Learning Outcomes

After completing this chapter, you should be able to:

- Discuss the effect of the impact of Internet technology on healthcare
- Explain how EHR systems use the Internet
- Describe decision support available on the web
- Understand how the Internet works
- Discuss methods of remote access and secure Internet communications
- Compare different types of telemedicine
- Describe the advantages and workflow of patient-entered data
- Contrast differences between provider-to-patient e-mail and secure messaging
- Understand the workflow of an E-visit
- Discuss patient access to electronic health records
- Explain the criteria for Patient-Centered Medical Home
- Understand and compare Personal Health Records

The Impact of Technology

In the book *The Electronic Physician*, the authors compare the adoption of the EHR to the automobile. Let us begin this chapter by expanding on that useful analogy.¹

A hundred years ago, the most common means of transportation was the horse and carriage. As the first automobiles began to appear, people referred to them as “horseless carriages.” The people of that era conceptualized this new invention in terms of the existing technology. Even the inventors of the technology were not immune to this viewpoint. Isn’t the engine in the front of a car today because that’s where the horse was yesteryear?

As the automobile began to appear across the country, many people did not rush to adopt it or understand the full potential of the change that society was about to undergo. The new vehicles seemed to some to be fancy toys, inferior to the horse and carriage in many ways.

- The supply chain of the period was built to feed and water the horse, not fuel the car.
- The condition of the roads, which were passable by horse, often caused cars to become stuck.

Viewed within the existing infrastructure of their time, the critics were right: driving an automobile instead of a horse seemed like a lot of work for very little gain.

People of our era use the term electronic medical records because they are thinking in terms of paper medical records. However, the opinion in a report by the IOM is that “Merely automating the form, content, and procedures of current patient records will perpetuate their deficiencies and will be insufficient to meet emerging user needs.”²

Using the horseless carriage analogy, you can see that healthcare workflow has been designed around the infrastructure of a paper chart. Adapting the electronic chart to fit the old technology provides a level of comfort during the transition to the new system, but it also prevents us from seeing the full potential of the EHR. Similar to driving early automobiles on inadequate roads, implementing an EHR without considering the landscape can make it seem like a lot of work for very little gain.

In chapter 1, doctors Bachman and Wenner stated that adopting an EHR changes the way clinician’s work. Implementation of an EHR enables the patient records to be used in ways that paper medical records cannot. To achieve these benefits clinicians must make it part of their workflow that is as natural as driving their car to the office.

Chapter 1 also listed the Internet as one of the social forces driving EHR adoption. If you are a college student today, the Internet as we know it did not exist when you were born. It is our newest technology. While we continue to evolve what we can do with it, the Internet changes the way we work.

The flexibility of the Internet and its ability to get information to and from almost any point in a worldwide network obviously has a lot of potential for healthcare. Providers can access their patients’ charts, communicate with patients, transmit medical images, and work from anywhere. In this chapter we are going to discuss how the Internet and related technologies are changing...

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patient’s expectations and changing the way healthcare is delivered. To conclude our analogy of the automobile, the Internet is the Information Highway and it is changing the 21st-century practice of medicine as surely as the interstate system changed the habits of 20th-century drivers.

**The Internet and the EHR**

The Internet is one of the key technologies impacting our society in general. It has changed the way that people communicate, research, shop, and conduct business. It also is influencing changes in healthcare.

People shop for doctors online, insurance companies provide online participating provider lists, physician specialty associations, and state and local medical societies all offer web sites that help patients locate a provider near them.

Patients also use the Internet for research. Many clinicians are finding their patients are coming to visits armed with printouts about their conditions gathered
from web sites. Some of these web sites provide reliable information, some do not. One of the most trusted sources of consumer information on the web is webMD Health® (www.webmd.com). On the webMD Health consumer portal, patients can access health and wellness news, support communities, interactive health management tools, and more. Online communities and special events allow individuals to participate in real-time discussions with experts and with other people who share similar health conditions or concerns. By using sites such as webMD Health, patients can play an active role in managing their own healthcare.

Another reliable source of health information on the Internet is a web site set up by a hospital or medical practice. Many medical practices today have their own web sites. An example is shown in Figure 11-1. Although some of these sites are limited to information about the medical practice, clinicians, and office hours, the site shown in Figure 11-1 includes online information about preventative health measures, diseases, and conditions that the practice treats as well as other features we will discuss later. Patient educational information on a clinic’s web site has the advantage of being consistent with the medical philosophy of the practice.

The ONC strategies discussed in Chapter 1 call for the use of technology to make health information available to the patient. “Consumer-centric information helps individuals manage their own wellness and assists with their personal health care decisions.”3 The HITECH Act, also discussed in Chapter 1, establishes criteria for providers that includes “engaging patients and families” through the use of web portals for their patients.

The ONC committee helping define meaningful use objectives stated: “The ultimate vision is one in which all patients are fully engaged in their health care, providers have real-time access to all medical information and tools to help ensure the quality and safety of the care provided while also affording improved access and elimination of health care disparities.”4 The committee recommendation included the following criteria:

◆ Patient access to self-management tools
◆ Patient access to personal health records, populated with patient health information in real time
◆ Secure patient–provider messaging
◆ Access to comprehensive patient data from all available sources
◆ Participation in a health information exchange (HIE)

**Decision Support Via the Web**

The rapidly expanding body of medical information challenges the clinician to continuously keep current with all the changes in healthcare practices. Regardless of the clinical setting where providers work, the need for up-to-date

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Figure 11-2 Medscape web site used by thousands of clinicians.
clinical support information is needed. Sometimes a provider may be caring for a patient who offers a health problem with which the provider has little or no care experience or who requires new and unfamiliar medications. In other situations a provider may be called upon to share his or her expertise with committees to develop new care protocols to support developing best practice guidelines. Providers may also be involved in new program development to meet needs in their community or to be involved in research to improve patient outcomes.

The quantity of information available to clinicians regarding conditions, disease management, protocols, case studies, and treatments far exceeds their available time to read it. No longer is it necessary for a physician to make a trip to the medical library or keep a vast library in the office.

Although the Internet offers easy access to a myriad of web sites that can quickly provide information to help support any knowledge deficit, it is important to obtain information from sites that can be depended on for accurate and quality information to guide their care. One such site is Medscape® (shown in Figure 11-2), the leading web site for providers, is a source of objective, credible, relevant clinical information and educational tools.

Medscape provides online continuing medical education (CME) as well as online coverage of medical conferences, access to over 100 medical journals, and specialty-specific daily medical news. Large numbers of research papers and nearly every medical journal is available on the site.

In addition to physician-oriented sites, professional organizations for other healthcare professionals are reliable sources of information on guidelines, practice standards, continuing education credits, upcoming conferences, and a variety of online networking opportunities. Here are several examples:

◆ Nursing professional organizations have many web sites offering information on professional practice and even include areas specifically designed for student nurses. Additionally, if the nurse is working within a particular clinical specialty, the professional nursing organization associated with the specialty will contain information that is clinical relevant and supportive of best practice standards.

◆ The American Association of Medical Assistants web site provides information on certification programs, online CME courses, and news useful to the medical assistant.

◆ The American Health Information Management Association (AHIMA) web site offers information on professional practices and issues regarding electronic records that are useful to the health information manager.

### Critical Thinking Exercise 63: Internet Medical Research

In this exercise you will need access to the Internet. You will visit two web sites to obtain information for patient education.

#### Case Study

Arnie Greensher is a 66-year-old male who is beginning cancer treatment.
Step 1
Start your web browser.

Enter the following URL address: www.careindividualized.com.

Step 2
Locate and click on the link for Patient.

Step 3
Choose from any of the patient information documents, and click on it. When the document is displayed, review it and print only the first page. Give the printout to your instructor.

Case Study
Brenda Green is a 54-year-old established patient with a history of hypertension and possible peripheral arterial disease of the legs. She has been prescribed Coumadin, a drug which has specific dangers. Follow the steps below to locate the answers to the questions in step 6.

Step 4
Start your web browser, if it is not already running.

Enter the following URL address: www.webmd.com.

Step 5
When the web page is displayed, type Coumadin in the search field and click on the button labeled “Search.”

A page of search results will be displayed. Locate and click on the link “Drug Information.”

Locate and click on the link “Coumadin Oral.”

Step 6
From the information displayed on the page answer the following questions:

What is the generic drug name for Coumadin?

What is a very serious (possibly fatal) effect of this drug?

What lab test is used to monitor the effect of this drug?

Integrated Decision Support

Although continuing education classes, medical journals, and web sites such as Medscape are available to a majority of clinicians, the information relevant to a particular case may not be easy to access during the patient encounter when it is most needed.

Decision support refers to the ability of EHR systems to store or quickly locate materials relevant to the findings of the current case. Clinics can imbed links in their forms that, when selected, display any type of helpful material. These
might include defined protocols, results of case studies, or standard care guidelines prepared by specialists, medical societies, or government organizations.

In current EHR systems, the decision support documents are selected and linked to the system by each individual practice. (The author is not aware of any system that automatically installs standard decision support documents or links.) The selection of decision support items is generally one of the responsibilities of a practice setting up the EHR. Therefore, the support content of EHR systems will differ from one healthcare facility to another.

**Understanding the Internet**

Most people know the Internet because of the services they use on it such as e-mail, research, games, and web pages. However, before proceeding further it may be helpful to understand how it works.

Multiple computers can be connected together to exchange data in private networks that can be accessed only by the users in that network. These are called local-area networks (LAN) or wide-area networks (WAN). In a LAN, data flows to and from specific computers using cables in a wired building.

