



## KEY MESSAGES

### ***Healthcare systems around the world are currently facing a major crisis***

Healthcare today is expensive and inefficient. Developed and developing countries with universal or private insurance are watching the percentage of gross domestic product (GDP) spent on healthcare increase at unsustainable rates. The US, for example, leads the world in healthcare spending and will likely spend nearly 20% of its GDP on healthcare by 2017, compared to 16% in 2006 and 13% in 2000. Research has suggested that nearly a third of these costs in the US are administrative. Furthermore, despite the vast amounts of money being spent on healthcare, patient care is not as good as it should be. The Institute of Medicine's (IOM) groundbreaking report published in 1999 cited that nearly 100,000 preventable deaths occur every year in hospitals, with patients suffering from an even greater number of adverse reactions that do not lead to death. Few providers know what their error rate is, much less are able to find ways to reduce that rate. Evidence-based medicine is adopted unevenly by providers, years after the research has been conducted. To literally add insult to injury, patients wait for hours in the emergency room (ER) to be treated and physician office appointments need to be booked weeks or months in advance. Physicians are unhappy, complaining that they spend more time on administrative tasks than they do treating patients. Patients are unhappy, having to wait for long periods of time to get care and feeling that when they do see a physician, they are rushed out without having all their questions answered. Governments and private payers are unhappy as their expenses increase every year.

### ***With the help of the internet, healthcare assumptions will be flipped on their head***

Healthcare does not have to be like this. Datamonitor believes that, with the help of internet-based technologies, healthcare will be dramatically transformed in the next five to seven years. In fact, healthcare, as a late adopter of technology, is now in the unique position to skip a generation of technology. Instead of following the exact technology path the financial and travel industries took to get where they are today, healthcare can simply jump straight into the technologies of 2009. For this to occur, however, a number of basic healthcare assumptions must, and will, be flipped on their head. First and foremost, healthcare will need to become truly patient-centric and consumer-driven. Today, those terms more often than not mean simply shifting more costs onto the patient, which actually deters patients from getting the care they need. In the future, patient-centric and consumer driven will refer to the fact that instead of patients going to the doctor for care, providers that patients pick will be meeting patients when and where it is convenient for patients, whether that is in the office, through online video conferencing or email. Self-service will mark another seismic shift in the healthcare market. Rather than every single healthcare decision and response going through the provider, patients will be taking health matters into their own hands. From booking appointments online without going through the doctor's receptionist to filling out medical forms without going into the office, choosing a specialist rather than being referred by a primary care physician (PCP) to paying for healthcare online, and even diagnosing and treating themselves for simple conditions, providers will no longer be the sole gatekeeper. A cultural change among providers, patients and technology companies, however, must take place for this to occur.

### ***Online solutions increase access, improve quality, decrease costs and empower patients***

The number of health-related websites and online applications will grow exponentially in the near future. Some will be geared toward providers only, while others will focus on the patient population. Another segment will look to connect providers with patients. Meanwhile, offline companies and services, such as seeing a doctor, are moving online and vice

versa. Datamonitor has divided these new solutions into the following categories: cloud computing and the movement towards mobile health, content-based sites, PHRs, online communities, sites that improve interactions and those that help complete transactions. These technologies provide value to patients and/or providers that would not be possible with the internet, increasing convenience, improving care, streamlining workflow and connecting people to each other. With each new application that arises, the benefits of going online increase exponentially. The snowball effect has already started, and providers and vendors that are slow to realize this will be at a great disadvantage in the future.

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## MARKET OPPORTUNITY

Healthcare systems around the world are facing a major crisis. From rising costs to the need to improve the quality and increase access to care, providers, payers and patients all agree that something must be done to fix healthcare. Datamonitor believes that by leveraging the internet, healthcare stakeholders will be able to address many of the issues they are facing today. However, the industry is resistant to change and, providers especially will need to be convinced that this particular change is needed. This section of the report will lay out a vision for the internet's role in healthcare and discuss the drivers and inhibitors to this change:

- The internet will transform healthcare.
- Patients are addressing healthcare pain points themselves.
- In order to move forward, healthcare must accomplish mission impossible: cultural change.

### ***The internet will transform healthcare***

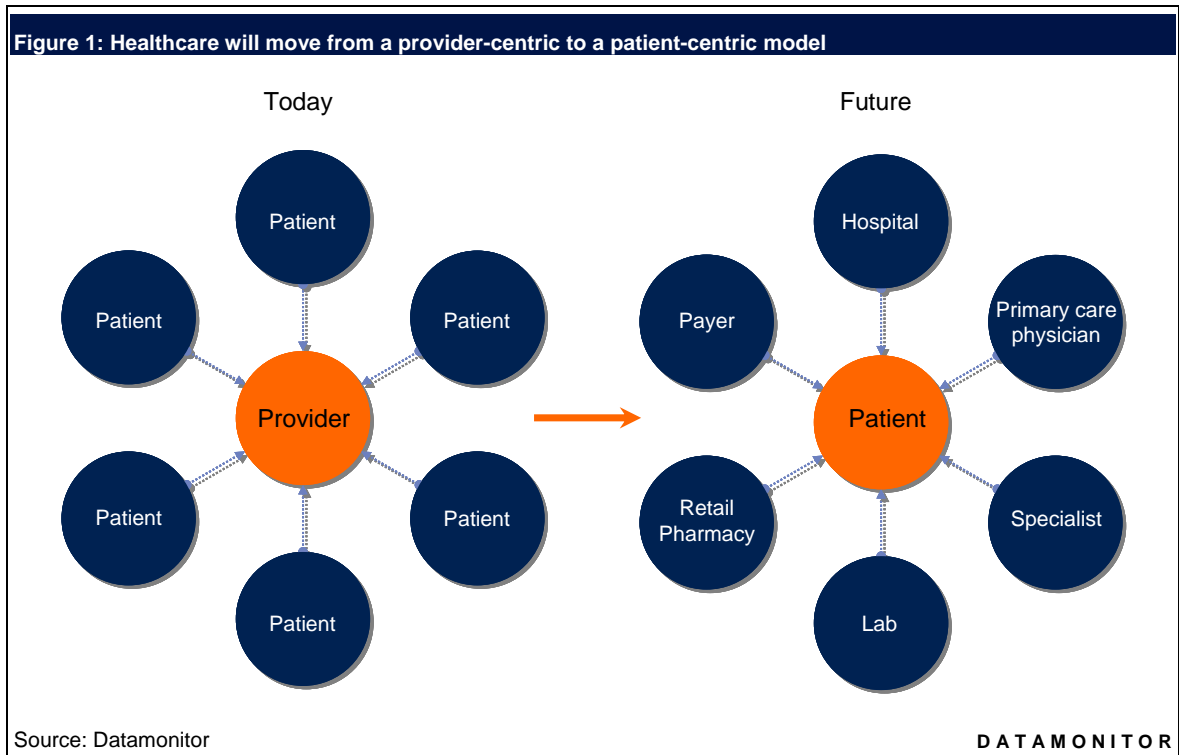
Healthcare today is expensive and inefficient. Developed and developing countries with universal or private insurance are watching the percentage of GDP spent on healthcare increase at unsustainable rates. The US, for example, leads the world in healthcare spending and will likely spend nearly 20% of its GDP on healthcare by 2017, compared to 16% in 2006 and 13% in 2000. Research has suggested that nearly a third of these costs in the US are administrative. Furthermore, despite the vast amounts of money being spent on healthcare, patient care is not as good as it should be. The IOM's groundbreaking report published in 1999 cited that nearly 100,000 preventable deaths occur every year in hospitals, with patients suffering from an even greater number of adverse reactions that do not lead to death. Few providers know what their error rate is, much less are able to find ways to reduce that rate. Evidence-based medicine is adopted unevenly by providers, years after the research has been conducted. To literally add insult to injury, patients wait for hours in the ER to be treated and physician office appointments need to be booked weeks or months in advance. Physicians are unhappy, complaining that they spend more time on administrative tasks than they do treating patients. Patients are unhappy, having to wait for long periods of time to get care and feeling that when they do see a physician, they are rushed out without having all their questions answered. Governments and private payers are unhappy as their expenses increase every year.

Healthcare does not have to be like this. Datamonitor believes that, with the help of internet-based technologies, healthcare will be dramatically transformed in the next five to seven years. Imagine for a moment that when patients need to find a new doctor, they will simply go to a website and choose their doctor based on actual information such as clinical outcomes data and patient satisfaction ratings, book an appointment right then and there and see the doctor of their choice within minutes from their comfort of their home, all through the internet. Patients no longer need to blindly pick a doctor, call up multiple offices for an appointment and wait on hold. Nor do they need to take time off work to go into the doctor's office. At the end of their appointment, patients will pay their doctor directly online. If patients have just a quick question, they will be able to email their doctors at any time of day, not just business hours, reducing the number of potentially embarrassing overheard calls that need to be made from an office cubicle. Providers that field patient inquiries over email and the internet will free up their in-person office appointment schedule for patients that need to be seen in the office; when patients want an office appointment, they will be able to see the doctor that day, rather than waiting days or weeks. Furthermore, with emails and internet appointments, providers will have a more flexible schedule, allowing them to work whenever and wherever they want.

