

Version

1

Segue Technologies, Inc.

HEALTH IT

The Digital Patient



www.seguetech.com

Version 1.0



Published 2013 by Segue Technologies, Inc.

Cover Design, Layout, and Illustrations created by
Segue Technologies.

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www.seguetech.com/blog

About Segue Technologies

Segue has developed innovative, dependable, and user-friendly applications since our founding in 1997. We provide a wide range of Information Technology services, focusing on Software Engineering, Information Management, Quality Assurance, and Systems Integration. We are a growing small-business, supporting Federal, Commercial, and Non-Profit clients.

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FOREWORD

Massive adoption of the Electronic Healthcare Record (EHR) by doctors and hospitals nationwide was expected to transform the delivery of health by both lowering costs and improving quality. Technology, however, has not remained static while this implementation has been occurring, and even as we begin to see benefits of the EHR falling into place, it is accompanied by an explosion of mobile apps and social media use that is changing us all into a new type of healthcare participant: the “digital patient.” Doctors are encouraging patients to use mobile apps in ways that would have been unheard of just a year ago. Recent polling indicates that 89% of physicians would recommend a mobile health app to a patient, and 93% of physicians believe that mobile health apps can improve a patient’s health outcome. Industry data in April 2013 showed over 31,000 health, fitness and medical related apps on the market.

Patient engagement is a key concept of healthcare reform, and more than ever, patients want to connect through social media. Platforms that were once the province of teenagers are now the go-to method for information and communication for patients of every age group. Doctors and hospitals are increasingly using social media to solicit feedback from patients and improve the delivery of care.

This eBook is a collection of blogs written by our technical experts and based on our experience working with clients in the Health IT environment. The first part of our eBook looks at the concept of a digital patient. The next section reviews some of the biggest trends in these areas that are affecting

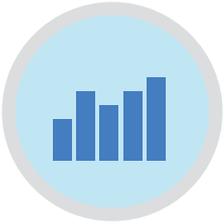
Health IT now. Trends that emerge so quickly and forcefully can also create chaos to accompany the exhilaration. Organizations, already busy with current transformation efforts, can get dizzy trying to accommodate even more change. Privacy concerns, HIPAA compliance, and data management are all areas that accompany mobile apps and social media as they enter the health environment. The second part of our book takes a look at some of these issues. The final section takes a closer look at the emergence of mobile applications in the Health market: how is mobile going to change the way that health care is delivered?

We are excited about the possibilities that being created every day through innovation and creativity in Health IT. Our vision of health and patients continues to evolve as we move forward.

A handwritten signature in black ink that reads "Peggy McShane". The signature is written in a cursive, flowing style.

Peggy McShane
Managing Director, Segue Health

Health IT: Mobile and Social



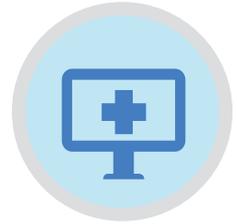
DATA

- 75% of adopters reported that using their EHR system resulted in enhanced patient care.
- 75% physicians who have adopted an EHR system reported that their system meets federal "meaningful use" criteria.
- Nearly 50% of physicians currently without an EHR system plan to purchase or use one already purchased within the next year.



MOBILE

- 80% of doctors use mobile devices at work.
- 59% of consumers who use mobile health services report the services have replaced some doctor visits.
- One-fifth of smart-phone owners have health apps.
- 75 million: The number of adults using mobile phones for health information in 2012.



COMMUNICATIONS

- 60% of doctors say social media improves the quality of care delivered to patients.
- 45% of individuals 45-64 would share health information via social media. More than 80% between the ages of 18-24 would share.
- 41% said social media would affect their choice of a specific doctor, hospital, or medical facility.
- 50% of physicians access YouTube for medical purposes.

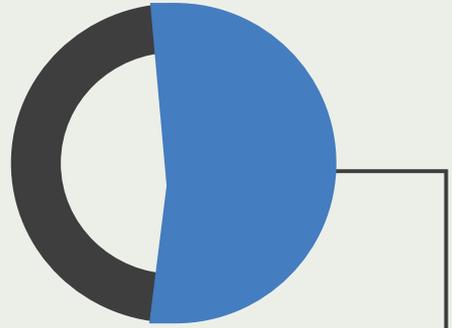
Health IT: Mobile and Social



TRANSFORMING COMPLEX DATA INTO USEFUL HEALTH INFORMATION

NEARLY **50%**

of physicians currently without an **EHR system** plan to purchase or use one already purchased within the next year



80%

OF DOCTORS

use mobile devices **at work**



59% of

OF U.S. ADULTS



Chapter 1

Environmental Scan:

The Digital Patient

What Does a Digital Patient Look Like? Model T's, Smart Phones, and Fitbits

by Peggy McShane

While preparing for the 2013 National Health IT Week, Segue Health was fortunate to have the opportunity to speak with [Dr. Doug Fridsma](#), Chief Science Officer and Director of the [Office of Science and Technology Policy](#) in the Office of the [National Coordinator for Health Information Technology \(ONC\)](#) about his thoughts regarding “The Next Generation of Health IT.” While it is tempting to talk about the potential effect the use of technologies such as [Google Glasses](#) or the rumored Apple [iWatch](#) could have on

Health IT, Dr. Fridsma stated that it is always dangerous to try to predict the future; instead, he envisions the real innovations and surprises will come from the impact of patient engagement.

The recent focus on the transition to Electronic Health Records (EHR) has given the Health IT world a tremendous push, but EHRs are primarily focused on providers. mHealth is more about consumer and patient engagement. One of the goals of healthcare reform is to create a system that is really about consumer engagement, an environment in which patients are not just the object of the healthcare system but fully fledged members of the health community, engaged as a vital part of the whole process.



Figure 1

Consider the [Fitbit](#). This particular smart phone gadget tracks several meaningful aspects of a patient’s health: exercise, sleeping, blood pressure, and weight. It generates a huge data set of information, more than a provider might actually want to review, but in Dr. Fridsma’s eyes, the real value of this technology is less about collecting information than in how it is engaging the patient. Individuals paying close attention to these personal health aspects are people who are engaging in a major way in their own wellbeing. And in health, we are just at the very beginning of seeing how this type of engagement is going to look.

PATIENT ENGAGEMENT THROUGH SOCIAL MEDIA

We see patient engagement also happening through social media – patients not only expect, but increasingly demand connectivity and interaction. People are using social media to solve problems and provide understanding that used to require the work of researchers and reporters. Yet it is important to recognize the strengths and limitations of this tool. Social media users can perceive a sense of urgency or reality based on input from other users that really doesn’t capture enough data to equate to a formal medical study. But Dr. Fridsma thinks the real potential of social media is still emerging. The way patients are using social media and associated tools is significantly increasing the way they engage in their health, to include everything from taking pictures of ongoing symptoms to share with a provider to reaching out to “patients like me” to connect with others experiencing similar symptoms.