The Internet is a worldwide public network that can be accessed by any computer anywhere. The Internet was created by interconnecting millions of smaller business-, academic-, and government-run networks. It is really a very large network of networks. In a network schematic it is sometimes referred to as a “cloud” because data does not necessarily follow a consistent path.

To understand the difference between a private network and the Internet, let us compare the post office and the phone company. When you make a phone call, the wires and circuits must establish an electrical connection with the phone of the person you are calling before that person’s phone rings and the call can go through. When you write a letter, you address the envelope and deposit it in the mailbox. You do not know how the post office will transport it or what roads the trucks will take, but in the end it is delivered to the address on the envelope.

The Internet Protocol encloses data in packets that have an address on them. The packets are sent through the various networks making up the Internet until they arrive at their address. The sending computer does not have to establish a wired connection with the receiving computer for this to occur.

**Secure Internet Data**

The problem is that the Internet is not secure. The packets of data pass through many computers and networks on their way to their destination. They can be copied, opened, and read by anyone with enough technical savvy.

How do we secure the information so we can use the accessibility of the Internet, but protect the information? As you learned in Chapter 10, encryption is necessary for transmitting EPHI over the Internet. Encryption uses a mathematical algorithm to convert readable data into encoded or scrambled data. The authorized recipient decrypts the message back to its original form using a mathematical key.
Secure transmission of data over the Internet usually relies on either of two methods. These are secured socket layer (SSL) or a virtual private network (VPN). Both of these rely on encrypting the transmission. There are additional secure transmission schemes not covered here.

SSL adds security by encrypting the content of web pages and automatically decrypting it when it is received to display the web page. This prevents anyone intercepting the transmitted packets from making sense of them. SSL, however, is limited to the type of things you can do on a web page. Some providers and organizations want to run software or view records that are on their office network computers from elsewhere. To do this, a VPN may be used.

The VPN uses the Internet to transport packets of data, but it has its own software that encrypts and decrypts the packets between the sending and receiving systems. The VPN also verifies the identity of the person signing on, ensuring access only to those who are permitted to use the system. A VPN is not limited to web pages and may be used to secure the data being transmitted for other application software, such as an electronic health record system.

**Remote EHR Access for the Provider**

As we discussed earlier, providers increasingly want access to their EHR when they are away from the office. Many medical facility networks are configured to allow providers to access their patients’ medical records. This is often referred to as “remote access.” Clinicians connect to their office network and sign on just as they would in the office.

The benefits to the provider and the patient are tremendous. Instead of staying late, the provider can go home, have dinner with the family, relax for a few hours, then sign on to the office computer system and complete any chart reviews or other work that would have previously meant staying late. Additionally, if the clinician receives an emergency call from or about a patient, the patient’s records can be accessed from home, helping the clinician to make better decisions. Figure 11-3 shows Dr. Wenner accessing his EHR from his patio.

![Dr. Wenner accessing his EHR from his patio.](image)
There are several means by which remote access can be accomplished securely, to protect the patient’s EPHI.

The most secure method of connecting is through direct dial. Small offices with only one or two doctors can set up phone lines with special modems that receive a call from the doctor’s home, disconnect, and then redial the number for the home computer. This method prevents unauthorized persons from accessing the system. There are, however, several drawbacks to this method. First, it requires a modem and phone line for every user who needs remote access at the same time as someone else. This is the reason it is not usually used in clinics with more than a few doctors. The other drawback is that the clinicians can only access the EHR from phone numbers that have been preprogrammed for the modem to dial back.

Another means of getting remote access is by using the Internet. This allows the clinician to access the records from anywhere he or she can connect to the Internet. Security for direct access to the office computer on the Internet usually requires a VPN, which was described earlier. A VPN is ideal for medium to large practices because it is not limited by the number of phone lines at the practice. However, running programs over a VPN is usually somewhat slower. A VPN is also complicated to set up and maintain. A medical facility will need to have an IT professional to manage a VPN.

A third method of remote access is provided by the EHR system itself. Some EHR vendors have created special software within their system that allows the clinician to access and interact with the EHR through the Internet via a SSL secured web site. The features vary by vendor, but typically the clinician can retrieve patient records, review and sign charts and lab results, and look at anything else in the patient chart. The clinician in this case is not using the actual EHR software, but a special subset created just for the web. For most clinicians, this level of remote access is sufficient, although there maybe some things that can be done in the office EHR but not on the web. If this method of access is offered by the EHR vendor, its advantage is that it confines the remote access to an isolated web server instead of the facility’s entire network. It therefore represents a lesser risk than a remote sign-on. This feature is equally desirable for smaller practices because it eliminates the need for a dial-back modem or a complicated VPN setup.

**Practicing Medicine Online**

Although the banking, brokerage/investing, and travel industries have made Internet-based transactions readily available to consumers, healthcare as a whole has not. That seems to be changing. An annual Survey of Health Care Consumers, conducted by the Deloitte Center for Health Solutions, found that “65 percent of consumers are interested in home monitoring devices that enable them to check their condition and send the results to their doctor” and “42 percent want access to an online personal health record connected to their doctor’s office. E-visits with physicians, personal health records, self-monitoring devices, personalized physician referrals and customized insurance products are innovations that consumers support. They are willing to try new services, change providers and hospitals and use their money in different ways to obtain better value from the healthcare system. And they are highly receptive
to technology-enabled care that eliminates redundant paperwork, replaces unnecessary tests and saves time and money.”

The leading organization in healthcare informatics, the Health Information Management Systems Society (HIMSS) has formed a Special Interest Group to study e-health, which they define as “The application of Internet and other related technologies in the healthcare industry to improve the access, efficiency, effectiveness, and quality of clinical and business processes utilized by healthcare organizations, practitioners, patients, and consumers to improve the health status of patients.”

Let us now examine several of the ways that providers and patients are using the Internet not only as a research tool, but as a tool for the actual process of patient care.

**Telemedicine**

Telemedicine uses communication technology to deliver medical care to a patient in another location. A consulting health professional studies the patient’s case and offers advice or instructions to the requesting physician or directly to the patient, neither of whom are at the consultant’s location.

Telemedicine can take many forms, ranging from a simple phone call between two doctors to a videoconference. Even examinations or surgical procedures have been conducted remotely.

Telemedicine can be practiced in real time or asynchronously (independent sessions not occurring at the same time). Before the Internet, early pioneers of telemedicine conceived of it terms of the technology of their time, television. They imagined a scenario in which the doctor and patient could see each other on television sets at each end. Satellites that carry television signals would securely transmit the bidirectional video sessions. There were several drawbacks to this approach.

- **Real-time telemedicine requires the presence of all parties at the same time.** When participants are located in different time zones, real-time telemedicine sessions can be difficult to schedule.
- **Television cannot transmit or display at a sufficient resolution for diagnostic images, such as x-rays or CAT scans.**
- **State laws can prohibit treatment of patients by providers licensed in another state.**

A better alternative was developed at Mayo Clinic in Rochester, Minnesota. Rather than trying to get participants on each end into respective television studios, they decided to conduct telemedicine asynchronously. Marvin Mitchell, division chair of Media Support Services at Mayo Clinic, calls this *store-and-forward telemedicine*. It allows a doctor requesting a consult to send case information that is saved and then reviewed and responded to later by a specialist at Mayo.

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If a video conference is an example of real-time telemedicine, voice mail would be a simple analogy of store-and-forward telemedicine. One doctor leaves a message stating the facts of the case; the other doctor listens to the message and then calls back, leaving a detailed response for the original doctor. In practice, however, telemedicine is not that simple.

In Mayo Clinic’s practice, the patient’s physician in a remote location does the necessary examinations and diagnostic tests he or she would normally do. Then the doctor creates an electronic package including high-resolution images, scanned paper documents, motion image capture, angiography, and anything else that the specialist at Mayo might need to review. The information is then transmitted with a consultation request to the Mayo telemedicine office via a secure Internet connection.

The Mayo telemedicine system follows the same workflow as if the patient were at the clinic. When the Mayo Clinic telemedicine office receives the electronic package, the patient is registered and given a Mayo Clinic patient number, then an electronic medical record is created. The diagnostic images from the package are stored in the Mayo PAC system and orders to the radiologist are created. Other records are imported into the EHR.

One of the principal advantages of this workflow is that it is as transparent to the Mayo physicians as possible. Specialists at Mayo see the remote patient’s records in the same system they use everyday. A Mayo radiologist views the diagnostic images, interprets them, and dictates a report. Similarly, other specialties look at the imported EHR data and dictate their second opinion into Mayo’s clinical notes system.

When all the subspecialists’ reports have been completed, a comprehensive second-opinion document is compiled and sent back to the remote physician. That physician can use the second opinion to work up the diagnosis and treatment plan for the patient. In Mayo Clinic’s case, real-time interactions between remote physicians are not necessary.

Although store-and-forward telemedicine works well for consults, it can involve delays when additional information or tests are needed and one must wait for the response to arrive. Also, it is not suitable to remote, robotic, or even guided surgery, all of which must be conducted in real time.

The benefit of telemedicine is that it makes high-level medical expertise available to remote and rural areas. Many communities do not have medical specialists. Even fewer places in the world have subspecialists, or sub-subspecialists who can recognize and treat rare or complex medical problems. Using telemedicine, it is possible for a local physician to get advice from a distant expert and guidance in treating the patient.

**Teleradiology**

One form of telemedicine that is specifically concerned with the transmission of diagnostic images from one location to another is teleradiology. Usually this is for the purpose of having the images “read” by a radiologist at the receiving end. This may be to obtain a second opinion or consult, or because the sending facility does not have sufficient radiologists on staff and has contracted to have radiology
interpretations done by another facility. In the latter case, state laws may require
the radiologist to be licensed by the state from which the images are sent.