Additionally, in the future, as part of their everyday routine, patients will wake up, brush their teeth and step on a scale that automatically logged their weight and sent it to a PHR. As patients went about the rest of their day, they could easily log their meals, exercise, medications, unusual symptoms and glucose readings (if they are diabetic) into their PHR through their computer or a mobile device like the iPhone. From their PHR, they could track their progress, receive automated feedback and share their data with family members and providers who would then analyze it and adjust treatment plans if needed. Providers will thus be able to follow up on patients daily or multiple times a day, week, or month, rather than once a year, putting preventative medicine into practice. Analytics that sorted through all this additional data and alerted providers only if needed would make this additional task easy for providers to incorporate into their already busy schedules.

These are only a few examples of how the internet will change healthcare. While these may be revolutionary ideas for the healthcare industry, to patients, they are logical, belated changes. Consumers are used to having instant access to information and services now. With Google at their finger tips, they can answer any question they can think of. They can book travel without going through a travel agent, withdraw money without talking to a bank teller and buy gifts without leaving their home. These activities are typical in other industries; healthcare organizations that provide the same experience to patients will be extremely well-positioned moving forward. Not only is it more convenient for the patient and more efficient for providers, but if done correctly, it improves care.

In order for all this and more to happen, a number of basic healthcare assumptions must, and will, be flipped on their head. First and foremost, healthcare will need to become truly patient-centric and consumer-driven. Today, those terms more often than not mean simply shifting more costs onto the patient, which actually deters patients from getting the care they need. In the future, patient-centric and consumer driven will refer to the fact that instead of patients going to the doctor for care, providers that patients pick will be meeting patients when and where it is convenient for patients, whether that is in the office, through online video conferencing or email (Figure 1).



Self-service will mark another seismic shift in the healthcare market. Rather than every single healthcare decision and response going through the provider, patients will be taking health matters into their own hands. From booking appointments online without going through the doctor’s receptionist to filling out medical forms without going into the office, choosing a specialist rather than being referred by a PCP to paying for healthcare online, and even diagnosing and treating themselves for simple conditions, providers will no longer be the sole gatekeeper.

Furthermore, healthcare, as a late adopter of technology, is now in the unique position to skip a generation of technology. Instead of following the exact technology path the financial and travel industries took to get where they are today, healthcare can simply jump straight into the technologies of 2009. In addition to this technological advantage, healthcare should capitalize on aspects of human behavior to unlock the full potential of technology. For instance, the anonymity technology affords makes healthcare a great fit as patients are often embarrassed to ask very personal questions.

In conclusion, the internet will transform healthcare, in the ways described above and later in this piece, as well as in countless ways that have not yet been invented. Healthcare organizations cannot afford to not move into the internet age. Once a few leading edge providers take the plunge (and a few already have), patients will start demanding it. Providers that make the leap now will be much better positioned to attract and retain patients and serve a much larger number of patients. With each new application that arises, the benefits of going online increase exponentially. The snowball effect has already started, and providers and vendors that are slow to realize this will be at a great disadvantage in the future.

### ***Patients are addressing healthcare pain points themselves***

As most providers have yet to venture online, the typical healthcare stakeholders are not the ones driving the charge towards the internet. The majority of hospitals and physicians are busy worrying about electronic health records (EHRs). Healthcare payers are equally focused on other technology issues like streamlining claims processing. While these are important, patients are often left with subpar healthcare experiences that are relatively easy to remedy with technology. It is easy enough that patients are taking it upon themselves to fix what traditional healthcare players do not have the time, resources or realization that there is a problem to fix. These patients turned entrepreneurs are drawing from personal experiences, hitting on pain points that all patients are feeling. The following are just a few examples of the ways patients are taking it upon themselves to change healthcare:

- Why do I have to wait to see a doctor? Startups address the access issue.
- Which provider is better? The internet increases transparency and improves the patient experience.
- What can I do to improve my health? The web enables patient empowerment.

#### **Why do I have to wait to see a doctor? Startups address the access issue**

With over 45 million uninsured in the US, a number that is growing due to the economic crisis, and many more patients worldwide that must wait hours, days, weeks or months to see a physician, access to healthcare is a major issue for patients. When patients are unable to get the care they need, when they need it, their condition deteriorates and precious time that could be used to treat them is instead wasted. This not only decreases the quality of care patients receive, but also increases the cost of care; by the time patients see a physician, they often need more aggressive and more expensive treatment. Timely access to care is therefore extremely important to help address the crisis healthcare systems are facing. Startups are uniquely positioned to address this issue as they can think "outside the box." Instead of working within traditional constraints and expectations, they are able to see new ways to solve old problems. Additionally, as internet-based companies, it is easier for startups to scale up to meet future demand than it is for traditional technology companies.

ZocDoc co-founder Cyrus Massoumi ran into a problem most patients come across when they need to make an appointment with a doctor. With a ruptured ear drum, he needed to see a specialist right away, but was unable to see a physician for four, long painful days because he could not find a doctor under his insurance plan who had an opening right away. When he looked up physician information on his insurance company's website, many of the doctors offices he called either had an incorrect number listed online or no longer took his insurance. In one case, the doctor had even retired. Of the physicians he did manage to reach, most had double booked calendars for the next few days, if not weeks, forcing him to wait to see a doctor. In a city as large as New York, it seemed ridiculous that not a single specialist with his insurance was available to see him with a few hours notice. ZocDoc seeks to change this, providing online appointment scheduling in New York City. With ZocDoc, patients can find doctors and dentists in their area, sort by insurance carrier, read reviews and schedule an appointment online. If seeing a doctor the same day is most important, patients can choose a doctor based on availability. If seeing a particular physician is more important, patients can choose to wait a few days to see the physician of their choice. With up-to-date insurance and scheduling information, finding a doctor and making an appointment no longer feels impossible for patients. Today ZocDoc is available only in New York City, but it is expanding later this year.

Another startup that is addressing this issue is American Well. However, it is taking a markedly different approach, offering online, on-demand consultations with physicians. American Well, already providing services in Hawaii, allows patients to connect with a physician through a simple web browser, using video conferencing via webcam or secure chat, or a telephone for approximately ten minute intervals for a fee. Patients can meet with a physician within minutes from whatever location the patient is, rather than making an appointment, traveling to the doctor's office, waiting in the doctor's office and then finally seeing the doctor. American Well believes that if the demand for healthcare increases, as it could if universal healthcare becomes the norm in the US, its services will be able to help handle the influx of patients.

### **Which provider is better? The internet increases transparency and improves the patient experience**

One of the most difficult decisions patients have to make in terms of their healthcare is which doctor to go to. While word of mouth referrals are still the most commonly used way to find a new doctor, it is not the most objective or comprehensive way to find a physician. The information that patients have had to make their physician pick has been limited. Part of this is simply because there are so many different types of quality indicators for physicians. Patients' criteria run the gamut from consumer-like expectations to tangible clinical outcomes. Patients want to be treated with compassion and respect, to have their questions answered and to play an active part in the development of their treatment plans. They want privacy, cleanliness, quiet and even internet access in their rooms. At the same time, patients obviously want to feel better after their hospital visits. Thus, being given a correct diagnosis, undergoing a successful surgery or having the correct medication prescribed are quality of care hallmarks. Surgery on the wrong part of the body is a flagrant example of bad healthcare. Having a nurse give a patient the wrong medication, or the right medication, but at the wrong time or wrong dosage, is just as harmful. Unnecessary, avoidable problems like suffering from hospital-acquired infections or bed sores are inexcusable. Finding data on all of this is difficult, if not impossible today.

A number of websites, however, are attempting to tackle this problem and increase transparency in the healthcare market. These websites are beginning to compile outcomes data and/or allow patients to comment on and rank doctors. While preliminary studies claim that these sites have yet to persuade the decisions of patients, Datamonitor disagrees. Patients going to a doctor they have already been to may not be swayed by comments left online, and lots of positive reviews may not convince a patient to choose a particular physician, but one terrible review could easily persuade a patient not to go to a new doctor. As more rankings are posted online, Datamonitor expects that they will become more and more important in patients' decision making processes.

