Unit I

The Healthcare Setting

1

Phlebotomy: Past and Present and the Healthcare Setting

NAACLS Entry Level Competencies

1.00 Demonstrate knowledge of the healthcare delivery system and medical terminology.
4.2 Describe the types of patient specimens that are analyzed in the clinical laboratory.
4.3 Define the phlebotomist's role in collecting and/or transporting these specimens to the laboratory.
9.00 Communicate (verbally and nonverbally) effectively and appropriately in the workplace.
9.1 Maintain confidentiality of privileged information on individuals according to federal regulations (e.g., HIPAA).
9.2 Demonstrate respect for diversity in the workplace.
9.3 Interact appropriately and professionally.
9.5 Comply with the American Hospital Association's Patient's Bill of Rights and the Patient's Bill of Rights from the workplace.
9.6 Model professional appearance and appropriate behavior.

Key Terms

Do Matching Exercise 1-1 in the WORKBOOK to gain familiarity with these terms.

AHA
ambulatory
blood bank/ immunohematology
C&S
certification
CEUs
chemistry
CLIA '88
CMS
coagulation
communication barriers
CPT
cytogenetics
cytology
ethical behavior
ethics
HCWs
hematology
HIPAA
histology
HMOs
IACET
ICD-10-PCS
kinesic slip
kinesics
MCOs
Medicaid
Medicare
microbiology
MLS
MLT
NAACLS
nonambulatory
PHI
PHS
phlebotomy
PPOs
primary care
proxemics
reference laboratories
secondary care
serology/immunology
TAT
tertiary care
third-party payer
UA

Objectives

Upon successful completion of this chapter, the reader should be able to:

1. Demonstrate basic knowledge of terminology for healthcare settings including the national healthcare organizations that contributed to the evolution of phlebotomy and the role of the phlebotomist today.
2. Describe the basic concepts of verbal and nonverbal communication as they relate to the professional image and proper telephone protocol in healthcare setting.
3. Compare types of healthcare institutions and the methods used by providers for coverage.
4. List the personnel levels in the clinical analysis areas of the laboratory and the types of laboratory procedures performed in each of the areas.

Overview

Healthcare today has evolved into an integrated delivery system (IDS) offering a full range of services intended to ensure that the patient gets what is needed at the right time and in the right way. In addition to physicians, nurses, and patient support personnel, allied health professionals such as clinical laboratory personnel play an important role in the delivery of patient care. The clinical laboratory provides physicians with some of medicine's most powerful diagnostic tests. Results of these tests greatly influence physician patient care decisions and positively affect those who manage patient outcomes and costs. Before patient test results can be reported to the physician, specimens must be collected and analyzed. Many of these specimens are blood specimens. The practice of drawing blood from a vein or through a cut in the skin is called **phlebotomy**, and the person who draws the blood is called a phlebotomist. Phlebotomists have been key players in specimen collection for some time. In addition to blood collection skills, successful specimen collection requires the phlebotomist to demonstrate competence, professionalism, good communication and public relations skills, working knowledge of the healthcare delivery system, and familiarity with clinical laboratory services. An understanding of phlebotomy from a historical perspective helps phlebotomists appreciate the significance of their role in healthcare today.

Phlebotomy: The Past

Since early times, people have been fascinated by blood and have believed in some connection between the blood racing through their veins and their well-being. From this belief, certain medical principles and procedures dealing with blood evolved, some surviving to the present day.

Some authorities believe phlebotomy dates to the last period of the Stone Age, when crude tools were used to puncture blood vessels and allow excess blood to drain out of the body. It is thought that this was an effort to rid the body of evil spirits or cleanse the body of impurities. A painting in a tomb showing the application of a leech to a patient is evidence of bloodletting in Egypt around 1400 BC.

A Greek physician named Hippocrates (460 to 377 BC) had a major influence on early medicine and is recognized to this day as the "Father of Medicine." An early medical theory developed by Hippocrates stated that good health required a balance in the body of four substances—blood, phlegm, black bile, and yellow bile—which he called body "humors." It was thought that disease resulted from an excess of one or more of these substances, and that removing the excess would restore health. Removing blood was called bloodletting, and the most common surgical technique used for bloodletting was called venesection (cutting a vein), which comes from the Latin words *vena*, "vein" and *sectio*, "cutting." It involved cutting into a vein with a sharp instrument to release the blood. Withdrawing large quantities of blood from a patient while trying to cure or prevent illness or disease was common.

Key Point: *Phlebotomy*, which comes from the Greek words *phlebos*, "vein" and *tome*, "incision or cut" is another word for venesection (also venisection).

The Middle Ages (medieval period) of Europe lasted from the 5th to the 15th century. In the early Middle Ages, surgery was considered a trade instead of a profession. Barbers, who were already skilled in using sharp instruments, were often called upon to perform bloodletting and other surgical duties. Consequently, barber-surgeons flourished. By 1210, the Guild of Barber-Surgeons had been formed in Paris; it divided the surgeons into Surgeons of the Long Robe and Surgeons of the Short Robe. Soon the Short Robe surgeons were forbidden by law to do any surgery except bloodletting, wound surgery, cupping, leeching, shaving, tooth extraction, and enema administration.

