By Lee H. Schwamm

Telehealth: Seven Strategies To Successfully Implement Disruptive Technology And Transform Health Care ABSTRACT “Telehealth” refers to the use of electronic services to support a broad range of remote services, such as patient care, education, and monitoring. Telehealth must be integrated into traditional ambulatory and hospital-based practices if it is to achieve its full potential, including addressing the six domains of care quality defined by the Institute of Medicine: safe, effective, patient-centered, timely, efficient, and equitable. Telehealth is a disruptive technology that appears to threaten traditional health care delivery but has the potential to reform and transform the industry by reducing costs and increasing quality and patient satisfaction. This article outlines seven strategies critical to successful telehealth implementation: understanding patients’ and providers’ expectations, untethering telehealth from traditional revenue expectations, deconstructing the traditional health care encounter, being open to discovery, being mindful of the importance of space, redesigning care to improve value in health care, and being bold and visionary.

I n 1996 the Institute of Medicine (IOM) defined telemedicine as “the use of electronic information and communications technologies to provide and support health care when distance separates participants.”1 The terms telehealth and telemedicine are often used interchangeably. However, telemedicine typically describes direct clinical services, while telehealth refers to a broad range of health-related services such as patient care, education, and remote monitoring.2 Given the current unsustainable trend in the growth of medical expenditures, increasing value in health care will require improvements in quality as well as reductions in cost.3 The integration of telehealth into traditional ambulatory and hospital-based practices can help achieve both goals. The telehealth interventions that aremost likely to achieve these goals will be those that address the six dimensions of quality outlined by the IOM in its landmark 2001 report, Crossing the Quality Chasm—namely, health care that is safe, effective, patient-centered, timely, efficient, and equitable.4 As the IOM noted, “health care is undoubtedly one of the most, if not the most, complex sectors of the economy. Sizable capital investments and multiyear commitments to building systems will be needed. Widespread adoption of many information technology applications also will require behavioral adaptations on the part of large numbers of clinicians, organizations, and patients.”4(p16) Telehealth can complement traditional ambulatory and hospital-based practices, which tend to be provider-centric, by creating delivery systems that are more patient centered and that use technology to increase access and quality, decrease cost, and help providers manage an ever-increasing volume of information and relationships. Over the past half-century, technological innovations have increased convenience and improved access for consumers. For example, automated teller machines, self-service gas stadoi: 10.1377/hlthaff.2013.1021 HEALTH AFFAIRS 33, NO. 2 (2014): 200–206 ©2014 Project HOPE— The People-to-People Health Foundation, Inc. Lee H. Schwamm (lschwamm@ partners.org) is executive vice chair of neurology and medical director of telehealth at Massachusetts General Hospital, in Boston. He directs the Massachusetts General Hospital and Partners TeleStroke Network. 200 Health Affairs February 2014 33:2 Overview by Rachel McCartney Downloaded from content.healthaffairs.org by Health Affairs on February 11, 2014 tions, drive-through windows at various businesses, and vending machines are all examples of “disruptive innovations”5 that have provided consumers with new and alternative ways to more efficiently obtain goods and services. These innovations are disruptive because they have displaced prior ways of doing things. They start by introducing, in an area of low profitability, a product that is just good enough to satisfy consumers but that has a much lower price than the alternative. Eventually, these new products improve enough so that they compete effectively with established, more expensive products. Health care, however, has remained a largely local and synchronous service, meaning that patients and providers must be in the same place (local) at the same time (synchronous). Exhibit 1 compares this type of health care delivery with delivery that is remote and asynchronous, which the use of telehealth permits. Seven Critical Strategies For Future Health Care Delivery Understanding Patients’ And Providers’ Expectations ▸PATIENTS: The Internet has changed the way in which people obtain information about health and health care. Physicians, nurses, and other professionals remain the preferred source of information for most people when they have health concerns, but online resources—including advice from other patients—have become a significant and increasingly accessed source of information in the United States. Among the 74 percent of US adults who use the Internet, 80 percent have searched online for information about health topics, 25–35 percent have read commentaries about health or medical issues, and 15–20 percent have found other people with similar health concerns.6 Increasingly, adults with Internet access are sharing their personal health experiences with other people—a process that is facilitated by easy access to communication tools such as social network sites, discussion forums, and online reviews. Patients are also forming online diseasebased communities and often volunteer to participate in clinical trials.7–10 For example, the organization PatientsLikeMe was founded in 2004 as a “health data-sharing platform…to transform the way patients manage their own conditions, change the way industry conducts research and improve patient care.”11 The organization recently announced the launch of Open Research Exchange, an online platform to connect patients with scientists involved in the early stages of research design.12 In addition, more than 13,000 mobile health applications for consumers were available from the Apple App Store in 2012 at an average cost of only $3.21.13 Despite this increase in interest and activity, patients remain concerned about their privacy and the use of their medical information.14 Patients need assurances that data derived from applications such as telehealth monitoring will be kept private and will be fully and meaningfully integrated into their electronic health records.

