Looking Ahead—
The Future of Health Information and Informatics

At the end of this chapter, the student should be able to:

10.1 Compare information management to health informatics.

10.2 Discuss barriers to the adoption of electronic health records.

10.3 Describe three emerging technologies or models that are improving the care of patients through information technology.

10.4 Illustrate three mobile devices that will make the collection and sharing of health information more timely and efficient.

10.5 Describe how virtual private networks (VPNs) are advancing the use of EHRs.

Key Terms

Decryption
Encryption
Evidence-based medicine
Firewall
Health Information Management
Health informatics
Local area network (LAN)
Patient-Centered Medical Home (PCMH)
Patient portal
Personal digital assistant (PDA)

Personal health record (PHR)
Picture Archiving and Communications Systems (PACS)
Smart Phone
Tablet computer
Telemedicine
Telehealth
Virtual private network (VPN)
Wide area network (WAN)
Wi-Fi
The Big Picture

What You Need to Know and Why You Need to Know It

Technology is part of the healthcare world, whether you are a clinician or hold an administrative role. It was mentioned in Chapter 1 that healthcare as a whole has been reluctant to embrace the digital age. That is not so when it comes to computerization of medical technology such as diagnostic and treatment procedures, however. Newer technologies are less invasive, require shorter recovery time, require less (or no) hospitalization, and are safer overall than previous procedures. Though we are far ahead in the use of medical technology for diagnostic and treatment purposes, we lag far behind other industries where computerization of information is concerned. In this final chapter we will explore some of the more common methods to access electronic records and will discuss newer (at least to healthcare) technologies that are in limited use, but gaining in momentum. As a healthcare professional, it is imperative that you stay abreast of emerging technologies. Even if you do not initially hold a position where you are involved in selection or implementation, you will definitely use technology in all of the positions you will hold throughout your career. And, since you have chosen healthcare as a profession, you have also chosen to become a lifelong learner—do not get too comfortable with how something is done today, as it will surely change in the blink of an eye!

10.1 Health Information versus Health Informatics

The American Health Information Management Association (AHIMA) Committee on Professional Development defined Health Information Management as follows:

Health Information Management improves the quality of healthcare by ensuring that the best information is available to make any healthcare decision. Health information management professionals manage healthcare data and information resources. The profession encompasses services in planning, collecting, aggregating, analyzing, and disseminating individual patient and aggregate clinical data. It serves the following healthcare stakeholders: patient care organizations, payers, research and policy agencies, and other healthcare-related industries.1

Where health information management pertains to both paper and automated capture, retrieval, storage and use of health information, health informatics is the management of automated health information in particular. Health information professionals whose work is geared more toward informatics focus on

structure of data, interoperability, design of input and output tools, security controls, development of data dictionaries, workflow configuration in an automated environment, and classification systems and terminologies used in a computerized healthcare system.

In short, health informatics is the technological side of managing health information—the design, development, structure, implementation, integration, and management of the technical aspects of electronic record-keeping. HIM professionals have historically ensured accurate, complete, readily available health information for use by care providers, administrators, researchers, public health officials, and insurers. Their focus is the content of the record, as well as integration of systems, and the ability to share electronic information. They manage health information regardless of the media on which it is kept. The HIM professional and the IT professional within a facility have always worked very closely together to ensure that standards are met and information is available, yet private and secure. In health informatics there is a melding of the two disciplines—IT expertise with HIM expertise, and this may be one and the same person in many cases.

For years, Health Information Management programs at all levels have included coursework in information-related software as well as electronic record-keeping in their curriculums, and now colleges and universities have begun including in-depth coverage of the electronic health record in their medical assisting, medical billing and coding, medical office management, and healthcare administration programs as well.

In a physician’s office, as well as other outpatient facilities, there may not be degreed health information professionals per se, but there is an individual within the facility who should know the requirements of a legal electronic health record, documentation requirements, and privacy and security regulations. Vendors also have support staff who are active participants in the installation and training of a PM or EHR system. They advise practices on using the software efficiently and effectively to ensure security and privacy of the information collected, and to ensure that documentation requirements are being met. If the practice does not have a full- or part-time technology position staffed, the office will contract with either a consultant or the vendor’s team.

**Check Your Understanding**

1. Between health information management and health informatics, which discipline is most closely associated with IT and which with information itself?

2. How could a practice management software vendor assist an office or facility that does not have a degreed HIM professional on staff?
In Chapter 1, resistance to an electronic system was discussed. But this subject is worth revisiting before discussing even newer technologies that, though in use, are still the exception rather than the rule.

