Introduction

Has it ever occurred to you that patients today receive medical care in the same manner that our grandparents did? We, as patients, go to the doctor to wait (and, wait) in the lobby of a chronically congested office for care.

One would assume that the proliferation of technology would improve our healthcare system. But, in a time when information is exchanged at the speed of light, certain aspects of our health system have never been more dysfunctional. Some have estimated that our country will have a shortfall of 45,000 primary care physicians by the end of the decade. Baby Boomers are retiring at 10,000 a day. And we notice the “slow down” of our most senior physicians – working only enough to reach retirement because they feel that they no longer “fit” into our current evolution of healthcare. Ironically, despite our nation’s wholesale adoption of technology, we have a growing health access problem.

In my practice of family medicine, we began to ask ourselves how we could not only address this, but also improve our care and service to our patients. And, it was that decision – that we were no longer going to kick-the-can down the road – which led us into a new delivery model of healthcare.

A Lean Solution

Our clinic is located in a small town in south central Kentucky. Like many, we shared the problems of being unable to attend to our patients in a timely manner. A staff, hardworking all, felt overwhelmed with providing daily acute care needs, superimposed on the demands of chronic disease and health maintenance. We could rarely accept new patients due to this burden. However, about three years ago, on the strong advice of my brother who is a hospital administrator, I accepted an invitation to train under the supervision of Toyota in the study of Lean Systems engineering. Thereafter, I not only visualize my clinical care differently, I see the health system differently.

Shortly after World War II, Toyota developed a new system of management and production to become competitive in the automotive industry. This system, referred to as True Lean, uses principles to relentlessly improve value to their customer by removing waste and improving service. It champions a culture of continual improvement at every organizational level. It relies on a concept of team where each role is important, recognized, and has responsibility. It uses an 8-step problem-solving method as its mechanism for improvement. The root-cause of a problem is embraced, rather than hidden. (When was the last time you heard someone admit a patient care mistake openly?) “Find a problem, fix a problem, see that it never comes back,” is a common maxim. Refined over 60 years, this is the scientific principle translated into action.

Ultimately, our team asked, “If the same True Lean problem-solving process were applied to improve our delivery of outpatient medical care, what might be its outcome?” This led to a rather surprising conclusion. The root cause of our clinic’s congestion was that about 40% of patients simply didn’t need to be there. We felt that those patients could be cared for equally well, and safely, outside the confines of our brick and mortar clinic.

We reviewed the literature for online care safety, and the known experience of online care within the model of the Medical Home model and felt comfortable applying it to our practice.
Online care (e-Visits) worked well for about a week before our first problem: care after hours. There was simply no efficient way to contact the physician, login from an outside computer, open a program, go to another computer, open a file, and meet our efficiency needs. So, we then engineered the encounter through a smartphone to allow the care request to follow the physician. Then our second problem became apparent: how do you attach relevant medical history (MH) to the history of present illness (HPI) in the communication to the physician and deliver a clear care plan along with patient education materials back to the patient in less than 4 minutes?

Our Solution

Ultimately, we came to engineer, develop, and test (with the association of a University-based partnership) a technology to provide online care via mobile platforms (smartphone/tablet). For lack of a better phrase, it was a “house call by smartphone.” However, after studying this for the last few years, we have come to believe that it is much more than a catchy phrase. We believe that it represents a new model of healthcare delivery and qualifies as a disruptive technology as defined by Christianson.

A patient desiring this option of care must register with the service, choose a credentialed provider, and securely provide their basic health history (MH). Once approved by the practice, they can request care at any time. For a care request, the patient logs into the secure website, reviews their MH, and conducts e-commerce to compensate the provider for care. An interrogation engine asks a series of questions which completes a thorough medical history. The HPI and MH are forwarded to the physician along with any photos a patient may wish to attach. Because most care is conducted by the physician on a smartphone, the provider has the option of either calling the patient or conducting a video visit. Our experience was that less than 30 percent of encounters warrant a phone call, and rarely was a video visit necessary. An assessment is made, prescriptions communicated to the pharmacy, and a full instruction/disease-specific information sheet returned to the patient. The encounter takes about 15 minutes for the patient and averaged about 3 minutes for the physician. After two years, 95% of care requests from patients were deemed appropriate to be addressed by this method by the physician.

What could this process become?

Once you begin to conduct care this way, it becomes immediately apparent that you’ve opened a new generation of telemedicine – one that’s cheaper and more efficient than other previous forms. It is telemedicine for the common man. We see it as a complement to current academic

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models that provide subspecialty care to disparate populations. More importantly it was efficient, efficient enough to engage our physicians. This means that for the first time, online care and telemedicine could be conducted within the Medical Home by the patient’s personal physician. Potentially this process addresses the access issue that is part of the patient centered medical home that every study shows lowers costs and improves outcomes.

When we learned that we could extend this new service from acute care to management of chronic conditions, the magnitude of the innovation became clear. By some estimates, 75% of our health dollars are spent on stable chronic care. In our experience, using this technology increased our capacity by 15% in the traditional fee for service portion of our practice while taking very little of our time. In effect, it added an extra hour each day to our traditional practice by keeping patients out who didn’t need to be there to get what they needed. Surveyed patients using the new technology were uniformly positive, with 97% saying they would use it again. Further, the per-capita cost of care decreased 15% - critical for health systems struggling on a 1-2% margin. Most importantly, surveyed patients, frankly, loved it. To restate: We provide care in less time, using fewer resources and, patients actually preferred it 97% of the time.