Currently, most states require a physician to be licensed by that state to treat
patients in that state. Mayo Clinic’s method of telemedicine solves the problem
of licensure that has hindered telemedicine in the United States. At Mayo, the
telemedicine consultation is physician to physician as a resource for the patient’s
doctor. Because they are not giving advice directly to a patient in another state,
no laws are broken. This method also has the additional advantage of keeping
the patient’s local physician in control of the patient care at all times.

Patient Entry of Symptoms and History

*Contributed by Allen R. Wenner, M.D.*

A day in a medical clinic is a busy stream of patients ranging in age from new-
born to geriatric. Their presenting complaints are as varied as their age range.
Because patients may have a minor illness or a life-threatening condition, it is
very hard to predict exactly how long each patient will take. As a result, the
clinician falls behind schedule. Patients from the morning often spill over into
lunch, which often becomes abbreviated.

In contrast to the hectic pace of the clinicians, time seems to drag for the
patients who are waiting. A major challenge for the staff is keeping the patients
from waiting too long in the waiting room or exam rooms.

In a traditional office, by the time the clinician enters the examination room and
greets the patient, there is still little or no information about the patient except
for vital signs and a few notes from the medical assistant or nurse. The clinician
has to begin by asking why the patient has sought care. After briefly listening
to the patient describe a complaint, the typical clinician interrupts the patient
after 18 seconds to clarify the story, often cutting off the patient’s natural flow
of narration. Clinicians pressed for time need to get to the point quickly.

An experienced physician can make a preliminary assessment a few minutes
into the interview. The bulk of the visit is spent confirming this hypothesis by
querying the patient about symptoms and the history of present illness, by a
review of systems, and then by performing the physical exam. Because of time
pressures or fatigue as the day wears on, the clinician may forget to ask about
vital pieces of data including essential symptoms, family or social history, or
habits such as alcohol or drug use.

With the pressures of patients waiting, after completing the physical exam,
assessment, and writing a prescription, the clinician may not have enough
time to provide patient education. Instead of answering questions about the
treatment and care plan, the clinician relies on a nurse or receptionist to
educate the patient. In the traditional paper office, the clinician leaves the exam
room and goes to a private area to complete the patient’s chart by dictating or
handwriting his or her recollection of the history as told by the patient, any
other relevant data remembered from the encounter and the physical exam,
as well as the diagnosis, prescription, and treatment plan.

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7Courtesy of Primetime Medical Software and Instant Medical History, used by permission.
EHR systems facilitate documentation at the point of care, but only the patient has the information about what symptoms were present at the outset of the illness and what the outcome of medical treatment of those symptoms was. The patient is also typically the source of past medical, family, and social history. The clinician’s time with the patient is spent entering the patient’s symptom into the visit documentation.

In the late 1980s, Allen Wenner, M.D., a physician in Columbia, South Carolina, wondered if history couldn’t be taken by a computer. The medical literature was replete with academic efforts at patient computer dialog, beginning with Warner Slack at Harvard\(^8\) and John Meyne at Mayo Clinic.\(^9\) If the patients entered their own data, it would free up clinical staff and allow more of the physician’s time to be focused directly on the important issues identified by patient. Dr. Wenner confirmed the theories of the academics that given the opportunity to add information to their medical chart while waiting was readily accepted by most patients. Working with his colleagues at Primetime Medical Software, he developed Instant Medical History™, an automated patient data entry component for the EHR. It is available in many commercial EHR systems today.

Dr. Wenner decided that the computer could ask all the necessary questions intelligently if it was given a limited set of initial information. A nurse would start the interview by entering the patient’s age and sex, and selecting the symptoms and organ systems for review. At that point, the computer could pose questions that simulated a live patient interview. The knowledge-based approach of the computer’s artificial intelligence changed the questions based on the patient’s answers, simulating a live clinical interview. The software sought to collect the necessary prerequisite data for the clinical interview.

Another important element of history taking is the depth to which a patient is asked questions. Dr. Wenner found the use of computer interviews improves the quality of the information presented by the patient because it is more complete. For example, an ideal interview about the upper respiratory tract and sinuses should include questions about unusual causes such as psittacosis, an infection acquired from raising birds, query about prevention such as use of tobacco, and consideration of the risk for pregnancy in determining treatment options. The clinician may forget or just not have enough time to ask these questions; the computer will not forget. Because the computer never forgets details, it allows a physician to converse casually with a patient while clarifying the objective information needed to make a confident diagnosis.

In the earliest days of computers, a study at Cornell University had patients answer questions on a punch card that was processed by a computer. The study found that “it collects for appraisal a large and comprehensive body of information about the patient’s medical history at no expenditure of the physician’s time; it facilitates interview by making available to the physician a preliminary survey of the patient’s total medical problems; its data, being systematically arranged, are easier to review than those on conventional medical histories; and, by calling attention to the patient’s symptoms and significant items of


past history, it assures that their investigation will not be overlooked because the physician lacked time to elicit them.”

Because patients want their physicians to arrive at the best diagnosis, Dr. Wenner found they are willing to answer questions. Also, because the physician can review the information entered by the patient, more time is available for explaining the diagnosis and educating the patient; the patient’s time and effort to enter the data are rewarded.

**Workflow Using Patient-Entered Data**

Instant Medical History can be administered on a kiosk or Tablet PC in the waiting room, in a subwaiting area, in the exam room, or at home via the web. Figure 11-4 illustrates one workflow of an office using Instant Medical History. As you will see in Exercise 64, it is also easily administered over the Internet.

![Figure 11-4 Workflow of patient entering his own data.](image)

1. When the patient arrives, a receptionist, nurse, or medical assistant asks the patient to complete a medical history and reason for today’s visit using a computer in a private area of the waiting room.

2. The patient is given access to a kiosk or other computer to enter his or her own history and symptom information using a computer-guided

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questionnaire. The questions are asked one at a time and can dynamically branch to other question sets based on the answers provided by the patient.

The patient completes the questions at his or her own pace and has an opportunity to change answers. Patients can review their histories and are better prepared to interact with the physician.

When the patient has completed the questionnaire, the system alerts the nurse or medical assistant that the patient is ready to move to an exam room. The nurse and patient review the patient-entered symptoms and history together. Where necessary, the nurse edits the record if there is additional information.

The computer organizes the patient-entered information for the provider in a succinct and easy-to-read format that becomes the starting point for the encounter. After review of the data, the nurse or clinician can merge it into the EHR encounter note.

The physician examines the patient and discusses the reason for the visit and reviews with the patient the HPI information now in the chart. Having a complete history in the EHR in advance of the exam provides the clinician with a great deal of useful information to begin making the proper diagnosis and considering appropriate treatment. It also allows the physician to spend less time documenting and more time with patient discussing the effects of the illness on the patient. It also allows the clinician time to discuss the treatment plan with the patient.

Because interview software records subjective information from the patient, the data represents a more complete and accurate reflection of a patient’s complaints than a physician’s dictation after the visit.

After asking a few confirmatory questions, physicians can complete the physical exam, assessment, and plan portions of the encounter note in the examination room while the patient is still present.

The encounter note has been completed at the point of care. As the patient leaves, the patient is given a copy of the encounter note along with any patient education materials or prescriptions.

**Internet Workflow**

Providers and patients soon realized that it was possible to complete the symptom and history interview before the visit by using the Internet. Today many medical practices enable the patient to complete the Instant Medical History questionnaire online before the visit. This saves time during the office visit and allows the patient to give more thought to their answers when completing the interview from the comfort of their home. When the patient arrives for his or her appointment, the data will already be available to the clinician.

**Improved Patient Information**

Data from patient screening is useful for providing pertinent information that allows an immediate diagnosis. Not only does the physician have a reasonable idea of the patient’s problems before any examination begins, but the data are also instantly ready to become part of the medical record.
Eliminating the bulk of transcription and dictation and replacing it with detailed, patient-entered data transforms the encounter from a data-gathering session into an opportunity to concentrate on the most important task at hand: caring for the patient.

The increased efficiency that computer screening allows makes office visits more enjoyable because the physician has more time to explain the diagnosis and educate the patient.

Dr. Wenner and his peers have found most patients willing and eager to answer a computer interview about their reason for the visit. The patient benefits because the time the doctor has saved from having to input the symptoms and history can be focused fully on the patient and used for counseling and education.

When the exam room is configured as shown in Figure 11-5, so that the patient and doctor or nurse can both see the screen, the patient is able to engage in the mutual process of documenting the visit. The patient benefits from this arrangement because when the patient and provider share information, the patient feels a part of the decisions and has a vested interest in following the plan of care.

John Mayne at the Mayo Clinic observed, “If the time physicians spend collecting, organizing, recording, and retrieving data could be reduced, at least in part, by information technology, more time would be available for actual delivery of medical care (and, thus, in effect increase the number of physicians) and at the same time the physician’s capabilities for collecting information from patients would be extended.”

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Guided Exercise 64: Experiencing Patient-Entered HPI

In this exercise you will have an opportunity to experience what we have been discussing, by taking on the role of a patient who is completing his “paperwork” for an upcoming appointment online. You will need access to the Internet for this exercise.

Case Study

Tomas Martiniz is a 24-year-old male who injured his knee when he jumped off a loading dock at work. He has an appointment at the Family Care medical clinic. He is going online to complete his medical questionnaire in advance.
Step 1
Start your web browser program and follow the steps listed inside the cover of this textbook to select a discipline, click on the book cover that matches this *Electronic Health Records* textbook, and log in.

When the welcome page is displayed, click on the link “Activities and Exercises” or select “Activities” from the drop-down list and click on the button labeled “Go.”

Step 2
A menu on the left of the screen will list various activities and exercises. Locate and click on the link *Exercise 64*.

