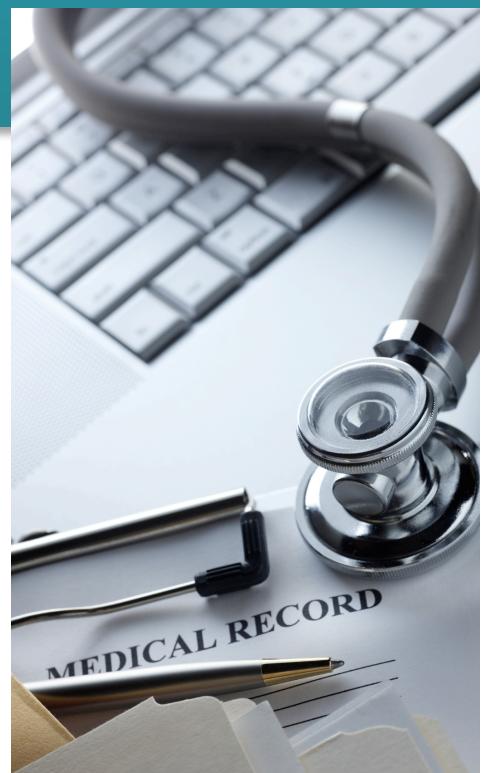
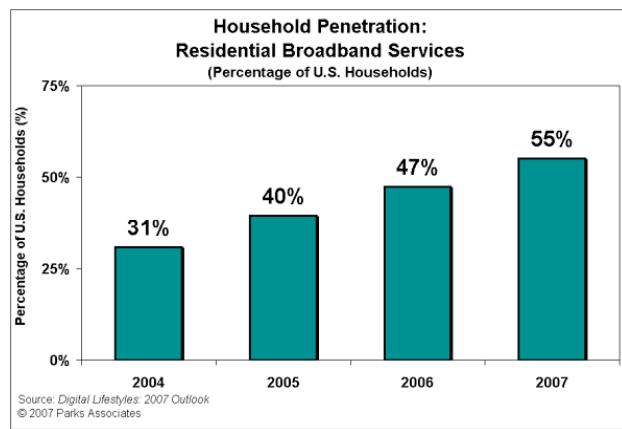


Online Health Management: *How will it change the way consumers, doctors, hospitals and insurance companies manage healthcare?*



Over the course of the last 25 years, information and communication technology (ICT) has become integral to the global economy, impacting every industry around the world. ICT has fueled innovation in industries as varied as agriculture, manufacturing, telecommunications, education and government. From improvements in business productivity and operations to the development of new products and services, it is hard to imagine an industry that hasn't been significantly impacted by the continuous evolution in PC hardware, software and network communications technology.

Consumer adoption and use of technology has also experienced phenomenal growth. Fifteen years ago few consumers in a mature market like the US actually owned a PC. Today, almost 80% of households in the US have at least one PC in the home, and most are running the latest software from Microsoft, Adobe, Apple and other developers. Ten years ago most US PC owners were using 56K dial-up to access the Internet, and what you could find on the Internet was mostly academic content, software and games. Today, 55% of households in the US have broadband Internet access and the World Wide Web easily lives up to its name. In 2007, when you consider the household penetration rate of MP3 players, digital cameras, and the use of VPN technology for home-based employees, US households have become very tech-centric for both work and play. No matter how you look at it, the rapid evolution of PC hardware, software and networking communications technology is continuing to impact how businesses operate and how consumers live.



How has technology impacted healthcare?

When we look at the industries that have been most profoundly impacted by technology, it is hard to ignore the improvements in the global healthcare industry. Much has been written about the impact of technology on healthcare—most especially about the continuous innovations in diagnosis and treatment. New developments in medical imaging, pharmaceuticals and genetics have all been made possible by the continuously increasing processing power of today's computers and the software running on them.

Networking communications technology has also had a significant impact on the healthcare industry, especially in the area of new diagnoses and treatments. Without the Internet, corporate networks and education networks, efforts such as the Human Genome Project would have taken many more years to complete and would have required significantly more resources to accomplish. Grid computing,

which provided the computational horsepower for decoding the human genome, would simply not be possible without the world's ever expanding communications network.

While it is clear that technology has had a significant impact on developments in the healthcare industry, it is not clear how much of an impact PC hardware, software and networking communications technology have had on the health of the typical American. How has widespread adoption of computers and the Internet changed the way American consumers manage their health?

