
2008 TRENDS BRIEF

2008 Trends to Watch: Healthcare Technology

Top priorities and technologies for healthcare in 2008

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DATAMONITOR VIEW

CATALYST

Technology markets are changing fast. This brief identifies and tracks the key forces shaping your business. Datamonitor's healthcare technology analyst will outline the main business priorities in your market, explain which trends will have the biggest impact and highlight technologies that healthcare organizations are most likely to invest in this year.

SUMMARY

Datamonitor's healthcare technology research provides insight into the adoption and use of information technology in healthcare organizations. Healthcare technology solutions include both clinical information systems and enterprise wide solutions for providers and payers. Through Datamonitor's research, end-user surveys and interviews with vendors, the following key trends and technology priorities will be top of mind issues for the healthcare technology market in 2008:

- Patients, and governments, are expecting a higher standard of care;
- Limited access to care is an increasing concern for healthcare systems;
- Sustainability of healthcare systems is a problem for all; and
- Technology priorities in healthcare directly align with quality, access and cost.

ANALYSIS

Healthcare has arguably never been more complex than it is today. While life expectancy and quality of life are at an all time high in most countries, given the amount of medical knowledge available today, both of these health indicators should be much higher. Furthermore, patients complain about everything from wait times and out of pocket costs to hospital acquired infections and surgery on the wrong part of the body and the general public is becoming more aware that they are very likely to receive different standards of care in different locations. Healthcare organizations and governments are grappling with the financial issues of healthcare as well as growing patient populations and a shortage of providers. The reasons for these shortcomings in healthcare are difficult to sort through as they are interrelated, nuanced and affect many different players – governments, hospitals, physicians and patients. This report will lay a framework for understanding the problems facing today's healthcare systems and how technology has the potential to address these issues. The top of mind priorities for healthcare executives include the following trends:

- Patients, and governments, are expecting a higher standard of care;
- Limited access to care is an increasing concern for healthcare systems;
- Sustainability of healthcare systems is a problem for all; and
- Technology priorities in healthcare directly align with quality, access and cost.

Patients, and governments, are expecting a higher standard of care

Improving the quality of care patients receive in healthcare settings has been a prominent issue since the Institute of Medicine (IOM) released its ground breaking 1999 report stating that medical injury caused approximately 100,000 preventable deaths every year in the U.S. Since then, stakeholders in healthcare have come to understand the need for providers to be more accountable for their actions. Increased transparency into clinical outcomes and patient satisfaction are vital to accomplishing this goal and healthcare technology can help address these issues as well as improve care directly. In addition, there are many, substantially different criteria for quality of care that must be taken into consideration. This section examines the various components of and ways to improve quality of care:

- Quality of care from a patient centric view requires better healthcare management; and
- Standardization will increase the quality of care of entire populations.

Quality of care from a patient-centric view requires better healthcare management

Patients' criteria for quality care run the gamut from consumer-like expectations to tangible clinical outcomes. Patients, more and more often, are complaining about long wait times in doctors' offices and emergency rooms. They also expect 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. These requests have resulted in hospitals training their staff on customer service skills and designing hospital rooms to feel more like hotel rooms. At the same time, while these peripheral niceties are a definite plus, patients 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. Likewise, the lack of communication between providers often leads to the prescription of conflicting medications or differing treatment plans. Unnecessary, avoidable problems like suffering from hospital acquired infections or bed sores are inexcusable. In fact, some payers like Medicare are now refusing to pay for medical errors, providing a hefty financial incentive for providers to prevent these mistakes from occurring.

These consumer and clinical criteria may seem impossible to address in the typically hectic healthcare environment where unexpected events happen all the time. However, with better management, it is possible to make improvements. Requiring surgeons to double check the surgery site with the patient and again right before surgery will decrease the chance of incorrect surgeries taking place. Likewise, nurses administering drugs should double check that they are giving the right drug to the right patients at the right times and the right doses. Increasing hand-washing habits of providers can decrease the spread of infection. More training for clinicians on how to better communicate with patients will help improve provider/patient relationships. Simple organizational changes such as these dramatically improve patients' quality of care. Furthermore, technology can help healthcare organizations achieve these goals through the use of digital checklists, bar coding solutions, online training and electronic reminders, to give a few examples. These initiatives, however, must first be organizational; installing technology by itself will not automatically fix a problem. Technology solutions will be effective only when they address underlying workflow issues.