In an interesting turn of events, providers can improve their online rankings by using the internet to their own advantage. GetWellNetwork is improving the actual patient experience by bringing the internet to the bedside, literally. GetWellNetwork was founded by Michael O'Neil, Jr. During his recovery from surgery, he found himself lying in bed, too uncomfortable to read a book, with nothing to do but stare at an old TV screen. Today, GetWellNetwork provides patients with bedside screens that invite patients to do everything from control the temperature in their room to call a nurse for water to learn about their diagnosis and treatment plan to surf the internet. Patients are able to use instant messaging services, access links to relevant health-related websites and online support communities, and can even set up their own CarePages and CaringBridges sites that keep loved ones informed. Patients' experiences in the hospital and their perception of quality of care are dramatically improved as they are more comfortable, more connected to the outside world and more educated about their condition. By keeping patients happy and educating them on their condition before they leave the hospital, not only are they more likely to recover faster, they are also more likely to recommend the hospital to their friends, family and others in their on/off-line social network.

**What can I do to improve my health? The web enables patient empowerment**

Some patients are more involved in their own care than others, but all patients have windows of times when they are more likely to change their habits, such as after a diagnosis. Numerous websites and applications are being built to help patients play a more active role in their care when they are ready. If these solutions make it easier for patients to become and stay engaged in their health, patients will be able to change their behavior and improve their health. From iPhone applications like calorie counters to pedometers that link to PCs and telehealth devices, the types of tools patients can use to manage their health are growing everyday. The progression from online health information to health tools is a logical transformation.

Ben and James Heywood, two of the three co-founders of PatientsLikeMe (PLM), are taking patient empowerment to the next level with the use of social networking. When their brother was diagnosed with Amyotrophic Lateral Sclerosis (ALS or Lou Gehrig's disease), they were inspired to create a site where ALS patients could share their experiences with each other. The site has grown to include fifteen other conditions. Patients share everything from what drugs they are taking to the doctors they have worked with to what their current health status is. This site is extremely valuable to patients, allowing them to find information that is specifically relevant to them and learn from the collective experience of others who have gone through this already. PLM also creates a natural support group for patients, encouraging each other to stick to their treatment. Datamonitor believes that this type of social networking allows patients to start personalizing medicine themselves in addition to arming patients, providers and researchers with potentially life-saving information. As the power of these networks continues to grow, Datamonitor expects that other disease conditions will utilize social networking as well.

***In order to move forward, healthcare must accomplish mission impossible: cultural change***

The possibilities for the internet's impact on healthcare are endless, but they are only possible if providers and patients accept the technology and if technology companies work with the stakeholders in healthcare, including other technology companies. A cultural change needs to occur or technology innovations will go to waste. Waiting for a generation change is no longer a valid excuse. Seventy year old patients and physicians on the brink of retirement are using the internet for healthcare. This mission is not impossible; the stethoscope was once considered too time consuming and troublesome for physicians and would never be adopted, yet today it is a symbol of medicine. Healthcare stakeholders of all ages need to overcome the following barriers to capitalize on the benefits of the web:

- The medical establishment is necessarily set in its ways.
- Patients worry about privacy at the expense of their health.
- Most healthcare IT vendors are not seeing the forest through the trees.

**The medical establishment is necessarily set in its ways**

Medicine has its own unique culture, and for good reason. Physicians and nurses must cope with life and death situations everyday at work. The things they see and the situations they must react to are not for the faint of heart. Because of this, from the moment students enter medical school and through the rest of their careers, physicians are taught to work within the established hierarchy and to practice medicine the way they have been taught. When sufficient research supports a new drug or treatment, then and only then will physicians consider altering their practice. In addition to this, the high paced

and overbooked structure of a physician's workday leaves little time for testing out new technologies, not to mention the lack of financial incentives for technology adoption providers face. This risk-averse and slow-to-change culture is a stark contrast to the high tech, constantly changing world of the 21<sup>st</sup> century. At this rate, by the time all physicians are 100% convinced that they should adopt technology like EHRs, current technology will likely be obsolete. While there are obvious benefits to the slow adoption of new ideas into medicine, a balance between established practices and today's world must be found. The internet will benefit providers, if they are only willing to give it a chance. For example, it will decrease overhead expenses (EHRs provided over the internet through a software as a service (SaaS) model are substantially less expensive and easier to manage than traditional software solutions), allow doctors to spend more time treating patients through improved efficiencies, help them stay up-to-date on new medical research and increase collaboration with their colleagues. In order for providers to overcome this hurdle and increase the adoption of new technologies, more research on the benefits of healthcare technology must be conducted and provider education needs to not just continue, but increase. Everywhere physicians turn, information on healthcare technology should be right in front of them. Patients need to ask their doctors why they do not have an EHR. Governments and payers need to apply more pressure. Providers who are technology champions must be leaders in their field and help their colleagues "see the light."

### **Patients worry about privacy at the expense of their health**

Patient privacy is one of the most sensitive topics in healthcare technology. Consumer advocates worry about lost laptops containing patient information, insecure portals, hackers and technology companies with access to medical data, and claim discrimination based on medical conditions and insurance denials are certain to occur. Admittedly, laptops from healthcare organizations are lost on a fairly regular basis around the world, and sensitive patient information has been leaked out, but Datamonitor has not seen patient data used for widespread public discrimination yet. In most cases, if the data has been accessed, it has been used for identity theft purposes only. The financial world has managed to address this concern, and the healthcare community cannot continue to hide behind privacy issues as a reason to avoid adopting new technology. Additionally, care needs to be taken to ensure innovation is not stifled by overly strict privacy regulations. If Health Insurance Portability and Accountability Act (HIPAA) regulations are pushed to the extreme, for example, then the exchange of patient information between providers caring for the same patient will become more difficult, rather than less. This increases the cost of caring for patients while simultaneously decreasing the quality of care. Of course, patient privacy must be protected, but the exchange of health information brings the most benefits to patients and must also be defended. Datamonitor believes the perceptions regarding privacy are slowly beginning to change. PatientsLikeMe's openness philosophy, that encourages patients to share their experiences with each other, and the very personal types of video patients post about themselves on ICYOU.com are examples of how views on privacy are changing.

### **Most healthcare IT vendors are not seeing the forest through the trees**

A culture change needs to occur not only with providers and patients, but also technology companies. For the most part, traditional, established healthcare technology vendors are content focusing on the way their business is growing today, so much so that they are dismissive of new delivery models and startups. For example, some software companies are still debating the merits of SaaS, although it is unclear what there is to discuss, as Datamonitor believes SaaS is a better solution for small organizations that cannot afford a large capital expenditure or an IT staff. If these companies want to target the market segment that has yet to adopt healthcare IT, then they need an SaaS solution.

Furthermore, many large IT organizations see no business model for up and coming startups and therefore assume they will disappear soon. What they have not taken the time to understand is that many of these startups have viable and innovative business models, and have solutions that challenge traditional healthcare technology products. If these established companies are not careful, they will be blindsided by smaller, nimbler organizations.

Even more disturbing is the fact that most healthcare IT vendors still do not truly support interoperability; the exchange of patient information between different IT systems continues to be a rare event. At the annual Health Information and Management Systems Society (HIMSS) conference, vendors work together and show that they can exchange information, but as soon as the exhibition is packed up, as far as Datamonitor can tell, vendors go back to encouraging clients to add another custom-built application that makes it more difficult to exchange patient information, in addition to increasing the price tag. From a technological standpoint, interoperability is not particularly difficult. The hard part is convincing the technology companies to work together. Healthcare tech companies that continue to work this way can expect a backlash from their customer base in the next few years as interoperability becomes the norm.

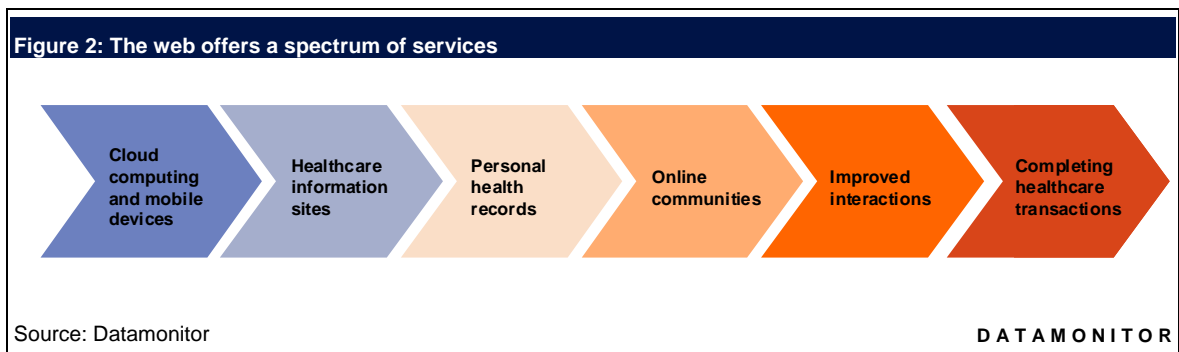
## TECHNOLOGY EVOLUTION

As the cultural barriers to using the internet for healthcare fall away and more patients and providers use the web, the number of new offerings will become increasingly overwhelming. In this section of the report, Datamonitor will categorize the different types of services being provided online and discuss the ways startups are looking to build sustainable business models. The use of group dynamics in community-based sites and the sources of inspiration for startups will also be explored:

- From simple information to completing transactions, the web offers a spectrum of services.
- Healthcare startups are testing promising business models.
- The best use of technology capitalizes on human nature.
- Innovative companies from other industries serve as inspiration for healthcare websites.

