HEALTHCARE AND COLLABORATIVE PLATFORMS

White Paper

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OVERVIEW

The Obama administration has put a clear focus on both modernizing America's IT infrastructure and on healthcare reform. This will present significant opportunities to those companies that provide technologies that enable or facilitate the delivery of web-based healthcare. HBR Labs, with its unique collaboration technology, is well positioned to take advantage of these opportunities and to allow the delivery of high quality, cost-effective medical care.

The White House web site states:"The Recovery Act also provides for $7.2 billion for broadband internet access nationwide, including grants for rural broadband access, expanding computer center capacity, and sustainable broadband adoption initiatives." Even prior to this, internet usage was growing among many segments of the population and, specifically, among both patients and physicians. Broadband connections, in particular, were becoming more ubiquitous, as well. Among primary residence U.S. households, broadband penetration grew to 57% in March 2008, according to Leichtman Research Group, and broadband penetration has grown on average 8.25 percentage points each year. In the workplace, 95.83% of U.S. workers who were connected to the Internet were connected with broadband.

That the Obama administration clearly intends for this new broadband internet capability to be used as part of his healthcare reform plans can be seen from the White House website, as well. As it further goes on to say:" The President believes that modernized infrastructure is a necessary part of the foundation for long term economic stability and prosperity. That includes everything from a comprehensive national broadband plan, to *new health care information technology*…" (emphasis added). The combination of expanded broadband connections, an impetus from the White House, and the features and capabilities of Web 2.0, presents exciting new opportunities both for patients and physicians alike.

Even prior to the Obama initiative, with all of this internet availability and usage people were becoming more comfortable using the internet for personal needs, including banking, purchasing goods and services by supplying credit card information, stock trading, seeking advice from experts, and attending to healthcare needs. Patient usage of the internet for healthcare issues in particular is clearly rising. According to a 2007 study by the Pew Internet & American Life Project, about 51% of people with a disability or chronic illness use the Internet and, once they get online, they become more frequent users. The study also found that about three-quarters of so-called "e-patients" said information they found online affected their treatment decisions and nearly 69% said information they found online led them to ask their physicians new questions or get a second opinion. More recent Pew project data showed that now 75% of e-patients with a chronic condition say their last internet health search affected a decision about

how to treat an illness or condition. Similarly, a survey by Jupiter Research found that 56% of U.S. adults sought health information from a source other than their physician, most often the internet.

On the physician side, another recent survey by Jupiter Research showed that 89% of physicians reported using the Internet for researching clinical information and 39% communicated to patients by e-mail. According to the Deloitte Research/Fulcrum Analytics survey of office-based physician use of the Internet, over 33% of respondents used e-mail to communicate with colleagues and nearly 25% communicated with patients via e-mail. Uses of e-mail included discussing symptoms/treatment with patients online (13.4%), determining whether an office visit is indicated (8.1%), and notifying patients of test results (6.5%). Of those physicians not currently communicating with their patients online, only 5.6%.were interested in starting to do so. Seventy-one percent did not use e-mail, and were not interested in doing so, mostly out of time and liability concerns. Reasons offered were varied: 55.1% feared too many e-mails, 53% feared e-mails adding to existing workflows and taking place outside of the current workday, and 35.2% did not interact due to lack of reimbursement; 63.6% of all respondents were concerned about the liability of e-mail communication and some 49% of all respondents gave liability as a reason for not communicating online at all. Interestingly, though, when asked what would increase their willingness to interact with patients online, 41% said insurance reimbursement, and approximately 30% mentioned the ability to see more patients, reduce payroll, reallocate staff, increase patient satisfaction scores, and spend less time on the phone. Physicians expect that the reimbursement for a 15-minute online consultation with an established patient should be $56.