For Dr. Fridsma, the anticipation is less about new technologies and more about watching the novel ways consumers will apply these technologies to the health environment. Smart phones didn't decide to include hi-res cameras to support healthcare, but the result has been that patients increasingly use their phones to help their providers make better diagnoses. He illustrates his point with an historical analogy: in the early 1900s, there was a series of articles, aimed at the medical professional, about the "physician's auto," discussing how the purchase of an automobile might impact a doctor. Articles looked at how using this new technology might impact costs, safety, and the delivery of healthcare. Then, in 1912, Ford began producing the Model T; suddenly, cars were so affordable that private vehicles were reasonable for the general public. As patients came to commonly own their own mode of transportation, healthcare was greatly impacted. Doctors stopped making house calls and patients began reliably driving themselves to seek treatment.

This example illustrated what Dr. Fridsma sees

happening now: Ford didn't begin producing their cars to impact the delivery of healthcare, but the implementation of this technology resulted in permanent changes to consumer engagement and how healthcare was provided. The same thing is happening again and again as mobile technology continues to evolve and patients continue to find ways to make technology matter in their own treatment.

The ONC continues to work on getting data out of paper and into an electronic format through [Meaningful Use](#) and other initiatives, but Dr. Fridsma emphasizes that a real definition of success is about people pulling sound information, demanding it, and making healthy choices based on it. He envisions patients making choices about providers as well, based on the provider's ability to provide the sort of connected and integrated [health information management](#) patients want.

His prediction:

Once consumers get a real sense of the value Health IT can deliver, it will be impossible to stop providing such services.

About the Author

As the Managing Director of Segue Health, Peggy leads business development and client account management for the Federal, Commercial, and Non-Profit health market segments. As part of this leadership, she works with Segue's ownership and technology teams to define innovative services and solutions, with the ultimate goal of supporting emergent health systems to transform health data into practical and useful information.

Social Media's Impact on Health IT: What Patients Expect

by Christina Cavoli

Research has shown that patients are using social media in increasing numbers to find health information and make health decisions. Whether it is a comfortable fit or not, doctors have an obligation to leverage this tool to make sure their patients are getting accurate information.

One in five Americans use social media websites as a source of health information, according to National Research Corp.'s [Ticker survey](#), with the vast majority (94 percent) using Facebook. This usage is not merely speculative; when asked about social media's influence, one in four respondents said it was "very likely" or "likely" to impact their future health decisions. It has long been acknowledged that a majority of patients are seeking information online—in fact, a recent [Pew study](#) shows 80 percent of Americans obtain health data online, and that health information is the third most popular online pursuit. In response, many health organizations have reputable and helpful websites. The growing reliance on social media needs to likewise be addressed.

Supplying patients with correct information in a digestible format is critical. People who have difficulty understanding health information have poorer overall health and a higher risk of death, according to a study by the Agency for Healthcare Research and Quality (AHRQ). People with low health literacy are also more

likely to use hospital emergency rooms and inpatient care and less likely to get flu shots or mammograms. The findings are significant, as more than 75 million adults in the United States have limited health literacy, and such inability to comprehend and use health information costs the U.S. economy as much as [\\$238 billion](#) each year.

Social networking should not be considered just another marketing gimmick. There is evidence that leveraging Facebook can boost patient engagement. Patients that engage in interaction before an appointment have a more meaningful experience. In addition to allowing professionals to connect with patients, it also encouraged patient-to-patient communication that is more comfortable and familiar to many users than the traditional support group formats. These “virtual” support groups allow patients to exchange emotional support and information, and are available to them 24/7.

Yet hospitals are not taking advantage of the opportunities Facebook creates to better engage patients, build healthcare communities, or develop their hospital brands. A [study](#), conducted by Verasoni Ah Ha! Insights, indicated that only a few hospitals across the country are really using social media. Less than 40 percent of hospitals posted daily to their pages, and only 6 percent had more than 10,000 fans. Yet on hospital pages where there is a high degree of interaction between the hospital and members, the study found that patients, family members, friends, and members of the community used the hospital’s Facebook presence to share experiences, laud, connect, and recommend hospital services, and in some cases praise certain physicians.

No one expects social networking to work for all aspects of health. One recent [study](#) shows that while patients would be willing to use secure messaging to go online with their doctors, they reject the idea of using social media to consult with their physician. Still, as social networking continues to grow, this may change; an [Intuit Health study](#) indicates that currently, a major trend regarding Americans and their health is that they expect their physicians to be easily accessible online. Seventy-three percent of Americans surveyed would prefer to use a secure online communication solution to make it easier to get lab results, request appointments, pay medical bills, and communicate with their doctor's office.

For many, social media seems particularly susceptible to incurring a privacy violation. It is true that patient information exchanged via social media networks as well as mobile devices is subject to all HIPAA regulations. Others worry about the need for greater accountability and guidelines. JAMA recently published a related [survey](#). The authors analyzed the tweets of about 250 physicians for a one month period who had at least 500 followers. The analysis has raised some concerns as some tweets contained potential patient privacy violations and conflicts of interest. Yet this concern may be overstated; the vast majority of tweets was professional in nature, with only 38 messages (0.7%) of all tweets analyzed representing potential patient privacy violations.

The turn from seeking online information to social media is a shift practitioners need to notice. Social networking can be leveraged to improve patient care, communication, and trust; stakeholders across the industry need to find a level of comfort and engage in this process.

About the Author

As a content manager consultant for Segue Health, Christina Cavoli contributes communications and outreach support to provide background research and a variety of marketing and business development products. Recent research efforts include a focus on the current financial implications of Meaningful Use Stimulus funds. Christina has a background of working with federal agencies and institutions in a communications capacity.

Chapter 2

Policy and Trends Impacting Health IT

Stronger HIPAA Requirements Are Here to Stay

by [Christina Cavoli](#)

READY TO REVISIT COMPLIANCE?

September 23rd marked the compliance date for the Omnibus Final Rule for HIPAA regulations, written earlier this year. These rules, that the Department of Health and Human Services (HHS) promises are the toughest to date, affect Covered Entities (CEs) (health plans, healthcare clearinghouses, healthcare providers), and their Business Associates (BAs) that handle protected health information (PHI) to ensure that it is handled in a secure, regulated fashion. Responsible organizations that break the rules can ex-

pect increased, hefty fines- up to \$1.5 million a year for repeating violations, with individual penalties for willful neglect breaches ranging from \$100 to \$50,000 per incident.