### *From simple information to completing transactions, the web offers a spectrum of services*

The number of health-related websites and online applications will grow exponentially in the near future. Some will be geared toward providers only while others will focus on the patient population. Another segment will look to connect providers with patients. Meanwhile, offline companies and services, such as seeing a doctor, are moving online and vice versa. Datamonitor highlights a series of interesting, up-and-coming companies in this segment of the report, grouped by the following categories:



- Healthcare is moving “into the cloud” and onto mobile devices.
- Content-based healthcare sites are ubiquitous online.
- Personal health records will help solve the problems facing health information exchange.
- “Light bulb moments”: creating communities, improved interactions and completing healthcare transactions.

### Healthcare is moving “into the cloud” and onto mobile devices

Following the larger trends in the technology market, early adopter healthcare organizations are starting to leverage cloud computing: IT services provided over the internet. From the use of SaaS to provide EHRs to physician offices and small hospitals to Salesforce.com’s entrance into the healthcare market, providers are slowly realizing the benefits of cloud computing. Its lower upfront capital costs are particularly attractive in this economy. Even in the US, with over \$20 billion set aside for healthcare technology in the stimulus bill, providers are still working under limited budgets. They must make the initial investment in EHRs themselves and the total financial incentives will not cover the full costs of implementation. Cloud computing is also attractive because it allows providers to focus on providing care rather than worrying about IT issues, as the IT vendor worries about the IT issues instead. Finally, after events like Hurricane Katrina, the benefits of having access to applications online rather than onsite have hit home.

Another movement that Datamonitor is seeing in healthcare is the increased use of mobile technologies. mHealth, short for mobile health, as it has been termed, is evident in the growing number of clinicians and patients using smartphones and cell phones as an on-ramp to the internet and other applications. Physicians are using their mobile devices to do everything from checking their email to examining patient x-rays to double checking drug interactions. Unlike most other healthcare technologies, doctors are asking for these solutions; one of the first iPhone applications released last year from Epocrates, a provider of clinical information and decision support tools, was chosen in part because over 800 physicians signed a petition asking for it. On the patient side, a number of iPhone applications are helping to empower patients, including numerous symptom checkers/navigators to LIVESTRONG.com’s calorie tracker and Healthagen’s iTriage, which helps patients find providers in their area. Datamonitor would like to see an iPhone application developed for PHRs in the near future to make it easier for patients to input information and show it to their providers during an appointment. Short message service (SMS) for healthcare purposes is also increasing. Some vaccine companies are sending out SMS reminders for second and third doses. However, Internet Sexuality Information Services, Inc. (ISIS), a nonprofit organization, is taking mHealth to another level. Through its SexInfo program, it offers sexual health text messaging to youths in San Francisco, answering personal questions through SMS. When data plans on cell phones become more affordable, ISIS envisions providing short, educational video clips through mobile devices as well. Mobile healthcare allows instant, convenient access to information for both providers and patients.

### Content-based healthcare sites are ubiquitous online

Health information is easy to find online; simply Google whatever health topic is of interest and millions of website links will appear. For example, in March 2009, a search for diabetes led to over 94 million results on Google. A search for cancer produced 227 million links. Finding accurate health information online, however, is a little more difficult, but by no means impossible. A number of health websites have risen above the rest, in part because of brand awareness, marketing, accurate content and ease of use. These include WebMD, Revolution Health, the National Library of Medicine and renowned healthcare organizations such as Mayo Clinic, to name just a few. Nonprofits like the American Diabetes Association and the American Cancer Society are also trusted sources. Wikipedia is another commonly used site, though not always 100% correct, reinforcing one of the main complaints providers have about the internet: that much of the information online is incorrect. **One content site that stands out from the rest is VisualDxHealth, a site that focuses on skin related conditions. Its content consists of a large database of images, not just words, which is particularly helpful for distinguishing between different types of rashes.**

Providers have online resources that they frequent for medical information as well, including PubMed, Epocrates, Ebsco and Elsevier, to name a small selection of websites. Much of this information is the same as what is found in print, only in this instance in digital, but increasingly, some of these companies are presenting the information online in an easier to find and read format. From searches to short summaries that lead into longer more detailed pieces and images, reference tools are changing as they move online.

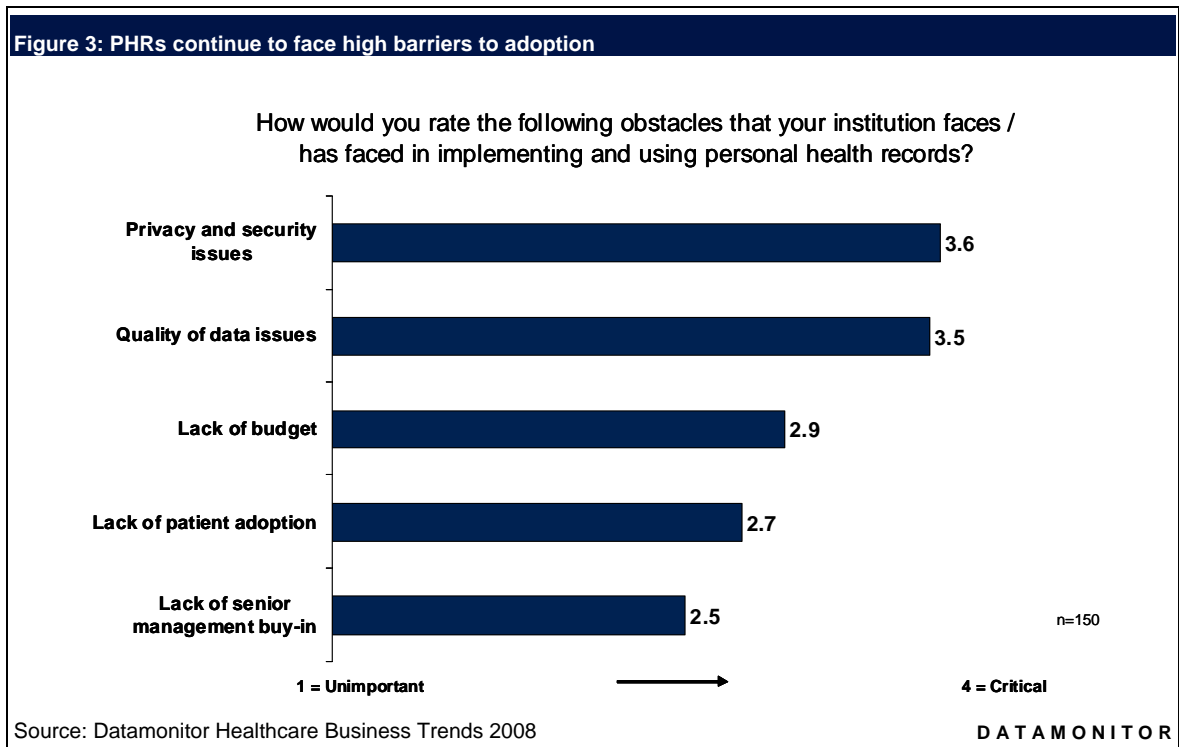
The information these content sites provide is invaluable to both patients and providers, and has changed the patient/physician relationship. However, the internet has more to offer than this. A second wave of healthcare websites are appearing online that do more than just provide information. They allow internet users to leave comments, interact with each other, schedule appointments, or even see a doctor. These next generation sites will be discussed in more detail later in this report.

Before moving on, however, Datamonitor would like to address one area of content-based sites that is severely lacking. Hospitals, insurance companies and physician offices, for the most part, have poorly designed websites, if they have one at all. Most are cumbersome to navigate and many look unprofessional. Like a self-reinforcing feedback loop, bad websites go unused, unused websites become neglected and neglected websites become even worse as technology improves. Insurance websites are probably the worst offenders, as the majority of their sites contain incorrect and out-of-date information. In a world where Amazon.com can keep track of what its many consumers have bought, insurance companies should be able to keep track of which providers are in their network. Many providers, particularly those in small offices, consider a website a luxury rather than a necessity; it is an added cost and a task that requires expertise rarely found in the office. Physicians need to realize that well-designed websites not only help patients and referring physicians find basic information like addresses and phone numbers, but they can also help streamline workflow. More advanced websites, for example, allow patients to book their appointments online, fill out and submit forms electronically before they go into the office, pay bills and request prescription refills. A frequently asked questions page can reduce the number of phone calls office staff needs to answer. A user-friendly and useful site will improve the patient experience and help physicians attract and retain patients.