Online Health Management Trends Survey 2007

To answer this question, Illuminas and Cisco Systems conducted a web-based survey of 4,105 US consumers. Respondents were selected to be representative of US online households based on age, gender, education and ethnicity. Since the survey was focused on understanding how consumers are using technology and the Internet to manage their health, this methodology was determined to be the most efficient at reaching the target audience and the most appropriate for answering the key questions of the study.

Factors that Influence Health Management Behavior

It is well understood that the ultimate goal of the healthcare industry is to improve the health and well being of its customers. If consumer use of online tools and technology is a means to that end, it is important to understand the drivers and barriers to consumer use of online tools for personal health management.

The 2007 Online Health Management Trends survey examined a number of the factors that influence the extent to which consumers manage their personal health, with a primary focus on the role online tools play in this process.

When we consider the household penetration rate of PC's and the Internet, as well as the vast number of online sources for health information that exist, we might expect that the majority of US consumers are using online tools for personal health management. The Online Health Management Trends survey shows that there are still many hurdles to overcome before the majority of consumers are willing or interested in using online tools to manage their health.

Based on the results of the survey we have identified three factors that drive greater levels of adoption and use of online tools for personal health

management: 1)

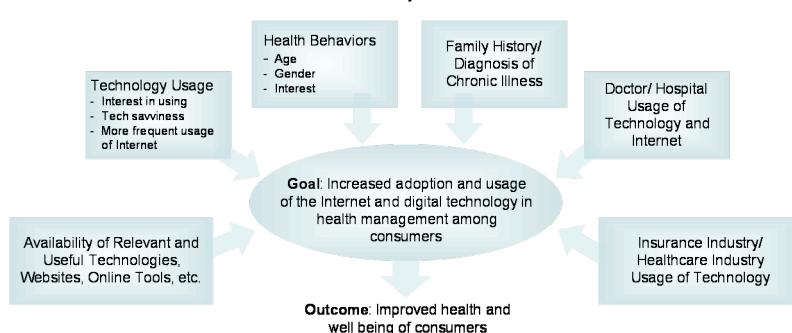
Personal health

management behavior

2) Technology

adoption and usage
by consumers, and 3)

Technology adoption
and usage by doctors,



hospitals and the broader healthcare industry.

Personal Health Management Behavior

Before exploring the role technology plays in personal health management, it is important to first understand basic human behavior with respect to health management. Technology alone will not cause most consumers to suddenly become more interested in their health or change their health management behaviors and attitudes. The adage, “if you build it, they will come” does not apply here. Health education and a continuing global focus on healthy behaviors must come before, or at a minimum, accompany, an industry emphasis on using online tools for personal health management. Consumers must want to be healthy and must be willing to take an active interest in managing their health before any technology can provide a benefit.

Interest, Age, Gender and Presence of Illness Drives Behavior

The 2007 Online Health Management Trends survey shows that consumers are generally apathetic about managing their health – unless they have a reason to be concerned. Only two out of five consumers surveyed had a primary care physician and just over half had a routine checkup in the past year. Even more telling is that on average, approximately one quarter of the US online consumers surveyed had not participated in any basic health related activities over the last 12 months (the study did not ask about exercise or physical activities).

When viewed in total, the survey data suggests that very few consumers are actively managing their health. However, when the data was segmented by demographic and behavioral characteristics, significant differences in health management behaviors became more evident.

Personal Health Management Activities Studied
Filled/refilled prescription
Routine annual checkup
Conducted health screening
Visited medical specialist
Outpatient treatment
Visited emergency room
Visited non-traditional specialist
Inpatient treatment

As one might expect, health management behavior is primarily driven by age. The younger we are, the less likely we are to perform any of these basic health management activities. As our bodies get older it is natural to experience more health-related issues requiring that we participate in basic health management activities.

Gender also plays a strong role in health management behavior. Women are significantly more likely than men to have had a routine annual checkup or conduct a health screening in the last 12 months. Women are also more likely than men to consult multiple sources for health information, such as a primary care physician, a medical website, friends or family. The survey results suggest that men are just more apathetic about personal health management.