Hospital systems are also beginning to see the value of the internet in healthcare delivery. As an example, the Henry Ford Health System has deployed a robust medical portal called “MyHealth” and then added “Evisits” to it in 2006, with over 238,000 patients and over 900 physicians enrolled and approximately 200,000 secure messages sent a year. Since then, the portal has helped the system reach new levels of patient and physician satisfaction. Patients surveyed after an Evisit had among the highest patient satisfaction scores of any patients using Henry Ford Medical Group services. Patients said that offering Evisits demonstrated Henry Ford was on the cutting-edge of care and indicated they wanted even more online interaction with physicians in the future. Physicians also found the system easy to use and recommend. Lastly, not only are patients and physicians more satisfied, but Healthcare Effectiveness Data and Information Set (HEDIS) measures for patients using the system rose after Evisits.

HEALTHCARE OPPORTUNITIES

There are numerous potential uses in healthcare for a collaboration platform such as that offered by HBR Labs, which can be broken down roughly as follows:

- One-time interactions
- Repeated interactions
- Home health
- Interactions with non-physician medical professionals
- Interactions with hospitals or health systems
- Interactions with medical drug and device companies

Each of these will be explored, in turn, in greater detail.

One-time interactions

Patients are using the internet for medical information in increasing numbers, as noted above. They tend to turn either to general search engines such as Google; medical information websites such as WebMD, sites offered by medical systems and universities, patient [usually disease-specific] sites, or pharmaceutical companies sites, or websites that offer the ability to confer or interact with a physician. The latter sites may provide medical experts only (such as MedIndia.net, webhealthcentre.com, m-opinion.com, et al) or the medical component may be part of a larger set of expert panels (such as liveperson.com, allexperts.com, justanswer.com, et al). The types of interactions offered range from emails to live chats to telephone conversations. There is little offered, however, in the way of live audio and video with document, image, and video co-viewing in real-time as is offered by HBR Labs. There is even less offered that runs directly in the browser without the need to download software, register, or log in. One thing people consistently seek is an interaction that “feels” as if it were in person, and few websites offer that experience besides HBR Labs.

A key characteristic of these interactions is that they often occur between people who have never interacted before and who most likely will not currently have or be willing to install mutually agreeable software to facilitate the interaction. Accordingly, a solution such as that of HBR Labs, which runs within the web browser and requires no prior installation has a distinct advantage over most other solutions, which do require downloading, installing, registering, and logging in. One good example of this type of implementation is HBR Labs’ LiveMDExpert portal (www.livemdexpert.com),which incorporates all of these features, including scheduling and billing. It allows a person (e.g., patient, relative) to search for a physician in a given field, read about the physician and see his consultation rates, and then schedule an online interactive session.

Patients

One group of potential users of “one-time interactions” is patients themselves seeking additional information beyond that which they received from their physician. Study data routinely shows that patients leave their physician’s office understanding only 50% of what they heard and remembering only 50% of that by the time they arrive home. They are often too intimidated to ask questions while with the doctor, and once they arrive home and think of questions they are reluctant to either call their physician or schedule another appointment just to ask for more information. This is seen regarding information both about the nature of their disease and the proposed treatment plan - be it medical or surgical/procedural. They then turn to the internet to supplement the gaps in their knowledge. If they turn to information websites as WebMD, they are often overwhelmed by the search results and they cannot personalize what they find to their own situation. If they use an expert, the online interaction experience they have may be suboptimal, as noted.

In addition, a physician who is an expert in his/her field may be geographically remote from the patient. Patients are not always able to travel to see the required expert, either for a second opinion or to help co-manage the patient along with the local expert. A good, easy to use collaboration platform would allow patients from all over the country to be cared for by physicians located at particular “centers of excellence.” Even if the patient had to travel for the initial consultation, just the ability to have the for follow up done remotely would be significant.

Family members

Another group of potential users are patients’ family members - especially those living geographically distant from the patient - who wish to learn more about what is happening to their loved one. With the patient him/herself unclear as to what is going on and the fact that it is usually difficult for family members to get to speak with the physician directly, they, too, must turn to other sources of information, with the same caveats as exist for the patients themselves.

