THE VIRTUAL PRACTICE

Tomorrow's medicine, today.

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"The President believes that better health information technology is essential to his vision of a health care system that puts the needs and the values of the patient first and gives patients information they need to make clinical and economic decisions – in consultation with dedicated health care professionals."

--Transforming Health Care: The President's Health Information Technology Plan, 2004

"To build a future of quality health care, we must trust patients and doctors to make medical decisions and empower them with better information and better options.."

--State of the Union Address. January 31, 2006

"The 21st Century Health Care System must have the built-in capacity to continuously change and accommodate innovations in knowledge and technology."

--Institute of Medicine: Fostering Rapid Advances in Health Care: Learning from System Demonstrations, 2002

In the past few years there has been a lot of talk. But little action.

Industries like banking, travel, and retail have transformed their businesses with technology during the past decade. A bank customer can access and act on current information about their accounts online at anytime. An airline reservation can be booked and a boarding pass printed in an instant. A customer can purchase and track an item across the globe from thousands of online retailers. Health care is the only major industry resisting the adoption of the technologies that we use universally today in other sectors of the economy. Despite all of the rallying cries for the modernization of medical practice, only four percent of practicing US physicians use a fully functional electronic medical

record.[1] The policy makers recommend that, "enhancing productivity and efficiency in the provision of care"[2] is a desirable strategy in addressing rising costs and access. But for some reason, health care, the fastest growing sector of the US economy, refuses to move into the future gracefully -- holding on to paper records, telephone answering services, and prescription pads.

Patient Access and Practice Overload

In many markets, patients are finding it increasingly difficult to access timely care. The current shortage of primary care physicians, coupled with the inefficiencies of outpatient practice limit access. Because the traditional payment model in outpatient medicine is based on face to face office visits, gaining traction in employing new models of health care delivery online has been met with a fair amount of resistance and caution.

A Shortage of Primary Care Physicians Across the Nation

Inefficiencies in the current state of health care and the concurrent revolution in the use of web-based technologies have emboldened some medical practices to introduce web-based tools for patients. While the financial benefits of adopting technologies early are not as clear in health care as in other industries[3], some practices recognize that the benefit to patients and physicians outweighs the financial risk. As a result, the Virtual Practice is providing patients with opportunities to employ and test technologies to enhance their care. To build a collaborative relationship between physician and patient, an increasingly interactive platform that enriches feedback and decisions at each stage of diagnosis and care can help both patients and physicians make more empowered and informed health decisions. Though technology is not a substitute for the relationship between physician and patient, its thoughtful and practical use can enable more efficient and effective care delivery both in real time and online.

Today, treatment and management of chronic diseases like obesity, diabetes, high blood pressure, and high cholesterol make up over 75 percent of all health care expenditures in the United States[4]. For the most part, management of these diseases from the traditional care delivery point of view is intermittent at best. To supplant the traditional model of episodic management of disease, the Virtual Practice is introducing platforms to strengthen physician involvement and patient engagement in chronic disease care.

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[1] DesRoches CM, Campbell EG, Rao SR et. al. Electronic Health Records in Ambulatory Care--A National Survey of Physicians. N Engl J Med. 2008 Jul 3;359(1):50-60 Epub 2008 Jun 18. Available at: http://content.nejm.org/cgi/content/full/NEJMsa0802005v1#T1

[2] Davis K, Schoen C, Guterman S, et.al. Slowing the Growth of US Health Care Expenditures: What Are the Options? Commonwealth Fund Report. Vol. 47. January 29, 2007. Available at: http://www.commonwealthfund.org/publications/publications_show.htm?doc_id=449510

[3] Kleinke, JD. Dot-Gov: Market Failure And The Creation Of A National Health Information Technology System. Health Affairs, 24, no. 5 (2005): 1246-1262. Available at: http://content.healthaffairs.org/cgi/content/full/24/5/1246?ijkey=6769394f77178c5b547c76a554bf99240fa94090

[4] The Centers for Disease Control and Prevention. Chronic Disease Overview. http://www.cdc.gov/nccdphp/overview.htm. Accessed 9/7/08.

What is the Virtual Practice?

The Virtual Practice consists of a combination of tools that enable improved patient-physician communication and care of patients wherever they are. The administrative underpinning of the virtual practice is the "**patient portal,"** a secure website which provides communication services between patients and their providers**.** Patients access the portal with a secure username and password at any internet connected computer and communicate with the practice to schedule appointments, request prescription refills, and review certain results. For providers, the portal also provides detailed statistics about a patients' activity. These analytics can be a valuable metric to analyze business processes and manage resources at the practice. All data is exchanged in a HIPAA (Health Insurance Portability and Accountability Act) compliant and secure fashion.