Understanding compliance with these regulations is critical when developing, implementing, and using Health IT systems.

CHANGES RESULTING FROM THE OMNIBUS FINAL RULE

So what's new? Highlights from the 563-page [ruling](#) include a change to the very definition of the word "breach." Previously, HIPAA invoked the "harm standard" for a breach, defining that it occurred when compromised security or privacy of PHI posed significant risk of financial, reputation, or other harm to an individual. In the Omnibus Final Rule, a breach is now defined as: "impermissible use or disclosure of PHI is presumed to be breached unless an entity demonstrated and documents low probability that PHI was compromised." This focus doesn't look at harm to a patient; it considers only whether information has been compromised, and shifts the burden of proof to the CE to provide risk analysis.

The final rule also makes BAs accountable for violations of specific privacy and security rules. This shouldn't be construed to mean that CEs are not also culpable; rather, both groups will be responsible for their own HIPAA violations. The final rule expands the definition of a BA to include health information organizations, e-Prescribing gateways, certain EHR providers, patient safety

organizations, data transmission service providers with access to PHI, and contractors involved with PHI. Additionally, BAs that employ subcontractors must use a contract that is as stringent as that between the CE and the BA.

IMPACTS OF THE OMNIBUS FINAL RULE ON HEALTH IT

How will this affect the production of mobile medical apps?

Developers need to start by asking two questions: Who will be using the app, and what information will be contained within the app? If the application is to be used by a CE, such as a physician or hospital, and if it will contain any PHI, such as individually identifiable information about health, it must be designed to be HIPAA compliant. On the other hand, if an app is for use by patients—such as a smartphone reminder to adhere to a medical regimen - it does not fall under HIPAA.



Figure 2

Another area of concern is cloud computing; despite the advantages of this approach, organizations are often hesitant to use it because of concerns about security and compliance. However, a [review](#) of HIPAA breaches published by HHS shows that to date, most cases of theft or loss of PHI involved a laptop or electronic media containing unencrypted PHI. Cloud-based services may in fact better incorporate all necessary and appropriate security and compliance infrastructure to avoid running afoul of HIPAA regulations than more traditional IT storage methods.

For designers of mobile apps and software to be used in a health IT environment, it is important to remain engaged and updated on HIPAA regulations. A clear understanding of the kind of data to be handled and the audience for the data is critical in ensuring correct compliance is built into the design.

Private, Secure, and Open for Sharing – Is There a Pragmatic Solution for Health IT?

by [Christina Cavoli](#)

The United States could achieve significant healthcare savings if it achieves widespread adoption of electronic health records (EHRs), but insufficient privacy protections are hindering public acceptance of the EHR concept, according to a new paper from researchers from North Carolina State University. The government is scrambling to create regulations that can catch up with ever evolving technology, while healthcare organizations must try to adapt to new IT systems while maintaining regulatory compliances that may still be unclear. Meanwhile, the promise of Health IT rests largely in the ability of technology to leverage the sharing of data in a previously unimaginable level, but this cooperative exchange of information must likewise respect all relevant privacy and security controls.

The widespread use of EHRs is expected to be a significant driver in lowering health costs. A significant part of the savings could be achieved through the exchange of Health IT. Studies have shown that widespread Health IT adoption could result in significant savings to the healthcare system through efficiency gains, but only if all, or nearly all, of the healthcare organizations participate in sharing of EHRs. Examination of the data by some [healthcare cost experts](#) suggests that the exchange of health information

contained in EHRs and other related Health IT activity will have a substantial impact on the healthcare system's costs, saving approximately \$80 billion annually.

Despite the benefits of widespread EHR adoption, its acceptance and implementation will not be achieved unless its risks are mitigated. There is concern that an EHR system will decrease the privacy of individuals in the sensitive area of personal health information and treatment. Studies show the public is concerned about over the privacy and security of personal health information.

The Federal Government anticipated a need to address these concerns. Provisions in the HITECH Act have created the most significant change to the health privacy and security environment since the original Health Insurance Portability and Accountability Act (HIPAA) Privacy Rule. Congress determined that it needed to establish improved privacy and security rules for the health industry. The most significant provisions of the HITECH Act focus on notification to individuals in the event of information security breaches. For the first time, Congress enacted a national provision on breach notification directed solely at the health industry.

As the driver behind EHR adoption, the US Federal Government has an important role in establishing rules to protect the privacy and confidentiality of health information. There is a need to create workable standards in which the industry can rely. In September 2009, the Health IT Standards Committee

endorsed a set of security and privacy standards for EHR systems that it indicated would become progressively more restrictive without repressing wider health information sharing.

Nonetheless, the importance of privacy issues on health technology may not be necessarily obvious to those trying to integrate new systems. A recent survey of physicians regarding the implementation of EMR systems was conducted by [Physicians' Reciprocal Insurers](#). Results showed that physicians are primarily worried about the costs of EHR systems, closely followed by training staff on EMR systems. Lowest on the list of concerns was “loss of patient information.” Achieving compliance with evolving federal privacy regulations is being overshadowed by these concerns, but incorporating new systems that do not contain adequate security measures means additional costs, training, and disruption in the future.

A secondary health benefit of EHR adoption is the possibility of improving treatment by sharing data in a widespread and consistent fashion. Such data can identify best practices and deliver more effective care to greater numbers of patients. This information could assist in determining provider (hospital and physician) performance outcomes, chronic disease monitoring, monitoring medication adherence, promoting safety metrics, determining patient satisfaction, more informed clinical decisions, and improving patient-physician communication tracking. For example, The National Health Information Network (NHIN), presently under development through a public – private partnership, will be used to provide “anytime, anywhere healthcare information and decision support via a comprehensive knowledge-based network

of interoperable systems.” The ARRA also contained \$1.1 billion for comparative effectiveness research (CER), which also relies on the cooperative sharing of medical data.

Patient privacy and confidentiality must be assured, and patients must feel safe with the use of Health IT in their medical decisions. Health providers need to clearly communicate with patients to ensure they understand their rights and feel protected. At the same time, privacy and security concerns must be handled with an eye towards the goals of information sharing and interoperability that are the cornerstones of implementing Health IT to achieve health-care reform. Participation is needed by all stakeholders in the field to make sure the regulatory environment and the practical environment are working together to provide the best solutions.