Table 1

	Chronic Illness % N = 1,298	No Chronic Illness % N = 2,807	Family History of Illness % N= 1,324	No Family History of Illness % N = 2,781
Filled/refilled prescription	93	45	77	53
Routine annual checkup	73	44	64	48
Conducted health screening	59	26	51	29
Visited medical specialist	60	20	47	27
Outpatient treatment	45	16	37	19
Visited emergency room	28	16	28	16
Visited non-traditional specialist	15	8	15	8
Inpatient treatment	14	5	13	6
None of these	2	32	9	29

Those more engaged in their health are significantly more likely to have performed a variety of medical activities

A history of family illness or the diagnosis of a chronic illness are also key drivers of health management behavior. As shown in Table 1, basic health management activities are performed significantly more often by those with a chronic illness or family history of illness, and the more specific activities such as visiting a medical specialist or having outpatient treatment were also much higher among these consumers.

Health Management Goals and Attitudes

Besides age, gender and specific health issues, the adoption of personal health goals will determine the frequency with which a consumer performs personal health management activities.

When asked their primary goals for health and health management, most consumers simply want 'To avoid getting sick' and 'To get the highest quality medical treatment.' As might be expected, both of these goals increase in importance with age. The younger the consumer, the more likely the focus is on 'Being in top physical shape' although even consumers over the age of 55 have a strong focus on this same goal.

Personal Health Management Goals Studied

Avoid getting sick
Get the highest quality treatment
Be fully informed of my options
Be in top physical condition
Have access to my doctor at any time
Be an equal partner with my healthcare providers in my health decisions
Have access to the latest medicine
Manage my healthcare costs
Have complete access to my medical records
Self-diagnose my medical issues

Key personal attitudes also drive health management behavior. In general, consumers are optimistic about their health. Few consumers are 'worried about their personal health' with only 2 in 5 consumers surveyed agreeing with this statement. Yet only half of consumers surveyed are comfortable with medical

terminology, agree that they are an informed healthcare consumer and frequently discuss medical topics with others.

Personal Health Management Attitudes Studied
I am optimistic about the future of my health
I am comfortable with medical terminology
I am an informed healthcare consumer
I often discuss medical topics with others
I am frustrated by the complexity of the healthcare industry
I am worried about my health

These attitudes change dramatically with age, gender and the presence of a chronic illness or history of family illness. Older consumers have much stronger attitudes about their health and are more likely to agree that they are comfortable with medical terminology, consider themselves to be an informed healthcare consumer and often discuss health topics with others.

Women are significantly more likely than men to agree that they are optimistic about their health, comfortable with medical terminology, are an informed healthcare consumer and often discuss medical topics with others. Men simply do not have as strong an attitude towards health and health management, although they aren't any less worried about their health.

Consumers with a chronic illness are significantly more likely to have both positive and negative attitudes toward health and health management issues. While they tend to be more worried about their health, they are much more likely to agree that they are an informed healthcare consumer, are comfortable with medical terminology, often discuss health topics with others and are also much more likely to agree that they are frustrated by the complexity of the healthcare industry.

It is clear that basic human attitudes, behaviors and tendencies influence the desire or need to manage personal health. General interest in health issues, age, gender and the presence of a chronic illness or family history of illness all play a significant role in driving health management attitudes, goals and behaviors. Technology alone will not drive consumers to change their health management behaviors. Continued health education and promoting healthy habits among adults and children are the most important first steps to improving the average health of US consumers.

As technology companies and the healthcare industry continue to develop new technologies, tools and services to help consumers manage their health it is important that they take into consideration some of the basic human characteristics that drive the use of online tools for health management. For example, websites that cater specifically to men and their attitudes about health or online tools that make it easier for older, chronically ill consumers to manage their health will go a long way to reducing perceived barriers to using online tools for personal health management.

Technology Adoption and Usage by Consumers

To better understand how consumers are using technology and the Internet to manage personal health, the 2007 Online Health Management Trends survey asked respondents about the basic technologies they are adopting and how often they use them for personal health management. Since the study was focused primarily on the use of online tools for health management, it does not provide an exhaustive look at technology adoption and usage.

The adoption of digital products throughout US households has grown steadily over the last 10 years and even more rapidly over the last three to five years. Respondents interviewed for this study reflect similar technology adoption trends. Almost every respondent surveyed uses a PC at least several times per week

and three-quarters of those surveyed use a PC daily. Slightly more than half of the consumers surveyed use instant messaging at least once a month and just over a third use it weekly. Many of the consumers surveyed have made the move to wireless Internet access, mobile computing and bringing their music with them wherever they go.