Along with the patient portal which streamlines access to information while maintaining privacy and security, there are three other key components of the virtual practice.

1. Asynchronous consultation with the provider team

Many patients would like to email physicians, but providers are concerned that email may provide an unlimited forum for long essays of complaints. Managing such communications to physicians can become unwieldy. We advocate a form of scripted templates that guide patients through online visits and present the provider with the information s/he needs in an interpretable form.

2. Synchronous communication with the provider

There is growing evidence that the use of videoconferencing in the medical environment is useful for a variety of acute and chronic issues. Videoconferencing between a provider and patient allows for the evaluation of many issues that may not require an office visit, and can be achieved in a shorter time.

3. Remote physiologic monitoring

Clinical information is one of the key resources that physicians need to care for patients. Using devices that remotely monitor patients' clinical and physiologic measures (blood sugar, blood pressure, caloric expenditure, et. al) provides a considerable opportunity for seamless collaboration between physician and patient to improve care and reduce the burden of unnecessary office visits.

Building a Virtual Practice | Requirements

- **The EMR (Electronic Medical Record)**

  An essential requirement to develop a Virtual Practice is a fully functional electronic medical record (EMR). In the EMR, structured patient clinical data and tools such as charting, result management, referral management and order entry reduce paper, enhance data access, and reduce time in non-direct care related activities. Certain electronic medical records systems enable affiliated providers with the ability to share data with other clinicians to facilitate communication and ensure continuity of care. Physicians' notes can be entered into electronic medical records using voice recognition software which eliminates the need and considerable cost of medical transcription. The EMR houses and represents the work of the provider, but can be interoperable with other components of the Virtual Practice.

- **The Patient Portal**

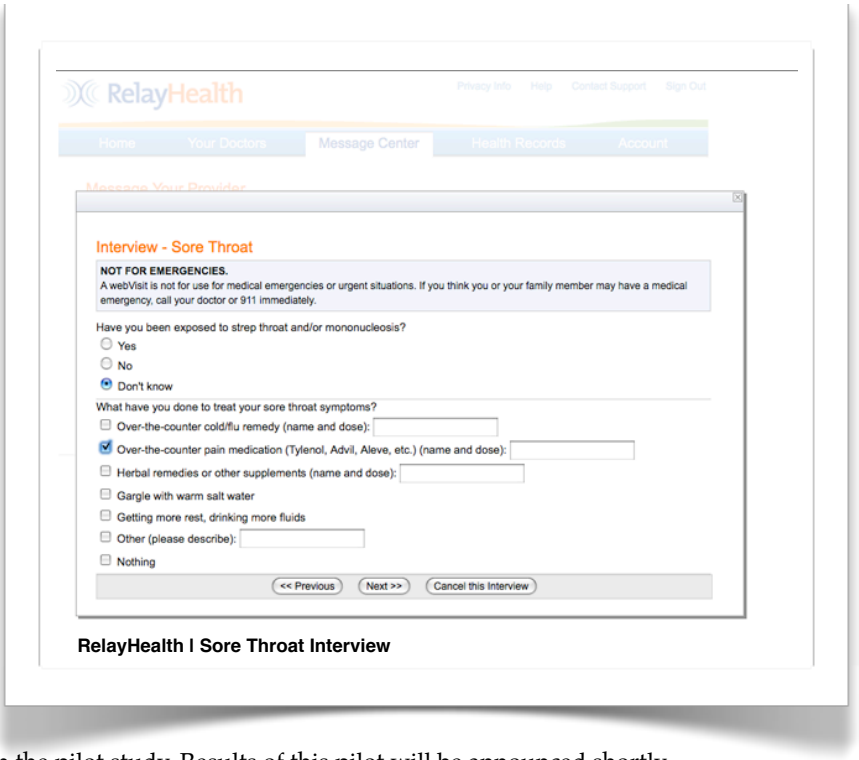
  The natural extension of the EMR is the Patient Portal, an online messaging system for patients. This provides a way for patients to initiate routine and non-urgent requests beyond office hours. Using this portal, patients may also complete requests for prescriptions, appointments, and referral authorizations and view limited ambulatory medical chart information. The portal is also complemented by a health information library and specific information about the medical practice. For administrative staff, requests processed through the patient portal reduce telephone volume, allow efficient triage of patient requests, and provide a way to transmit lab results and interpretation letters to patients electronically.