Information about the exercise will be displayed.

Locate and click the link “Click here to start the web portal program.”

Step 3
The sample provider web portal shown in Figure 11-6 will be displayed.

Locate the section of the web page labeled “Already have an appointment?” and click on the link “Medical Questionnaire.”

The interview web page, “Get started preparing for your next doctor’s visit,” will be displayed.

Step 4
Locate and click on the button labeled “Start Interview.”

![Figure 11-7 Student ID and patient information portion of the interview.](image)

Step 5
The center portion of the web page will display the Interview dialog as shown in Figure 11-7.

Enter the following:

Student Name or ID: Enter either your name or student ID as directed by your instructor.
Patient Information:

First Name: **Tomas**

Last Name: **Martiniz**

Click on the circle next to **Male**.

Click on the down arrow buttons in each of the Date of Birth fields and select from the drop-down lists: **October, 7**, and **1987**.

Compare your screen to Figure 11-7. When everything has been entered correctly, locate and click on the button labeled “Next.”

![Figure 11-8 Reason for visit: Knee pain.](image)

**Step 6**

The reason for visit screen will be displayed.

The interview on web page is functionally identical to online questionnaires on the web sites of doctors such as Karen Smith, M.D. (shown in Figure 11-1), and many other forward-thinking doctors.

Locate the free text field (circled in red in Figure 11-8) and type: **Knee pain**.

Compare your screen to Figure 11-8. When you have finished typing, locate and click on the button labeled “Next.”

**Step 7**

The software at the web site will conduct the interview by asking Mr. Martiniz the questions listed in the following table, one question at a time. For each question there will be buttons labeled with various answers to the question. Additional buttons allow you to skip a question or go back to the previous question.

For each question in the following table, locate click on the indicated button. If you make an error, click on the button labeled “Previous Question” and correct your error.
<table>
<thead>
<tr>
<th>Interview Question</th>
<th>Click on the button labeled</th>
</tr>
</thead>
<tbody>
<tr>
<td>What kind of problem are you having with your knee (or knees)?</td>
<td>Pain</td>
</tr>
<tr>
<td>What were you doing when the problem or pain began?</td>
<td>Fell</td>
</tr>
<tr>
<td>How long ago did your knee symptoms begin?</td>
<td>3 to 4 days</td>
</tr>
<tr>
<td>How did your knee symptoms begin?</td>
<td>Suddenly or quickly</td>
</tr>
<tr>
<td>Please select the best answer which most closely describes the pace of your knee problem.</td>
<td>My symptoms seem to be getting better but improvement is slow</td>
</tr>
<tr>
<td>Has your knee symptoms caused you to stop or reduce work, exercise, or other activities?</td>
<td>Yes</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how severe is your knee problems?</td>
<td>5 to 6 moderate</td>
</tr>
<tr>
<td>What time of day does your knee problem occur?</td>
<td>No specific time of day</td>
</tr>
<tr>
<td>Do your knee problems improve with activity?</td>
<td>No</td>
</tr>
<tr>
<td>Are your knee problems made worse by walking, running or other movement?</td>
<td>Yes</td>
</tr>
<tr>
<td>Are your knee problems worse when at rest or not moved?</td>
<td>No</td>
</tr>
<tr>
<td>Does your knee swell?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is your painful knee joint red?</td>
<td>No</td>
</tr>
<tr>
<td>Is the painful knee joint warm?</td>
<td>No</td>
</tr>
<tr>
<td>Is the painful knee joint tender when you touch it?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is the skin of the knee draining or open?</td>
<td>No</td>
</tr>
<tr>
<td>Which best describes where your knee is tender?</td>
<td>On the outside of the knee</td>
</tr>
<tr>
<td>How long have you had knee pain?</td>
<td>1 to 3 days</td>
</tr>
<tr>
<td>Which knee is painful?</td>
<td>Left knee</td>
</tr>
<tr>
<td>Which part of your knee hurts?</td>
<td>The part towards the outside</td>
</tr>
<tr>
<td>Does your painful knee joint creak or make a grating noise when you move it?</td>
<td>No</td>
</tr>
<tr>
<td>Does your painful knee joint lock when it is moved in certain ways?</td>
<td>No</td>
</tr>
<tr>
<td>Does your knee give way?</td>
<td>No</td>
</tr>
<tr>
<td>Are you able to completely bend and extend your knee?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is the skin around your knee red, warm, swollen, tender, or draining fluid?</td>
<td>No</td>
</tr>
<tr>
<td>Have you noticed any lumps under the skin around your knee along with the pain?</td>
<td>No</td>
</tr>
<tr>
<td>Does your knee(s) seem to be enlarged or larger on one or both sides?</td>
<td>Yes</td>
</tr>
<tr>
<td>When do you have knee pain?</td>
<td>Only during activity</td>
</tr>
<tr>
<td>Does your knee pain become worse when climbing up stairs?</td>
<td>Yes</td>
</tr>
<tr>
<td>Does your knee pain become worse when going down stairs?</td>
<td>No</td>
</tr>
<tr>
<td>Is your knee pain worse when you are bearing weight on your legs?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is your knee pain worse when you are kneeling?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is your knee pain worse when you turn or twist on your leg with your foot planted?</td>
<td>Yes</td>
</tr>
<tr>
<td>What happens to your painful knee joint when you are active?</td>
<td>Joint pain become worse during use</td>
</tr>
<tr>
<td>Does your knee pain become worse if you actively move the knee joint (that is if you make the knee joint move as you would during activity but without any stress or pressure on the knee joint)?</td>
<td>No</td>
</tr>
<tr>
<td>Interview Question</td>
<td>Click on the button labeled</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Does your knee pain become worse if you move the knee joint passively (that is if you make the knee joint move by having someone else move it for you)?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever injured the knee joint that is now painful?</td>
<td>Yes</td>
</tr>
<tr>
<td>Have you ever had the knee joint that is now painful immobilized (motionless) for 3 days or more?</td>
<td>No</td>
</tr>
<tr>
<td>Did this episode of knee pain start at the same time as an injury to the knee?</td>
<td>Yes</td>
</tr>
<tr>
<td>Which best describes the way that you injured your knee?</td>
<td>I jumped or fell from a high place</td>
</tr>
<tr>
<td>Which best describes how quickly your knee pain has come on?</td>
<td>Suddenly and worsened quickly over hours</td>
</tr>
<tr>
<td>What time of day does your knee pain occur?</td>
<td>No specific time of day</td>
</tr>
<tr>
<td>How would you describe the pain you usually have in your knee?</td>
<td>Moderate</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain with walking on flat surfaces?</td>
<td>5 to 6 (moderate)</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain with walking up stairs?</td>
<td>7 to 8 (severe)</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain with walking up hills?</td>
<td>Skip this question</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain with walking down stairs?</td>
<td>5 to 6 (moderate)</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain with walking down hills?</td>
<td>Skip this question</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain while running?</td>
<td>Skip this question</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain while kneeling?</td>
<td>9 to 10 (unbearable)</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain sitting with knee straight?</td>
<td>3 to 4 (mild)</td>
</tr>
<tr>
<td>On a scale of 0 (no pain) to 10 (severe), how is your knee pain at night?</td>
<td>3 to 4 (mild)</td>
</tr>
<tr>
<td>Do you have a skin rash?</td>
<td>No</td>
</tr>
<tr>
<td>Have you had any fever in the past 4 weeks?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have discolored blood vessels or varicose veins in your skin?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have tenderness, swelling, redness, or pain anywhere on your leg in addition to around your knee?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have a new hard lump or mass anywhere on your leg?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have pain from your back shooting down your leg?</td>
<td>No</td>
</tr>
<tr>
<td>Have you tried any treatments for your knee problem?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have rheumatoid arthritis?</td>
<td>No</td>
</tr>
<tr>
<td>Do you have osteoarthritis also known as degenerative arthritis?</td>
<td>No</td>
</tr>
<tr>
<td>Has a doctor ever diagnose you as having bursitis?</td>
<td>No</td>
</tr>
<tr>
<td>Has a doctor or other health professional ever told you that you had back problems?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever broken a bone of your lower extremity (thigh, knee, calf, ankle etc.)?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever dislocated a joint of your lower extremity (hip, knee, ankle, foot, etc.)?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever had a problem with phlebitis?</td>
<td>No</td>
</tr>
<tr>
<td>Have you had knee surgery?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever had an injury to your knee ligaments, knee tendons, or knee cartilage problem?</td>
<td>No</td>
</tr>
<tr>
<td>Have you ever had an infection in your knee?</td>
<td>No</td>
</tr>
</tbody>
</table>
Step 8
When you have reached the end of the interview, a free-text note box is displayed to allow the patient to enter additional comments in his or her own words.

Type: “I jumped off a loading dock at work.”
Locate and click on the button labeled “Next.”

Step 9
The final screen of the interview allows you to review your work.

Compare your screen to Figure 11-9 by scrolling the window as necessary. If there are any differences (other than the patient’s age), repeat the exercise, making certain you answer each of the questions in steps 6 and 7 correctly.

Step 10
At the bottom of the interview report screen are two buttons labeled “Print” and “Save.” The Save button will save the report to a file, similar to the Export button you have used in other exercises.

When everything in your report is correct, locate and click on the appropriate button to either print or save to a file, as directed by your instructor. Once you have your printout or file output in hand, close your browser and proceed to Exercise 65.

Critical Thinking Exercise 65: Reviewing Patient-Entered Data

It is important to note that a patient entering medical history either at the doctor’s office or via the Internet is not accessing the actual EHR, but rather a separate application. This protects the security and integrity of the EHR.

