

Connected Health: Can it save the US Healthcare System?



1 Executive Summary

While the healthcare debate raged across the United States, Cambridge Consultants in collaboration with MassMEDIC undertook a study on Connected Health, to determine its status today and the role it could play in the future of healthcare. The study included conversations with providers, patients, payers and the technology industry as well as a survey of about a 100 respondents. The study was undertaken because of our belief in the benefits of coordinated proactive healthcare centered on the consumer and the ability of collective industry initiatives to significantly improve health outcomes while reducing costs. The whitepaper summarizes study results as well as comments from an expert panel discussion. It also puts forth recommendations for action that are both timely and relevant, given the recent passing of the Healthcare Reform Law.

Some of the major findings from the study were related to awareness of Connected Health and opinions on what could be achievable with widespread adoption of Connected Health technologies. A significant portion of the respondents (40 percent) were unaware of Connected Health as a concept. However, of those who were aware, 75 percent believed strongly in the potential to yield cost savings, most notably via better management of chronic diseases and reduction of errors. An encouraging finding, it also came with a caveat – most people believed it would be several years before we see such broad implementation. Among the challenges cited were lack of adequate infrastructure, absence of reimbursement for Connected Health tools and resistance by physicians to deviate from their usual workflow.

It is heartening to see efforts being made to overcome these challenges by both industry organizations as well as the federal government. Bodies such as the Continua Health Alliance are developing interoperability standards for devices and data management systems that will facilitate seamless data exchange. Government incentives to promote implementation of Electronic Medical Records (EMRs) and directives such as reduced payment for 30-day readmissions, bundled payment, role of Accountable Care Organizations (ACOs), etc. will likely boost adoptions as providers become motivated to keep patients well and reduce their costs. Demonstration projects sponsored by the Centers for Medicare & Medicaid (CMS) as well as initiatives already undertaken by leading provider organizations such as Partners Healthcare, the Cleveland Clinic and Kaiser Permanente, will build evidence of the benefits and cost savings from Connected Health, thereby convincing the wider audience to embrace these tools.

Connected Health solutions could help relieve the pressure being felt by providers and insurers alike and enable them to effectively manage the total cost of care. We believe there are practical and feasible ways to effect change and deliver results that the Healthcare Reform Law aims for in the short term by altering the way we approach healthcare. The key lies in adopting a Connected Health mindset, which means keeping the consumer at the center, closing the loop between various stakeholders, and aiming to deliver a “Continuum of Care”, thereby realizing significant dollar savings.

2 Connected Health Study

Almost everyone in the healthcare and affiliated industries has been talking about two things over the past several months – the escalating costs of healthcare and the healthcare reform efforts by the Obama government. Strong opinions have abounded on either side of the reform debate and muscles were flexed in order to shape its outcome. It has taken a year to pass the Healthcare Reform Bill, and now there is one major question on every one's minds – will the ultimate outcome address many of the core healthcare issues and lead to significant dollar savings in the near term?

In this interesting and evolving climate, Cambridge Consultants in collaboration with MassMEDIC undertook a study on Connected Health because of our belief in the benefits of coordinated proactive health care centered on the consumer and the ability of collective industry initiatives to bring about significant change in the status quo. This paper highlights findings from the study which included conversations with providers, patients, payers and the technology industry. It also puts forth some recommendations for action based on our insights and observations.

Connected Health – What is it all about?

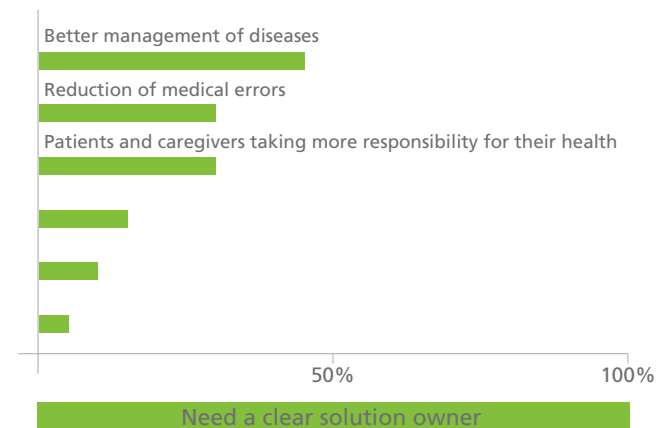
Is this just another term, more jargon in an already crowded space? Does it mean something to those familiar with it? During the course of our interviews, it quickly became apparent that the term is interpreted differently by different people. Some people think only of electronic medical records (EMRs) while others think of tele-medicine for rural populations. We did encounter some broader definitions like the one from Partners Center for Connected Health (CCH) in Boston. They use the term to reflect a range of opportunities for technology-enabled care programs to deliver care outside the traditional clinical setting. Unfortunately, we very rarely encountered attempts to frame the term in its broadest sense and would therefore like to propose an interpretation that focuses on a general approach to health rather than on technology or an offering.