The Importance of Data Liquidity in Health IT Implementation

by Mike Behrmann

We've all heard the latest buzz words: **big data**, **data visualization**, **data integrity**. The prevalence of these terms in Health IT circles are evidence that Health organizations are faced with immense amounts of data, and their “buzz” status is more than enough warning that facing data challenges is an imminent prospect. With better and faster technologies and the implementation of **Electronic Health Records (EHRs)** and **Health Insurance Exchanges (HIEs)** in the near future, we will see even more data flooding into the national system of health networks and databases. IT partners like Segue will have a critical role in supporting health organizations in their data challenges – managing data volume, ensuring data quality, and ensuring accessibility.

DATA LIQUIDITY

One of the main focuses of healthcare reform is ensuring that patients are the center of all medical decisions. It is evident that if reaching a truly patient-centered healthcare system is our goal, more must be done with patient data. We must reevaluate how this data is analyzed, presented, and how it moves throughout the healthcare system. In addition the validity and accuracy of the data needs to be ensured. When a caregiver or researcher is making a treatment decision for an individual patient, they need to have confidence in the data that has helped them reach that decision.

Yet a lack of liquidity remains, keeping much of the patient’s information effectively locked down.

Liquidity refers to **the ability of patient data to move throughout the healthcare system securely and usefully.** This “liquid” health information is meant to be pushed digitally to all appropriate parties via EHR and HIE channels. The Health IT vision is to have complete, vital, real-time patient information liberated from a file cabinet and available at the point of care whenever it is needed, wherever it occurs. On-demand access to a truly complete medical picture can enable improvements in health quality, efficiency, and convenience – all while reducing the costs associated with delivering that care.



Figure 3

BIG DATA AND HEALTH IT

Clinical information is increasingly complex and voluminous. Health Organizations are trying to understand how “big data” can be successfully leveraged using IT tools. The majority of the data is unstructured and currently sits unused, having been retained largely for regulatory purposes. However, if it can be harnessed, it could provide tremendous benefits to caregivers and patients.

“Big Data” requires unique data warehousing, mining, and analytical capabilities to turn data from information into knowledge and action. This goes beyond crunching numbers on a spreadsheet, but it is possible. For example, at [Beth Israel Deaconess Medical Center](#), Doctors are avoiding the “cookbook medicine” approach of applying the same battery of tests to all patients who come into the emergency department with similar symptoms. By accessing patient data, caregivers take an evidence-based approach to medicine. To enable this, Beth Israel has developed an app that gives caregivers self-service access to 200 million data points from about 2 million patients. The ability to collect and parse such huge amounts of current information creates a meaningful step forward in providing patient-centered care.

ACHIEVING HEALTH DATA AND LIQUIDITY

What steps are needed to reach the state of Health Data Liquidity? A lack of standardization in everything from naming conventions to coding is problematic, but analytics are increasingly touted as a resolution to this issue. Normalizing raw patient data by mapping it to [LOINC](#) (Logistical Observation Identifiers Names and Codes) and [SNOWED CT](#) (Systematized Nomenclature of Medicine – Clinical) and using natural language processing and tools such as

the Notifiable Condition Detector can free currently locked data for research. The Beth Israel app, for example, uses SNOWMED CT to encode physicians' free-text notes, making them searchable.

Where might harnessing the big data lead us? What does it mean, why does it matter? A simplified list of benefits includes:

- Reduction of Medical Errors
- Improved collaboration throughout the healthcare system
- Facilitation of better patient-care transitions
- Faster, better emergency care
- Increased convenience for patients
- Enhanced ability to respond to public health emergencies and disasters
- Improved platforms for innovations and breakthroughs

Big data is overwhelming, but that is best viewed as an opportunity, not an obstacle, for improving the delivery of healthcare.

About the Author

Mike Behrmann has over 30 years of experience in software development and design, database architectures, and emerging Internet and enterprise-computing technologies. In his current role as Executive Vice President he is responsible for Software Engineering Leadership and CMMI Process Management as well as applying Segue core competencies to healthcare information management needs. His IT roles have included software engineer, database architect, and project/program manager. His efforts in process definition and continual improvement have resulted in Segue's CMMI Level 2 appraisal, with a goal of reaching level-3 maturation.

A key initiative for Mike is the identification of service matches between Segue's core capabilities and the needs of the Healthcare IT industry. He is working to adapt Segue's experience in Information Management: data quality/cleansing, migration, and security.

Chapter 3

The Rise of Mobile Applications for Health IT

The Future of the Mobile Health Market

By Peggy McShane and Dan Fogarty

The growth of the Mobile Health (mHealth) application market will reach “[\\$26 billion globally by 2017](#).” Mobile Applications are a part of the overall [mHealth](#) market. The use of mobile and wireless devices to improve health outcomes, health services, and health research, is worth more than [\\$50 billion globally](#) as of 2010. According to [mHIMSS](#), mHealth has “evolved rapidly in recent years largely due to recent advances in broadband availability, mobile device innovation, and availability of applications for mobile devices. The pace of policy-making has lagged advances in technology in the highly regulated healthcare space.”

With more than [17,000 medical apps](#) available, the FDA recently announced new regulations that “[will](#) focus on a handful of apps that turn smartphones into devices, like a heart monitor, or medical attachments that plug into smartphones, like arm cuffs that measure blood pressure.” Access to mobile medical and health apps has resulted in “consumers increasingly relying on mobile applications to help them manage their health and fitness, with the top 10 mobile health apps generating up to four million free and 300,000 paid downloads per day, according to [research2guidance](#).”



Figure 4

What impact does the growth of adults using mobile phones for health information from 61 million in 2011 to 75 million in 2012 have on users in the Mobile Health market?

The mHealth industry offers seven potential application and developmental opportunities in the U.S. and abroad:

- 1. Education and awareness**
- 2. Helpline**
- 3. Diagnostic and treatment support**
- 4. Communication and training for health workers**
- 5. Disease and epidemic outbreak tracking**
- 6. Remote monitoring**
- 7. Remote data collection**

The growth opportunity is available today for private sector and federal collaboration and innovation. The mHealth market contains requirements for communication, technical, IT, and education support. It requires the developers, communication experts, and other stakeholders to understand the demand and critical significance of mobile health applications.

For example, two recently awarded Department of Veteran Affairs contracts that total more than \$1 million include:

1. [Mobile Health Communications](#) valued at \$474,055:

[The Department of Veterans Affairs](#) (VA) is engaged in a Mobile Health Initiative as part of its efforts to develop new models of healthcare delivery. The mobile health initiative will deliver mobile health applications to Veterans, Veteran Caregivers, and VA Clinicians that will integrate with VA data systems. The applications include mobile-optimized websites, as well as mobile applications that will operate on smartphones, mobile tablets, and computers. The Veteran-facing applications are intended to place Veterans at the center of their health through the use of mobile technology, allowing them to more effectively manage their interaction with VA healthcare services (source: [GovWin](#)).