Once the data is reviewed by the nurse, the data can be imported or merged directly into the EHR to become part of the encounter note. In this exercise you will take on the role of the nurse, to review the data Mr. Martiniz has entered.

Case Study
Tomas Martiniz is a 24-year-old male who has an appointment May 28, 2012, at 9:00 AM. He has used the Internet to complete his medical questionnaire in advance. The data has been merged into the EHR to initiate the encounter note for his visit.
Chief Complaint
Tomas Martiniz is a 24 year old male. His reason for visit is "Knee Pain".

History of Present Illness
#1. "Knee Pain"

Location
He reported: Left knee joint pain. Tenderness on the outside of the knee. Pain towards the outside of the knee.

Quality
He reported: Knee larger than normal.
He denied: Knee unstable when stressed. Painful knee joint looks in certain positions.
Back pain moves down the leg. Knee joint movement associated with grating noise.
Lumps under the skin. Leg redness, swelling, or tenderness. New lump on leg. He reported: No limitation of range of motion of the knee.

Severity
He reported: Knee pain moderate. Knee pain moderate (5-6/10) walking on flat surfaces and walking down stairs. Knee pain mild (3-4/10) sitting with knee straight and at night. Knee problem slowly improving and moderate (5-6/10). Knee pain severe (7-8/10) walking up stairs. Knee pain unbearable (9-10/10) while kneeling.

Duration
He reported: Knee pain 1 to 3 days. Knee problem 5 to 4 days.

Timing
He reported: Knee pain occurs at no specific time of day. Knee problem started with a fall, started suddenly or quickly, and at no specific time of day. Knee pain began with injury. Knee pain starting suddenly and quickly worsening over hours.

Context
He reported: Knee pain only with movement.
He denied: Previous immobilization of painful knee joint.

Modifying Factors
He reported: Knee pain becomes worse during use. Knee pain worse when climbing stairs, bearing weight, kneeling, and twisting.

Associated Signs and Symptoms
He reported: Knee swells and tender.
He denied: Knee red and warm.

Past, Family, and Social History

Past Medical History

Surgical History
He denied: Knee surgery.

Accidents and Injuries
History of: Previous injury to painful knee joint. Knee injured by jumping from a high place.
He denied: Broken hip or leg. Lower extremity dislocation.

Social History
History of: Treatment for knee problem.

Activities for Daily Living
History of: Knee problem reduced activity.

Review of Systems

Constitutional
He denied: Fever in the last month.

Cardiovascular
He denied: Varicose veins.

Skin
He denied: Knee draining. Rash.

Additional Comments
I jumped off a loading dock at work.

Figure 11-9 Completed interview for Tomas Martiniz.
Step 1
If you have not already done so, start the Student Edition software.
Click Select on the Menu bar, and then click Patient.
In the Patient Selection window, locate and click on Tomas Martiniz as shown in Figure 11-10.

Step 2
Click Select on the Menu bar again, and then click Existing Encounter.
Select 5/28/2012 9:00 AM Office Visit as shown in Figure 11-11.

Step 3
Click on the Print button on the Toolbar at the top of your screen to invoke the Print Data window.
Be certain there is a check mark in the box next to “Current Encounter” and then click on the button labeled “Print and Close,” even if you normally exported a file in previous exercises. You will need a printed copy for the next step.

Step 4
Compare the answers from the interview report you printed in the previous exercise with the encounter note you have just printed. On your printed encounter note identify and draw a circle around any instances where the terminology is different.

If there were any differences, why would the patient’s terminology and the medical nomenclature be different?

When you are finished, give your interview report or output file to your instructor.

Provider-to-Patient E-Mail Communication

The HIPAA Security Rule does not expressly prohibit the use of e-mail for sending electronic protected health information (EPHI). The Security Rule allows for EPHI to be sent over an electronic open network as long as it is adequately protected. However, as you learned in Chapter 10, the security standard for transmission security includes addressable specifications for integrity controls and encryption.

The HIPAA Privacy Rule permits the patient to disclose information to anyone that the patient likes, but the covered entity cannot. This means a patient can e-mail a doctor or medical facility containing any information he or she wants about his or her medical condition, even if the e-mail is not encrypted. However, the clinician has to be very guarded in replying through unencrypted e-mail—that is, neither a copy of the patient’s message should be included nor any specific information revealed. Most importantly, the patient should consider whether he or she should send private health information using unencrypted e-mail.
Although e-mail can be secured by encryption similar to the public/private keys discussed (as part of electronic signatures) in Chapter 10, it becomes unmanageable on the part of the medical practice because encryption keys would have to be kept on file for thousands of patients and the appropriate key used for e-mail from each. The preferred alternative is to use a secure web site for communication between the patient and provider.

**Secure Messaging**

Instead of sending an e-mail message from his or her usual e-mail system, the patient logs on to the clinician’s web site and types the information in an e-mail screen on the web page. The web site handles all the security, protecting the EPHI as required by HIPAA.

Responses to the patient are handled similarly. The patient checks back to the site for messages, or receives a benign message via regular e-mail informing them that there is a reply from the medical office waiting. The patient then logs into the secure site to read the message and, if necessary, writes a reply.

**E-Visits**

Even when using secure messages, clinicians have concerns about the potential for medical liability, the lack of structure in the messages, and the difficulty of keeping the e-mail exchange as part of the patient’s medical record. Also, the doctor does not receive payment for the e-mail exchange.

One solution that enhances the efficiency of providers and improves the accessibility of healthcare for the patients is the E-visit. An E-visit allows the patient to be treated by a clinician for nonurgent health problems without the patient having to come into the office.

An E-visit has all the advantages that e-mail lacks: not only are E-visits secure but the E-visit also gathers symptom and HPI information, creating a documented medical encounter. When the E-visit data is imported into the EHR, it becomes a part of the patient’s chart, just like any other visit.

Equally as important to the clinician, e-visits are reimbursed as a legitimate E&M visit. At the time that this book was published, E-visits were being paid by Blue Cross/Blue Shield™ plans and other private insurance carriers in numerous states. A study by Price-Waterhouse-Coopers predicted that more than 20 percent of all office visits could be replaced by an online equivalent.12

**Workflow of an E-Visit**

The basic workflow of an E-visit begins with patient-entered symptom, history, and history of present illness information. Some E-visit web sites use Instant Medical History to gather HPI data from the patient. Other E-visit web sites use a combination of check boxes and free-text messages, similar to secure messaging discussed earlier. Some E-visit web sites such as one at the Mayo Clinic allow the patient to upload digital photos.

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The workflow begins when a patient accesses his or her physician’s web site and signs on. The patient must already be an established patient with the practice and have medical records on file. E-visits are not generally permitted for a new patient who has never been seen at the practice.

The patient answers a few simple questions and selects the reason for the visit from a list. This allows the software to determine which question sets would be appropriate to ask. The patient also could just enter a free-text complaint.

The patient answers online interview questions related to his or her reported complaint, as shown later in Exercise 66. Answers to certain medically significant questions could cause the software to ask different sets of medically related questions automatically. The patient can add free-text clarification at various points in the interview.

E-visits are only used for nonurgent visits. If the software detects that the condition seems urgent, the patient is advised to seek immediate medical care and the provider is notified. If the software determines that although the condition is not urgent, it is one for which the patient should be seen in person, the patient is given a message to that effect and automatically offered a choice of available appointments.

When the interview is complete, the data entered by the patient is recorded in the EHR and the clinician is notified that an E-visit is ready to review. Even in the event that the patient must come in for the visit, the doctor is better prepared because the symptom and history information is already at hand.

Unlike e-mail, which is directed at a particular individual and therefore not likely to be accessible by another provider, E-visits can be directed to the “doctor on call,” allowing practicing partners to share “E-visit” duty, just like they share other on-call services. Providers usually respond promptly after being notified. A study of E-visits that was done in California found a majority of patients were happy if the provider responded by the next morning. Remember, E-visits are for nonurgent matters.

The clinician reviews the patient-entered data, reviews any relevant patient medical records, and replies to the patient. The system allows the provider and patient to continue to exchange messages, much as a question-and-answer session in the exam room, except for the factor of time, which is sometimes delayed by one or both parties’ responses.

The clinician also can prescribe electronically during the E-visit, just as he or she would during an office visit. When the patient receives the clinician’s reply to the E-visit, that patient is prompted to select a preferred pharmacy from a list (if it is not already known to the EHR) and the prescription is electronically transmitted to the pharmacy by the doctor’s system.

The doctor’s response also can include patient education material and comments or care instructions from the doctor, all of which are recorded in the care plan. The doctor’s practice management system can verify the patient eligibility for the E-visit, and submit the claim electronically.

By Karen Smith, M.D., FAAFP

I practice medicine in Raeford, North Carolina, which is located in the second-most impoverished county in our state. We are close to a military base, so we have a culturally diverse mix of patients, those native to this area as well as people from all over who are stationed here.

After graduating from family medicine residency, my family relocated to Raeford. There were only three doctors in town caring for the whole population. The first two practices I worked at used paper medical records. When I set up my own practice I knew EHR was a necessary tool. That is when I met Dr. Alan Wenner. I went to his lecture symposium titled the “High-Performing Physician.”

We simultaneously implemented both an EHR and a practice management system in place from day one. In 2008, the NCQA introduced the recognition process for the “medical home.” We reviewed the criteria and the requirements for Patient-Centered Medical Home (PCMH) status; we already had most of it. The last component we needed was the virtual health office.

Our practice web site (shown in Figure 11-1) allows patients to register online, request an appointment, complete their Instant Medical History (IMH) symptom assessment before their appointment, review health insurance information, obtain their lab results, access medical information for common medical conditions, and have a virtual office visit with their doctor online.