### **Personal health records will help solve the problems facing health information exchange**

PHRs have become the latest accessory to have. Not only are Google and Microsoft offering PHR platforms, but many EHR companies are adding PHRs to their solutions sets, some healthcare insurers are encouraging their members to use one, and hundreds of other companies ranging from WebMD to NoMoreClipboard to TrialX offer or are connecting to PHRs. Some of these companies fully understand the power of PHRs, but many others seem to be just jumping on the bandwagon, waiting for PHRs to become the next "must-have" product.

However, for most of the healthcare community, even within healthcare technology circles, PHRs are still just an interesting solution to watch. The majority of healthcare providers and those that work in the healthcare technology field have not yet tried the products that are available today and do not understand how they work. Like consumers, most are worried about privacy and security issues (Figure 3). One of the more frequently raised concerns is over whether or not Google or Microsoft should have access to private healthcare data. Clinicians worry about the quality of the data and bystanders wonder if patients will really go through all the trouble of entering their own data into the computer. In short, most do not see the value of PHRs. Amid this confusion, however, is a solution that, if adopted, will not only empower patients, but could also circumvent many of the problems facing regional and national health information exchange (HIE) initiatives.

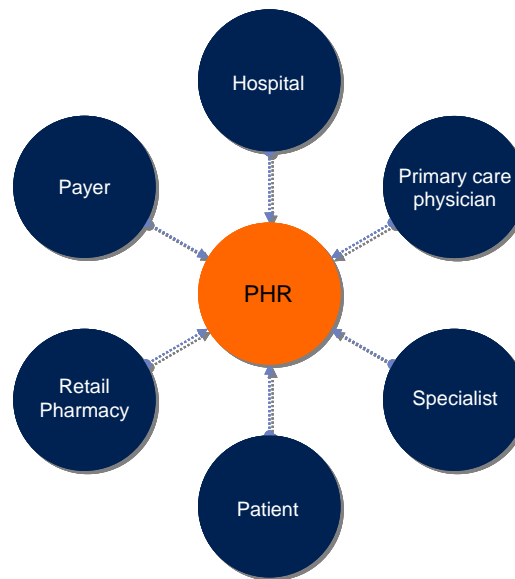


To address the skeptics first: ‘Why should Google or Microsoft have access to my healthcare data?’ Because if you’re wheeled into an ER unconscious, would you rather your doctor be able to access your information in your PHR or have no idea who you are, what you’re allergic to, what medications you are on or what your family history is? In a life or death situation, the fact that a technology company has your health information may not be such a “big deal” after all. In terms of security and privacy, the high profile companies offering PHRs are taking these concerns very seriously. They have password protected the information online and allow only authorized employees within their company access to data. They fully realize that if they were to sell patient information, patients would stop using their product. PHR providers are taking steps to ensure that only patient-authorized users, like patients’ physicians and family members, have access to the data. In terms of the quality of data, when information is imported or entered into the PHR, PHRs like GoogleHealth note where the data originated from. Thus, if a patient has entered in his or her own information, then the PHR will indicate as much. In addition, information that a patient has entered in a PHR must be taken with just as much trust (or lack thereof) as the information that a patient gives in person. However, if the information is pulled from a retail pharmacy such as Walgreens, or a physician office, the PHR will state that as well. Therefore, clinicians need not worry about patients “tampering” with their health record and are able to judge each piece of information based on its source. However, if patients choose to keep some of their health information private, then physicians may not be able to provide the most appropriate treatment to new patients as certain data has been blocked. Technology vendors and providers will need to win the trust of patients and remind them that the more information that is available to physicians, the better able they will be to treat them. Finally, the beauty of PHRs is that, in a connected world, patients will not have to enter their entire medical history because they will be able to import it from an existing source. The point is for patients to enter in information that is not in their health records

yet, such as a symptom as soon as it arises, new family diagnoses, daily glucose readings, weight changes, or notes regarding the next appointment. This increased patient participation and knowledge is what empowers patients, while adding a new, additional layer of patient information for physicians.

Datamonitor realizes that adoption of PHRs will most likely still be slow. Like any new, emerging technology, particularly in healthcare, acceptance takes time. In addition to the concerns addressed above, most consumers still do not understand or are aware of PHRs either. Furthermore, not enough partnerships with hospitals, doctors' offices, labs and pharmacies have been established to make it easy for patients to import their data from their providers. Most providers, in fact, still do not even have EHRs. However, much like shopping over the internet was met with much resistance and worries about credit card security in the beginning, Datamonitor believes that PHRs will become a part of normal everyday life in the future once patients and providers understand that the benefits of PHRs outweigh the risks. Datamonitor also expects that access to PHRs through mobile devices will encourage patients to use PHRs.

Despite the reservations of consumers and the majority of the healthcare community, Datamonitor believes that when PHRs are adopted, they will play an important role not only in empowering patients, but also in HIE. PHRs, in fact, could circumvent the expensive technologies and time consuming consensus process which regional health information organizations (RHIOs) must go through today, making PHRs a more sustainable HIE solution. PHRs are able to do this because they, by definition, follow the patient. Therefore, rather than institutions connecting to other institutions through a RHIO and then RHIOs repeating the whole process again as they connect to other RHIOs, if each organization connects to a PHR, then they are automatically connected to everyone else that is connected to the PHR (Figure 4). Of course, there may be more than one PHR that organizations will need to connect with (though Datamonitor expects that one day an application will be developed that will connect different PHR platforms, resulting in organizations really only having to connect to one) but, overall, fewer players are involved, thus simplifying the process. If the organizations are able to agree with the PHR policies, they do not have to come up with their own. Finally, as PHRs today are free to patients and to organizations (not including the costs of the initial connection), the expense of maintaining a connection to PHRs is not an inhibitor. Even if PHR companies were to charge a fee in the future, Datamonitor expects that as an SaaS solution, the cost would be subscription-based, easy to predict and much more affordable than other HIE solutions available today. National, even international, exchange of patient information will be possible with PHRs.

**Figure 4: PHRs could greatly simplify HIE**


Source: Datamonitor

DATAMONITOR

### “Light bulb moments”: creating communities, improved interactions and completing transactions

The next evolution of healthcare internet applications, beyond content-based sites and PHRs, are often grouped under buzz-worthy terms like Web 2.0 or Health 2.0. Without a doubt, many of these 2.0 startup attempts will flicker and fade away. However, a few emerging, second generation technologies are already making big waves in the healthcare world and are poised to create a tsunami that will change the healthcare landscape. These solutions make perfect sense as they solve market problems in ways that are not possible without the web. Datamonitor divides these innovative websites into three distinct types: online communities, transaction-based sites and improved communication.

A number of social networking websites for healthcare are appearing online. The most successful ones, however, are not centered on making friends or being social. Instead, they focus on patient problems and building communities around common experiences. PatientsLikeMe (PLM) connects patients with the same health conditions. PLM patients share both their experiences and quantitative assessment of their conditions with each other, from the first symptoms they experienced to the treatments they have undergone (and which they felt worked and which did not) to how they feel today. Currently focused on a mix of rare and prevalent conditions, the site serves as an invaluable source of information for patients, a support group and a resource for medical researchers. As the number of users increases, patients continue to be able to search not only for other patients with the same condition, but also search within those patients based on gender, age, and treatment history. In this way, PLM makes personalized medicine a reality now. Today, the site connects approximately 30,000 patients across its various conditions. PLM is adding enormous value to patients, providers and researchers, in a way that was nearly impossible without the internet. In the future, Datamonitor expects that patients with any disease or combinations of conditions will have a virtual network to go to, whether through PLM or another site.

Sermo is another online community, but this one is for physicians to discuss professional issues with each other. Discussions revolve around topics such as hard-to-solve patient cases, the validity of new research studies and the effects of new policy. Providers working alone in small private practices and/or in rural areas can now connect to colleagues in a few clicks of a mouse. A nagging question can be answered in a few minutes' or hours' time from a number of experts in different fields of medicine. Currently over 100,000 physicians in 68 specialties are members of Sermo. Sermo provides an invaluable professional resource for physicians, a place where doctors can learn from each other as well as support each other.