Quality of care will become an increasingly important issue to the public. Patients have always played a part in the evaluation of healthcare – word of mouth physician referrals are still the most commonly used ways to find a new doctor. But in today's consumer-driven and patient-centric healthcare system and connected society, patients have even more power. When a woman dies on the floor of the emergency room while waiting to be seen by a doctor in a hospital in Los Angeles, CNN News anchor Glenn Beck has a terrible surgical experience or Dennis Quaid's newborns receive an overdose of medication, the general public hears about it and the hospitals and clinicians involved must take responsibility for their mistakes. Thus, quality of care from the patient's perspective will continue to be an important issue that providers must focus on in 2008 and technology will definitely play a role in achieving better outcomes.

Standardization will increase the quality of care of entire populations

Concentrating on the health status of individual patients is important, but evaluating the care of populations as a whole is equally critical. In the past few years, research on the varying degrees of health and the disparities in care among different populations and geographies has led to striking findings. The Dartmouth Atlas Project, for example, found that the rate of surgery for similar diagnoses widely varied depending on geography. Doctors in certain cities in the US operated up to four times as much as other cities. These discrepancies in care, furthermore, have not proven to show that more healthcare equals to better healthcare. This phenomenon is not restricted to the US; in the UK, it is commonly known as the "postcode lottery" – whichever postcode, or zip code, one lives in determines the type of healthcare (good or bad) one will receive.

Standardizing care across local, regional and national areas makes good healthcare more equitable. Thus, no matter which hospital an ambulance takes a patient to, that patient would receive the same care he/she would receive at any other hospital. These standards should be based off of evidence-based medicine, medical interventions that have been proven, through research, to work. Furthermore, the criteria should be extremely clinically specific. For example, clinical best practices recommend that heart attack patients should be given thrombolytic agents within 30 minutes, patients with pneumonia need to receive antibiotics within four hours and potential heart failure patients should undergo left ventricular

evaluation. As new research becomes available, these best practices should evolve. Governments will take the initiative for healthcare standardization across countries and many will use financial incentives to increase compliance. Technology like electronic health records (EHRs) will give healthcare organizations a way to easily follow, document and analyze their performance and clinical decision support systems will keep physicians up-to-date on recent medical research.