For years, care providers have been documenting the health records of patients by writing orders, progress notes, and chart notes, or by dictating History & Physicals (H&Ps), discharge summaries, operative reports, consultation reports, and correspondence. They are used to it; it is the way it has always been done. Providers know that if a laboratory test result is needed during a patient’s visit, they need only flip to the laboratory tab of the patient’s folder and it will be there (well, hopefully it will be). Paper and folders are inexpensive, relatively speaking. If it was impossible to complete the record at the time the patient was seen, the record would be sent to the health information department for completion at a later time, or if a patient was seen in the office and the provider needed to dictate the chart note, it was easy enough to take the record back to her private office to complete later. Many care providers see this paper system as being easier, and it may seem more efficient; however, the quality of documentation that is written or dictated days (or even weeks) after the care was provided is questionable, paper records are often illegible if they are handwritten, and if dictation and transcription are used there is lag time before the typed report is filed in the record. Additionally, from a security perspective, a paper record can easily be picked up by someone with no need to have or see it and, if a paper record gets lost, hours of staff time can be spent searching for it.

Implementing and maintaining an electronic record is expensive, that is true. But, the argument for patient safety, higher quality medical care, point of care documentation, faster results of diagnostic tests, and ability to both share information with other care providers when necessary and access a patient’s chart from any location, not to mention access clinical decision support, should outweigh the “high cost” argument. Financial incentives through HITECH have been the driving force for many practices that have now decided to convert to a paperless (or almost paperless) system. Recall that beginning in 2011, hospitals and physicians’ practices that adopt meaningful use of EHRs will receive incentive payments. Those hospitals and practices that hold out will be penalized if they have not adopted meaningful use of an EHR by 2015.

Converting from a paper system to an electronic system can be a lengthy, sometimes chaotic process. It can no doubt cause loss of productivity for both staff and care providers. When procedures within the office that are seemingly efficient in the manual form are computerized, there are bound to be errors in conversion, steps that are overlooked, and general frustration for all involved. However, proper planning, heeding the advice of the software vendor’s installation
team, and accepting the fact that the conversion, training of staff, and use of the system will all take longer than expected should make the whole process more tolerable. It does take time and effort to convert to and use an electronic system, but the same can be said for any change in procedure in any profession.

**Check Your Understanding**

1. Healthcare facilities that do not adopt electronic record technology will begin facing penalties in the year __________.
2. Up to this point, what has been the driving force behind facilities adopting EHRs?

### 10.3 Emerging Technologies and Models

#### Patient Portals

Patients today are becoming more interested and involved in their own healthcare. They are taking a more active role, and thanks to the Internet, arrive at their appointments knowing what their care provider may ask and why, and what treatment options exist. They have a list of questions ready for the care provider, which allows for a more productive visit. **Patient portals** are another means to better, more meaningful communication with a care provider, and are a functionality of EHRs that satisfy Meaningful Use regulation. A patient portal is a method of accessing portions of one’s own office health record. These portals are secure and can only be accessed with a user ID and password. In PrimeSUITE the portal is known as PrimePRACTICE. Through it, the patient can:

- E-mail the practice with questions about concerns they may have regarding their care
- Make appointments
- Complete history forms and authorizations online
- Request prescription refills
- Get results of tests


By using the secure portal, the office staff spends less time answering phone calls, calling patients back (or playing phone-tag), and entering data in the record; patients are more satisfied because their questions are answered more promptly, and they feel that they are more in control of their care. You may not realize that your care provider offers patient portals; if the office is automated, and an EHR is in use, ask about it!

Many insurance plans have similar options for their subscribers, including communicating with a nurse or care provider to answer...
questions about symptoms, treatment options, coverage, and the like. Take a few moments to look at the website for your health insurance—does it have patient portal capability?

Personal Health Records (PHRs)
The Personal Health Record (PHR) is maintained and kept with the patient, and is a record of his or her past and current health information including drug allergies or reactions, immunization dates, past and present medical conditions, surgical procedures, family history, list of current medications, and insurance information. The PHR is not a legal record because it is just that—personal; there are no safeguards to ensure it is complete, it is not written by a medical professional, much of it may have been compiled from memory, and it does not meet the legal requirement of “being compiled during the normal course of business.” However, it is a valuable tool when a patient seeks medical care, particularly if emergency care is required or if there has been a change in care providers. The PHR is only as good as the information in it—all of the information should be up-to-date and accurate. It also needs to be available when needed. If patients expect their PHR to be a useful document, family members should know where the PHR is kept, and it should be taken to office visits or to the emergency department when such visits occur. Patients may keep the PHR in a paper format or online (or may print it from the online portal). There are many options for doing so, including the PHR websites of many major insurance carriers and the AHIMA PHR website found at http://www.myphr.com/. Other free online PHRs include Microsoft Health Vault, iHealthRecord, Telemedical.com, and MedsFile.com, just to name a few. The AHIMA website provides a full list. PHRs are not a new technology, but their use is becoming more prevalent.