Physicians

Physicians, especially those not near major academic medical centers, are also turning to the internet to interact with colleagues for help with difficult cases. The explosion of social networking websites has not passed medicine by, and numerous physician-oriented sites have arisen (Sermo, doctornetworking.com, doctors.com, et al). Once again, the key to a high quality and efficient interaction is the ability to co-view documents (e.g., lab results, imaging studies, EKG’s, etc.), coupled with the “feel” of a live, in-person interaction.

Repeated interactions

The focus here is on providing greater efficiency and convenience to the parties involved. A significant amount of time is wasted traveling to the other party’s

location, time is lost from work, and travel may be difficult for some due to distance or disability, among other things.

Patients and their regular physician

Whether it is a physician reviewing test results with a patient or a patient wishing to discuss their condition (e.g., showing the doctor a skin rash), not infrequently the discussion requires mutually viewing critical data. Some things are just better when done with a collaboration platform, such as that of HBR Labs, than when done by telephone of email. For example. the impact of a test result and stressing the need for a treatment is much stronger when the discussion is complemented by an image that is reviewed together (e.g. X-ray, CT scan, cardiac stress test images). Other things are impossible to do by telephone – view a skin rash, for example. As noted, disabled patients may have great difficulty reaching the doctor's office or clinic. As most physicians will attest, sometimes one needs to see the patient, not just hear him/her on the telephone, in order to get a good sense of what is going on medically and make a proper judgment

Physician to physician

Similar to what was described above regarding one-time physician to physician interactions, physicians often confer with one another on mutual patients and need to review results such as images together (e.g. an interventional cardiologist showing the coronary angiogram results to a cardiac surgeon for consideration of bypass surgery; radiologist reviewing an X-ray with the internist, etc). Much time is wasted by busy physicians trying to coordinate being at the same place at the same time to review such data.

Home health

The home health care market is booming. Encompassing both post-hospital-discharge patients and patients with chronic diseases, for whom the goal is to avoid hospitalization or institutionalization (e.g., a skilled nursing facility), home health care is becoming a larger and larger part of the overall healthcare picture. Besides the considerable cost savings that are achieved by keeping patients at home and the obvious improved patient comfort – which have always been true - several other factors are coming into play. First is the fact that the demographic changes in both the U.S. and Europe are leading to an older population with the attendant higher prevalence of patients with chronic diseases and post-hospitalization patients. Second, the predicted shortage of primary care physicians and of hospital and institutional beds is looming. Third, the dramatically rising cost of healthcare is forcing the search for a new paradigm of healthcare delivery. Last, and perhaps most relevant to HBR Labs, is the availability of the technology to enable acceptable levels of home monitoring (including internet enabled blood pressure machines, ECG telemetry, weight scales, etc., etc.) coupled with the mandated use of electronic medical records (EMRs) by the year 2012. It will now be reasonable and possible to monitor

patients at home, with each caregiver having complete access to the patient's medical records so that appropriate, high level care can be given. With "e-prescribing" capabilities the soon to follow with most, if not all, EMRs, the caregiver could not only monitor and diagnose, but also prescribe and arrange for home delivery of prescribed medications from a local pharmacy.

This is already staring to be put into practice. The Department of Veterans Affairs (VA) has introduced a telehealth system for some of its patients. The VA's home telehealth program cares for 35,000 patients and is the largest of its kind in the world. It helps veterans understand and manage chronic conditions such as diabetes, hypertension and chronic heart failure. According to a recent study, veterans with chronic conditions who are using the system can manage their health and avoid hospitalization. The study found a 25% reduction in the average number of days hospitalized and a 19% reduction in hospitalizations for patients using home telehealth. The data also show that for some patients the cost of telehealth services in their homes averaged $1,600 a year - much lower than in-home clinician care costs. Along the same lines, according to a new study from the Spyglass Consulting Group, *Trends in Remote Patient Monitoring 2009,* remote patient monitoring technology enables healthcare providers to treat patients before their conditions become more acute.