Virtual Practice Research

The Virtual Practice is using and testing technologies that offer alternatives for patients and providers in delivering care and managing disease. The Virtual Practice is leveraging technologies that are used universally today in technology-enabled businesses. Most people who work in business settings are familiar with interactive videoconferencing which allow two or more locations to interact through two-way video and audio transmissions simultaneously. While videoconferencing has been used widely in medical teaching, where techniques or conferences are broadcast to a group watching remotely, there has been resistance to using this technology in medical care delivery. Obviously, there are limitations in conducting physical exams through web cameras. However, within certain limits, virtual visits (a patient-physician real time encounter using videoconferencing technology) can be an effective means to deliver care to patients. Virtual visits may also reduce overhead costs for a physician practice by reducing the space and resource requirement at a practice for a patient. For patients, a virtual visit can minimize time taken away from work and transportation costs. The following three projects we describe are the essential components of the Virtual Practice.

1) Relay Health Online Asynchronous Visits

In online learning environments, exchanges between students and teachers are frequently enacted asynchronously rather than in simultaneous or face-to-face conversations. This type of communication taking place at different times is a standard protocol for many online learning, auction, and business web services. With RelayHealth, a provider of health-related web services, the Virtual Practice is testing a tool that conducts asynchronous exchanges between physicians and patients to conduct online visits. Visits are available for about 100 non-urgent symptoms and conditions commonly seen in a primary care practice. Patients login to the RelayHealth website and complete a relevant online interview using RelayHealth's webVisit®. The visit is conducted asynchronously and allows patients to request advice about non-urgent symptoms and avoid unnecessary office visits for minor problems. Using the RelayHealth e-visit platform, patients participate in online medical interviews that gather and document key data about symptoms. Results of these online interviews are relayed to the physician. A physician in the practice reviews the patient's responses from the web interview and determines a treatment plan using communication channels online. If the patient's condition requires further evaluation, the physician will request that the patient visit the office in person. Currently, 357 patients have enrolled in the pilot study. Results of this pilot will be announced shortly.



RelayHealth | Sore Throat Interview

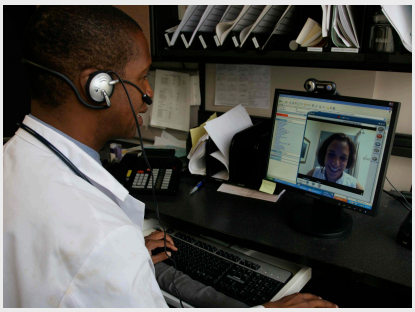
2) Synchronous Communication | The Virtual Visit

We recently concluded two research studies which compared face-to-face visits with virtual visits using web cameras. Though virtual visits are not meant to replace the traditional face to face visit in primary care, virtual visits may be a viable option in circumstances where patients need to be routinely monitored (i.e., in chronic conditions like diabetes, hypertension, obesity or depression). Virtual visits may also be effective for triage of acute non-urgent issues like upper respiratory infections or back pain.

In these studies[5], a physician conducted visits with existing patients known to the physician's practice with computers equipped with web cameras and videoconferencing software. We examined the feasibility, effectiveness and ac-

[5] Dixon RF Stahl JE. Virtual Visits in a General Medicine Practice: A Pilot Study. Telemedicine and e-Health. August 1, 2008, 14(6): 525-530.

ceptability of a face-to-face office visit in comparison to a virtual visit. We compared a physician's ability to diagnose and treat patients face to face in an exam room versus through a videoconference. We identified gaps in diagnostic or therapeutic capability and examined patient and physician satisfaction. Though patients preferred the in-person visit they were also satisfied with the virtual visit. The ability to take a patient's history and the physician's therapeutic effectiveness were not significantly different in either setting. We also found that for patients who did not require urgent medical attention, patients and the physician saw the virtual visit as a potentially useful alternative to the traditional visit for many medical conditions. These studies indicate that virtual visits can be an effective means of care delivery for a specific repertoire of chronic and some acute conditions. For virtual visits to become a reality in primary care practice, payers must be willing to provide both organizational and financial support to enable virtual visits to become an integral part of outpatient medical practice.