A Connected Health “mindset” would enable and deliver a “Continuum of Care” with the patient/ consumer at its center, tying together all components and stakeholders within the health system. By closing the loop between consumers, caregivers, clinicians and payers, this approach would promote participatory medicine. Moreover, rather than episodic care tied to certain events, a Connected Health mindset would shift the outlook toward wellness and enable individuals to always avail of appropriate care no matter where they are, in order to remain as healthy as they can.

Connected Health – what can it achieve? (Benefits)

The Connected Health mindset can be applied to all aspects within the healthcare ecosystem, bringing significant benefits. A few examples that have the potential to make the biggest impact on patient well-being and save significant healthcare dollars in a short time span are discussed here.

Those who are aware, recognize benefits of Connected Health



1. Change role of patients and caregivers

A significant aspect of the Connected Health mindset involves patients/ consumers. Traditionally, consumers have been at the receiving end rather than the driving end of healthcare. As Dave deBronkart, patient advocate (also known as ePatient Dave) and co-founder of the Society for Participatory Medicine says, *“The biggest stakeholder - the one with the most at stake - is the consumer, the patient. We tend to talk about patients as if they’re someone who’s not in the room. They are: it’s personal. It’s you, your mother, or your child. If we think the government is the biggest stakeholder, we will end up optimizing for the government and not for the patient or user. That said, I must equally emphasize the role of Participatory Medicine. Patients need to get in the game of being actively engaged in their own care. Although different people have different appetites for how much they want to be involved, in general people need to be responsible for their own health.”*

Unfortunately, in the times of employer paid health benefits, there has not been much direct incentive for people to take care of themselves. But that has not changed the general public view of good medical care as a right. People expect to receive the best quality care when they do get sick, disregarding the fact that several illnesses are direct consequences of their own lifestyles.

A significant shift in consumer culture and outlook is required in order to realize sustained reduction in healthcare costs. Connected Health provides the tools to achieve this shift. Patients can be given complete access to their medical records so they can collaborate with their care providers to make informed decisions and choices. Moreover, they can be given visibility to the actual costs of the care they have received. At the same time, consumers need to be held accountable for their own wellbeing. Incentives can be structured to reward healthy lifestyles, while penalties are enforced for reckless behavior. Whether this is achieved via health savings accounts, varied out of pocket payments, or discounts on insurance premiums for better health, a “cause and effect” financial structure will go a long way in changing public behavior. Employers could play a big role in raising awareness. Educating their employees regarding the cost of health insurance and its impact on individual compensation, encouraging healthier lifestyles and promoting wellness programs, could also help change consumer behavior.

2. Better disease management

A handful of chronic diseases (asthma, diabetes and hypertension) are placing an incredible burden on the US healthcare system, accounting for almost 70 percent of the costs. Moreover, the obesity epidemic that has gripped the country is only making matters worse. The traditional health care model where patients meet with their doctor for a few minutes twice a year is not effective in addressing these growing issues. Treatment plans may sometime be tailored to a person’s conditions but are almost never adjusted to meet an individual’s need or living environment. What is more important, there is very little being done to change an individual’s behavior such that these diseases may be prevented or controlled before they lead to serious issues.

It is clear that reducing the onset of these diseases and actively managing the individuals who are suffering from them, is the only way to radically cut health care costs. Connected Health solutions lend themselves well to this task. Active disease management programs could be established via tertiary care centers such as pharmacies. People could be equipped with appropriate devices and other means so that they could easily monitor their diseases. The data, when fed to intelligent monitoring software, could spot adverse patterns and alert program coordinators who could intervene before an acute event results. Regular counseling and coaching tools could be used to raise awareness and encourage people to manage their conditions. Once again, rewards and incentives aligned with better health results could provide the much required nudge to passive populations.