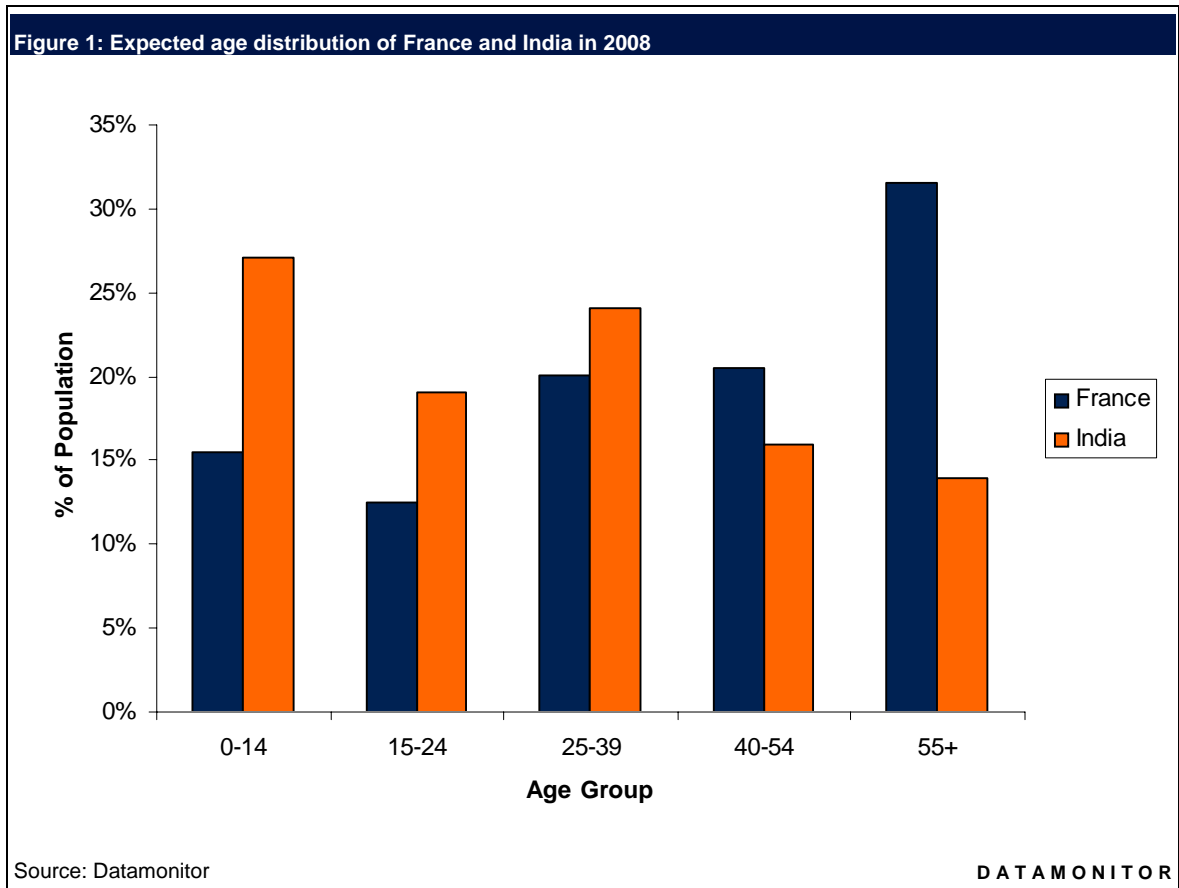
Limited access to care is an increasing concern for healthcare systems

Whether due to individual cost, an inability to find a local specialist or incredulously long waiting periods to see a physician, many would-be patients are either forgoing care all together or seeking it in non-traditional ways. Those who are avoiding doctor appointments are instead going to emergency rooms when they need care, often for ailments that a primary care physician could easily have treated. By the time patients are in the emergency room, their previously easy to treat illnesses have progressed to such an advanced stage that drastic procedures must be undertaken. This lose/lose situation is costly for healthcare systems and results in a lower quality of life for patients. Contrastingly, patients with the means to seek care on their own terms have turned to non-traditional routes like concierge medicine, retail clinics, alternative medicine and medical tourism. These patients are able to pay out of pocket for treatment when they need it. Though the outcomes of these two types of patients are extremely different, both are due to the same cause: a lack of access to care in today's healthcare systems. This is a problem facing both universal and private healthcare systems and is driven by a number of factors, including:

- A growing, changing population needs more healthcare;
- The unsuccessful recruitment and retention of providers will result in a continued shortage; and
- Individual costs of healthcare are high and discourage patients from getting the care they need.

A growing, changing population needs more healthcare

The world's population is growing, from an estimated 6.6 billion today to an expected 8.9 billion by 2050. While each country throughout the world will experience a different population growth rate – Europeans, for example, will actually see a declining population, whereas Asia and Africa will see population explosions – the cumulative effect on healthcare worldwide will be an increase in the number of patients that need care. In addition to this, populations will age in different ways. Developed countries are seeing their populations live longer while birth rates decrease or remain the same, resulting in an ageing population. As the elderly tend to have more health problems and complex diseases than the young, an older population will use more healthcare resources. Developing countries, in contrast, have very young populations. Approximately 60% of the world's youth (those between the ages of 15 and 24) live in Asia, posing extremely different, but no less important, healthcare priorities for this region.



Chronic diseases, among the young as well as old, rather than acute diseases are also more prevalent today and take longer, by definition, to treat. Other population complexities that will affect healthcare include the increasing trend towards urbanization and a growing middle class in developing countries. As cities become larger and more central to people’s lives, healthcare should improve as clinicians are more available and up-to-date on medical treatments in urban areas. However, infrastructure issues like water sanitation and pollution will play a greater role in people’s healthcare. A growing middle class will also have higher expectations for the amount and quality of care they will receive; they will not necessarily be satisfied with the services at the public health clinic down the road.

