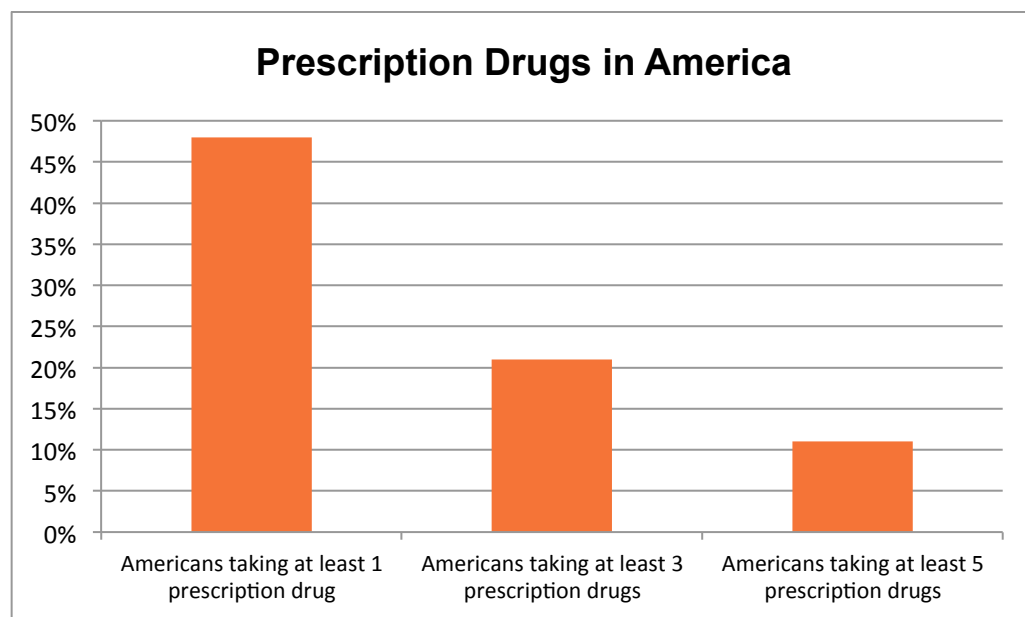
Source: Centers for Disease Control and Prevention, http://www.cdc.gov/nchs/fastats/drugs.htm

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[5] Reported in Bloomberg Business Week, 4/1-4/7 2013

Improving Patient Compliance

Patient adherence to taking their prescriptions as prescribed is a problem that we think smartphone and mobile phone apps are well-suited to address. And in addition to patient's themselves using these apps, there is opportunity for mobile technologies to assist long-distance caregivers as well. For example, an adult child may not be able to move across town to care for a parent, but with RPM and mobile technology it is possible to keep an eye on mom or dad's vital statistics and receive an alert if anything goes wrong. According to the National Institute on Aging, there are approximately seven million long distance caregivers who could be aided by this type of technology.[6]

Mango Health, a start-up company, offers a multi-faceted smartphone application to help consumers keep track of what they should be doing to safeguard their health. Users download the app, and then enter their medications or supplements, timing, and doses. The drug interaction database informs users if their prescribed drugs have potentially dangerous interactions with other medications, supplements, food, or drink. Then the app automatically sends reminders when it's time to take medications and supplements based on a patient-set schedule.

As a further way to encourage healthy behavior, Mango Health uses game-design principles to create a reward system for healthy behavior. Users earn a type of app-specific "currency" that can unlock real-world rewards with Mango's partners, including donations to charities and rewards at stores like Target. (Mobihealthnews.com).

We believe innovative solutions such as these have the ability to change patient behavior and create new channels of interaction that increase compliance.

> *"Because our phones are always at our sides, the right software can help ensure that we immediately understand potential interactions between medications and supplements before we take them, that we never miss a scheduled dose, and that we are kept in the know about information that could affect how well our medications and supplements work."*
> *- Mango Health*

Pushing People to Better Fitness

The connectivity that makes mHealth possible need not only involve ongoing or chronic medical issues. It can also encourage preventative activity.

For example, a company called Gain Fitness offers a free iPhone app that promises customers it will build a customized workout, regardless of skill level. Features include a "smart, sweat-tracking calendar" that "keeps you focused and accountable," HD video of exercises with directions, and audio cues. Users get workouts and plans matched to their fitness level, goals, and time constraints directly on their devices.

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[6] http://caringconcierge.wordpress.com/2012/03/27/308/

One of the fastest-growing—and increasingly personalized—categories of apps are those focused on personal training and health maintenance. From apps that tell you how much you walk every day to how much you sleep each night, we believe this category of "preventative mHealth" plays an important role in maintaining and improving individual habit change, leading to better fitness.