Getting people to take their medications is another way to keep diseases in check and prevent expensive longer term complications. *“A major cost of chronic disease management is due to wastage of drugs that patients don’t take”,* says Dr. Arvind Patel of the Maine Telemedicine Services Division at the Regional Medical Center at Lubec. *“If you can make the patient take their meds regularly, that would improve their health and save a lot of money, directly and indirectly.”* The New England Healthcare Institute recently estimated overall costs of poor medication adherence to be around \$290 Billion annually. Active compliance tracking via connected medication delivery devices combined with regular reminders, simple medication management devices, and automatic refills could help increase adherence. The Partners CCH in Boston has completed several studies targeting different disease conditions. Their initiatives ranged from simple medication reminders to regular monitoring of physiological parameters for patients released from hospitals. Their results prove that simple interventions and regular monitoring at home can lead to significant improvement in overall health outcomes and reduce hospital readmissions.

Unfortunately, cost has long been an issue with remote monitoring and tele-health solutions as there is practically no reimbursement for them. However, the ROI demonstrated by the Partners studies and the ongoing initiatives to change payment structure for hospital readmissions may lead to increased adoption of these technologies by mainstream clinical institutions.

3. Reduction of errors

Medical errors account for almost \$17 billion of wasted healthcare dollars annually, not to mention the harm and suffering they cause. *“The ability to avoid errors, properly care for patients and practice evidence-based medicine is a huge part of the business case for Connected Health”,* says Keith Hovan, CEO of Southcoast Regional Hospitals. *“The average adverse drug effect event costs hospitals hundreds of dollars per event. If a system can be implemented to check for drug interactions, allergies, dosage etc. in real time, then medication errors can be avoided. Patients can be spared of complications and significant amount of money can be saved. The same thing can be said for patient identification.”*

Other sources of medical errors in the hospital are also often traceable to the right data not being available at the time it is needed or systems not being able to share data with each other. The critical care setting is an excellent example of the side effects of too much technology. Each patient’s bedside is littered with a number of monitoring devices, infusion pumps, and life support equipment. None of these devices interact with one another, so the responsibility to gather the data they

generate lies squarely on the clinical staff. The environment is so complex that it often takes too long even to determine the source of an alarm.

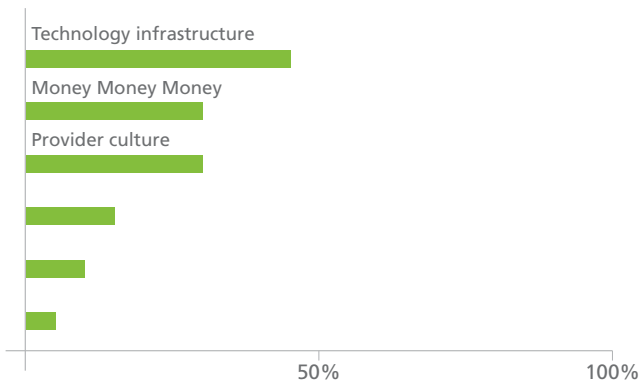
Connectivity and access to data can help minimize errors. Real time availability of complete patient data and access to allergy and drug interaction databases combined with automated decision support algorithms can be powerful tools in the fight against medication errors. Other initiatives such as ICE (Integrated Clinical Environment) promote standardization and interoperability amongst devices that will enable valuable data to be easily read and understood by the clinical staff. These Connected Health solutions, if properly incorporated in hospital workflows, can significantly reduce the burden on nurses and doctors, thereby reducing medical errors, speeding up recovery times, and cutting down wasted expenditure.

Connected Health - why aren't we seeing more of it already? (Challenges)

If you are reading this but have never before heard of the term Connected Health, you are not alone. Almost 40 percent of those surveyed during the study indicated that they were not aware of Connected Health examples or solutions. This partly explains why despite all its potential, the concept is stuck in the early infancy stages of adoption. Not only that, almost 90 percent of those aware of Connected Health think that widespread adoption is probably somewhere between 4 and 15 years away! One could easily get discouraged by this finding, but instead it just reinforces the need to raise awareness and improve wider understanding of the concept.

Most study responders pointed to a few perceived challenges that seem to be holding back widespread adoption. These are discussed here.