2. [Mobile Applications WPS Health Education and Training Support](#) valued at \$589,000: The Department of Veterans Affairs has dedicated resources to develop mobile health applications to improve the quality of care the VA provides to its veterans. Mobile applications will assist veterans and their caregivers with ongoing care once he/she leaves the medical center. The VA intends to develop applications for veterans and their veteran caregivers as well as applications to train VA employees. All applications will be accessible through the VA enterprise application store. Office of Training Strategy is tasked with producing the mobile application training material for distribution to veterans, veteran caregivers, as well as VA employees (source: [GovWin](#)).

In order to enter into, or continue to grow in the mHealth market, it is important to consider the industry's impact on patients and physicians. A recent [Information Week](#) article posed the question, "What's Holding Back the Mobile Health Revolution?" Overall, the balance of education and control of patient medical care and data on the use of smartphone apps is new territory for regulators and policy-makers, as well as developers and end-users. It is essential for all stakeholders to continuously monitor new policies and regulations regarding mHealth apps, as well as to strive for innovative new developments in order to improve patient care.

About the Author

As a communications consultant for Segue Health, Dan Fogarty provides social media, marketing and strategic communication support for various Health and Health IT clients. Recent support includes social media campaigns, mobile health blog posts and strategic market research. Dan currently works at the National Institutes of Health and holds a Master's degree in Communication from Johns Hopkins University.

Can Mobile Apps Reduce Health Costs?

By Peggy McShane / Christina Cavoli

It is impossible to escape the ongoing buzz: Mobile apps are going to revolutionize how patients obtain healthcare. The wireless health market (currently at \$23.8 billion) will [reach \\$59.7 billion](#) by 2018! There are over 97,000 mHealth apps and the top 10 mHealth applications generate up to 4 million free and 300,000 paid downloads [per day!](#) But it is reasonable to react to all the hype with a bottom-line question: Can mobile apps actually reduce the cost of healthcare?

Most analysts agree there is great potential for mHealth apps to provide functions at a lower cost. Predictions range from reducing costs by encouraging healthier habits to substantial decreases in the cost of treating chronic conditions by as much as [\\$200 billion](#) over the next 25 years. Prevailing areas for cost reduction include the following:

Improving Preventative Care and Health Education:

In our current state of affairs, most of our health dollars—[over 70%](#) -- are spent on chronic disease, even though there is widespread understanding that money invested in preventative medicine and health education could lead to better outcomes. mHealth fitness, wellness, and health apps provide a powerful medium for focusing on changing lifestyle behaviors that can lead to chronic conditions, such as smoking, poor nutritional choices, and obesity.

Addressing the Needs of an Aging Population:

The increasing age of our population corresponds with a rise in healthcare services. Medicare currently covers about 50.7 million seniors; by 2030, that number is expected to increase to about [78 million](#). mHealth apps have the potential to assist seniors in living independently and reducing the need for face-to-face consultations. One [report](#) indicates mHealth apps could reduce senior care by as much as 25%.

Mobile healthcare can [allow seniors to live independently](#) and spend more time at home, while reducing the costs of elderly medical care as fewer face to-face consultations are needed. For example, Norway, Denmark and Sweden expect to save between [1.2 billion and 2.5 billion](#) Euros by substituting alert/monitoring systems for elderly patients in place of institutional care.

Reducing Costs through Improved Administration:

mHealth apps have the potential to assist in data collection, allowing for remote diagnostics, better access to medical records, and reductions in administrative time.

A recent [report](#) by the Deloitte Center for Health Solutions found that mHealth could potentially save \$305 billion over a ten-year period through increased productivity gains that include reduced travel time, better logistics, faster decision-making and improved communications.

It will take time to observe how mHealth apps are being used to truly determine how effective they are in reducing healthcare costs. Researchers at the Scripps Translational Science Institute (STSI) recently began “[Wired for Health](#),” a study intended to evaluate the effects of this technology health spending. The study, focused on patients with chronic conditions, has issued half of the participants a mHealth app relevant to their condition to assess whether patients who actively use this technology can better manage their health conditions and if such success correlates with decreased healthcare spending. We can expect to see further similar studies as organizations continue to consider investment in mHealth technology.

We all know that in the IT world, the “latest and greatest” can come and go in the blink of an eye, and that the “sizzle” doesn’t always deliver the promised substance. In the case of mobile health apps, however, it seems the potential for positively impacting the delivery of healthcare while driving down associated costs may be just getting started.

How Much Does it Cost to Build a Mobile App?

By Ron Novak

Have you noticed how very few companies in the software industry address the question of mobile app development cost on their websites? When researching development of a Health IT or other app, if you have searched on the internet or spoken with a software development company directly, the answer you probably have encountered most frequently is; “well, that depends” with little to no additional explanation. While this may seem like a cop out, it’s actually the right answer- it does depend.

Don’t stop reading; I promise I’ll explain further. Now, I might be breaking some unknown pact between my fellow software brethren by revealing this super-secret information, but the majority of the mobile application development projects that we have worked on have fallen within the range of **\$50,000-\$150,000**. That is by no means all-inclusive; however, it is fairly representative of the projects we have been exposed to.

Now let’s get into what exactly “it depends” on. **The three main factors that affect the cost of a mobile app build-out are: Functionality, the targeted users/devices and timeline.**

Functionality (what you want the app to do) is the most important factor in determining cost. There is a big difference between an app that does something simple such as creating a to-do list compared to a fully-featured interactive game app like Angry Birds.

Historically, apps that do one or two things really well (such as SoundHound) have been more successful than apps that have been crammed with extra and sometimes needless functionality. Although app developers are getting more efficient with usability when delivering apps with more extensive functionality, I still think that developing an app to do one or two specific tasks really well is the best approach and ultimately will reduce the overall cost of development. The main take-away here is the more you want the app to do, the more it is going to cost you.

Targeted users/devices (who you want to use your app)

can drastically affect cost when developing a mobile app. There are a few key technology-based questions you should be prepared to consider when planning your mobile project.

The biggest and most commonly debated question is whether you should build a Native App or a Mobile Web App. For reference, a Native App is one that is developed specifically for a certain mobile operating system (such as iOS or Android) and installed directly on the device whereas a Mobile Web App is an app that is not operating system-specific and runs on a device's web browser. The focus of this article isn't to discuss the pros and cons of these two alternatives, rather to explain how choosing one option over the other can affect the total cost of the project.

Ultimately, cost will be affected by the selection of the target audience since this selection drives the technical solution. For example, let's say you want to develop a clinical mobile app to assist Doctors with conducting their rounds and you know that they will all be using hospital-issued iPhones.