The other type of next generation sites center around the way patients interact with other healthcare stakeholders in the way that they want. Allviant's upcoming product, CarePass, allows patients to define the nature of their communications with their providers, insurance companies and other healthcare stakeholders. CarePass' goal is to be a single source for patients to check and manage all their healthcare transactions. Focused only on the financial and administrative aspects of care, patients will be able to unify their healthcare information into a single construct and then decide how and when they want to receive alerts, reminders and notifications. For example, patients could decide that they want SMS updates daily or emails weekly on any changes to their accounts or phone calls for health prompts such as prescription refill reminders. This new take on customer relationship management (CRM) is owned, managed and controlled by the customer and centers around their needs and preferences rather than those of individual companies. A model of pushing information out to the patient in the format and time they want it, rather than waiting for them to seek out information on their own, is not only more convenient, but it also gives patients better insight into their healthcare and can benefit healthcare organizations through reduced costs as well.

One of the most innovative healthcare technology organizations Datamonitor came across while researching this report is a nonprofit. ISIS develops and uses technology for the promotion of sexual health and to prevent disease transmission. While other healthcare IT companies have products that are geared toward departments of health and other public health organizations, the services ISIS directly address important public health issues by reaching out to individuals. One of their most successful projects is called inSPOT. The inSPOT website allows users to send anonymous (or signed) ecards to sexual partners informing them that they should be tested for a sexually transmitted disease (STD). If the user lives in selected cities or states that partner with ISIS, the ecard will include information such as where to get screened and if necessary, treated, for an STD. Partner notification is a crucial part of stopping the spread of STDs, but one that too often does not occur because people are too embarrassed to call previous partners and tell them. Sending an ecard is much easier for people to do, and therefore, more effective. Another incredibly useful project is called SexInfo, a text messaging program for youth in San Francisco. Teenagers receive answers to their questions related to subjects such as STDs and pregnancy over their mobile phones. As SMS is one of the most popular forms of communication among teens and is fairly discrete, this is a great way to reach the target audience. STDTest.org, another site that ISIS developed, recommends which STD tests the user should take based on a quiz. Users can download and print the appropriate lab slip from the website, bring the slip to a test location, get tested and then go back to the site to check the results of the test. If the results are positive, the individual receives a call from the department of health in addition to information on the website. Finally, STDTest.org is linked to inSPOT, encouraging those who tested positive to tell their partners. ISIS is planning to expand its services into other geographies, nationally and internationally, as well as into all age groups from teens to parents to the elderly. Datamonitor would like to see more government health departments adopting these low cost, effective public health solutions. ISIS has been successful because it utilizes the anonymity of the internet and SMS to its advantage. Additionally, ISIS picked up on the fact that its audience for SexInfo communicated via SMS and reached out to them through that

medium rather than another one. Vendors and providers that are able to leverage these two characteristics of ISIS are more likely to succeed in their endeavors.

The final category of next generation healthcare organizations help patients complete a transaction, whether that be booking an appointment, finding a caretaker or actually receiving care. ZocDoc lets patients in New York City schedule appointments with dentists and physicians online. Patients go to the website, pick the type of caregiver they are looking for, enter in their insurance information if applicable and search for a dentist or doctor. They can choose their provider based on appointment availability, location, provider's profile or comments left by other ZocDoc patients. With a few clicks, patients can book their appointment online for free, without having to make any phone calls or being put on hold by a receptionist. Patients have taken to it because it is easy and convenient. They can book an appointment at any time, even in the middle of the night, and they do not have to reveal personal information over the phone, possibly within earshot of their co-workers during office hours. Providers are coming around because their patients like it so much and because they are able to fill last minute openings. This, coupled with automatic appointment reminders, allows providers to avoid double booking their schedules. Research has shown that the average physician has a cancellation rate of approximately 10–20%. Based on ZocDoc's own research, providers who use their services have a cancellation rate of less than 3%. ZocDoc, thus, helps solve the problem of patient no-shows, long wait times and access to care in general. Furthermore, ZocDoc demonstrates its commitment to patient health (and incidentally increases traffic to its website) by sending occasional general health reminder emails to its users. For example, it sent emails encouraging users to book an appointment to get their flu vaccines during flu season and around the New Year, and recommended its users make appointments for their annual physicals. With careful attention to both patient and provider needs, ZocDoc has solved one of the most aggravating and difficult aspects of healthcare through untraditional means. Other technology companies should follow ZocDoc's innovative lead, keeping in mind that they do not need to work within healthcare's conventional constructs.

Enurgi, a Univita company, allows its users to complete a transaction similar to ZocDoc's, with some additional functionalities. Rather than book appointments with dentists and physicians, Enurgi allows patients and their families to find home health caregivers in their area, connect with them and then pay them online. Enurgi already has over one million US caregivers in their database. Patients and their families can search the caregiver database by location and specialty, then choose a provider by the caregivers' profiles and patient rankings. Patients can also submit jobs and compare responses to their "bid." For families that live in a different location than the patient, this site makes finding a caregiver infinitely easier. With developing countries facing a growing, ageing population, services like Enurgi will help keep elderly patients out of costly nursing homes and living independently, reducing overall healthcare costs and improving the quality of life of patients.

American Well takes the healthcare transaction to the final level, by connecting patients directly to doctors over the web. Launched in Hawaii in January 2009, American Well works with health insurance companies to link their network of physicians to patients through video conferencing via webcam, online chat or the phone. With more laptops equipped with video cameras, along with the growing webcam market, an increasing number of patients already have video conferencing capabilities at home. Those that do not can use online chat or the phone instead. Patients log on, answer a few questions about why they are seeking care, and then based on the answers to their questions, they are directed to the correct type of physician. Patients then choose which individual doctor they would like to speak with based on physician profiles and ratings. If a specific physician is not available, patients can decide for themselves if they would like to wait to see him/her or if they would prefer to see someone else immediately. Then, armed with a checklist, patients "see" a physician from the

comfort of their home at any time of the day. Providers, likewise, are now able to see additional patients whenever and wherever it is most convenient for them while generating supplementary income. Each insurance company dictates the pricing and reimbursements of these online care visits, benefiting themselves through the addition of a new revenue stream that makes healthcare more efficient. Online care visits will be less costly for insurers than in-person appointments, but will still generate income. American Well also connects to Microsoft's HealthVault, allowing providers and patients to exchange patient information. Patients are able to share information with the providers they are seeing online and physicians, in return, will document the visit in the patients' PHRs. The new information can then be shared with patients' PCPs.

Each of these solutions provides tremendous value to patients and clinicians, but added together, the whole is even greater than the sum of its parts. As more provider websites connect to services like ZocDoc, PHRs link to more applications, content sites add online communities and so on, the usefulness of each increases. Furthermore, Datamonitor believes that if patients and physicians use one of these new technologies, they will be more likely to use others, increasing technology adoption while improving care and efficiencies. Doctors who sign onto Sermo, for example, may be more likely to use EHRs if they see their peers using them. Likewise, patients who use PHRs could decide to use a third-party application like NoMoreClipboard, which then contacts the patients' providers. Providers might then encourage the rest of their patients in their practice to use the service. As more innovative, "outside the box" solutions are introduced, they need to connect to each other to fully leverage their potential.

### ***Healthcare startups are testing promising business models***

Many of the established healthcare technology companies look at these web startups and dismiss them, assuming that without a sustainable business model, they will not be around in a year or two. Considering Facebook and Twitter have yet to establish their own successful business models, it is unsurprising that these startups are often dismissed. What the more traditional technology companies have yet to understand is that in this new space, there are completely new sets of business models.

For the most part, the actual users of these websites will be able to use the solutions for free or for a very minor cost, such as a charge of a few dollars when downloading a smartphone application. In some cases, more advanced capabilities will be available to users for a subscription fee. Most users will stick to the free version, but a percentage will opt for the subscription. A model that many of these internet companies are using is a sponsor model, where a sponsor, typically a large employer, insurance company or pharmaceutical company, pays for these subscription costs of its employees/members. Therefore, an employer buys subscriptions for its employees and in addition, is able to brand the portal employees use to access the site. Companies that have large universities sponsor their products have not only been able to reach university employees, but also students. When students graduate, they will likely want to continue having these services. This model is an ingenious way to build market share, and if companies are able to find enough subscribers, through individuals or sponsors, then this business model can provide a stable source of income. However, as a percentage, the number of individuals that will pay for services will most likely be low and sponsors will only continue to offer the solutions to their employees/members if vendors are able to demonstrate that they are providing a tangible return on investment (ROI). Many startups, therefore, are using downloads and subscription fees as one part of a larger business model that includes some, or all, of the following components.