Telemedicine
Telehealth and Telemedicine are of great benefit to patients who do not have the means to travel to a doctor’s appointment or who live in remote, medically underserved areas. Telehealth is more associated with preventive care. With the use of audiovisual equipment, the patient and the care provider or healthcare professional can connect through teleconferencing technology, allowing each to see and hear the other. Through telemedicine technology, a patient’s blood pressure, heart rate, respiratory rate, EKG tracing, or medical imaging can be monitored remotely. Should the care provider find something that is not within normal limits, the patient would then need to seek on-site care (or emergency care dispatched). The imaging technology of Picture Archiving and Communications Systems (PACS), whereby radiologic images are viewed remotely, is one of the original uses of telemedicine.

Through the use of telemedicine there is cost savings to both the insurance carrier and the patient; patients who would not otherwise be able to make visits to their care providers now have better access
to care, which in turn improves outcomes and in general is more convenient for patients, particularly those who do not have transportation or who live a distance away from their care provider.


Many Veterans Affairs Medical Centers provide telemedicine or telehealth to assist in the care of veterans. The Department of Veterans Affairs telehealth website can be found at http://www.telehealth.va.gov/index.asp.

**Patient-Centered Medical Homes (PCMH)**

Patient Centered Medical Home (PCMH) is a model that was developed to care for patients with chronic conditions by the American Academy of Family Practitioners. The premise encourages and facilitates the patient’s (and family’s) involvement in his or her own care. It is mentioned in this chapter because it ties in with the concept of a patient-centric health model. The PCMH also encourages a primary care physician approach to patient care, which is also the premise of many managed care insurance plans that require a “gatekeeper” to reduce redundancy and overutilization of testing and services, and provide overall more efficient and effective healthcare.

The use of health information technology is paramount to the PCMH model because the use of quality measures, including registries, referral tracking, results tracking, medication alerts, performance measures, use of evidence-based medicine, an updated problem list and current medication list, are all part of the PCMH model—all of the elements that are requirements of Meaningful use as well.

**Evidence-Based Medicine**

Meaningful use of data requires decision support capability as part of the EHR. This is also known as evidence-based medicine because the diagnostic and treatment protocols are based on proven research and best practices. Through evidence-based medicine, a patient’s plan of care is based on current, proven practice. Alerts or reminders automatically appear in a patient’s chart based on data captured about that patient. An example would be a female patient who has just passed her fortieth birthday. The FDA Office of Women’s Health recommends a screening mammogram be performed at the age of 40 and every 1 to 2 years thereafter. Current EHR software makes it possible for physicians to be alerted to the latest diagnostic and treatment recommendations and modalities, which in

---

turn improves efficiency, patient care, and clinical outcomes. It is clear why the use of evidence-based medicine is part of the Meaningful Use regulations.

### Check Your Understanding

1. What are the diagnostic and treatment protocols of evidence-based medicine based on?
2. Is a patient’s Personal Health Record a legal document? Explain your answer.
3. If a patient is being monitored using telemedicine, what would happen if an abnormal reading was found?
4. How does a PCMH make a patient’s experience more positive?

### 10.4 Making the World of Health Informatics User-Friendly and Convenient

In order for an electronic health record system to be successful, the care providers need to be satisfied with the product. They typically look for portability, mobility, flexibility and convenience—all qualities of products used in the twenty-first century and all requirements of the healthcare team if they are to work efficiently.

Portable devices allow for flexibility and portability. They are advantageous because they are convenient (the provider does not have to find a computer to use); are cost effective (the provider can use an inexpensive device and there is no need to rework because notes and procedure codes are entered at the point of care, which reduces the number of lost or missing charges); improve accuracy (the care provider does not have to jot down notes that would need to be transferred into the record at a later time); and, in general, create overall satisfaction since the information needed to care for patients is available at any time from any location. The connection to the EHR may be through a local area network (LAN) or wide area network (WAN). LANs link computers and related devices that are physically close to one another such as within a building; WANs connect computer networks together that are not physically close (see Figure 10.1). And, of course, access can be via the Internet. The types of portable devices used include personal digital assistants (PDAs); they are small enough to fit in one’s hand, yet allow access to LANs, WANs, and the Internet and may also have phone capability. Smart Phones are telephones that also allow Internet browsing as well as, audio, video, and camera functionality; and tablet computers are larger than PDAs or Smart Phones, yet smaller than a laptop computer—they too provide access to LANs, WANs, and the Internet.
Check Your Understanding