Instant Medical History is readily accepted by our patients, especially military families. Because of a base realignment of the military, we have 30,000 new military personnel coming into our community and a lot of them already registered online and completed their IMH before they come into the office.

**Workflow of Our Office**

Our patients’ have several ways of contacting us; some call on the telephone and some just walk in. Our preferred first point of contact, however, is our web site. We automate a lot of our pre-visit activity. I have already mentioned they can complete the IMH symptom assessment over the Internet. We also have an automated system that telephones patients to remind them of their appointments. Once the Televox system has confirmed their appointment, one of my staff reviews their chart to see if their immunizations are up to date, if they have a balance due, or need anything else before their visit. In addition, we have now introduced a live operator system via the practice portal and Athena communicator, which is a very important combination of the web with a person who is familiar with the office systems.

When a patient shows up, existing demographic information is verified as that person is checked in on the computer. Once the patient is checked into the system, the nurse is automatically notified on her computer that the patient is checked in. She then goes to the lobby and gets the patient. She takes the patient’s vital signs and then brings the patient into the exam room. There she starts her nursing intake. She will start the Instant Medical History and then leave the patient in the room to do his or her own entry, unless the person did the entry from home via our web site before coming. About 15 percent of our patients do it in advance.

If the patient did it at home, the nurse would extract it and bring it into the HPI section of the note. If the patient does it in the office, the nurse will return when that person is finished and then paste it into the note. In either case, when that is done I will see a color change on my computer and know that the patient is ready for me.

I go into the exam room and log on to the EHR. I have computers in every exam room, so I do not have to carry anything around. I have the patient elaborate a little more on the purpose of the visit. I perform the exam and go over any issues the patient may have. Then I sit down with that person so that we are both on the same level and can both see the computer screen. The computer is positioned where we can both see it at the same time and yet I can maintain eye-to-eye contact. My exam room computers are set up the way Dr. Wenner recommends (as shown in Figure 11-5) and it works well.

Many of my patients have hypertension or hyperlipidemia. By sharing the screen, the patient can actually see the objective information: “Here is your cholesterol and what you have been doing is working well.” To get the patient to be compliant with the treatment plan, we put it in together. I am literally entering the orders in front of the patient as a way of emphasizing “I am putting this in the way we mutually agreed.” When I have everything ordered, I look at the patient and ask, “Did we cover everything today, or is there anything else we need to take care of?” When the person answers no, then I close the encounter note. I stand up and we walk out the room together.
All of our office systems are interfaced. For example, if I had ordered labs when I wrote the order, the lab system automatically printed the labels and if an ABN (advanced beneficiary notice) is necessary, it printed out as well. Many times I will walk the patient to the lab and the phlebotomist already has the tubes ready. Because I use a bidirectional interface, the lab orders have already gone to the lab company.

When the patient is finished, he or she is taken to the front desk where my instructions to the patient, follow-up visit information, and a summary of today’s visit is already prepared—all of this from the click of a button on the exam room computer. By the time the patient gets to the front desk to check out, he or she already has an appointment card ready for the next appointment, the billing information for the claim has gone into the billing system, the charges have been posted, the patient due has been calculated and ready for the front desk to collect balance due, including any deductible that has not been met.

Even after the patient goes home, if he or she has a question about treatment, medication, or just forgot to ask something, the patient can go online to our web site and send me a secure message.

Virtual Office Visits

We also offer patients the ability to use our web portal to have their office visit online instead of coming into the office. What we had to do was make it clear to the patient that “using the virtual office means the doctor is going to see and take care of your problems online; you do not need to physically present to the office.” Our virtual office visit uses an interview question format similar to the IMH symptom assessment.

- The patient logs in and chooses Virtual Office Visit. The normal E-visit workflow is to collect the payment on the web site at the time of service; however, we initially had an issue with the electronic payment process to be resolved.

- The patient confirms personal information and answers the health questions specific to the topic of the consultation, which normally takes about five minutes.

- Upon completion of their Virtual Office Visit, the system sends me a message.

- I log on and review the visit. I can see everything that the patient put in. I then create the response. I can reply with any further questions, but in most cases the online interview has gathered sufficient data. I also have access to my patient’s medical history in the EHR. If I put in a prescription, it is sent to the pharmacy and adds information to the patient message that this is the patient’s medication and the name of the drug store where it has been sent. Alternatively, I can say that the patient needs to come into the office in person.

- The patient then receives an e-mail notification from us. The confidential e-mail message does not disclose any information about the nature of the visit to our site. It simply asks the patient to return to our site for more information.

- Upon revisiting our site, the patient logs in and views the message from the physician. This message contains the treatment plan or a request for additional information. If the treatment plan involves prescription medications, the patient is given the pharmacy information.

In most cases, that completes the E-visit because these are very specific conditions and treatments that can be done this way. Also, because these are my patients, I know what their health conditions are. I usually do not have to ask patients for further information and can close out the E-visit.

The utility of the E-visit occurring is very useful for our group. We promote the use of our web site everywhere, including our practice policies and patient care information sheets, but using the web portal and virtual office visits has been a learning curve in our community. I think in part this is because of the impoverishment in our county; only 30 percent of the households have Internet access within the home. I have noticed our military patients and their families use E-visits more than my other patients, but the Army has given the families computers and Internet access, so that may be a factor.
Mayo Clinic Study of E-visits

The largest study of Internet use for online care (E-visits) using a structured history was conducted in the Department of Family Medicine at Mayo Clinic in Rochester, Minnesota. Here are excerpts from the study.14

“Patients in the department preregistered for the service and then were able to use the online portal for consultations with their primary care providers.

“After completing (data entry for) the e-visit, the patients received an e-mail stating that their clinician would review their consultation within 24 hours. Another e-mail was forwarded to the clinician informing him or her of an e-visit waiting in the secure portal. “The portal allowed the clinician to use templated encounter forms for many common illnesses so that information such as diagnostic codes, links to patient education, and treatment plans could be stored and reused. This standardization of treatment greatly speeded the process of reviewing an online visit. Medications were often prescribed during the process and faxed to the pharmacy. At the conclusion of the online visit, patients received an e-mail stating that the results of their encounter could be found on the portal. Patients would then log in and view the materials.

“Generally, online consultations were completed by clinicians within 24 hours of the e-visit submission; only 11 were not completed. E-visits were completed by the patient’s primary provider 89% of the time; 11% of the consultations were provided by an on-call clinician for absent providers or if the patient selected ‘first available doctor.’

“Because patients could enter any symptom or concern, ask questions, and add additional comments, the e-visits eliminated the need for clinicians to ask for further information in most instances. This was because the patient’s history was organized and pertinent information including all medications, allergies, and vital signs such as weight were always obtained. The volume of exchanges could be decreased further by emphasizing the need to send pictures of rashes. . . .

“Some consultations for patients with chronic disease seemed to show promise. Patients with diabetes mellitus first had laboratory tests and then were asked to complete an online visit regarding their diabetes. If all was well according to the interview and laboratory results, the patients did not need to visit the office. Hypertension was also managed online; patients sent in their blood pressure responses and clinicians managed their medications and laboratory studies online.

“During the 2-year study, 4,282 patients were registered for the service. Patients made 2,531 online visits, and billings were made for 1,159 patients. E-visits were made primarily by working-aged women who completed e-visits for themselves, their dependents, and their older parents during office hours and involved 294 different conditions. Two percent of the visits included uploaded photographs, and 16% of the e-visits replaced nonbillable telephone protocols with billable

14Steven C. Adamson, MD, and John W. Bachman, MD, Pilot Study of Providing Online Care in a Primary Care Setting (Rochester, MN: Department of Family Medicine, Mayo Clinic, 2010).
encounters. The e-visits made office visits unnecessary in 40% of cases; in 12.8% of cases, the patient was asked to schedule an appointment for a face-to-face encounter.

“The study showed the feasibility of online visits to educate, treat, and bill patients. The extent of conditions possible for treatment by online care was far ranging and was managed with a minimum of message exchanges by using structured histories.”

**California Study**

In an independent study sponsored by Blue Shield of California, most patients and doctors in the study preferred a web visit to an office visit for nonurgent medical needs. Providers found that the E-visit gathered the important details and eliminated multiple messages back and forth that occur when trying to provide patient care via e-mail. The patients found that the time spent scheduling, driving, parking, and waiting was saved with an E-visit.\(^\text{15}\)

**Guided Exercise 66: Patient Requests an E-Visit**

**Case Study**

Jacob Silverstein is a 46-year-old male with a history of hypertension and diabetes. He is on medication and has regular check-ups at his family practice. He has an issue with his medication and is going to try an online E-visit instead of coming to the office.

**Step 1**

Start your web browser program and follow the steps listed inside the cover of this textbook to select a discipline, click on the book cover that matches this *Electronic Health Records* textbook, and log in.

When the welcome page is displayed, click on the link “Activities and Exercises” or select “Activities” from the drop-down list and click on the button labeled “Go.”

**Step 2**

A menu on the left of the screen will list various activities and exercises. Locate and click on the link **Exercise 66**.

Information about the exercise will be displayed.

Locate and click the link “Click here to start the web portal program.”

**Step 3**

The sample provider web page shown in Figure 11-6 will be displayed.

Locate the section labeled “E-visits for Established Patients” and click on the link “E-visit.”

Step 4

The “Welcome to Family Care E-visit” web page is displayed. It includes simulated payment information as shown at the top of Figure 11-12. A key difference between an E-visit and a pre-visit questionnaire is that providers collect a copay at the time of the E-visit. It is not necessary to collect the copay on the pre-visit questionnaire page as the patient will be coming into the office, where the payment will be collected.