Although many companies are avoiding advertising at all costs, ad revenue is not completely off the table. GoogleHealth and Microsoft HealthVault have pledged that no advertisements will appear on their websites, though third party

applications and other startups are open to advertisements, including ones from pharmaceutical companies. A handful of these startups even believe that advertisements will be useful to both advertisers and patients. Advertisers obviously benefit from reaching a much more targeted audience, but patients benefit in the same way as they see only advertisements relevant to their condition. While many consumer advocates worry that patient privacy will be violated, and Datamonitor strongly believes that direct to consumer (DTC) marketing must be regulated, patients with cancer, for example, want to know if there is a new drug that is available to them, but have little interest in a drug for a condition they do not have. As pharmaceutical companies already advertise directly to consumers in magazines and on TV, Datamonitor would not be surprised to see more advertising occurring on health-related sites as well. Particularly in this economy, targeted online advertising may offer a better ROI for companies than print or TV marketing. However, advertisements must be incorporated into the application tastefully, as bombarding patients with advertisements directly in their medical history will only ostracize the audience. In an interesting twist to typical advertising, LIVESTRONG.COM has promoted advertisements from likeminded, health conscious companies like POM and Wii Fit.

Linking to provider websites is another business model that many startups are considering. Whether through widgets on small physician office sites or direct interfaces with their portals, companies that provide clinicians with services to streamline their office processes are exploring this option. Finally, social networking sites with built in targeted communities are a perfect fit for market research. Sermo has already begun utilizing this as part of its business model, sometimes with obviously sponsored surveys, but other times more discretely. Time will tell if these models will work. Datamonitor already sees traction in the sponsor models and market research uses. Advertising revenue will not be too far off.

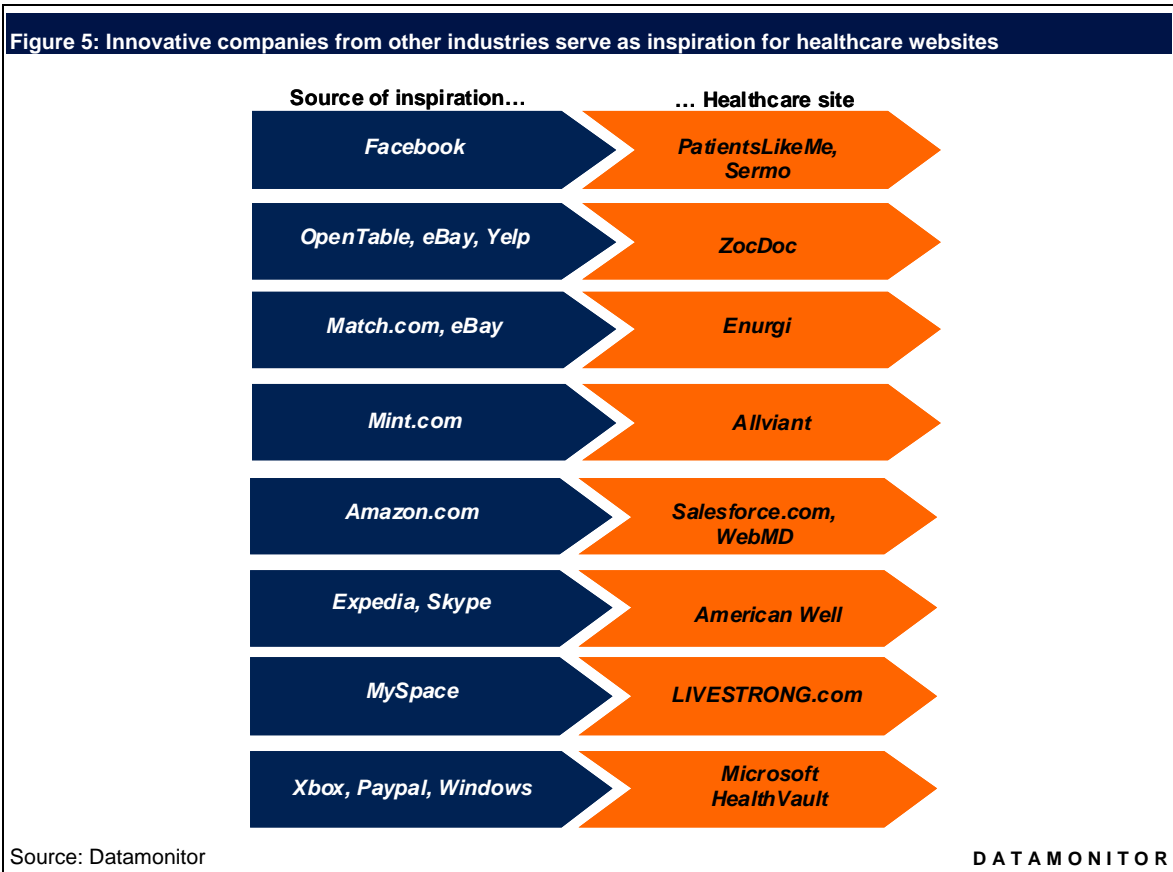
### ***The best use of technology capitalizes on human nature***

Many of these startups are successful not only because of their value proposition, but also because they have been able to harness the nature of humans and group dynamics to their advantage. For example, as stated previously, ISIS utilizes the anonymity of the internet and SMS to increase sexual health awareness. As PLM's community of patients follow each other's progress, they essentially use peer pressure to encourage each other to continue their treatments, exercise, even just get out of bed. This positive take on peer pressure helps improve patient outcomes. In this way, PLM is like an online version of Alcoholics Anonymous or Weight Watchers for the chronically ill. LIVESTRONG.COM does something similar by letting their users "dare" each other to lose weight or quit smoking, for example. By posting these dares online for the whole world to see, members are encouraged to stay on track. Sermo allows providers to truly collaborate with each other on patient cases, but it also encourages collaboration by making it into a competition. Physicians, already a competitive group of people, are ranked on the site by the number and quality of their postings. Thus, the more they log on to the site and participate, the more recognition (sometimes in monetary forms) they receive on the site. Other companies that are building communities around other specific health issues would be remiss to not use tools like these in some way on their sites. Even real life communities are starting to leverage human behaviors, as some large employers are providing incentives to their employees to stay healthy, such as through gym membership rebates.

### ***Innovative companies from other industries serve as inspiration for healthcare websites***

Leading websites are serving as models for healthcare startups. As healthcare is a late adopter of technology, this phenomenon is typical in the healthcare technology industry, but it is even more pronounced in the online world. From Facebook to Paypal, Myspace to Match.com, companies are drawing inspiration from an impressively wide range of sources, as shown in Figure 5. Many of the parallels between the sites are obvious: Facebook as a model for PLM and

Sermo, OpenTable and ZocDoc, Match.com and Enurgi, Mint.com and Allviant. Other comparisons are more technical: the layout and functionality of web pages is often inspired by Amazon.com, American Well's video conferencing component has a similar feel to Skype, and Yelp is an example of how to manage end-user comments. Microsoft HealthVault and LIVESTRONG.com are taking this one step further and are developing their overall strategies similarly to other products. HealthVault aims to be a platform, much like Xbox Live, Paypal and Windows are, with applications on top of it. LIVESTRONG.com wants to be a place patients go to for health, just as MySpace is where fans go to for music.



Datamonitor believes there is no reason to “reinvent the wheel” and that if another industry has solved a problem, healthcare should take advantage of that knowledge. In this way, healthcare will be able to skip a generation of technologies and catch up to other industries. However, the health of patients is different from a music fan site and appropriate changes and precautions need to be made. Nevertheless, Datamonitor expects healthcare companies to continue looking to other industries and looks forward to seeing how startups will draw from the likes of Twitter, Second Life and other companies not included in the figure above.

## **CUSTOMER IMPACT: RECOMMENDATIONS TO HEALTHCARE ORGANIZATIONS**

The majority of healthcare providers, particularly those practicing in small offices, are hesitant to adopt new information technology in their practice. This is understandable given the pressing nature of their work and the demands on their time. However, technology can help streamline their workflows, giving them more time with patients and less time with administrative tasks, while also improving patient care. Furthermore, patients are moving ahead and using technology and will expect their doctors to be up to speed. Datamonitor offers the following recommendations to providers as they start venturing online:

- Adopt SaaS EHRs that will be interoperable with other healthcare technologies.
- Create a website that patients will go to first when they have a health question.
- Keep up with your patients.

### ***Adopt SaaS EHRs that will be interoperable with other healthcare technologies***

With the flurry of news surrounding the American Recovery and Reinvestment Act of 2009 and the billions of dollars being spent on healthcare technology, providers in the US are facing the reality that they will have to adopt EHRs in the next few years. Datamonitor suggests physician offices and small hospitals invest in EHRs that are delivered through an SaaS model. By having the EHR vendor host the software, providers do not have to worry about maintaining the technology themselves. They can focus on patient care instead of IT. Furthermore, the startup costs of SaaS are much more manageable for providers as it is a simple, easy to predict, subscription fee. In addition to SaaS, EHRs should be easy for providers to use and should be interoperable and be able to exchange information with other EHRs and healthcare technologies like PHRs and telehealth devices. Many vendors claim they are interoperable, but only after extensive and expensive custom work. Providers, backed by the wording in the stimulus plan, must push vendors to make interoperability a common feature of EHRs.