Significant challenges need to be overcome



1. Lack of a clear owner

The most significant cause, one pointed to by more than 50 percent of the responders is the lack of a clear solution owner. There is a definite misalignment of responsibilities and benefits amongst the various stakeholders. Moreover, it appears that we are not quite sure who should or can drive the change. According to Bill Kassler, Chief Medical Officer of CMS New England, part of the reason for the mess today is that we have many stakeholders, none of whom are strong enough to impose their will or preferred solution on the others, but many are just strong enough to prevent other solutions from being imposed against their will. Dr. Kassler equates it to the Nash Equilibrium in game theory. *“Each sector has divergent interests, and the status quo is maintained because it is everyone’s second best solution. No sector is powerful enough to prevail on its own, and many sectors are able to veto proposals which are perceived to be harmful to their interests. Collaboration and compromise are the only way forward,”* he says.

2. Technology Infrastructure

The perceived barrier at the forefront of people’s minds revolves around technology. A majority of people surveyed believe that inadequate technology infrastructure and the high cost of devices is holding back widespread adoption of Connected Health solutions. Technology is broadly viewed as a cost center rather than an enabler to benefits and savings. *“One issue is that the added value of Connected Health will be the largest only when it has already been fully established. While the overall scenario is still shaping up, individual decisions (based on Return on Investment calculations) may be difficult to take,”* points out Eric Thelen, CTO of Philips Home Monitoring. *“Government incentives or initiatives by large players (e.g. insurance providers) can help to boost the overall Connected Health infrastructure beyond this threshold. After Connected Health has reached a certain level, additional decisions to connect, participate and further enhance the overall system will become easier.”*

The Connected Health model relies heavily on availability of data and ready access to it by various parties. Unfortunately, devices and systems are not yet interoperable thereby posing a major challenge to data collection. Data transfer from one health system to another requires a mountain of effort and is often error prone. One study participant horrifyingly recalled his move from the west coast to Boston. As a cancer survivor, he requested his complete treatment record before he moved, so if he were to need medical attention again, his new care team would know what he had been through. Not only was obtaining information worse than pulling teeth, he discovered that the records seriously under-represented the amount of radiation therapy he had received. Had he not checked the

records, the lifetime radiation limit could easily have been exceeded and that could have killed him. Unfortunately, stories like these are all too common with today's systems. We can hope that with increased adoption of EMRs by clinical operations country wide and adoption of probabilistic patient identification techniques, data handling and transfer will be simplified.

Interoperability amongst monitoring devices and data collection systems is yet another issue cited by many as a major roadblock. It appears that major players in healthcare are beginning to recognize the benefits of following standard data formats and communication protocols, as evidenced by the progress made by the Continua Health Alliance over the last 3 years. Open communication protocols and compliance to existing standards will be the key to building the wider ecosystem for the Connected Health vision to succeed.

3. Money

Not surprisingly, the lack of reimbursement for Connected Health solutions is one of the leading barriers identified by most. Providers do not get paid for monitoring their patients while at home or answering questions via email. Financial incentives are not lined up for physicians to encourage healthy lifestyles or adherence to medication. Moreover, Medicare coverage for tele-health systems is limited to those deployed in rural areas.

The cost benefit equation is also the key issue holding back technology implementation. Take EMRs for example. The providers need to bear the cost of installing an electronic system but any cost savings that may be realized go to the payers. This upfront investment has historically resulted in significant resistance to EMR adoption. With incentives from the federal government, EMR adoption is slowly increasing. However as the race to the penalty deadline heats up, the underlying issues with most products remain unaddressed. Most commercial products available today are probably too complex for what they need to achieve. The long list of "features" which are perhaps extraneous to the key task of improving patient care and safety (and achieving "meaningful use"), make these products unwieldy and difficult to incorporate into normal clinical workflows. Although some vendors have taken initiatives to simplify data viewing and access by patients, a majority of products still remain bulked up and hence carry a hefty price tag. Unfortunately, providers facing a deadline may be reluctantly buying into the existing products rather than demanding a change.

The debate around reimbursement for Connected Health technologies continues to rage. Most payers including the CMS insist on seeing evidence of significant benefits. Each provider would like clinical studies to be conducted using their patients and processes. However, experts familiar with

the government's payment policies, like Tom Barker, Partner at Foley Hoag and ex-counsel for the Department of Health and Human Services, believe that we may never see real reimbursement for Connected Health solutions. Although the CMS conducts demonstration projects and budget has recently been made available to fund larger programs via Accountable Care Organizations (ACOs), it is unlikely that we will see widespread reimbursement in the near future. However, programs carried out by various institutions like Partners have shown significant ROI for regular monitoring of patients with chronic diseases like congestive heart failure (CHF) and diabetes. The data shows a significant drop in ER visits and hospital re-admissions, especially for cardiac patients. Providers who recognize these benefits could cut down their losses should payment for 30-day hospital readmissions get reduced or eliminated in the near future as well.