Our model estimates that in outpatient care alone, the United States can save $30 billion per year. It wouldn’t be difficult for a medical economist to extrapolate that using this tool for hospital discharge follow-up might exceed this number. Some report that a simple phone follow-up from a non-physician can reduce re-admits 25%. This process could move some current emergency department (ED) care into primary care clinics, which would now have the capacity to accommodate them. This provides for both short term savings from addressing uncompensated care and long term savings from better chronic disease management. Other access points, such as palliative care, home health, and long-term care are also opportunities for cost savings. Most importantly, the cost to industry for lost time, talent, and productivity could be estimated. Indeed, this new delivery model has the potential to bend the health care cost curve for the first time, changing from the model of Blockbuster® to Netflix®.

**Implications**

Mobility in online care is one of the rare examples in which disruption can improve each aspect of the health system. Patients can receive care from their own provider anytime, anywhere. Medical providers increase access, lower liability contrasted to undocumented phone calls, and retain compensation for their intellectual work. Health systems can improve revenue from clinics, reduce readmissions, and reduce ED misuse. And, they can now stake a claim on the most valuable real estate in healthcare: the peripheral device. In essence, they have a communication tool directly to their patients. Employers can see less absenteeism and presenteeism (coming to work ill), and ultimately stabilize insurance costs. Third party insurers can see less acuity and lower costs, allowing them to assess risk (the same can be said of ACOs). Lastly, governments can increase access, lower cost of care, and make their medical workforce more efficient.

Market displacement may occur for retail clinics, be they onsite or virtual. Also, traditional first-generation telemedicine models may have to change to account for the involvement of a patient’s primary care physician as well as medical specialties, dentists, and allied health professions.

The power of true mobility in health delivery might be condensed into a phrase borrowed from Christiansen: ‘The culture that has computer access and embraces e-commerce will champion online healthcare. They want the same thing that we all do, less disruption in our daily life. HMOs in the 1980’s taught us that patients will leave their physician if necessary to get what they want. The market’s response has been online care via the Internet, retail clinics (increasingly becoming virtual), Urgent Care, and ED misuse. However, as physicians, we understand that what patients really want is convenience and the care of their private physician. True mobility for patients and physicians offers both. In our clinic, we’ve found the fact that we demonstrate respect for their needs but it has, ironically, brought us closer together.

**Four Key Questions**

1. **How will this make it easier for patients to get access to care and obtain continuity?**

   This new process is designed specifically to accomplish this goal. The key strategy is that it provides access not just to a well-trained associate of the patient’s personal physician, but to their personal physician him- or herself. Because the time required for each e-visit is so short, most physicians will choose to answer the patient’s request in the evening even if not on traditional “call.” This brings access to all the nuances that make this patient’s situation unique, and most of these nuances are not in the traditional medical record, and reside only in the memory of the personal physician. The physician can choose to “sign off” at some time at night for personal time and sleep, and we found that very few e-visit requests come overnight.
2. How will it provide ways to increase the patient’s participation in their care?

The high rate of patient satisfaction and ability to get their needs met on their own schedule should translate to patients’ feeling of ownership of their health, something we will continue to monitor. By providing digital access to patient education materials chosen for them at the time of our response we expect their participation to increase, reaching them at their most “teachable moment.” We also found that because the follow-up of stable chronic disease can be accomplished for many patients online, they take even further ownership and appreciate the deference of not having to disrupt their schedule to return to the clinic unnecessarily.

3. How will it provide the skills necessary for patient self-care?

The process we use begins with asking the patient to answer three questions: 1. Do you think that the problem could be handled by phone with the doctor? 2. Could in-person care wait a day if it had to? 3. Would you be willing to wait a few hours for a response (if necessary) rather than be seen in the office later? With these criteria our 2-year study found that about 97% of care requests by patients could be handled by online care. We believe that this process will begin the patient’s “self- triage” thinking that is the gateway to self-management. The actual skills of, for example, self blood glucose monitoring or measuring blood pressure can be assisted with providing digital learning resources, but will still require face-to-face teaching time.

4. How will it coordinate care among different clinical settings?

With 97% of patients able to conduct care online, the few exceptions were directed to in-office follow-up with us, requiring only coordination among our providers. However, we anticipate that it will become necessary on occasion to forward a summary (HPI/PHM/photos) of a request for care to a third party (colleague, Urgent Clinic, ED) to maximize continuity. In a rural area with fewer providers, the need to avoid multiple re-testing that can come from seeing several different physicians concurrently is much less of an issue than in urban areas.

Conclusion

Certainly, this new e-visit tool will require some refinement with experience. Nonetheless, medical care delivery will move forward into the virtual space. The question is at what point will family medicine recognize and embrace this inevitability? The delivery model that the public values is the same model that expands the Medical Home, increases access, lowers global costs, and potentially provides an immediate partial solution to the healthcare manpower shortage. E-visits could be adapted to implement care to Medicaid patients affordably, but this will require additional innovation. Currently what is required is physician leadership, support from policy makers and payers, and education of the public.

REFERENCES


• Dr. William C. Thornbury, Jr. is the Medical Director of Medical Associates Clinic in Glasgow, Kentucky. He graduated from the UK School of Pharmacy and subsequently from the University of Louisville School of Medicine. He then completed a family medicine residency at the UL-Glasgow program, serving as their first Chief Resident.