In this scenario, developing a Native app for iOS (Apple) devices seems like a pretty logical solution, right? However, take that same scenario and complicate it by requiring support for Android, Windows Mobile, and Blackberry/RIM devices. If you were to develop a Native app for each of the required platforms, it could end up costing you 4X what it would cost to develop one mobile web app! The reason for this is that code development for each mobile operating system is essentially an independent effort and usually requires different programming languages and environments. So, as you can see one size does not always fit all with respect to mobile, and the selection of your target audience weighs heavy on cost.

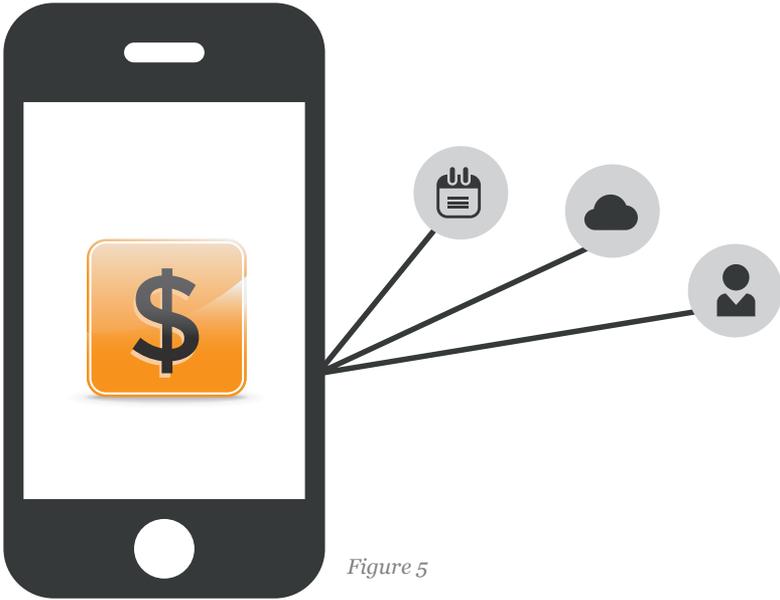


Figure 5

Timeline (when do you want it!) is another key factor in cost determination with a mobile app project. Having a reasonable timeline (with customer involvement throughout the process) is the best way to keep the project within budget and avoid cost overruns. Having an unrealistic expectation of a project delivery can cause unneeded rush charges and can also affect cost. For example, let's say your company wants to develop an app to control the Mars Rover and you want it next week. Do you think a rush delivery affects cost? You bet it does. Although some development tasks simply can't be rushed and take however long they are going to take, requesting a quick turnaround time can definitely have an impact on cost.

So there you have it: a break-down of what goes into the pricing and cost factors of developing a mobile app. Getting a basic understanding will help your organization decide when it is time to invest in creating the next innovative, exciting mHealth application.

About the Author

As part of Segue's ownership team, Ron Novak leads the Commercial and Non-Profit customer verticals with the guiding principles of innovation, exceptional customer support, and customer value. His diverse experience in Information Technology has been formed through a consistent desire to understand the total picture with respect to information exchange, security, and the end-user experience. Ron is currently focused on leading development of Mobile Technologies to help businesses reach their customers in exciting new ways and supporting Non-Profits in better serving their members. Mobile application development is a natural extension of Segue's capabilities in Web development; Ron is applying this Segue experience to rapidly develop exceptional applications at low cost. Under his strategic direction, Segue's Mobile Application Development Team has grown from a small two-person operation to a cohesive development team that is releasing capability-specific mobile apps for Android and iOS platforms.

Top 10 Health Mobile Apps

by Matt Gorbsky

The number of mobile health app downloads has exploded recently. As consumers become better educated about making healthy lifestyle decisions, and as mobile devices become more advanced and pervasive in our daily lives, it's no surprise to see this rise in interest and use of health-related applications. I've compiled a list of the best representative apps out in the market today. I'd also like to mention that I have restricted this list to only include applications that are available for both Android and iOS.

1. [iTriage](#)

iTriage was one of the first apps that tried to be the Swiss Army Knife of mobile health apps- a one-stop shop for all your health needs- and it's continuing to improve. Recently acquired by [Aetna](#), the app integrates [CarePass](#) (Aetna's platform for mobile patient data access) as well as other personal health records such as [Microsoft's HealthVault](#). Users can view their health record, look up medical symptoms, search for doctors, view hospital wait times, and much more. I'm putting this first on my list because I believe it offers users more of what today's engaged patients are expecting from their medical providers: engagement and information. It's not a perfect or complete healthcare tracking solution (yet), but in my opinion, it's on the right path.

[iTunes](#) | [Android](#) (Free)

2. [WebMD](#)

Long established as a popular source for medical information, WebMD's mobile application provides [health information management](#) in an easy-to-use format. From symptom checking (complete with a "touch where it hurts" model), to drug side effects, to pill identification and first aid essentials, the app allows users to get the information they need quickly and accurately.

[iTunes](#) | [Android](#) (Free)

3. [Zombies, Run!](#)

What better motivation to run than being chased by a horde of zombies? This app places you in an immersive audio experience and makes you feel like you're in an episode of your favorite zombie TV show or movie. Along with gamification (building up a base as you progress through missions), the app also allows you to track progress on the web, share runs with friends, and sync your runs with RunKeeper (# 7 in this list). There is also a less expensive, 5k training version.

[iTunes](#) | [Android](#) (\$3.99)

4. [Couch-to-5K](#)

If being chased by Zombies isn't your type of motivation to get out and run, Couch-to-5K might be of interest. Designed to get the average couch potato in shape to run a 5K in 9 weeks, the app provides a number of "personal trainers" to choose from – real human audio encouragement. Workouts are designed to take 30 minutes per day, 3 days per week, for 9 weeks.

[iTunes](#) | [Android](#) (\$1.99)

5. ***I'm Expecting* - Pregnancy App**

I'm adding this one since it's been on my phone for the past seven months and gets used quite often. As my wife and I get ready to welcome a new addition to our family, the *I'm Expecting* app has been extremely helpful in keeping us up-to-date on what to expect, what's happening to our baby on the inside, what's happening to my wife, and what we should keep an eye out for. My only complaints are that the app is geared towards expectant mothers, not the fathers as well. I suppose that's to be expected given the name, but I think Dads could get a lot out of the app as well.

[iTunes](#) | [Android](#) (Free)



Figure 6

6. [Fooducate](#) - **Healthy Food Diet**

I heard about this during a recent dHealth DC meet up through a story of parents giving their kids this app and telling them they can get any snacks in the supermarket with a B+ grade or higher. Fooducate lets you scan the barcode on food packaging and gives you easy to digest (no pun intended) nutritional information. The app also proposes healthier alternatives if you scan something that may not be too healthy for you. A gluten-free version is also available for \$0.99.