▸PROVIDERS: Health care providers face many challenges. The growth of managed care, documentation requirements, malpractice claims, consumerism and an erosion of trust have changed the practice of medicine and affected the patient-doctor relationship. Providers are less and less satisfied with the amount of time available for them to spend with patients, their decision-making autonomy, and how much leisure time they have.16 Evolving work ethics and a desire for greater workplace flexibility are among the many factors that are influencing the number and nature of people who seek careers in health care.16,17 Practitioners increasingly expect to be able to use technical innovations and to have them produce benefits for both patients and themselves.18,19 And, in fact, electronic systems that intelligently aggregate and process data (for example, tracking levels of blood glucose over time) between patients’ medical visits and that provide decision support functions (such as alerts for drug-drug interactions) and web-based clinical diagnosis systems are helping make practitioners more efficient and accurate.20 Providers also want easy access to reliable and secure medical information from trusted sources.15 They want patient data to be easily integrated into longitudinal health records, and they want those records to be monitored and analyzed to help prevent future disease events. In addition, they want to be alerted when new treatment options become available. Telehealth applications are expected to make all of this possible when they are effectively integrated into existing practice models. But to facilitate the use of online systems, providers must have access to reliable, ubiquitous, and highquality bandwidth. In 2010 the Federal Communications Commission reported that more than 3,000 small provider groups across the country faced a broadband connectivity gap that would deny them such access.21 As telehealth provides greater access to care in more geographical markets, some physicians may feel financially threatened because patients will be able to access care from other sources, such as distant large health systems with sophisticated telehealth portals. And as medical care becomes more commoditized and more widely available, new financial risks to providers and organizations may emerge, including price competition from providers in other parts of the country or even other countries. Untethering Telehealth From Traditional Revenue Expectations It is unrealistic to expect a rapid return on investment for many telehealth applications. For example, a telehealth consultation might be more efficient than a face-to-face office visit, but it also might not be reimbursed. At this point, telehealth applications might best be viewed as important organizational learning experiments. Returns on investment should in general be considered a long-term matter. They will likely be achieved through reduced numbers of patients’ visits to “bricks and mortar” sites, increased sizes of patient panels, and decreased numbers of high-cost events such as hospitalizations. The more that telehealth activities are directed to populations associated with financial risk (such as thirty-day readmission penalties or alternative quality contracts), the less traditional revenue will decrease. Payers provide scant reimbursement for telehealth, and what limited payments there are go mostly for delivering care to underserved rural areas. Most initial telehealth activities thus will be financed by providers. In scenarios where telehealth activity is financed by providers without external reimbursement, setting financial incentives for telehealth too high might encourage waste and overuse (for example, repeated follow-up telehealth video consultations when a single telephone call would suffice instead) or stimulate adoption to such an extent that providers would have insufficient time for traditional in-person visits. Alternatively, setting the incentives too low might make providers unlikely to adopt telehealth. Lastly, online “second opinion” and other telehealth vendors might compete with hospitals: They could lure providers employed by hospitals away The traditional face-to-face office or clinic visit is composed of many parts, each of which must be analyzed to determine its value. The resulting data can be used to reassemble the parts of the health care encounter into the future form that will replace the traditional one. Wherever feasible, less costly solutions that take advantage of telehealth’s capabilities should be incorporated into the future form. For example, securely collecting and combining ahead of time information such as health records, medical images, and medication lists will be necessary for virtual visits. And doing so would be more efficient than having providers gather and organize this information during inperson visits. An approach known as value stream mapping should be applied to the health care encounter in both the outpatient and inpatient environments. Value stream mapping is a Lean manufacturing technique that is used to design and analyze the flow of materials and information required to deliver a service. Activities in the outpatient setting that could benefit from it include appointOverview 202 Health Affairs February 2014 33:2 by Rachel McCartney Downloaded