1. What are Smart Phones?
2. How does mobility save time for a physician?

10.5 Virtual Private Networks—Advancing the Use of EHRs Remotely Yet Securely

To use mobile functionality, a wireless connection is necessary. This is known as Wi-Fi, which sends data via high radio frequency. Of course, utilizing mobile technology does require high levels of security. The use of a virtual private network (VPN) is one way to ensure the security of the information flowing between the mobile device and the EHR. A VPN uses the Internet as its path, but built into the VPN is software that encrypts (codes) the data being sent and interprets the data being received (decryption). A VPN also verifies the identity of the user through his or her user ID and password, and only allows users access who have been granted permission to sign on to the network. The use of a VPN provides for the secure environment to allow sharing of health information with users at remote locations. In addition to the VPN, a firewall is another security method (see Figure 10.2). Firewalls prevent unauthorized access into or out of the network through use of both hardware and software devices that filter activity over the network. Based on predefined rules, the firewall acts as a barrier—activity that passes the rules may continue in or out of the network; activity that does not pass the rules may not.
Figure 10.2 Placement of a firewall between computers, servers, and the Internet

Security measures such as those noted above are necessary to exchange information on a small scale within or among related medical practices or hospitals, as well as between the Health Information Exchanges (HIEs) that are the vision of the Office of the National Coordinator (ONC).

Pulling It All Together

The intent of this worktext has been to introduce students to the automation of health information with emphasis on those of you who have chosen to study health information management, medical assisting, and medical billing and coding. Having chosen one of these professions, you will work closely with automated systems; many of you will be lucky enough to be involved in choosing a system from the very first steps, others will use the systems on a daily basis, and yet others will climb the ladder into implementation, training, and developing computer programs and systems that will enhance the automated exchange of information.

Medicine and healthcare are not static; changes occur daily. Those changes need to be communicated, implemented, and tracked to determine their impact on patient care. As a healthcare professional, you will not be observing from the sidelines; instead, you will be an active participant in improving access to, quality and utilization of readily available, complete, accurate, and secure health information.

Check Your Understanding

1. How does a VPN verify a user’s identity?
2. What role does encryption play in using VPNs?
## Chapter 10 Summary

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Concepts for Review</th>
</tr>
</thead>
</table>
| **10.1** Compare Health Information Management to health informatics. pp. 198–199 | - Define Health Information Management  
- Define health informatics  
- Role of HIM professional in each |
| **10.2** Discuss barriers to the adoption of electronic health records. pp. 200–201 | - Written records and dictation have been the norm  
- Paper and dictation are fairly inexpensive  
- Lengthy process to convert to electronic records  
- Training time is extensive  
- Loss of productivity  
- High frustration level |
| **10.3** Describe three emerging technologies or models that are improving the care of patients through information technology. pp. 201–204 | - Patient portals—means of communication between patient and medical practice  
- Personal Health Record—patient keeps own record of history, immunizations, allergies, surgeries, past conditions, and family history  
- Telemedicine—allows patient to be “seen” without leaving the home  
- Patient-Centered Medical Home (PCMH)—primary care physician is leader of a team that cares for the patient; patient is more involved than in traditional approach; use of technology inherent in the process  
- Evidence-based medicine—technology “researches” best practices and decision support to assure that patient is receiving most up-to-date diagnostic and treatment options |
| **10.4** Illustrate three mobile devices that will make the collection and sharing of health information more timely and efficient. pp. 204–205 | - Use of EHR can be more convenient by making it mobile; use of personal digital assistants (PDAs), Smart Phones, and tablet computers allow for portability  
- Wireless (Wi-Fi) connections are required to use portable devices |
| **10.5** Describe how virtual private networks (VPNs) are advancing the use of EHRs. pp. 205–206 | - Though portability is necessary, so is security  
- Virtual Private Networks encrypt and interpret information that is sent and received via wireless networks  
- Use of firewalls as a security device |
MATCHING QUESTIONS

Match the terms on the left with the definitions on the right.