On average, the US consumers interviewed for this study spend 23 hours per week on the Internet or about 3 hours per day. This figure includes all time spent and does not differentiate between personal and work time on the Internet. While we did not seek to quantify the number of hours that consumers are spending online managing their health, three out of five respondents indicated that they had used online

tools in the last 12 months to manage some aspect of their health.

	All Online Consumers	Chronic Illness	No Chronic Illness	Family History of Illness	No History of Family Illness
	N = 4,105	N = 1,298	N = 2,807	N= 1,324	N = 2,781
PC Usage - Daily (percent daily or several times a day)	76	81	74	79	75
Mean hours per week using the Internet	23 hours	26 hours	22 hours	25 hours	23 hours

It should come as

no surprise that some US consumers are using technology and the Internet to manage their health as many of the necessary elements are already in place. Affordable PCs, affordable broadband Internet, and rapidly growing wireless access make it easier for consumers to access the Internet anytime, anywhere. However, it is the availability, affordability and relevance of websites, online tools and other technologies for healthcare management that will ultimately drive increased consumer adoption and use of these technologies.

Interest and Access are Barriers to Using Technology

While many technologies are currently available for managing personal health, key elements of human behavior impact the use of those technologies. Using computers and the Internet can be a challenge for those who either are not ‘into’ computers and the Internet, are intimidated by technology or simply cannot afford a PC or Internet access. So while a plethora of online tools for health management are readily available, they may not be relevant or useful to consumers who are not ‘into’ technology, are intimidated by technology or simply out of reach for those that cannot afford them.

Technical Savvy Drives Usage of Online Health Tools

Technical savvy also plays a role in a person’s ability to leverage technology and the Internet to manage personal health – and technical savvy is no longer determined by your age. What used to be a universal truth was that the younger you were, the more likely you would be to use technology. As household penetration rates for PCs and other technologies has increased, so has the use of these technologies across all age groups. It is still true that younger consumers are more willing to adopt and use newer technologies such as MP3 players and instant messaging, but more mature technologies like PCs and the Internet have been widely embraced by consumers of all ages.

To understand the relationship between technical savvy and the use of online tools for personal health management, Illuminas conducted an analysis of the survey data that looked at frequency of PC usage and the number of hours using the Internet as proxies for technical savvy. The survey data was then segmented by consumers who use a PC daily, consumers who use a PC less frequently, consumers who use the Internet twenty-one hours or more in a week and consumers who use the Internet for fewer than twenty-one hours in a week.

Analysis of the two approaches to identifying tech-savvy segments showed that frequency of PC usage, not time spent using the Internet, is a much stronger indicator of tech-savvy and a much stronger predictor of using online tools for health management. However, hours spent using the Internet is still a factor in online health management behavior as there is a strong correlation between PC usage and time spent online. The tech-savvy consumer spends an average of twenty-five hours per week online – almost 40% more time online than the less tech-savvy consumer who spends an average of eighteen hours online per week.

	Daily PC Usage	< Daily PC Usage
	N = 3,122	N = 983
Mean hours per week using the Internet	25 hours	18 hours

Health Management Goals Stronger Among Tech-Savvy

The 2007 Online Health Management Trends survey measured health goals that can be achieved both in-person (offline) as well as those that could be achieved using technology and the Internet (online). Getting the highest quality treatment, being fully informed of treatment options and having access to a doctor at any time can all be accomplished offline, but they can also be accomplished or enhanced using technology and the Internet.

When asked about health management goals, tech-savvy consumers (those who use PCs daily) were significantly more likely than less tech-savvy consumers to have each of the following as health goals:

- *the desire to avoid getting sick,*
- *to get the highest quality treatment,*
- *to be fully informed of treatment options,*
- *to be in top physical condition*
- *to be an equal partner in their health decisions, and*
- *to have access to the latest medicine.*

The correlation between tech-savvy (PC usage) and having these health management goals is very strong, yet which direction is the causality? Is it that once a tech-savvy consumer experiences the benefits of using the Internet as a source of health information they are more likely to adopt a greater interest in managing their personal health? Or are consumers with a greater interest in managing their personal health more likely to use a PC daily and use online tools to manage their health?

Stronger attitudes about healthcare management are also highly correlated with tech-savvy. Consumers who use PCs more frequently are significantly more likely to agree with every attitude tested in the survey. Given that our tech-savvy consumers are spending significantly more time online we might conclude that some aspect of their time online is influencing their attitudes about personal health management.