Similarly, 48% of healthcare organizations interviewed in a recent study have funded home telehealth initiatives themselves. As noted, a strong return on investment exists for healthcare delivery networks serving as provider and payer, including such organizations as Kaiser Permanente and the Veterans Administration. St. Luke's-Miners Memorial Hospital in Schuylkill County, Pennsylvania, now has a telemedicine connection with St. Luke's Center for Diabetes and Endocrinology in Center Valley. The technology allows doctors to examine patients remotely through a desktop videoconferencing system. The REACH Call interactive Web-based system includes video and the ability to see crucial test results such as CT scans and allows a physician to evaluate a patient at a remote location.

With the increasing awareness that telehealth programs can save provide significant cost savings while also yielding better health care, such telehealth programs are only going to increase in number and in scope. As such, those who can provide the right technology infrastructure at the right price will be well positioned in the healthcare world. Note that, for the most part, the convergence with consumer electronics products is enabling patients to use devices with which they are already comfortable, including smart phones, personal computers and cable boxes. However, for telehealth to really become widespread, prices for remote patient monitoring devices and associated peripherals need to drop from several thousand dollars to less than $500 per unit before healthcare organizations will make further investments to support their patients with chronic diseases.

Non-physician medical professionals

There are numerous types of interactions that patients have with non-physician medical professionals that do not necessarily require a live, in person, meeting, yet could be enhanced and yield greater results if the participants could only meet virtually. These types of interactions are with those experts who help with lifestyle/preventative issues and with those who actually administer or adjust therapy, and include

- Dieticians
- Smoking cessation specialists
- Physical/occupational rehab therapists (for continuation of a program at home)
- Drug/alcohol treatment follow ups
- Public health counselors (pregnancy, sexually transmitted diseases and HIV/AIDS counseling, etc)
- Optician
- Psychologists

In each case, the need is for the capability to interact in a way that mirrors a live interaction, for which the ability to include live video of each participant is particularly helpful, and that also can provide a common platform for viewing relevant documents, images, videos, websites, etc., such as would occur were the participants to meet in person. HBR Labs' solution provides for just such a virtual interaction.

Health Systems

In addition to what was described above, where the medical professional interacts with the patient to monitor or deliver healthcare, there are numerous ways in which health care delivery can be enhanced by allowing patients to access their healthcare system directly. In Europe, with Germany as a leader, patients are able to securely access their medical records from home and can make portions of it available to others (e.g., family members, in-home caregivers/aides). Their experience has shown that this leads to patients taking a greater role in their own health care and being more aggressive and compliant with following prescribed medicine and exercise regimens and with adopting lifestyle changes such as smoking cessation or diet change. The natural expansion is to allow the patient to remotely interact with the relevant professional to ask questions or seek advice about what they see in their records. Again, the HBR Labs solution provides an excellent vehicle for that interaction.

Providing the HBR Labs interactive experience can also potentially enhance patients' dealings with more mundane issues as billing and scheduling. By

providing the capability for the patient to remotely co-view the relevant bills and insurance data together with the billing personnel, those conversations could be far more efficiently handled. Similarly, pre-admission/pre-procedure remote interactions would not only provide greater efficiency, but would also allow for the hospital personnel to offer the various options that produce additional income for the institution (such as private rooms, admission to the “luxury suite” rooms, higher end meals). The discussion could be enhanced by incorporating the co-viewing of brochures that describe these options and then completing the ordering process together. Pre-admission “tours“, commonly given in the labor and delivery suites to expectant parents but also important for patients traveling to a remote facility (e.g. to a tertiary care or academic medical center), can also be done in a virtual manner, saving time and money while, again, providing a good marketing opportunity for the institution.

Health systems can also use remote technology to provide continuing education opportunities to their staffs, who may not live near any of the facilities or who may by definition be geographically dispersed, such as a visiting nurse service where the nurses never go to a base office, per se. As an example, the Cheyenne Regional Medical Center offered an eight-week nurse education course broadcast from the University of Washington. While teleconferencing software exists, it is far more expensive in comparison to HBR Labs solution, has the added downside of requiring installation and registration, and usually consumes significant IT/help resource expenditures for technical support.