4. Culture

Both providers and consumers in the US share the responsibility for today's approach toward healthcare today. Resistance to change exists in both camps. *"Healthcare professionals tend to think only of care models that involve face to face interaction. Traditionally, healthcare has always been a human resource based model"* says Dr. Joseph Kvedar, Founder and Director of Partners CCH. But he is also quick to point out that current affairs are largely focused on changing provider behavior. *"We need an equal emphasis on changing consumer culture as well. Today, the broad consumer mentality is to view illness as an accident. People think of themselves as victims and try to find someone to blame, when in fact they need to understand that half of the chronic illness burden is a result of unhealthy behaviors. Consumers need to be held more accountable for their own health."* At CCH, they have observed a drop in resistance to Connected Health solutions by primary care physicians once benefits were demonstrated to them. Cardiac patients, who ordinarily required an office visit every week, don't need to come in if their blood pressure is monitored at home regularly. This freed up time for the physicians to see other patients.

In addition to getting physician buy-in, a change in consumer culture is equally important. The public mindset toward health has always been quite passive and reactive. Instead, people need to take responsibility for their health and be willing to improve their lifestyles, follow medical guidance and proactively manage their conditions.

Despite all the barriers identified by a majority of the people surveyed, it was refreshing to come across a different point of view, one that is positive and optimistic. Rick Packer, CEO of ZOLL Medical, believes that these are not insurmountable walls, but just nuisances that can be overcome when the need

is strong enough. Rick gives an example of HIPAA laws which until recently did not support electronic data transmission, but can now accommodate electronic data security. Rick believes we will see a definitive move toward implementation of EMRs in the near future.

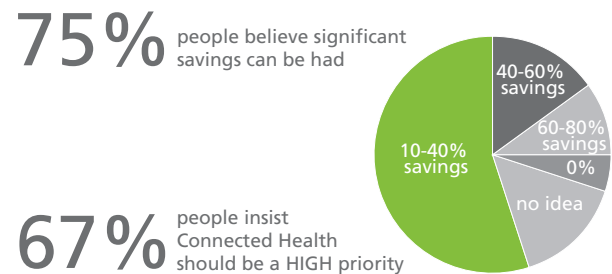
While EMRs will certainly serve as the key enabler to Connected Health solutions by providing access to data, benefits will not be realized unless systems are in place to take advantage of this data. There is need for improvements in infrastructure and technology to ensure that Connected Health solutions become main stream. But rather than waiting for things to change, we recommend focusing on the tremendous power that can be harnessed with the technology that is already in place today.

Where do we go from here? Who will make the change?

We find most incumbents frozen in their tracks, waiting to see which way the winds blow. It is perhaps the newcomers and radical thinkers who could bring a wave of new ideas to change the traditional approach to healthcare. A new Connected Health mindset based on real time availability and access to data and the ability to deliver care via alternative means would give equal control to various stakeholders in the system and demand equal responsibility in return. In this paradigm, wellness and prevention will take a front seat via active lifestyle coaching. Regular monitoring and proactive management will be the mantra for addressing chronic disease. The balance of power between patients and providers will shift, and the relationship will be collaborative rather than one-way. The care model will shift to being patient-centric and patient driven. Its no wonder that those familiar with this approach believe that Connected Health solutions could deliver up to 40 percent savings in healthcare spend.

Where will the savings come from? The low hanging fruit is in the healthcare dollars that today's system seems to be wasting. According to recent research by analysts at PriceWaterhouseCoopers almost half of the healthcare spend (~\$1.2 trillion annually) in the US is unnecessary or wasteful. The biggest offenders are overuse (\$210 billion), inefficient claims processing (\$210 billion), preventable hospital admissions (24 billion), and using emergency rooms as clinics (\$17 billion). The Connected Health mindset could prevent some of this wastage by improving efficiency and delivering near term results. A few examples of how this can be achieved are discussed here.

Tremendous faith in potential to save healthcare \$\$



Where will the savings come from?

1. Automation

Smarter automated systems have changed the nature of service industries like banking and airlines in the past decade. Such systems could bring significant operational efficiencies to healthcare as well. These systems are mature and can be made secure such that sensitive healthcare data is handled appropriately.