Why are Consumers Using Online Tools for Healthcare Management?

When it comes to online healthcare management, the 2007 Online Health Management Trends survey finds that online consumers are primarily using technology and Internet tools to acquire information about health. Regardless of the degree of tech-savvy, among all respondents the top two uses of online tools are about accessing health information. Online consumers want to be better informed about available treatment options and better informed about medication options.

Access to health information online can certainly have an impact on behavior. Barely five percent of all US online consumers surveyed say they have self-diagnosis as a *goal* for using the Internet, yet when asked if they actually engaged in this activity, significantly more indicated they had. A third of tech-savvy consumers and almost a quarter of less tech-savvy consumers have actually used online tools to attempt self-diagnosis. The availability of health information online is tempting consumers to avoid visiting the doctor and at the same time inviting them to self-diagnose and self-treat their ailments. Do consumers have the education and knowledge necessary to use this information properly?

Too Much Information?

US online consumers have a variety of sources for getting health information. Physicians are by far the most preferred source for information, although only 3 out of 5 consumers surveyed say they use physicians as a source. Within this specific audience (online consumers), medical websites and online search engines are used more often than family and friends for health information. Not surprisingly, tech-savvy consumers are significantly more likely to use medical websites and online search engines than those who are less tech-savvy.

A basic search on any number of health-related subjects reveals millions of web pages. From government sponsored sites (e.g. NIH), to foundations (e.g. Mayo Clinic), to many other organizations and companies (e.g. WebMD), consumers can find information on almost any health topic on the Web. Yet even with all the tools and information available, less than a third of consumers would agree they are 'an informed healthcare consumer.'

With all of the information available on the Internet, why do so few consider themselves an informed healthcare consumer? Could there be too much health

information available? And more importantly, how do consumers know which websites to trust and which information is most accurate and credible? These issues alone could be preventing many consumers from using the Internet as a tool to become better informed about their health.

It is interesting that tech-savvy consumers are significantly more worried about their health than non-tech savvy consumers. Could it be that access to technology and online health information fuels greater anxiety over health? Recent research from the School of Communication, Ohio State University, suggests just the opposite – that an individual's health anxiety drives online health information seeking behavior. Regardless of the cause of this anxiety, consumers need to become more knowledgeable about how to use and interpret all of the health management information available on the Internet.

Should the healthcare industry address the issue of information quality and accuracy on the millions of web pages that have been published? Given the vastness of the Web it is almost an impossible task for the healthcare industry to 'police' the information being published. Yet some type of information certification program could be developed to authenticate or qualify the information on a given website, similar to what has been done with seal of approval from the Better Business Bureau.

Online Health Management Tools and Better Health

Results from the 2007 Online Health Management Trends survey show that consumers are using technology and the Internet in varying degrees to manage their personal health. Tech-savvy consumers and those with a chronic illness are more likely than the average consumer to be using technology and the Internet to manage personal health. In addition the survey shows there is a strong correlation between personal health management goals and attitudes and the degree of tech-savvy, presence of a chronic illness, and certain demographics.

What then has been the impact on overall health as a result of using online tools and technologies? Do consumers think they are healthier as a result of using the

Table 2

	All Online Consumers	Chronic Illness	PC Usage Daily	PC Usage <Daily
	N = 4,105	N= 1,324	N = 3,122	N= 983
No improvement as a result of using technology and the Internet	44	37	43	47
At least some improvement as a result of using technology and the Internet	56	63	57	53

Internet and online health management tools? The answer depends upon which group you ask.

Just over half of respondents surveyed indicated they have experienced at least some improvement in their health as a result of the use of technology and the Internet.

While this is a success in many ways, more than two out of five online consumers say they have experienced no improvement in their health as a result

of using technology and the Internet. Almost two-thirds of respondents with a chronic illness indicated they have experienced improvement in their health as a result of technology while the tech-savvy segment was only slightly more likely than average (57%) to say they experienced improvement in their health as a result of using technology and the Internet.

Why is the perceived impact of technology on health greater among online consumers who are more engaged with their health management (diagnosed with chronic illness) and those who are more tech-savvy? Survey results show that these segments are significantly more likely to believe that online tools and information empower them to better manage their health, are an important part of their personal health management and have allowed them to manage their health more effectively. These segments were also significantly more likely to believe the Internet has changed the way they go about managing and maintaining their health.