Thus, the issues of access to healthcare are not simply that the population of the world is growing, making healthcare more in demand. With more chronic diseases, different ageing patterns, urbanization and economic shifts within populations, the complexity of providing adequate healthcare to all becomes difficult given the limited resources of healthcare systems. Prevention, health education and disease management will be needed to address these present and future demands on healthcare, though the results of these will not be seen immediately. Increasing the efficiency of healthcare organizations, through technology solutions such as patient scheduling systems and telehealth solutions, will be a step towards increasing access to care for the world’s growing, changing population.

The unsuccessful recruitment and retention of providers will result in a continued shortage

In addition to a growing population, the problem of limited access to healthcare is exacerbated by a global shortage of clinicians. Within both developed and developing countries, the numbers and distributions of physicians and nurses are not sufficient to support the healthcare needs of each population. In developing countries, this is extremely apparent with places like Ethiopia having only .03 physicians to 1,000 people compared to 2.3 physicians in the UK, according to the World Health Organization (WHO). Developed countries may have enough doctors in absolute numbers, but they are often poorly distributed in terms of specialty and location. The US, for example, has many specialists, but not enough primary care physicians. Furthermore, specialists are clustered around urban areas, leaving rural patients without easy access to much needed care.

The profession as a whole is also facing difficulty recruiting and retaining providers. New college graduates are increasingly looking to enter other fields, particularly finance and business, rather than medicine. Medicine no longer carries the same degree of respect or financial returns that it did in the past. Among those that do attend medical school, some choose to not practice afterwards, preferring to work in jobs like healthcare consulting or finance. The majority of medical students are encouraged to specialize, either directly by their professors or indirectly by financial motivations, further distorting the ratio of primary care physicians to specialists. Practicing physicians face more paperwork than ever before; malpractice insurance rates have forced some specialists to go out of business; and nurses face high rates of burnout. To address part of this issue, developed countries, rather than educate and train their own to fill these gaps in care, recruit healthcare professionals from developing countries. This "brain drain" has essentially crippled many developing countries' healthcare infrastructure, leaving them with little, if any, medical professionals. Thus, the medical profession is changing both in terms of absolute numbers and in regards to the way medicine is viewed as a career. Savvy physicians are reacting to these changing times by taking actions they would not have taken 10 or 20 years ago. Marketing oneself, previously viewed as unprofessional and taboo, is now becoming more and more acceptable, as hospitals and physicians hope to increase the number of paying patients they see. The average number of physicians practicing together in a single office is increasing as it becomes more and more difficult for single physicians to support the overhead needed for a practice today and physicians look to share the burden of being on call everyday. Finally, technology solutions like telehealth and electronic health records respectively allow providers to treat more patients in less time and expand their geographic reach and streamline their workflow, allowing them to spend more time taking care of patients and less time on the administrative aspect of healthcare.

Individual costs of healthcare are high and discourage patients from getting the care they need

As Michael Moore's healthcare documentary, *Sicko*, aptly, though biasedly, reveals, healthcare in the US is expensive, even for those with health insurance. Patients in dire need of medical care have gone bankrupt and lost their homes to pay their medical bills. Others, who need care, but not as immediately, forgo doctors appointment and ration their medications, taking them every other day, rather than every day, to save on costs. While most other developed nations with universal healthcare do not see stories like these in their headlines, the costs of healthcare for patients are an issue everywhere as costs are not simply the bill one receives after an appointment, but also travel costs and time one spends traveling to, waiting for and getting care. Unexpected medical costs are difficult to plan for and when patients are unable to work, they are faced with twice the setback of increased expenses with no regular income. Universal health insurance will alleviate the extreme cases of when individuals must choose between their life or their retirement savings, but increased transparency of costs will help address the less dramatic instances when the choice is between taking medication every day or every other

day. If patients have cost and quality information, then they will be better informed and be able to make informed decisions about their care. Until this information is available, patients will be powerless and consumer-directed healthcare will never reach its full potential. Healthcare technology solutions can help make healthcare organizations more efficient, decreasing the costs of healthcare and the costs to patients, but the greatest impact will be the use of websites and social networking sites that will share and compare financial information online.