[iTunes](#) | [Android](#) (Free)

7. [RunKeeper](#) - **GPS Track Run Walk**

RunKeeper is one of the top GPS-based run tracking apps in the markets. The interface provides rich graphs, maps, and other statistics about your running activity in a clean, simple user interface. They claim to have over 20 million users and it's easy to see why. There are many run tracking apps out there, but few seem as polished as this.

[iTunes](#) | [Android](#) (Free)

8. [Strava Cycling](#) - **GPS Riding**

If cycling is more your style, Strava Cycling helps you keep track of your rides. Similar to RunKeeper, Strava presents an extremely clean, simple experience to track past bike rides, view live data during a ride, compare your stats against friends (or pros), and find new courses to ride. Strava also lets you connect heart rate monitors and track that data as well. Gamification comes in the form of competing

against friends or becoming King or Queen of the Mountain. A running version is also available.

[iTunes](#) | [Android](#) (Free)

9. [Fitbit](#)

Fitbit is one of the dominant tools used by the “self-quantifiers.” It’s essentially a web-enabled pedometer that tracks your movement and displays your data in lots of fancy charts. The mobile app also allows users to input food intake to help you track calorie consumption and amount burned, which should help those wanting to lose weight to do so.

[iTunes](#) | [Android](#) (Free)

10. [iBlueButton](#)

This app deserves some explanation as to why I’m including it in this list. As a standalone app, it’s hard to endorse. In what seems to be the [major problem with Hybrid applications](#), the interface isn’t as smooth as native applications should be. Android users are presented with the iOS-centric menu – complete with disclosure indicators (those “>” symbols that tell iPhone users they can click something which Android has not adopted). However, to me, this app represents the future of healthcare in America. The iBlueButton app builds on top of the [Blue Button Initiative](#), a nationwide movement to get patients’ health records into the hands of patients.

The value of this is understood by anyone who has ever had to deal with coordinating care for themselves or their loved ones. Patients sometimes have to visit teams of doctors, specialists, labs, and pharmacies during treatment for a single issue. The job of ensuring that each doctor is aware of what the others are doing often falls on the patient. Having full, open, and easy access to your records make this job much more bearable.

This app itself allows users to download their data from Medicare, insurance providers, or providers' patient portals. From there, patients can view medication lists, view treatment histories, and share that data with doctors or other interested parties. As the concept interoperability begins to permeate through the world of electronic medical record providers, my hope is apps like this become less necessary.

For now, however, I applaud the U.S. Dept. of Veterans Affairs for allowing veterans access to their records through BlueButton and other apps like it.

[iTunes \(Consumers\)](#) | [iTunes \(Veterans\)](#) | [Android \(Consumers & Veterans\)](#) (Free)

About the Author

Matt Gorbisky is an analyst and mobile services manager at Segue with experience in systems integration, mobile technology, and health IT. He's a graduate of Penn State and a fan of technology. Matt enjoys working on electronic projects with microcontrollers and brewing beer in his spare time.

Do I Need to Get FDA Approval for my Mobile App?

by Matt Gorbsky

On September 21, the U.S. Food and Drug Administration (FDA) issued its long awaited [final guidance](#) for developers of mobile medical applications. The FDA stated that it intends to exercise enforcement discretion for the majority of mobile apps as they pose minimal risk to consumers. **The FDA's current guidance indicates that the majority of medical apps are either:**

- Not medical devices as defined by the Federal Food, Drug and Cosmetic Act (FD&C) and therefore do not fall under FDA regulation, or
- If defined as medical devices, pose a risk level low enough to preclude enforcing FD&C requirements.

The Agency is attempting to focus regulatory oversight on a subset of mobile medical apps that present a greater risk to patients if they do not work as intended while continuing to encourage innovation in the field of medical mobile app development. **The primary areas of this oversight are for mobile apps that:**

- are intended to be used as an accessory to a regulated medical device (example: an app that allows health professionals to make a specific diagnosis by viewing a medical images from a specific apps operating on a smartphone or a mobile tablet) and

- transform a mobile platform into a regulated medical device (example: an application that turns a smartphone into an electrocardiography (ECG) machine to monitor heart rhythms)

The FDA is trying to take a careful approach to a technology that is growing exponentially and transforming constantly. It seems reasonable to regulate technology that might pose a risk to patient health if it malfunctions or is used improperly, yet no one wants to see the FDA begin “regulating” how smartphones and tablets are produced and sold. The current guidance is trying to find that balance. Need more clarity?

Check out our guide and infographic below.

Is Mobile App Intended for Use in Performing a Medical Device Function?				
Operates in a similar manner as a medical device.	Controls the operation or function of an implantable or body-worn medical device.	Displays, transfers, stores, or converts patient-specific medical device data from a connected device		Operates in similar manner as a medical device and is marketed/intended for medical practitioners
				Ex: mobile app that offers an LED light.
Ex: app on a smartphone to analyze and interpret EKG waveforms to detect heart function irregularities.	Ex: Mobile apps that act as wireless remote controls or synchronization devices for computed tomography (CT) or X-Ray machines.	Ex: Mobile apps that connect to a nursing central station and display medical device data to a physician's mobile platform for review.	Does marketing, labeling, distribution of app promote use as a light source for doctors to use in patient examinations?	Is marketing aimed at general public? Does it show system illuminating objects generally, not specifically for medical purposes?
NEEDS FDA APPROVAL	NEEDS FDA APPROVAL	NEEDS FDA APPROVAL	NEEDS FDA APPROVAL	NO FDA APPROVAL
Take Away: Apps that function in place of other medical devices will be treated as medical devices. How an app is marketed and the audience it caters too will also impact how it is regulated.				

Figure 7

Is It a Low-Risk Mobile App?