Take the hospital setting where a considerable amount of data is generated for each patient. Monitoring devices track physiological parameters, diagnostic tests are run and medications are infused. If all this data is easily accessible to the entire care team, careful and accurate decisions can be made. Unfortunately, the complexity involved in data collection and lack of interoperability amongst hospital equipment is a major source of errors as pieces of data get overlooked or are not acted upon. Data collection and decision support systems embedded within the normal workflow could provide a lending hand to the hospital staff and minimize expensive errors. Other activities like patient check-in and recording of history, basic vitals measurement, etc. could be mechanized where possible to reduce the burden on healthcare staff. By far the largest savings could be had by applying this technology to streamline administrative tasks such as coding and billing.

2. Care coordination

A key issue with the healthcare system today is lack of coordination between providers. This not only leads to needless spending due to redundant and repeat tests, errors, etc. but also results in longer treatment and recovery times.

A Connected Health approach could enable coordination such that all clinicians treating an individual work from a single comprehensive medical record. Efforts made by auxiliary but important care personnel such as physical therapists, nutritionists, psychologists etc, could all part of the central

clinical efforts. Moreover, an individual could obtain emergency care wherever he or she happened to need it, whether across town or in a different state and still have their entire medical history accessible.

The Connected Health mindset values alternate means of care and would aim to make them feasible. If access to primary care physicians for simple everyday things can be provided via email or phone, unnecessary office visits could be prevented and the staff could be freed up to better serve those patients that need in-person care. Mobile technologies would become part of the care delivery model, leveraging commonly used devices like mobile phones to reach out to consumers.

3. Remote management

Regular management of chronic diseases and better adherence to medication regimes could lead to the substantial saving of healthcare dollars. Today's care paradigm does not put great emphasis on lifestyle choices and prevention of disease. Most people are oblivious to the consequences of their everyday actions. Less than 50 percent of patients take their preventive medications as prescribed.

The Connected Health approach could bring together all key stakeholders such that systems could be put in place to benefit everyone involved. People with chronic conditions could be provided with the right tools and motivation to better manage their disease, clinicians could remain in the loop and proactively intervene to prevent acute events. Wireless technologies are now evolving to a stage where they can now enable medical devices to be connected in a reliable and seamless manner. Such connected devices in the hands of consumers at home could be used to facilitate regular feedback between patients, caregivers and providers, improving outcomes and reducing costs of care. Patients could be monitored after acute events or hospital stays thereby ensuring that they remain stable and prevent expensive re-admissions. Medication adherence could be improved by providing people with concrete near term benefits such that they remain motivated to stay the course.

An excellent example of a collaborative grassroots approach to care is the initiative that was run by Pfizer with the local Medicaid office in Florida some years ago. The program termed "Florida: A Healthy State" was launched to implement a prevention based approach. Educators and professional aides worked together with community organizations and local physicians across the state to help people understand their conditions and better manage them. The program saved the state \$42M in the first year!

Concluding Remarks

It is clear that major efforts will be required to change the status quo and bring the healthcare system in the US back from the brink of disaster. The Healthcare Reform Law is hopefully a step in the right direction. Whether it is centralized efforts by the government or a collective force from the industry that brings about bigger change remains to be seen.

The ubiquitous nature of mobile phones has given rise to the "mobile health" or mHealth movement which is generating new ways to deliver healthcare. Moreover, consumers of the new generation are becoming "E-Patients," empowering themselves with research and health information widely available via the internet. They will make smart choices and seek best value if they are empowered to make decisions and feel the costs in a tangible manner. This will drive efficiencies and improved service within the sector.

Social media tools have proliferated our every day lives. Applications like Twitter and Facebook are being used by everyone from teenagers to large pharmaceutical companies as well as the CDC to share information with large audiences instantaneously. The real power of Connected Health could well be harnessed via such everyday tools that reach out to consumers at large.

We strongly believe in the Connected Health mindset and its potential to bring about a real change in the way we deal with healthcare in the US. A fresh pair of eyes and some divergent thinkers can forge the path to realize the Connected Health vision. We are seeing encouraging signs from small private enterprises entering the healthcare domain, taking the initiative to drive change. These players, with flexible and innovative business models have the potential to be hugely successful and take market share away from traditional incumbents, provided they are able to deliver a solution that brings benefits to all stakeholders. However, a significant and deliberate push from the top will perhaps be essential to catalyze a wider revolution.

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