SMS: Promoting Simple and Effective mHealth

Our research leads us to believe simple solutions may have the greatest impact on mHealth in the near-term. For example, SciDev.net reports applications such as text messages could save more than a million lives in Sub-Saharan Africa over the next five years.

Much progress could be made with simple, relatively inexpensive, and common mobile phone solutions. A report produced by consultancy PricewaterhouseCoopers (PwC) India, says that Africa's low adoption of mHealth solutions contributes to the three million lives lost each year across Africa to HIV/AIDS, tuberculosis (TB), malaria and pregnancy-related conditions. Some of these lives could be saved by use of simple SMS text messages that alert patients to comply with treatment.

Automated text messages could also help healthcare providers be more prepared. "Many of the deadly conditions are relatively simple to treat, prevent or contain. SMS reminders to check stock levels at health centers have shown promising results in reducing stock-outs of key combination therapy medication for malaria, TB and HIV," says the Price Waterhouse Coopers report.

This technology approach has already proven effective in Tanzania, where a unique healthy pregnancy text messaging (SMS) service reached 100,000 active registrants in March 2013.

Wazazi Nipendeni' (Parents Love Me) is an mHealth Tanzania Public Private Partnership that sponsors a national healthy pregnancy and safe motherhood multi-media campaign. The partnership strengthens the campaign by providing informative text messages and appointment reminders in Swahili at no charge for pregnant women and mothers of newborn babies up to 16 weeks of age. More than four million text messages have been sent to those who signed up for the free healthy pregnancy and safe motherhood information since its launch late November 2012 (PRWeb.com).

SMS solutions that are deployed in developing countries may be gaining the most attention but we believe there is tremendous potential across all economic and geographic areas

Security, Standards, and Interoperability

The global adoption of mHealth initiatives will continue to face security and compliance issues in the near-term. Those issues will remain, and in some cases increase, as organizations choose to support a BYOD (bring your own device) environment.

Andrew Brown, Executive Director of Enterprise Research at Strategy Analytics states, "In an environment where BYOD is more and more common, health care organizations need to be especially vigilant to safeguard patient confidentiality while reaping the benefits of remote image access on multiple platforms. Ensuring regulatory compliance in healthcare remains critical."

We believe that thinking beyond individual devices, interoperability across operating systems is essential to supporting scalable mobile healthcare solutions. However, according to a survey by Price Waterhouse Coopers, adoption of standards and guidelines has been inconsistent.

The chief obstacle is the prevalence of proprietary end-to-end solutions designed to capture and protect an installed base. The result is systems that are "difficult to integrate." A separate PwC report notes that interoperability is crucial to continued adoption of mHealth technology and that "interoperability across diverse systems and vendors is essential to create truly scalable mHealth solutions." However, PwC observes that published interoperability guidelines for connected health devices from the Continua Health Alliance, a non-profit industry organization that certifies mHealth solutions globally, are being inconsistently adopted.

Regardless of the varying degrees of application sophistication, our research concludes that the communications infrastructure now exists to link populations of almost any income level or geographical location to a health resource, making mHealth the most promising area for growth in the healthcare industry.

Summary

Today there is a recognized need by providers, insurers, and governments to improve services and reduce the costs of healthcare in general, and specifically for the ageing populace and those with chronic illnesses. The emergence, and proliferation of smartphones, broadband internet access, dedicated remote patient monitoring devices and patient-centric applications, plus a new understanding on the part of patients of how these technologies can help them, are offering a unique opportunity to transform healthcare and healthcare economics.

Four trends are coming together to encourage the healthcare industry to embrace mobility:

1. Mobile and wireless technology innovations are connecting patients to providers in new ways are opening up opportunities for new kinds of services and relationships. These technologies, along with emerging standards for secure data management are propelling digital transformation.

2. Our global population is growing older and the median population age is increasing along with the attendant increases in chronic illnesses. New, efficient and cost effective ways of treating these populations are required, and mobile and wireless technologies are a promising part of that.

3. The mobile and wireless technologies foundation for mobilizing healthcare is in place, and both patients and healthcare providers are widely embracing it both in their personal and professional lives. We believe patient demand will continue to pressure providers to expand the use of mHealth solutions, and initial objections by healthcare providers will quickly erode in the face of patient and market demand.

4. We believe mobile apps enable interactions with healthcare providers that will ultimately lead to improvements in personalized, predictive, participatory, and preventative care.