Virtual Visit

3) Remote Monitoring for Chronic Conditions

Monitoring and managing chronic health conditions has always been a challenge for patients and physicians alike. Existing health care systems are based on an acute-care model where a patient presents to a physician and the physician tells the patient what to do. This model works for much of acute care where a patient has an episodic problem and the physician can solve this problem with a single course of medicine or a one-time treatment. However, with chronic and common diseases like diabetes, high blood pressure and heart disease, this model is not effective. Recent innovations such as telephonic care management are not well integrated into the practice environment. It is well known that compliance with treatments and therapies is one of the major challenges of ambulatory medicine and the management of chronic disease. Patients must take an active role in their care for chronic diseases to be effectively managed. To meet this challenge, active and consistent collaboration between physician and patient is the key to progress and improved outcomes.

By providing tools that enhance collaboration between physician and patient, the Virtual Practice is changing this model of care and introducing tools for management of chronic disease. The Virtual Practice is currently conducting a clinical research study evaluating the effectiveness of a device that remotely monitors patients with chronic health conditions. The Virtual Practice is currently conducting a randomized controlled study recruiting from our population of adult patients who have been diagnosed with one or more of the following chronic conditions:

- Obesity;
- High blood pressure;
- High cholesterol;
- and pre-diabetes (glucose intolerance).

Remote Monitoring Studies

In order to determine the effectiveness of a metabolic monitoring device (BodyBugg™) in management of these chronic conditions, subjects are randomized into two groups. One group receives a metabolic monitoring device and behavioral counseling. The other group receives behavioral counseling alone. The BodyBugg™ monitors caloric intake and expenditure when strapped to a subject's upper arm. The data that the device collects is uploaded to a secure website when connected through a USB cable to a computer connected to the Internet. Physician investigators and study subjects with the device can login to a secure website and review their data online. The study is scheduled to conclude in winter 2008. Results will be announced then.

BodyBugg™ Remote Physiologic Monitoring Device

Summary

The virtual practice can be an active component of any practice that delivers ambulatory care. A combination of tools that enable improved patient-physician communication and remote care of the patient provide the building blocks for a virtual practice. This can be implemented at any ambulatory care practice using an electronic medical record. A functioning virtual practice must include:

1) A secure patient portal that allows for the patient and practice to complete routine administrative tasks;

2) A web-based application for asynchronous consultation between patients and care delivery team members;

3) Web-based videoconferencing for patients to have real time visual consultation with physicians. Videoconferencing allows for certain problems to be evaluated without the need for a face to face visit.

Additionally, remote monitoring of patients can allow for the capture of important physiologic metrics that cannot be captured in the practice environment. This can enhance the clinical picture of a patient for a provider.

Technology alone will not suffice to make the Virtual Practice succeed in an ambulatory care setting. As with any significant change in practice, buy-in from leadership and stakeholders is critical to success and adequate IT infrastructure and support must be in place and available. All stakeholders including front office staff, medical assistants and physicians must be part of the planning and rollout process.

Essential Tools for a Virtual Practice

- A patient portal for patient-physician messaging
- Technology for asynchronous online visits
- Ability for physicians to deliver care to patients synchronously through videoconference

This ensures a smooth implementation so that processes can continuously be improved and adapted to the individual needs of the practice..

Along with enhancing and enabling medical care, these tools also provide patients and physicians with the opportunity to build partnerships outside the traditional confines of the doctors' office. By providing tools that enable consistent communication and connectedness, care delivery, in whatever setting, can be more efficient and effective. The fully functional Virtual Practice is an ambulatory practice bolstered by improved information channels, improved information for providers, and ultimately, improved outcomes for patients.

Appendix

Virtual Practice | Portfolio of Technologies and Projects

	Purpose	Enrollment	Dates	Industry Partner	#/% of physicians in practice using the tool
Virtual Practice		6915	NA		8/100%
Relay Health Pilot	communication and care delivery	357	05/2008-9/2008	Relay Health/McKesson	5/62.5%
Remote Monitoring of Chronic Conditions	communication and physician monitoring	50	05/2008-10/2008	BodyBugg™	2/25%
Secure Patient Portal	communication, test results, administrative functions	4729	02/2002-present		8/100%
Virtual Visit Phase I	care delivery	40	10/2007-12/2007		1/12.5%
Virtual Visit Phase II - Randomized Controlled Trial	care delivery	150	03/2007-04/2008		4/50%%
Electronic Medical Record	test results, physician administrative functions	6915			8/100%

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