Sustainability of healthcare systems is a problem for all

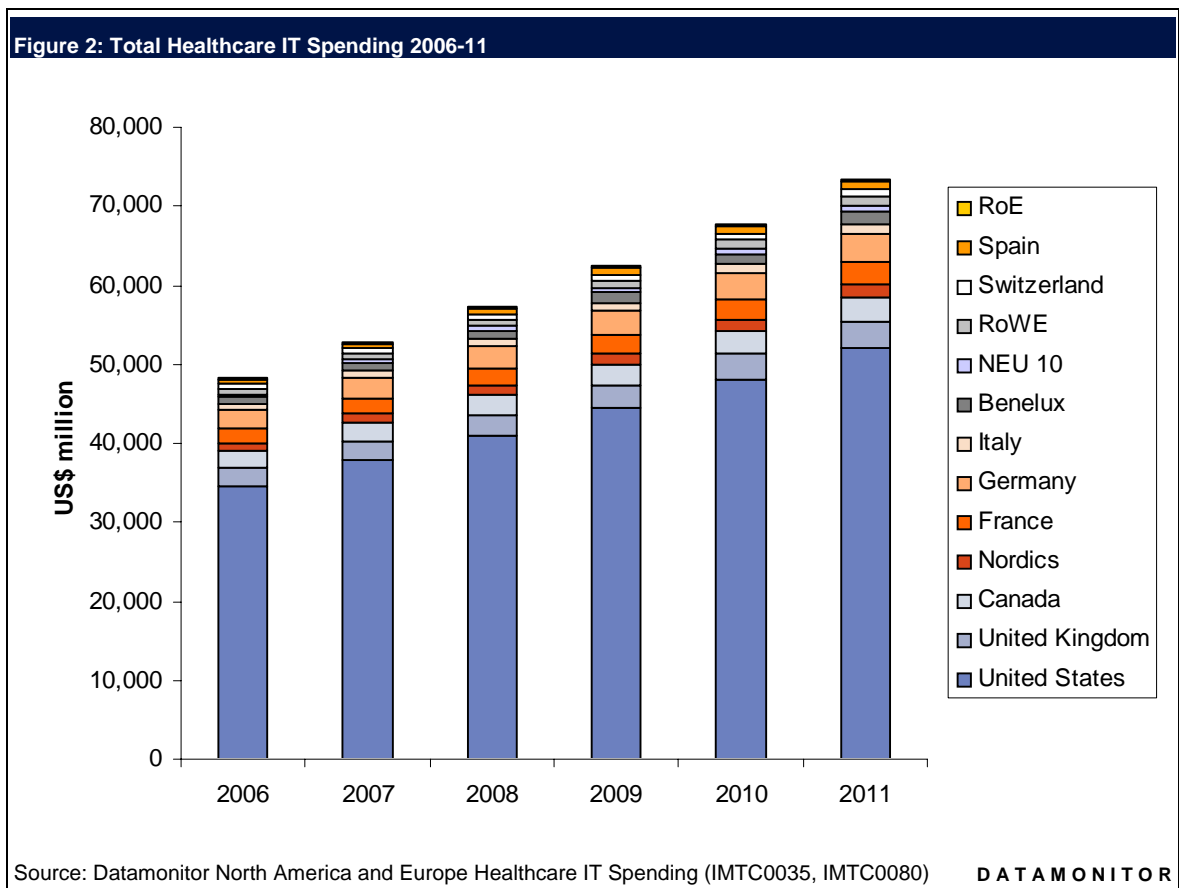
Healthcare costs are not just a concern at the micro level; at the macro level, grappling with costs are as, if not more, complex. Countries around the world, those with universal insurance as well as private insurance and hybrid models, are struggling to find ways to continue financing the rapidly increasing cost of healthcare. In the US, for example, healthcare spending is growing at a faster rate than the overall economy; in 2005, total healthcare spending was approximately \$2.16 trillion and is expected to increase to \$4 trillion by 2015. Moreover, the realization that healthcare in the US, while the most expensive in the world, is not the best, has created much concern among policymakers that the US may not be using its healthcare dollars efficiently. Private insurers as well as government programs, such as Medicare and Medicaid, are looking to change the current reimbursement structure in hopes of curbing this growth in cost while addressing quality issues. Recently, Medicare announced that it would no longer pay providers for medical errors and Medicaid and private insurers are looking to follow suit. Pay-for-performance (P4P) is another area in which reimbursement is likely to move towards. Rather than paying providers by quantity (number of procedures or appointments), payers want to move towards reimbursing physicians for quality instead. Studies have shown that improving care will, in the long run, decrease overall costs. The struggle, especially in the US, is that payers receive the financial benefit and patients receive better care, but the hospitals and physician offices are often left with the cost of improving care, seeing little or no financial benefits.