1. [LO 10.5] encryption  a. clinical decision support based on research and best practices
2. [LO 10.1] Health Information Management b. science that deals with health information, its structure, acquisition, and uses
3. [LO 10.3] patient portal c. improving healthcare through working with data and ensuring that the best information is available for decision making
4. [LO 10.3] evidence-based medicine d. coding data to make it more secure
5. [LO 10.3] Personal Health Record (PHR) e. high radio frequency wireless connection used by Smart Phones and PDAs
6. [LO 10.3] telemedicine f. the monitoring or exchange of health information remotely
7. [LO 10.5] VPN g. secure method of accessing individual health records and information through an EHR
8. [LO 10.4] Wi-Fi h. secure Internet environment that encrypts data and allows remote access to health information
9. [LO 10.1] health informatics i. medical history maintained and kept by an individual patient

MULTIPLE-CHOICE QUESTIONS

Select the letter that best completes the statement or answers the question:

1. [LO 10.1] Health informatics is basically the ______ part of managing health information.
   a. critical
   b. structural
   c. technological
   d. usable

2. [LO 10.4] One benefit of accessing the EHR through mobile devices is a reduction in:
   a. cost.
   b. errors.
   c. satisfaction.
   d. both A and B are correct
3. **[LO 10.2]** Incentives are being offered to EHR adopters through _______ legislation.
   a. CCHIP
   b. HIPAA
   c. HITECH
   d. ONC

4. **[LO 10.3]** Care providers use _______ as a way to support their decisions and diagnoses.
   a. current medical trends
   b. evidence-based medicine
   c. Meaningful Use
   d. patient-centric care

5. **[LO 10.1]** Which of the following stakeholders are served by the health information management profession?
   a. Patient care organizations
   b. Payers
   c. Research agencies
   d. All of the above

6. **[LO 10.2]** According to the text, which of the following is a way to make the transition to EHRs easier?
   a. Allowing staff members to be frustrated and anxious about the change
   b. Following the advice and suggestions of the EHR vendor’s installation team
   c. Providing immediate training so that ramp-up is quicker
   d. Saving money for EHR costs by eliminating staff

7. **[LO 10.3]** A PCMH focuses on _______ communication between patients and providers.
   a. decreased
   b. increased
   c. random
   d. structured

8. **[LO 10.1]** There _______ be a degreed health information professional on staff in a healthcare office.
   a. might
   b. must
   c. will
   d. will not

9. **[LO 10.4]** There must be a _______ available for providers to use portable devices to access health information.
   a. computer terminal
   b. Internet hookup
   c. wireless connection
   d. wireless router
10. [LO 10.3] Who is in charge of a Personal Health Record?
   a. HIM professional
   b. Patient
   c. Provider
   d. Medical staff

11. [LO 10.2] Penalties for facilities not adopting electronic health records will begin in ________.
   a. 2011
   b. 2013
   c. 2015
   d. 2018

12. [LO 10.3] Videoconferencing and remote vital sign monitoring are part of:
   a. patient-centric care.
   b. a patient portal.
   c. telemedicine.
   d. virtual health networks.

13. [LO 10.5] What does VPN stand for?
   a. Verifying Provider Network
   b. Verified Protocol Network
   c. Virtual Private Network
   d. Virtual Provider Network

14. [LO 10.3] Recent advances in healthcare rely increasingly on:
   a. change.
   b. precedent.
   c. technology.
   d. tradition.

SHORT ANSWER QUESTIONS

1. [LO 10.1] Explain the difference between health information and health informatics.

2. [LO 10.3] What are some advantages to a healthcare facility using the Patient Portal function?

3. [LO 10.4] What is meant by mobile device?

4. [LO 10.5] How does a VPN ensure data integrity and security?

5. [LO 10.2] Explain why many care providers view a paper-based system as easier than an electronic one.

6. [LO 10.1] What does an HIM professional do?

7. [LO 10.2] How can healthcare facilities make the adoption of EHRs as easy and painless as possible?
8. **[LO 10.4]** How do mobile applications reduce costs and errors?

9. **[LO 10.3]** Describe a Patient Centered Medical Home (PCMH).

10. **[LO 10.5]** What is Wi-Fi?

**APPLYING YOUR KNOWLEDGE**

1. **[LO 10.3]** After reading about the patient portal in your text, are there any disadvantages to using a system like PrimePRACTICE? Justify your answer.

2. **[LO 10.2]** What is your opinion on the use of incentives to encourage healthcare facilities to adopt EHRs? Explain your answer.

3. **[LOs 10.4, 10.5]** You are a healthcare professional who has the ability to work from home on certain days. How would you go about accessing the work you need to do on a given day from your home?

4. **[LOs 10.1, 10.2, 10.3, 10.4, 10.5]** Your healthcare office is beginning to discuss adopting an EHR system, mobile accessibility, and other new capabilities such as telemedicine. Your supervisor has asked you to come up with some brief talking points for the staff discussing the new technologies, their advantages, and ways in which each staff member will be impacted by the new systems. Come up with a short outline for your presentation.