Does the mobile app perform one of the following:

- supplement clinical care and assist patients with self-management of disease or conditions without providing patient-specific treatment or treatment suggestions
- provide simple tools to log, track and organize health information
- provide easy access to patients' health conditions beyond simply providing an e-copy of a medical reference (e.g., drug-allergy look-up tools)
- communicate potential medical conditions to health providers
- perform simple calculations routinely used in clinical practice (e.g., BMI calculators)
- enable individuals to interact with personal health record or electronic health record systems

Examples:

- Apps that coach patients with conditions such as cardiovascular disease, hypertension, diabetes or obesity, and promote strategies for maintaining a healthy weight, getting optimal nutrition, exercising and staying fit, managing salt intake, or adhering to pre-determined medication dosing schedules by simple prompting
- Apps that provide simple tools for patients with specific conditions or chronic disease (e.g., obesity, anorexia, arthritis, diabetes, heart disease) to log, track, or trend their events or measurements (e.g., blood pressure measurements, drug intake times, diet, daily routine or emotional state) and share this information with their health provider as part of a disease-management plan
- Apps that use a patient's diagnosis to provide a clinician with best practice treatment guidelines for common illnesses or conditions such as influenza
- Apps that are drug-drug interaction or drug-allergy look-up tools
- Apps that serve as videoconferencing portals specifically intended for medical use and to enhance communications between patients, health providers, and caregivers
- Apps specifically intended for medical uses that utilize the mobile device's built-in camera or a connected camera for purposes of documenting or transmitting pictures (e.g., photos of a patient's skin lesions or wounds) to supplement or augment what would otherwise be a verbal description in a consultation between health providers or between health providers and patients/caregivers

FDA ENFORCEMENT DISCRETION

Take Away: Manufacturers of a large number of mobile apps will not be subject to FDA registration and listing, Quality System regulation, adverse event reporting or more onerous premarket notification or clearance requirements—even if the mobile app meets the definition of a medical device—if it falls into any of these categories. This is good news for industry.

Figure 8



Red Flag: *Even if an app is considered “low risk,” the FDA strongly recommends that manufacturers of all mobile apps that may meet the definition of a medical device follow the Quality System regulations contained within 21 C.F.R. Part 820 in the design and development of their mobile medical apps.*

Is App Used in a Healthcare Environment but NOT a Medical Device?

Does the mobile app perform one of the following:

- Medical Reference Tools
- Educational tools for medical training or to reinforce training previously received
- General patient education and facilitate patient access to commonly used reference information
- Automated general office operations (ex: scheduling assistance)
- Generic aids or general purpose products (magnifying glasses, recording audio, etc.)

Examples:

- Medical dictionaries
- Games that simulate various cardiac arrest scenarios to train health professionals in advanced CPR skills
- Allow users to input pill shape, color or imprint and displays pictures and names of pills that match this description
- Generate reminders for scheduled medical appointments or blood donation appointments

NO FDA REGULATION

Take Away: These are all types of mobile apps that may be used in a healthcare environment but are not considered medical devices.

Was App Created for Personal Use or Use within a Small Group of Users?

Licensed practitioners, including physicians, dentists, and optometrists, who manufacture a mobile medical app or alter a mobile medical app solely for use in their professional practice and do not label or promote their mobile medical apps to be generally used by other licensed practitioners or other individuals are not considered medical mobile app manufacturers.

Examples:

Dr. Smith creates an app that enables attaching an ECG electrode to a smartphone, enabling the patient to records eradings for 24 hours. Others in Dr. Smith's practice also use this app, but it is not marketed or labeled for promotion to people outside the practice.

NO FDA REGULATION

Take Away: The Final Guidance is good for health professionals and practices that have developed software for patient care that was built for personal/in-house use. The definition of "mobile medical app manufacturers" explicitly excludes licensed practitioners who develop apps solely for use in their professional practice, as long as they do not label or promote the apps for use by others.

Figure 9

Still unsure?

Full guidance is available at the [FDA website](#).

Mobile medical app developers can send questions to mobilemedicalapps@fda.hhs.gov. The FDA also encourages mobile medical app manufacturers to search FDA's public databases, including the Product Classification and 510(k) Premarket Notification databases, to help determine the level of regulation that may be applicable to specific devices or functionalities.

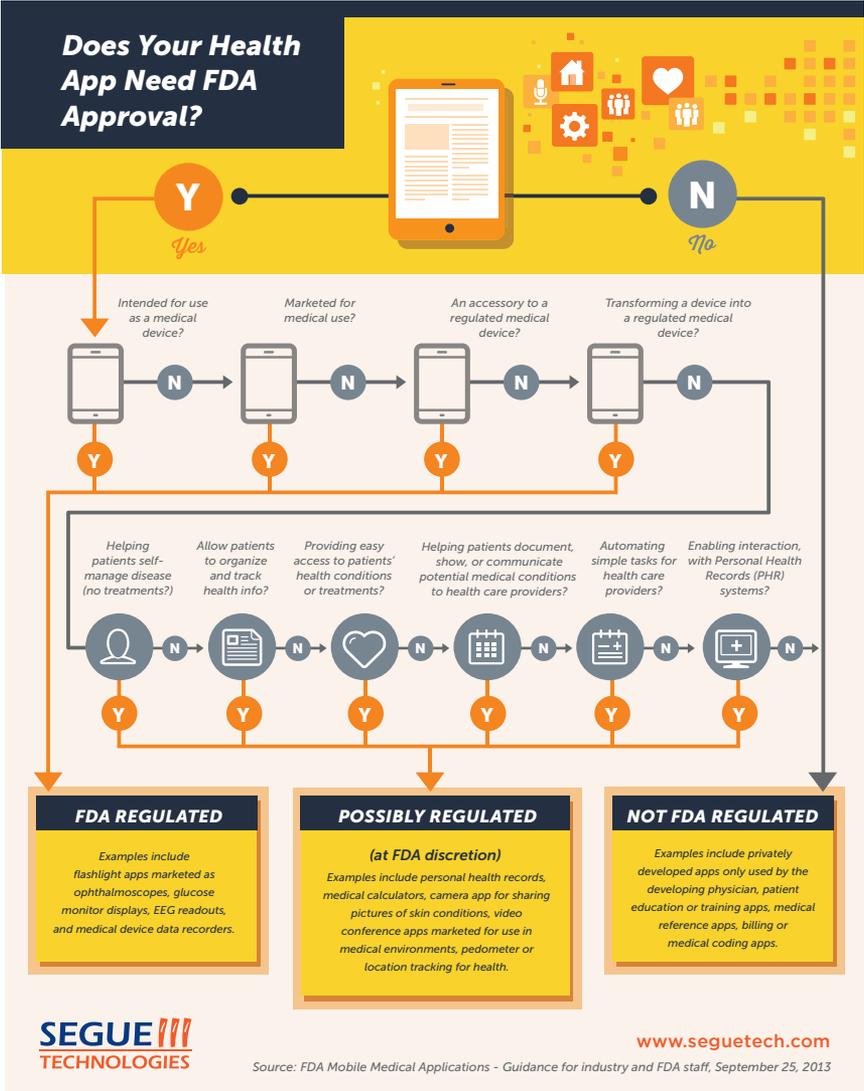


Figure 10

ABOUT HEALTH IT: THE DIGITAL PATIENT

Thank you for reading our Health IT eBook. We hope you found it informative and interesting.

If you are interested in working with Segue, please contact us so we can learn about your needs and plan a development path that works for you.

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