This is a student exercise; you will not be charged. Do not enter any personal credit card data; simply complete the student ID and patient information fields shown below.

Locate and click on the button labeled “Start Interview.” The center portion of your web page will look similar to Figure 11-12.

Step 5

Enter the following:

Enter your name or student ID as you have in the previous exercise.

Enter the follow information about the patient:

First Name: Jacob
Last Name: Silverstein
Click the circle next to Male
Click on the down arrow buttons in each of the Date of Birth fields and select from the drop-down lists: April, 4, and 1966.

Compare your screen to Figure 11-12. When everything has been entered correctly, locate and click on the button labeled “Next.”

**Enter the Reason for Your Visit**

Please select the reason for your visit from the list below.

- Abdominal or Stomach Pain
- Adult Routine Medical Exam
- Back Pain
- Chest Pain
- Child Medical Exam
- Cough

OR enter the reason for your visit.

(e.g., cough, headache, chest pain, depression) Help

**Figure 11-13 Reason for visit “Cough” selected from list.**

**Step 6**

The Reason for Visit screen will be displayed.

Locate and click on “Cough” in the list of reasons as shown in Figure 11-13.

Locate and click on the button labeled “Next.”

**Step 7**

The interview process will start. For each question in the table below, locate and click on the indicated button. If you make an error, click on the button labeled “Previous Question,” and correct your error.

<table>
<thead>
<tr>
<th>Interview Question</th>
<th>Click on the following buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have a cough?</td>
<td>Yes</td>
</tr>
<tr>
<td>How long have you had a cough?</td>
<td>16 - 20 days</td>
</tr>
<tr>
<td>Have you had a cold, flu, or cough within the last month that seemed to improve and then worsen?</td>
<td>No</td>
</tr>
<tr>
<td>Do you cough all day long?</td>
<td>Yes</td>
</tr>
<tr>
<td>Does your cough sometimes wake you up at night?</td>
<td>No</td>
</tr>
<tr>
<td>Does your cough seem to occur in spasms or episodes of multiple coughs?</td>
<td>No</td>
</tr>
<tr>
<td>When you cough, are you bringing up any sputum or phlegm from deep in your chest other than a small amount early in the morning?</td>
<td>No</td>
</tr>
</tbody>
</table>

(continued)
Step 8
When you have reached the end of the interview, a free-text note box is displayed to allow the patient to enter messages in their own words. Leave the box empty.

Locate and click on the button labeled “Next.”

Step 9
The final screen of the interview allows you to review your work.

Compare your screen to Figure 11-14 by scrolling the window as necessary. If there are any differences (other than the patient’s age), repeat the exercise, making certain you answer each of the questions in steps 6 through 8 correctly.

Step 10
At the bottom of the Interview Report screen are two buttons labeled “Print” and “Save.”

When everything in your report is correct, locate and click on the appropriate button to either print or save to a file, as directed by your instructor. Once you have your print out or file output in hand, close your browser and proceed to Exercise 67.
**Chief Complaint**

Jacob Silverstein is a 44-year-old male. His reason for visit is "Cough".

**History of Present Illness**

1. "Cough"

**Severity**

He reported: Cough continuously throughout the day.

**Duration**

He reported: Cough 16 to 20 days.

**Timing**

He denied: Nocturnal cough. Seasonal cough.

**Context**

He reported: Cough nonproductive. Cough started after any medication change. He denied: Cough seems to occur in spasms or episodes, stopping in between. Deep breathing causes chest pain.

**Modifying Factors**

He denied: Cough after exercise. Cough worse lying down.

**Associated Signs and Symptoms**

He denied: Wheezing. Shortness of breath. Recent cold improved then worsened.

**Past, Family, and Social History**

**Past Medical History**

He denied: Pneumonia.

**Social History**

He denied: Cough associated with history of exposure to birds.

**Tobacco Use**

He reported: Never used tobacco.

**Review of Systems**

**Constitutional**

He denied: Cough associated with fever. Night sweats.

**Ear, Nose, and Throat**

He denied: Nasal drainage. Hoarseness.

Figure 11-14 Completed interview for E-visit.

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**Guided Exercise 67: Clinician Completes the E-Visit**

**Step 1**

If you have not already done so, start the Student Edition software.

Click Select on the Menu bar, and then click Patient.

In the Patient Selection window, locate and click on Jacob Silverstein as shown in Figure 11-15.

Figure 11-15 Select patient Jacob Silverstein.
Step 2

Click Select on the Menu bar again, and then click **Existing Encounter**.

Select 5/29/2012 7:30 PM e-Visit as shown in Figure 11-16.

The encounter note containing the patient-entered data from the E-visit will be displayed.

Step 3

When the encounter is displayed, locate and click on the Manage tab at the bottom of your screen. Review the HPI data supplied by the patient displayed in the right pane and then locate and click on the tab labeled “Medications” in the left pane. Compare your screen to Figure 11-17. Review Mr. Silverstein's prescription history. Note that a new drug was prescribed on 5/11/2012.
Step 4
Locate and click on the tab labeled “Problem List” and then click on “Hypertension” to highlight it, as shown in Figure 11-18.

Locate and click on the Flowsheet button on the Toolbar at the top of your screen (highlighted orange in Figure 11-19).

Step 5
Scroll the Flowsheet downward until your screen looks like Figure 11-19. Locate and click on the red button for the Assessment:

- (red button) Hypertension

Locate the Medications, Vaccines section near the bottom of the Flowsheet. Click on the description “Ordered Lisinopril” (circled in Figure 11-19). The entire row will become highlighted. Do not click the red or blue buttons.
Figure 11-20 Select “discontinue” from the Prefix drop-down list.

Step 6

Locate and click on the down arrow in the Entry Details “Prefix” field. Select “discontinue” from the drop-down list.

Figure 11-21 Dx: Adverse effect of drug therapy.
Locate and click on the Flowsheet button on the Toolbar to close the Flowsheet.

Locate and click on the Encounter tab at the bottom of your screen.

**Step 7**

Click on the Dx tab in the left pane.

Locate and click on the Search button on the Toolbar at the top of your screen. When the search dialog window is displayed, type "adverse," and then click on the button in the dialog window labeled “Search.” Compare your results to the left pane of Figure 11-21.

Locate and click on the red button for the following finding:

- (red button) Adverse effect of drug therapy

**Step 8**

Click on the Rx tab in the left pane.

Locate and click on the Search button on the Toolbar at the top of your screen. When the search dialog window is displayed, type “Amlodipine,” and then click on the button in the dialog window labeled “Search.” Compare your results in the left pane of your screen to Figure 11-22.

Highlight the finding “Calcium Channel Blockers Amlodipine Maleate,” and then click the Rx button on the Toolbar at the top of your screen. This will invoke the Rx Writer.

**Step 9**

Select the dosage “10 milligram tab,” as shown in Figure 11-23, and then double-click on it.

**Step 10**

The Rx Brand window will be displayed (not shown). There is only one brand, “Amvaz”; double-click on it.
Step 11
The Rx Writer will display the selected dosage and manufacturer. Complete the prescription by entering the remaining information in the following fields:

Quantity: 1
Freq: daily
Per Day: 1
Route: by mouth
Days: 30
Amount: 30
Refills: 3
Generic: Y

Compare your screen to Figure 11-24. When everything is correct, locate and click the button labeled “Save Rx.”

Do not close or exit the Encounter until you have a printed copy in your hand. You will lose your work if you exit before printing.
Step 12

Click on the Print button on the Toolbar at the top of your screen to invoke the Print Data window.

Be certain there is a check mark in the box next to “Current Encounter” and then click on the appropriate button to either print or export a file, as directed by your instructor.

Compare your printout or file output to Figure 11-25. If it is correct, hand it in to your instructor. If there are any differences, review the previous steps in the exercise and find your error.

Patient Access to Electronic Health Records

Although HIPAA guaranteed a patient’s right to obtain copies of their health record, the HITECH Act went further. As we discussed in Chapter 1, CMS “meaningful use” criteria for EHR incentives included:

◆ Providing patients with timely electronic access to their health information (including lab results, problem list, medication lists, allergies, and so on) within 96 hours of the information being available to the provider.

◆ Providing patients with an electronic copy of their health information upon request.

◆ Providing inpatients with an electronic copy of their discharge instructions and procedures at time of discharge, upon request.

◆ Sending reminders to patients per patient preference for preventive/follow-up care.

The Agency for Healthcare Research and Quality (AHRQ) created the Hospital Consumer Assessment Healthcare Providers and Systems (HCAHPS) as a standardized survey instrument and data collection methodology for measuring patients’ perspectives on care. In 2008 AHRQ reported that patients in the HCAHPS survey indicated that they preferred to go online to access records, results, and scheduling.16

The number of medical offices with interactive web sites is growing. Practice web sites provide a secure means of communication, as demonstrated in the earlier exercises. In addition, practice web sites allow the patient to request an appointment time or a prescription renewal, and provide secure access to results of recent lab tests and other information in the patient record.

Among primary care clinicians, much of this change is being fueled by the implementation of the Patient-Centered Medical Home.

The Patient-Centered Medical Home

“The Patient-Centered Medical Home (PCMH) is an approach to providing comprehensive primary care for children, youth and adults. The PCMH is

16Richard Grehalva, eHealth Patterns in the 21st Century (Birmingham, AL: MEDSEEK, 2010).
a healthcare setting that facilitates partnerships between individual patients, and their personal physicians, and when appropriate, the patient’s family.”

Practices qualify for PCMH status by meeting the Physicians Practice Connections Patient-Centered Medical Home criteria, developed and owned by the National Committee for Quality Assurance (NCQA). There are three levels of recognition, with the higher levels achieved by increased use of electronic communication and web portals. The nine PCMH standards are:

1. **Access and Communication**—processes for scheduling appointments, communicating with patients, and data showing that the practice meets this standard.