from content.healthaffairs.org by Health Affairs on February 11, 2014 ment scheduling, checking out after an office visit, and filling prescriptions or orders. Activities in the inpatient setting could include hospital admission, discharge, and follow-up. After these activities have been “mapped,” they should be adapted to use in telehealth. The participation of information technology professionals in these processes will be essential. In addition, because many of the activities are in administrative, legal, or workflow domains, diverse staff expertise is required. Key items to modify include contracts for professional services and standards for competency to practice; definitions of where visits can legally occur; regulations governing the documentation of visits; decision support reminders; billing and coding procedures; and patient registration, visit scheduling, and data collection. See the online Appendix for the structure of the medical and administrative team that one organization is using to implement telehealth.22 Traditional medical documentation and communication are largely confined to the paper or electronic health record. Because mobile devices are convenient and inexpensive, many providers have begun to use them to send and receive text and e-mail messages containing confidential and important patient information. Health care organizations should encourage the use of these devices, with appropriate legal and privacy safeguards. But most of the information exchanged in this way is not currently captured in electronic health records, and it should be. And unless providers can enter medical information into patients’ records simply, using word processing instead of performing complex tasks such as categorizing the type or values of the information, they are not likely to do so.23 Health care organizations should develop mechanisms to allow providers to rapidly incorporate user-friendly mobile technology into their daily workflow. This would ease the burden of medical documentation and communication. Being Open To Discovery Many telehealth innovations are designed to make care safer and more convenient. Examples include secure messaging, virtual video-based visits with providers, and the use of digital or cell-phone cameras to photograph rashes and skin lesions. Other innovations will open up entirely new avenues of care delivery in which patientsmay not even be aware that health interactions are taking place. Examples include the remotemonitoring of body weight, physical activity, medication adherence, and heart rhythms. One example of a real-time, affordable, telehealth application is TeleStroke. This is an online system that uses interactive videoconferencing and the acquisition and transfer of digital images to allow experts at large urban centers to evaluate acute stroke patients in community and rural hospitals for the application of time-critical, clot-dissolving intravenous medications with offers of more-lucrative payments.

TeleStroke has already achieved mainstream adoption because it commoditized and distributed acute stroke expertise efficiently in a market of underserved hospitals that were willing to pay for it. It is a hospital-to-hospital rather than a patient-to-provider relationship that has proved to be financially sustainable with a short-term return on investment. Being Mindful Of The Importance Of Space Space refers to both the physical and emotional environments in which virtual encounters occur. For example, if a person needs health care while at work, his or her workplace may lack the facilities, technology, privacy, and comfort needed to conduct a telehealth encounter. Public, residential, and commercial spaces might need to be redesigned to include health kiosks or other appropriate spaces for telehealth care. Similarly, providers might need different environments at home or at work to use these new services. Telehealth encounters might help people avoid traffic, anxiety, and wasted time. However, they might also remove fundamental elements of the in-person encounter, such as interacting with medical assistants, nurses, and receptionists, that are important for the effective functioning of the office practice or for ensuring that key health measurements or interventions occur. To the extent that patients or providers feel that a virtual visit lacks or interferes with the human connection of a face-to-face visit, other meaningful benefits may be lost as well. For example, patients may be reluctant to volunteer information about sexual dysfunction if they do not feel that they are in a safe, private environment that is conducive to discussing very personal matters. Organizations must make informed choices about when to replace an in-person interaction with a remote human-to-human or human-tomachine virtual interaction. It remains to be determined whether the virtual visit can reliably reassemble and provide the necessary attributes—such as registration functions, vital sign measurement, laboratory monitoring, physical examination, diagnostic assessments, therapeutic recommendations, and postvisit coordination of care—at a lower cost than a face-to-face visit. However, the growth of online social networks suggests that consumers are open to alternative, lower-cost, and very convenient ways of interacting with others.