Universal healthcare systems and countries with a mix of public and private healthcare spending are also grappling with cost issues. Many European countries as well as Canada, Japan and Australia have experienced their total health expenditures per capita rise at an average annual growth rate of three to four percent. The UK is also beginning to see its upper class citizens using private insurance more and the worry is that as they use private healthcare providers, they will become less supportive of a universal healthcare system and less willing to see their tax dollars spent on services they do not use. Healthcare technology is able to increase efficiencies in the healthcare system, allowing public and private payers to do more with less. Thus, along with reimbursement initiatives, technology solutions have a role to play in managing the costs of healthcare.

Technology priorities in healthcare directly align with quality, access and cost

Any decision made by healthcare end users, whether clinical or administrative in nature, will be driven by the need to improve quality of care, increase access and decrease costs. Technology will play a role in addressing each of these areas. The healthcare community is finally realizing the potential benefits of IT to a greater and greater degree. In 2008, Datamonitor expects that global healthcare IT spending will total \$57,249m. Healthcare organizations will be investing in infrastructure, administrative and clinical applications and more advanced aspects of healthcare technology, such as telehealth and RFID. Interoperability will also increasingly be a top of mind concern as providers and payers use a greater number of solutions that need to communicate with each other. Thus, vendors need to build and position their products with these issues in mind. This section will discuss the following 2008 technology trends in the healthcare market:

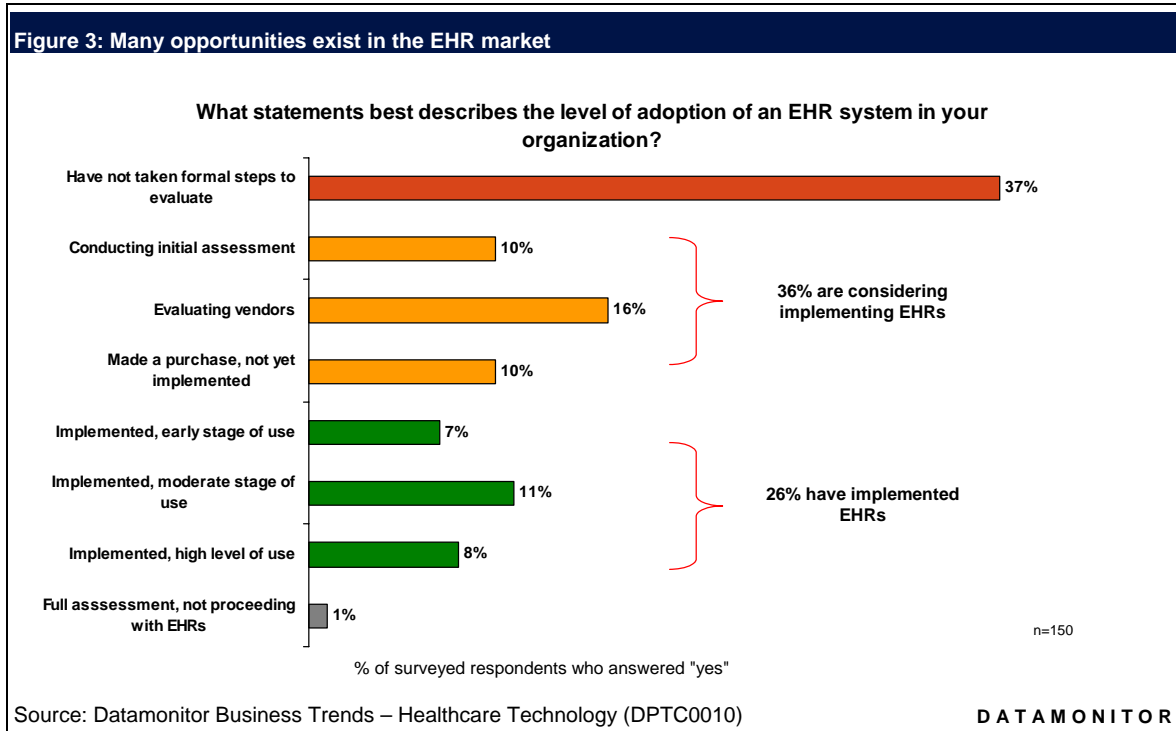
- End users will continue to focus on investing in administrative and clinical applications;
- Healthcare organizations are interested in aspects of advanced healthcare technology; and
- Interoperability will be increasingly important to payers and providers.