Ultimately, consumer opinion about the impact of technology and the Internet on personal health will be driven by a number of factors including age, gender, interest in health issues, presence of a chronic or family illness, comfort level with technology, and level of tech-savvy. Table 3 shows some of the significant differences in opinion between the consumer segments identified in this study.

Yet in spite of the differences, there are also some interesting similarities in opinion between the segments that speak to the challenges in using technology and the Internet to manage personal health.

Fewer than half of all consumers surveyed, and only half of any of the segments identified in the survey are willing to agree that technology and the Internet have had a positive impact on how they manage their personal health. Consumers with a greater level of tech-savvy or with a chronic illness are much more confident in their ability to manage their health using online tools and resources, and those with a chronic illness are much more likely to say that the Internet has changed the way they manage and maintain their health. Yet why do only half of all the consumers interviewed believe that online tools and information have empowered them to better manage their health? Is it because so few consumers

Table 3

	All Online Consumers N = 4,105	Chronic Illness N= 1,324	PC Usage Daily N = 3,122	PC Usage <Daily N= 983
Online tools & information empower me to better manage my health & well-being	47	54	50	38
Online health information is an important part of my personal health management	43	50	46	36
I can manage my health more efficiently with online tools & resources	41	47	44	33
The Internet has changed the way I go about managing and maintaining my health	35	41	37	28
Medical providers have fully embraced the Internet to help deliver health and information services	27	27	27	26
I am a healthier person today because of the Internet	24	27	25	19

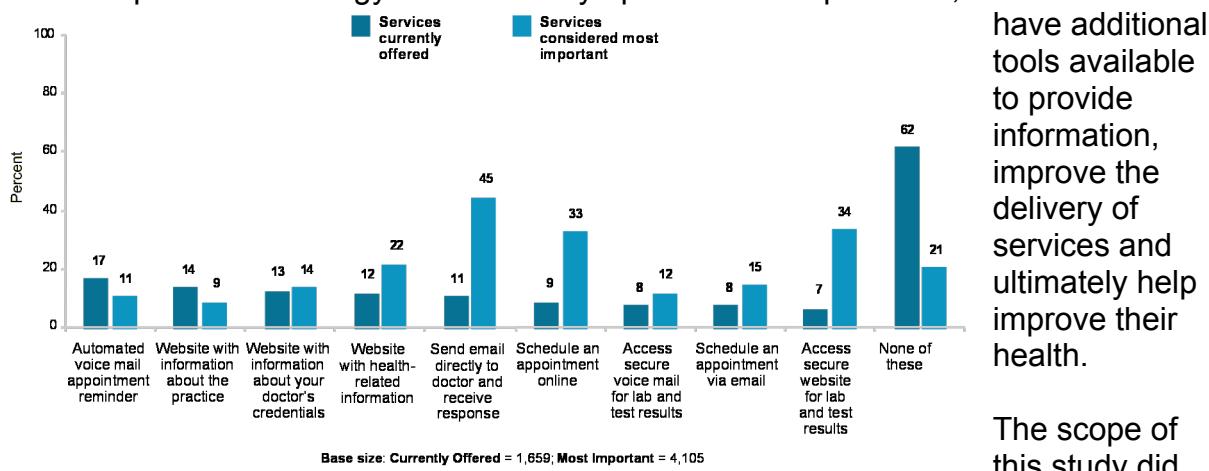
Top 3 box score : respondents rating 'strongly agree,' 'moderately agree' or 'agree'

are concerned about their health or because consumers don't know how to take advantage of the online tools and information that are available? The most telling statistic from this table is that regardless of segment, significantly fewer consumers believe that medical providers have fully embraced the Internet to help deliver health services. Consumers aren't willing to say the Internet has made them a healthier person, but a significant percentage are willing to say that online healthcare management tools are having an impact on their health.

Regardless of your perspective, it is clear that there is more work to be done. Consumers must become more educated about and interested in managing their personal health regardless of age, gender or attitude. At the same time, the healthcare industry must do more to make technology and the Internet a valuable, relevant and vital part of how consumers manage their health.