### ***Create a website that patients will go to first when they have a health question***

When patients need to find a florist, a restaurant, a college, or just about anything else, they go online and check the website. But, when patients look for their own PCP on the web, more often than not, all they find is a black hole. It is difficult to find even an address or phone number of a physician online. This needs to change. Patients expect to be able to “Google” their doctor’s name and find out what time the office closes or if they take a new insurance policy. Having information like this online is not only convenient for patients who can check it anytime from anywhere, but also decreases the volume of calls to the office, freeing up office staff to take care of other issues. Additionally, with the help of other applications, providers can include online scheduling on their websites and have patients fill out forms electronically before they come into the office instead of giving them paperwork when they arrive. These streamline office workflow even more. Websites are one of the easiest technology solutions to implement and maintain, and a number of companies ranging from MedSeek to NewMedicalWeb to the college student majoring in computer science can help providers move online. Providers that do not yet have a website should create one and those that do have a website should ensure that it is kept up-to-date, in terms of content and functionality, but also in layout and appearance.

***Keep up with your patients***

Providers that adopt EHRs and have their own websites will seem technologically advanced to their peers and their patients, but they cannot be content to stop there. New technology is always around the corner, particularly in the consumer market. Providers should keep their eyes on two patient-centered technologies today: PHRs and smartphone applications. Again, providers that have EHRs that are compatible with PHRs will be better positioned in the future to exchange health information with their patients. Providers need to pressure their EHR vendors to make this a reality. Smartphone applications and their corresponding websites can help make staying healthy more fun, or at least more manageable, for patients. Thus, not only should physicians be aware of what is available online, but they can encourage the use of apps as well. In conclusion, providers should not be surprised if patients start coming to appointments armed with iPhones, BlackBerrys and other mobile devices instead of piles of paper printouts.

## **GO TO MARKET: RECOMMENDATIONS TO TECHNOLOGY VENDORS**

Healthcare technology vendors, both startups and veterans, are facing a difficult economy and, at the same time, a unique opportunity given President Obama's plan to spend over \$20 billion on healthcare technology through the stimulus bill. While the bill focuses on EHRs, they are only the first part of healthcare technology adoption for providers, not the last. Therefore, technology vendors must start now to prepare themselves for a changing landscape, where providers will all have EHRs and access to the internet. Datamonitor suggests vendors consider the following recommendations as they move forward:

- Interoperability, particularly with PHRs, must take precedence.
- Traditional healthcare technology companies cannot afford to ignore the web.
- Advice for startups: focus, focus, focus.
- Healthcare technology vendors need to think outside of the box to stay competitive.

### ***Interoperability, particularly with PHRs, must take precedence***

Vendors have so far been able to avoid the issue of interoperability for the most part. A handful of technology leaders have called for the exchange of health information, and HIMSS puts on a yearly Interoperability Showcase and standards committees have debated among themselves for years, but, no one has enforced the exchange of information to the relief of private companies that are hesitant to work with their competitors. However, the American Recovery and Reinvestment Act of 2009 will change this. The bill states that EHR users will only qualify for additional reimbursement if they meet a set of criteria, including being able to exchange patient information. The onus will fall on EHR vendors to make their products interoperable or face declining market share, as clients will begin asking for it. Datamonitor believes one of the most efficient ways to share information is through PHRs, as it is easier and less costly to integrate with one or two PHRs than every one of the hundreds of EHRs out there. With PHRs playing a central role in HIE, all healthcare technology vendors must work with PHR companies if they want to remain competitive in this market.

### ***Traditional healthcare technology companies cannot afford to ignore the web***

Established healthcare technology companies, from EHR vendors to system integrators, have a tendency to be dismissive or at the very least indifferent to the new technologies appearing online. These vendors cannot afford to stick their head in the sand and pretend nothing is changing. SaaS models are still being debated internally among some companies, when they should be fully embraced. Many vendors are still taking a "wait and see" approach to PHRs and wave off questions about social networking uses in healthcare. Meanwhile, startups are poised to take advantage of huge opportunities as the traditional healthcare world plods along at its own pace. Healthcare technology companies that ignore this space will not only miss the chance to partner with ground-breaking startups, but they may end up blindsided in the end. At the very least, vendors should be developing partnerships with PHR platforms. Companies looking to jump into the online space will consider acquiring start-ups while others should honestly evaluate how their product portfolio will be impacted given the change in market conditions.

***Advice for startups: focus, focus, focus***

Entrepreneurs looking to enter the healthcare technology space will find a sea of opportunity, but a market that is also extremely crowded and difficult to differentiate from. While the thought of founding and working at a startup sounds glamorous, in reality, it is anything but. Startups will need to be patient and plan realistically as the healthcare market has a long sales cycle. Focusing on a particular healthcare problem and only that problem is key. Solve that problem well first, and then consider expanding. Spreading oneself too thin will only weaken the company. Innovative ideas will be recognized, however, and if a startup has the potential to successfully solve a problem, partners like Microsoft are likely to come calling.

***Healthcare technology vendors need to think outside the box to stay competitive***

The most innovative startups profiled in this report are ones that created a solution that circumvented healthcare's conventional constructs. From ZocDoc, which defied the expectation that patients need to call up their physician to make an appointment, to PLM, which connects patients to other patients with the same condition, to American Well, which is making online consultations a reality, these and other startups are not restricted to working within the traditional healthcare structure. Other technology companies must follow suit. Healthcare is going to change drastically; vendors that are not producing the solutions that are driving this change must at least be prepared for a market filled with more demanding customers (made up of both providers and patients) who expect the type and quality of services they have access to in other industries, not the provider-centric model healthcare has today.

## APPENDIX

### *Definitions*

**Electronic health records** – Datamonitor defines an EHR as a computerized application that manages patient information over time for a group of users. An electronic medical record (EMR) is the clinical component of an EHR, the part of the record that documents patients' medical histories, symptoms, diagnoses and treatments. Thus, EHRs include EMRs, but also contain financial, administrative, research and educational aspects of patient care.

**Interoperability** – Datamonitor's definition of interoperability in healthcare is the ability to exchange health information stored in disparate IT systems both within a healthcare organization as well as among them.

**Personal health records** – Datamonitor defines PHRs as an EHR controlled and maintained by the patient.

### *Abbreviations*

ALS – amyotrophic lateral sclerosis

CRM – customer relationship management

DTC – direct to consumer

EHR – electronic health record

EMR – electronic medical record

HIE – health information exchange

HIMSS – Health Information and Management Systems Society

HIPAA – Health Insurance Portability and Accountability Act

ISIS – Internet Sexuality Information Services

PCP – primary care physicians

PHRs – personal health records

PLM – PatientsLikeMe

RHIOs – regional health information organizations

ROI – return on investment

SaaS – software as a service

SMS – short message service

STD – sexually transmitted disease

### **Methodology**

- **Ongoing briefings** – Datamonitor conducts interviews with software, hardware, networking and services vendors serving the healthcare industry as well as end users and standards organizations on an ongoing basis.
- **Secondary research** – other secondary sources of information include international organization statistics, national/governmental statistics, national and international trade associations, SEC filings, broker and analyst reports, company annual reports, and business information libraries and databases.

### **Further reading**

*Insane Ideas in Healthcare IT*, March 2009, BFTC2354

*Has Telehealth Reached the Tipping Point?*, March 2009, BFTC2317

*2009 Trends to Watch: Healthcare Technology*, December 2008, BFTC2190

*Business Trends – Healthcare Technology*, December 2008, DPTC0021

*Finding a Place for Real Time Location Systems in Healthcare*, December 2008, DMTC2213

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*Global Healthcare Technology Spending Forecast Through 2013*, June 2008, IMTC0293

*Wii Fit: A Plan for Getting Telehealth into Shape*, May 2008, BFTC1936

*Google Health: Not Yet the Perfect Personal Health Record*, May 2008, BFTC1935

*Clinical Decision Support in Healthcare – One Step Closer to the Omniscient Clinician*, May 2008, DMTC2184

*Doctor + iPhone = Better Healthcare*, March 2008, BFTC1933

*Improving Efficiencies through the Development of Claims Processing in Healthcare*, March 2008, DMTC2180

*Opportunities in the Electronic Health Record Market*, December 2007, DMTC2146

*Telehealth's Increasing Role in Healthcare*, September 2007, DMTC2128

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### ***Datamonitor consulting***

We hope that the data and analysis in this brief will help you make informed and imaginative business decisions. If you have further requirements, Datamonitor's consulting team may be able to help you. For more information about Datamonitor's consulting capabilities, please contact us directly at [consulting@datamonitor.com](mailto:consulting@datamonitor.com).

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