2. **Patient Tracking and Registry Functions**—organizes patient-population data using an electronic system that includes searchable patient clinical information used to manage patient care. The practice applies electronic or paper-based charting tools to organize and document clinical information consistently using standard data fields and uses the system to identify the following:
   - Most frequently seen diagnoses
   - Most important risk factors
   - Three clinically important conditions

   The practice uses electronic information to generate patient lists and remind patients or clinicians about necessary services, such as specific medications or tests, preventive services, pre-visit planning and follow-up visits.

3. **Care Management**—implement evidence-based guidelines for the three identified clinically important conditions, use guideline-based reminders to prompt physicians about a patient’s preventive care needs at the time of the patient’s visit. Maintain a team approach to managing patient care, use various components of care management for patients with one or more of the clinically important conditions and coordinate care with external organizations and other physicians.

4. **Patient Self-Management Support**—establish a system to identify patients with unique communication needs and facilitate self-management of care for patients with one of the three clinically important conditions.

5. **Electronic Prescribing**—eliminate handwritten prescriptions, use drug safety alerts when prescribing, and improve efficiency by using cost (drug formulary) information when prescribing.

6. **Test Tracking**—order and view lab test and imaging results electronically, with electronic alerts; manage the timely receipt of information on all tests and results.

7. **Referral Tracking**—coordination of care and following through critical consultations with other practitioners.

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8. Performance Reporting and Improvement—measures or receives performance data by physician or across the practice and reports on:

◆ Clinical process
◆ Clinical outcomes
◆ Service data
◆ Patient safety

Collects data on patient experience with, and reports on:

◆ Access to care
◆ Quality of physician communication
◆ Patient/family confidence in self-care
◆ Patient/family satisfaction with care

Uses performance data to set goals based on measurement results and, where necessary, act to improve performance. Produces reports using nationally approved clinical measures and electronically transmits them to external entities.

9. Advanced Electronic Communication—maximizes electronic communication with patients via the web to support patient access and self-management. Sends patients e-mail about specific needs and clinical alerts. Uses electronic communication among the care management team for patients with one of the three identified clinically important conditions.

The Personal Health Record

As we discussed in Chapter 1, even with growing adoption of EHR in many medical facilities, connectivity between the EHR systems of those entities is often lacking. Although the ONC strategies may eventually address this, there is one entity central to the record who can bring records from multiple sources together—that is the patient. The patient is also the person most likely to recognize discrepancies or differences in records from different providers.

Online services independent of any one medical group have sprung up to offer patients the ability to maintain their own medical records online. This is called a Personal Health Record (PHR). The ONC strategies discussed in Chapter 1 encourage the use of PHR.

A PHR is an online service that allows patients to log on to a secure web site, and to create and update their records. Patients control who has rights to access the information and can add or remove permission for clinicians they might visit to view the online record.

The clinicians, of course, retain their own records, but the doctor’s EHR typically contains only the information gathered at that office. The record maintained online by a patient can contain data from patient visits at multiple practices. Another advantage of the online PHR is that it is available everywhere. Whether a patient is traveling and needs medical care, or is just being treated at a different medical practice, patients can retrieve their own records using the Internet and share them with the provider.
Early attempts to develop secure PHR solutions sometimes included stand-alone computer programs or flash drives that contained copies of the patient’s records. The problem with these solutions is that if patients need urgent care and do not have their computer or flash drive with them, then they do not have access to their PHR. The trend for most PHR systems today is to provide the PHR as an Internet service, making it almost universally available.

Kaiser-Permanente, one of the largest healthcare providers in the United States, has implemented what is perhaps the largest PHR to date. Their comprehensive web site securely connects more than 8.6 million members to a personal health record that includes timely access to lab results, medication information, summaries of their health conditions, and other important health information. Using the web site, Kaiser-Permanente patients can securely communicate with their physicians, nurses, and pharmacists, perhaps avoiding the need to make a trip to the clinic in person. The web site also provides access to the up-to-date medical knowledge and patient education information.

As Kaiser-Permanente has shown, the PHR can be more than just a repository of patient records. Sophisticated PHR services can present the patient with preventive health alerts, reminders to renew prescriptions, and links to evidence-based articles related to PHR data that can help the patient better manage their own health.

There are numerous organizations developing and sponsoring web-based PHR. While there may be differences between their offerings, there are some fundamental basics patients should look for in every PHR.

- Data is secure and private
- Data is managed by the patient
- Patient controls who can have access
- Universally accessible via the Internet
- PHR contains information for one’s lifetime
- Patient can see who entered each data record and when
- (And ideally) the PHR should be able to exchange data with provider systems

Critical Thinking Exercise 68: Researching the PHR

You will need access to the Internet to complete this exercise.

Step 1
Start your web browser.

Listed below are six PHR web sites. Additionally, your local hospital, health insurance plan, or certain government programs may also offer PHR that you may use for this exercise. Select at least two sites to use for your will research.

www.google.com/health  www.myphr.com
www.healthvault.com  www.mymediconnect.net
www.ihealthrecord.org  www.webmd.com/phr
Step 2
Type the URL of your first choice in the address field of your web browser.

When the web site is displayed, read the information provided about that organization’s PHR. Many of the sites offer a demonstration version, if one is available click on it.

Take notes or print pages of the web site. You will use these in step 4.

Step 3
Type the second URL you have chosen in the address field of your web browser. Study the information presented on the second site, taking notes or printing pages as you did in step 2.

Step 4
Write a comparative analysis of the web sites you have visited. Include the following information in your report:

What entity owns or operates the PHR web site?
Is the owner a nonprofit or for-profit corporation?
Compare the features offered by the two PHR.
Were there any significant advantages of one over the other?
Compare the two PHR for ease of use.

When you have finished, give your completed report to your instructor.

Chapter Eleven Summary

The Internet is one of the key technologies impacting healthcare. It not only facilitates remote access for the clinician, but gives the provider instant access to medical research and medical libraries for decision support.

Patients research their conditions using the Internet and bring the information with them to their office visits. Patients are also sending e-mail to their doctors asking medical questions about their conditions. However, the Internet is really a large network of networked computers, which is sometimes referred to as a “cloud.” EPHI, which is sent over the Internet, needs to be secured.

Remote provider access to the EHR via the Internet usually involves setting up a VPN or using SSL encryption. Telemedicine provides specialist consultation to patients in remote locations. Similarly, teleradiology allows a radiologist to interpret diagnostic images from another location.

Providers are setting up secure web sites, where patients can see their medical information and consult with their doctor using secure messaging. One feature of these web sites is the ability for patients to use the Internet to enter information about their history and symptoms before arriving at a scheduled appointment.
Numerous studies have shown that patient data can become a significant contributor to the EHR, for some of the following reasons:

- Only the patient has the information about what symptoms were present at the outset of the illness.
- Only the patient knows the outcome of medical treatment of those symptoms.
- The patient is also the source of past medical, family, and social history.
- Patient-entered data is a more accurate reflection of a patient’s complaints.
- Patients who can review their histories are better prepared for the visit.
- Up to 67% of the nurse or clinician’s time with the patient is spent entering the patient’s symptom into the visit documentation.
- A computer can be used by the patient over the Internet or in the waiting room to enter the same symptom and history information that the nurse or clinician would have entered.
- Patient-entered data is organized by the computer for the provider in a succinct and easy-to-read format that becomes the starting point for the encounter.
- Having a complete history in advance of the visit allows the clinician to ask fewer questions about the diagnosis and concentrate more on the effects of the illness on the patient. It also allows the clinician more time to discuss the treatment plan with the patient.

Other features found on practice web sites allow patients to request an appointment time or a prescription renewal, provide secure access to information from their medical record and securely communicate with their doctor. However, even using secure messaging, merging the e-mail threads into patients’ EHR or filing an insurance claim for e-mail consults would be a challenge. A preferred alternative is the E-visit, which allows patients to be treated by their regular physician for nonurgent health problems without having to come into the office.

The E-visit gathers symptom and HPI information and creates a documented encounter. It can be integrated into the EHR to become part of patients’ chart, and, equally important to the clinician, E-visits are reimbursed as a legitimate E&M visit in some states.

A Patient-Centered Medical Home is a model for providing primary care. PCMH standards encourage electronic orders, results, and communication with patients.

PHR, or Personal Health Records, enable patients to better manage their health by maintaining their own electronic copies of their health records. The PHR is secure, private, owned, and managed by the patient; patients control who can access their records. The most popular type of PHR is universally accessible by the Internet and many are able to exchange data with a provider’s EHR system.
Testing Your Knowledge of Chapter 11

1. Name the two methods of securing information sent over the Internet described in this chapter.

2. List three examples of changes in healthcare related to the Internet.

3. What percentage of a clinician’s time is spent entering patient symptoms and history into the chart?

4. What is an E-visit?

5. Name three criteria required to qualify for Patient-Centered Medical Home status.

6. Where was the largest study of using the internet for E-visits conducted?

7. Describe the differences between provider-to-patient e-mail and E-visits.

8. What were the two types of telemedicine described in this chapter?

9. What does HIPAA require when sending EPHI by e-mail?

10. Name two of the CMS criteria for EHR incentives related to patients’ access of their health records.

11. What is a PHR?

12. Who controls access to the PHR?

13. Give three examples of decision support information available via the web.

14. Does the Internet function more like the telephone or the post office? Explain your answer.

15. You should have produced two Internet research documents, one printed encounter note, one printed interview report, and a report comparing PHR. If you have not already done so, give these to your instructor.