Medical drug and device companies

Almost every consumer product has a toll-free telephone number and a website listed on it – from sophisticated electronic equipment down to candy bars. Consumers love to be able to contact manufacturers and sellers and the companies rightly see it as a good marketing and customer service opportunity. Medications and medical devices are no different. However, because of the additional health factor with these items, the need for a good way for patients to interact with the companies is even more compelling.

With pharmaceuticals, patients will often have questions and won’t always be able to easily contact their physicians in a timely fashion. By providing easy, immediate access to their panels of professionals (e.g. physicians, nurses, pharmacists) to address these issues, drug companies can position themselves as caring and concerned. The HBR Labs platform would allow patients to easily interact with these professionals, while allowing the professionals to make use of company-provided medical content (documents, images, videos) to enhance the discussion. The analogous situation exists for medical devices, with the additional aspect of being able to provide instructions for use to patients who may be having difficulty with equipment, including showing them prerecorded images and videos and even doing live demonstrations. Despite attempts to

simplify home health devices, many patients who are not technically savvy (especially the elderly) still make repeated calls for help in operating them. As such devices become more and more prevalent – everything from home blood chemistry monitors (e.g., glucose, PT/INR) to therapeutics (e.g., specialized oxygen tanks, CPAP machines) to up and coming diagnostic equipment (e.g. internet-enabled stethoscopes and blood pressure machines) – this need will only increase.

PRIOR BARRIERS

Previously, several barriers to the implementation of the above opportunities existed, including technological, legal, and reimbursement issues. With the new telehealth initiative, the barriers are beginning to fall and the technology is either being adapted or the incentives are there for its rapid development.

Technological

As noted, many of the technologies that will be needed already exist or can be modified relatively easily. Almost every piece of medical monitoring equipment today has an output port that can be modified to work with an internet communications device, be it a PC or a small, stand-alone, dedicated device. The availability of good, interactive collaboration software such as that of HBR Labs helps “close the loop” of patient-device/data-medical expert. A patient need no longer go to the physician’s office just to have his ECG, blood pressure, weight, or any of a myriad of other items checked in order to then have his medications adjusted. As the technology improves, many such devices are becoming lightweight and mobile, allowing for communications via the cellular telephone network or WIFI. such solutions a;ready exist for ECG and pulse oximeters, with the output able to be displayed on handheld devices such as PDAs and smart-phones.

Legal

The main legal barriers centered around two issues: practicing medical care without a license in the relevant jurisdiction (e.g. a patient in one state interacts with a physician in another), and malpractice concerns. As the need to provide remote health care services is becoming more acute, for all of the reasons noted above, new paradigms of medical practice and the laws governing it are being developed. Malpractice insurance products covering virtual interactions are already becoming available and are even being provided by some of the existing physician-consult websites, such as American Well. Several states have introduced or passed legislation allowing for medical providers to diagnose/treat patients outside of their home states (analogous to being permitted to drive in one state on the basis having a driver’s license in another).

Reimbursement

Traditionally, payment was given in medicine only for in-person interactions. In addition, payments were lower if there were no physical exam, and the provider had to actually touch the patient to perform it. The Centers for Medicare and Medicaid Services (CMS) still has several restrictions for Medicare telemedicine reimbursement. Thus, having patients return to the office and then examining them during a visit to discuss their condition pays the most, just speaking to them alone without examining them pays the least, and communicating with them by telephone or email usually pays nothing. Not surprisingly, there has been an associated reluctance on the part of health care providers to adopt internet-based interactions for fear of losing income. Several states and private insurers have now begun to pay for such remote interactions, especially in light of the technologies that allow for a “virtual examination” and the significant cost savings that can be achieved. Patients appreciate the convenience and physicians appreciate the ability to unclog their waiting rooms. Physicians can also see a net increase in patient visits, since those patients who avoided office visits due to constraints such as work/time-off or immobility can now be seen.