TECHNOLOGY ADOPTION AND USAGE BY PHYSICIANS AND HOSPITALS

The third factor that influences the extent to which consumers use technology or the Internet to manage their health relates to the adoption and use of technology throughout the healthcare industry. As hospitals and primary care physicians incorporate technology into their daily operations and practices, consumers will



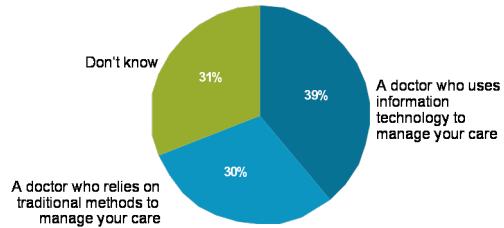
have additional tools available to provide information, improve the delivery of services and ultimately help improve their health.

The scope of this study did

not include interviews from the broader healthcare industry, hospitals or insurance companies. It did, however, explore consumer perceptions of primary care providers and their use of technology. One of the striking perceptions expressed by respondents in this study, and consistent across all segments, is that medical providers haven't done enough to fully embrace technology and the Internet in their practices.

Online consumers do not believe their primary care physicians are actively using technology and the Internet in their practices. Perceptions among consumers are that even basic technologies such as automated voicemail appointment reminders aren't being used. Interestingly, consumers aren't looking for physicians to incorporate sophisticated technologies into their practices. Rather, survey participants indicated they are looking for doctors to adopt what are very

basic tech-related solutions. The technology tool most important to consumers is email - 45% of those surveyed would like to be able to send their doctor an email and receive a response. Accessing lab results via a secure website was the second most important technology requested by consumers while the ability to schedule an appointment online was the third most important. In general consumers don't seem to be interested in anything more than basic process automation tools for working with physicians.



A somewhat counterintuitive finding from the study is that when presented with the option of a doctor who uses traditional methods versus a doctor who uses information technology to manage patient care, respondents did not overwhelmingly select the technology-oriented physician. Is this because consumers do not see the value technology can bring to the doctor-patient relationship or is it because consumers aren't sure how doctors could use technology as part of their practices? Whatever the reason, until consumers demand that their physicians integrate technology into their practices, or only select those physicians who incorporate technology into their practices, technology adoption will come slowly to office-based medical practices.

Human Characteristics Also Influence Healthcare Industry Decisions

Human behavior, attitudes, demographics and technical savvy also play a role in the adoption and usage of technology within doctors' practices and hospitals. Young, newly minted doctors and hospital administrators are more likely to be pushing for the use of technology in their practices and hospitals, while more established practitioners are likely to stick with the way things have always been done. It might be easy to criticize 'older,' more technology-averse doctors for not embracing technology in their practices, but legitimate concerns do exist. Do doctors have time to sit and answer the many emails they might receive from patients? Do nurses? Isn't their time better spent in person with patients, talking to them and being able to see and touch them?

What about the legal issues surrounding the use of email or instant messaging for communication? Given the litigious nature of our society and the rising cost of malpractice insurance, very few doctors, if any, would be willing to commit anything to writing for fear it could be used against them in a lawsuit. While email might seem like a great solution for better doctor-patient relationships, it is not the most efficient communication method and certainly introduces other complications to that relationship.

Consumers have embraced Web 2.0 technologies for maintaining their social networks and voicing their opinions about a variety of subjects. Could this same technology find its way into the medical community? What would consumers

want to see on a physician's Facebook page? On their blog? The complexities of the doctor-patient relationship may not lend themselves to these technologies, but it is still early in the development of these online tools. The innovative doctor that manages to balance the fine line between potentially liable content and providing patients with valuable information and perspectives could pave the path for a whole new doctor-patient relationship.

The Slow Pace of Change in the Healthcare Industry

One of the larger and more frustrating barriers to technology having a more positive impact on healthcare management is the slow pace of change within the broader healthcare industry. From patient to doctor, doctor to hospital, and each in turn to insurance companies, there is a general frustration about the excessive costs, paperwork and lack of efficiencies and privacy within the healthcare management system. Consumers are still very concerned about private information being released, stolen or used to discriminate against them when it comes to getting health insurance coverage. Even greater frustration is expressed about the complexity of the broader healthcare system.

While there has been significant improvement in the automation of much of the paperwork in the system, there is still a tremendous amount of...well, paperwork. The dream of a standardized, electronic medical records (EMR) system has remained just that, a dream. According to research from the US Centers for Disease Control (CDC), as of 2006 less than one-third of office-based physicians report using fully or partially electronic medical record systems (EMR) and only 9% of general and children's hospitals were using computerized prescription order entry systems. The complexities of our healthcare system, competing investment priorities and intense competition between companies vying for lucrative software contracts have all made progress towards a standardized EMR system slow at best.