End users will continue to focus on investing in administrative and clinical applications

Administrative and clinical applications, such as patient administration systems (PAS) and EHRs, will continue to be a priority for healthcare organizations this year because these solutions streamline organizational workflows, while increasing efficiencies and decreasing costs. For example, the potential impact on financial returns is particularly obvious for technologies like claims processing. Patient scheduling systems can increase access to care and revenue by allowing providers to fill last minute cancellations and decrease the number of staff needed to handle appointments. Additionally, EHRs are able to increase the quality of care patients receive by giving providers more complete patient information. Most healthcare organizations do not yet have clinical applications, and those that do, oftentimes do not have ones with advanced functionalities and will need additional solutions and services. Furthermore, providers and payers that already have administrative and clinical systems are looking to upgrade or

overhaul their legacy systems. The demand for these solutions, therefore, will continue to grow. Reliable, user-friendly and reasonably priced applications will be best positioned in this market.



Healthcare organizations are interested in aspects of advanced healthcare technology

While most hospitals and physician offices barely have a basic IT infrastructure, many are already looking to jump ahead and try new, cutting edge technologies. Clinical decision support systems, radio frequency identification (RFID), telehealth and speech recognition are a few examples of the innovative technologies available now. While most all of these technologies are still in their early stages of development and will change dramatically in the next few years, they are also able to bring value to organizations now. Clinical decision support systems, which help clinicians make decisions on the diagnosis of and treatment plans for patients, will help improve quality of care. RFID solutions allow hospitals to keep track of expensive medical equipment and medications, allowing for better inventory tracking and use of resources. Some hospitals using RFID to track patients and employees to improve patient flow throughout the hospital (particularly in emergency rooms), reaction times to emergencies like code blues and security of patients (prevent child abductions and/or elderly patients from wandering out of the hospital). Telehealth, the diagnosis and treatment of patients when the healthcare provider is in a different location than the patient, will improve access to care, giving rural patients the opportunity to be seen by providers in urban areas. Speech recognition technology allows physicians to completely bypass the need for transcription services, decreasing costs immediately, and also aids providers in the adoption of EHRs – doctors that do not like typing information into a computer are able to dictate instead. Over time, all of these technologies will be used by healthcare organizations, but in the immediate future, only a few organizations will use a few of these solutions. A long-term care provider may use

telehealth, but not RFID, whereas an academic medical center will use RFID and clinical decision support, but decide to only implement speech recognition in the radiology department. Adoption of these technologies will be piecemeal and spearheaded by leaders in the organizations until the basic administrative and clinical applications are in place.

Interoperability will be increasingly important to payers and providers

The advent of all these different technologies is groundbreaking for healthcare, but unless these solutions are leveraged off one another, the full benefit of each will not be realized. Thus, interoperability between solutions will be of utmost importance. EHRs, personal health records (PHRs), PAS, picture archiving and communication systems (PACS), financial and billing systems, telehealth devices, RFID, clinical decision support systems are only a few of the technologies found in healthcare organizations. If each only worked on its own, then a patient's EHR would not include digital images from the hospital's PACS or information from the patient's PHR. The efficiencies gained from IT are reduced dramatically when physicians must log into multiple different systems and are unable to see all the results at one time. This would create more fragmentation within healthcare rather than less. Interoperability with technology outside of a hospital's four walls is just as important as within; the EHRs of primary care physicians should be able to connect to hospital EHR systems and vice versa. Providers are also looking to increase the speed and ease of communicating with payers with the aim of increasing reimbursement rates. Aligning provider and payer technologies will aid this goal.