Many private insurers also will not reimburse for virtual visits, although some states, such as California and Kentucky, have legislated that they must reimburse the same as for face-to-face consultations. Other programs, such as Eastern Montana and Inland Health in Washington, have negotiated with payers for telemedicine reimbursement. The *New Hampshire Business Review,* March 19, 2009, reported that, in New Hampshire under a bill that was passed recently by the New Hampshire Senate, Health insurers would no longer be able to require that a doctor meet a patient face-to-face in order to be reimbursed. Senate Bill 138, which defines telemedicine and requires its coverage, passed the Senate on a 17-5 roll call vote. The measure now goes to the New Hampshire House for approval. Supporters maintain that the bill will both lower health-care costs and provide better care in rural areas. "This is going on now," said Sen. Kathy Sgambati, but she noted that there is "confusion on how to bill" for such services that is preventing some providers from engaging in the practice. Similarly, Sen. Debbie Reynolds. Stated that "This is vastly going to reduce the costs of health care and help with early detection," Telemedicine would help with early detection and "access to specialty care that would reduce the severity of diseases." As these sentiments spread among legislators and the cost savings are demonstrated more and more, the reimbursement issues should begin to be resolved

Patient reluctance

For many patients, there has been a reluctance to use virtual visits because they wish to experience the “healing-touch and feel” of a real office visit. The newer technologies, such as HBR Labs’, go a long way towards recreating a more “live” feel to the virtual visit. Of course, younger patients who are already used to using

the internet for social interactions are inherently more comfortable with the virtual visit.

For some patients, privacy concerns are paramount. As was seen previously in the internet commerce world, initial security and privacy concerns, regarding credit card information, for example, were eventually alleviated as the technology improved and people gained confidence. The presence of the HIPPA regulations and the generally good compliance of healthcare providers and institutions to date has already done much to foster that confidence.

As the time and convenience factors are becoming more apparent, more and more patients are willing to use virtual medical services, as was discussed in the opening section of this document.

Infrastructure

Providing these services requires, at a minimum, a standard internet connection and, for many services - such as HBR Labs' - a broadband connection. Fortunately, as noted earlier, broadband is becoming more and more ubiquitous. Ironically, the remote geographic areas that might benefit the most from internet-based medical services may be the least likely to have broadband. However, several government initiatives have been launched in recent years to bring broadband service to those areas, including some specifically initiated to allow for the remote delivery of medical services. With the added stimulus of the HIMSS bill, the lack of appropriate infrastructure should be less and less of an issue.

Need for connection of medical records

Central to many services described is the assumption that medical records (or the relevant portions thereof) can be accessed remotely by all parties who need such access for care delivery, including the ability to append new results/findings to those records. Again, the new HIMSS bill and EMR requirements should facilitate this. While the multiplicity of different, competing and proprietary EMR systems has always been problematic, EMR system vendors and third party software developers are starting to provide "interface solutions" that will allow the different systems to communicate and exchange information. Shared concerns about security are also being addressed, thus lowering the barriers to seamless integration of a patient's medical records across different providers and institutions (doctors' offices, laboratories, imaging centers, hospitals, etc.).

SUMMARY

The current environment is rife with opportunities for purveyors of remote and internet based medical services. The combination of the need for cost containment, primary care physician shortages, a graying population with an ever increasing need for medical services but without necessarily having a way to get to them, the realization that preventative and follow up care can be delivered effectively via the internet, the presence of improved technology, and favorably changing reimbursement and legal environments will allow such services to flourish, with more services to come that have not even been though of. The U.S. military is a major developer of remote medicine technologies, and feels a mandate to pass along the advances it makes to the civilian sector. Private companies already have developed [as yet relatively] simple remote robotic surgical systems, with more advances to come. Companies that can develop and provide technologies to service these growing needs are destined to fit well into a growing market niche .