Consumers Prioritize Where Technology Investment Should Occur

It is important to point out that consumers understand the impact technology innovation has had on the healthcare industry and where they are willing to accept tradeoffs in investment. While consumers would like to see technology innovations improve the flow of information between healthcare providers and the insurance industry, ultimately they would rather see greater investment in using technology to cure cancer and other chronic diseases.

When asked to trade off certain benefits of technology innovation, consumers were significantly more interested in having more accurate diagnoses than a faster diagnosis, lower overall medical costs than easier paperwork, and an overall better quality of life than increased longevity. Consumers were also more willing to trade EMR and easy access to medical records for greater control over and privacy of their personal medical records.

Conclusion

The increasing consumer use of technology and the Internet to manage personal health should not be a surprise to anyone in the healthcare or technology industry. If we consider that almost 80% of US households own a PC and that 55% of those households have broadband Internet access we might expect a significant number of consumers to be using online tools to manage their health. Unfortunately this is not the case in 2007, according to results from this study. Only three out of five online consumers surveyed indicated they had used online tools in the last 12 months to conduct health management activities and almost two in five online consumers had not used any online tools for the health related activities studied. Of those consumers who did conduct health management activities online, those activities were primarily about information gathering.

The availability and adoption of technology and the Internet alone will not cause consumers to be more interested in managing their personal health either online or offline. Factors such as age, gender and unfortunately, the presence of a chronic illness are the strongest predictors and drivers of increased focus on personal health management. Until US consumers in general decide that managing their health is a priority they will continue focusing time and energy elsewhere. Healthcare providers must continue to focus efforts on educating consumers about the benefits of a healthier lifestyle while at the same time providing more relevant and useful online tools for managing personal health.

The increased adoption and use of technology and the Internet are also predictors and drivers of increased focus on personal health management. If one of the healthcare industry's goals is to improve consumer health through greater adoption and usage of online tools then the industry must do more. Breaking down the barriers to technology adoption and use among consumers, doctors and hospitals should be a top priority for all organizations throughout the healthcare industry. More relevant, affordable and easy to use technologies must be developed to allow consumers to go beyond just information-based tools on the Web.

While no one can argue that technology has played a significant role in improving patient care (diagnosis and treatment), it has not found its way to the doctor-patient relationship or the hospital-patient relationship. Whether it is the overall cost or the actual implementation, or the lack of priority, very few doctors or hospitals have gone beyond the basics. Doctors and hospitals must do more to reduce the complexity of the healthcare management process while at the same time keeping the primary focus on improving diagnosis and treatment.

It is the doctors and hospitals that have the biggest challenge before them. Consumers want them to embrace technologies in their practices and operations, but at the same time guarantee privacy and accuracy of information. Even more challenging for the private physician practices and hospitals is finding the budget to purchase and implement these technologies. Physician practices and

hospitals are for-profit operations and demonstrating return on investment for technology is required to justify the expense of implementation. Yet even in 2007, measuring ROI for any technology investment is not governed by any GAAP standards.

Finally, while profitability and ROI are typically measured in dollar terms, shouldn't the healthcare industry measure technology ROI in more human terms? Shouldn't patient health and satisfaction with the healthcare system be valued more as a return on investment than dollar profit? Those doctors and hospitals that are willing to sacrifice short-term profitability by making investments in technology may ultimately be the winners. In the short-term incorporating a greater level of technology into private medical practices and hospitals (beyond diagnosis and treatment) will have a positive return in terms of more efficient offices and processes, patients that have access to better personal health management tools, and less-stressed patients because of a more satisfying healthcare management process. In the long-term we would expect technology to ultimately have a positive return on patient health through better record keeping, more accurate diagnoses, and new treatments as a result of better information. Of course in the long run private medical practices and hospitals will also experience operational efficiencies that lead to cost savings and a significant return on investment – in both human and dollar capital terms.

About Illuminas

Illuminas is a [market leading research consultancy](#) that uses scientific methods to gain insight to specific issues relevant to our clients. Illuminas' Austin-based practice specializes in technology research and focuses on the ways technology intersects with other industries, such as finance and healthcare. Illuminas has offices in London, New York, Austin, Hong Kong and Shanghai.