As healthcare organizations spend more on technology, they need to make sure their solutions will be interoperable with other solutions. End users must press their vendors for answers regarding interoperability. More often than not, substantial, additional time and resources must be invested in integrating different solutions with each other. Providers themselves must take responsibility and invest wisely in solutions that they need based on what technology they have already. Purchasing systems that are redundant or that do not work together will not be valuable for the organization.

ACTIONS

Vendors should demonstrate that their solutions will improve quality, access and cost

With a number of top of mind issues facing healthcare organizations in 2008, vendors would be remiss to not address them. Solutions must address at least one issue, if not more, to be justifiable purchases for healthcare organizations. With already strained budgets, hospitals and physician offices do not have the financial freedom to buy a product simply because it sounds interesting. Anecdotal stories on how a technology improves access to care are acceptable, but reports on return on investment (ROI) or research on clinical outcomes will be regarded more highly. Finally, the technology should be presented within the framework of these three trends. Technology alone, without a context, will not sell as well as technology that fits into end users' frames of reference. Questions that vendors need to answer include: how will this solution make the clinician more efficient, allowing him/her to see more patients in less time and how will the technology improve patient care. Vendors who are able to address these issues will be more successful in the healthcare market.

Healthcare technology solutions must be interoperable

As the already crowded technology field becomes inundated with more competitors, vendors must find a way to work together and provide healthcare organizations with the solutions that they need even if they come from different vendors. Although all vendors wish they could provide absolutely every technology that their customers need, in reality, vendors provide more value when they concentrate on a few areas and work with other vendors to provide a complete solution. Thus, ambulatory care EHR vendors should work with hospital EHR vendors, speech recognition vendors should partner with all EHR vendors and billing systems should be linked to clinical solutions. Interoperability, furthermore, must be a relatively easy process, not one that requires substantial, additional investment by end users. Creating standards may be the most effective way to increase interoperability between technologies. Vendors cannot afford to have their solutions isolated from others. When an interconnected healthcare system is the end goal, vendors must be open to working with others.

Intuitive, reliable and affordable technology will be preferred over complex solutions

An impressive list of functionalities means nothing to healthcare providers if their system crashes in the middle of surgery. In addition, doctors want to spend as little time as possible documenting and more time with their patients. Technology that inhibits this interaction will be discarded for better solutions. Finally, if a small physician office cannot afford the technology, they will not buy it, no matter how great it works. Infrastructure needs should be addressed prior to installation of solutions. Vendors must solicit regular feedback from end users and tailor solutions to their needs and consider software deployment methods like software as a service (SaaS) that may be more financially favorable to some market segments.

APPENDIX

Abbreviations

Benelux – Belgium, Netherlands and Luxemburg

EHRs – Electronic health records

IOM – Institute of Medicine

NEU 10 – New EU 10 including Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia

Nordics – Denmark, Finland, Norway and Sweden

P4P – Pay for performance

PACS – Picture archiving and communication systems

PAS – Patient administration systems

PHRs – Personal health records

RFID – Radio frequency identification

RoE – Rest of Europe including Bulgaria and Romania

RoWE – Rest of Western Europe including Austria, Greece, Ireland and Portugal

ROI – Return on investment

SaaS – Software as a service

WHO – World Health Organization

Methodology

- **Ongoing vendor briefings** – Datamonitor conducts interviews with software, hardware, networking and services vendors serving the healthcare industry 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

Business Trends – Healthcare Technology (Customer Focus), DPTC0010

Healthcare Technology Opportunities in the Electronic Health Record Market (Review Report), DMTC2146

Telehealth's Increasing Role in Healthcare (Review Report), DMTC2128

Reducing Medical Error and Improving Diagnostics through Digital Imaging (Review Report), DMTC2023

European Healthcare Provider IT Spending (Interactive Model), IMTC0081

North American Healthcare IT Spending Forecast (Interactive Model), IMTC0035

Addressing the Challenges of Consumer-driven Healthcare (Review Report), DMTC1651

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