To distinguish their profession from that of the Long Robe surgeon, Short Robe barber-surgeons placed a striped pole, from which a bleeding bowl was suspended, outside their doors. The pole represented the rod squeezed by the patient to promote bleeding and the white stripe on the pole corresponded to the bandages, which were also used as tourniquets. Soon, handsomely decorated ceramic bleeding bowls (Fig. 1-1) came into fashion and were passed down from one generation to the next. These bowls, which often doubled as shaving bowls, usually had a semicircular area cut out on one side to facilitate placement of the bowl under the chin.

During the 17th and early 18th centuries, phlebotomy was considered a major therapeutic (treatment) process, and anyone willing to claim medical training could perform phlebotomy. The lancet, a tool used for cutting the

Figure 1-1. A bleeding bowl. (Courtesy of Robert Kravetz, MD, Chairman, Archives Committee, American College of Gastroenterology.)

vein during venesection, was perhaps the most prevalent medical instrument of the time. The usual amount of blood withdrawn was approximately 10 mL, but excessive phlebotomy was also common.

FYI: Excessive phlebotomy is thought to have contributed to George Washington's death in 1799, when he was diagnosed with a throat infection and the physician bled him four times in two days. It was because of Washington's request to be allowed to die without further medical intervention that the physician did not completely exsanguinate him (i.e., remove all his blood).

During this same period, phlebotomy was also accomplished by cupping. Cupping involved the application of a heated suction apparatus, called the "cup," to the skin to draw the blood to the surface. Then, the capillaries in that area were severed by making a series of parallel incisions with a lancet or a fleam. The typical fleam was a wide double-edged blade at right angles to the handle. Eventually, multiple fleams (Fig. 1-2) were attached and folded into a brass case for easy carrying. Fleams were also used for general phlebotomy to open a vein, or sometimes an artery, to remove large amounts of blood. The blades were wiped clean with only a rag; therefore, they undoubtedly transmitted blood-borne infections from patient to patient.

FYI: Today, cupping or dry cupping (cupping without the incisions) is performed by some alternative medical practitioners. It is believed the suction penetrates deep into the tissues, mobilizing blood flow and causing the tissues to release harmful toxins that can then be removed by the body (as in dry cupping) or via blood loss from incisions.

Figure 1-2. Typical fleams. (Courtesy of Robert Kravetz, MD, Chairman, Archives Committee, American College of Gastroenterology.)

Figure 1-3. A leech jar. (Courtesy of Robert Kravetz, MD, Chairman, Archives Committee, American College of Gastroenterology.)

For more localized bloodletting, leeching (application of leeches to suck out the blood) was often used. Leeching involved placing a drop of milk or blood on the patient's skin to entice a European medicinal leech called *Hirudo medicinalis* to attach to the spot chosen for bloodletting. The leech would engorge itself with blood, which took about an hour, and then drop off. By the mid-18th century, leeching was widely practiced in Europe, especially in France. Leeches were kept in special vessels that were filled with water and had perforated tops so the leeches could breathe. Early leech jars were glass, and later ones were ceramic (Fig. 1-3). After declining in the early 1900s, medicinal use of leeches has made a comeback since the 1980s as an aid in microsurgery procedures such as skin grafts and reattachment of severed limbs and digits. In these procedures, leeches are used to suck up pooled blood, break up microclots, and promote the flow of oxygenated blood to the area. The value of leech therapy (Fig. 1-4) is found in the worm's saliva, which contains a local vasodilator (substance that increases the diameter of blood vessels), a local anesthetic, and hirudin, an anticoagulant (substance that prevents clotting).

Phlebotomy: The Present

The practice of phlebotomy continues to this day; however, principles and methods have improved dramatically. Today, phlebotomy is performed to

- obtain blood for screening and diagnostic purposes and to monitor prescribed treatment.
- remove blood for transfusions at a donor center.

Figure 1-4. A toe with a leech. (Courtesy of Robert Kravetz, MD, Chairman, Archives Committee, American College of Gastroenterology.)

- remove blood for therapeutic purposes, such as treatment for polycythemia, a disorder involving the overproduction of red blood cells.

Phlebotomy is primarily accomplished by one of two procedures:

- Venipuncture, which involves collecting blood by penetrating a vein with a needle attached to a blood collection device or syringe.
- Capillary puncture, which involves collecting blood after puncturing the skin with a lancet or special incision device.

The Changing Role of the Phlebotomist

Healthcare delivery systems are constantly changing. Advances in laboratory technology are making point-of-care testing (POCT) commonplace, and services that were once unique to the laboratory are now being provided at many other locations. The development of teams and the sharing of tasks have become necessary as healthcare organizations attempt to find the balance between cost-effective treatment and high-quality care. Work responsibilities have been revised so that many types of healthcare professionals are cross-trained in several skills, including phlebotomy. Consequently, the term "phlebotomist" is applied to any individual who has been trained in the various techniques used to obtain blood for laboratory testing or blood donations. A competent phlebotomist must have good manual dexterity, special communication skills, good organizational skills, and a thorough knowledge of laboratory specimen requirements and departmental policies. A selection of duties and responsibilities associated with the role of phlebotomist is listed in Box 1-1.

BOX 1-1

DUTIES AND RESPONSIBILITIES OF A PHLEBOTOMIST

Typical Duties

- Prepare patients and site for specimen collection following nationally recognized standards and institution's guidelines.
- Collect venipuncture and capillary specimens for testing following nationally recognized standards and institutional procedures.
- Prepare specimens for proper transport, ensuring the integrity and stability of the sample.
- Adhere to all HIPAA and confidentiality guidelines, including all Code of Conduct and Integrity programs instituted by the employer.
- Transport and dispatch samples efficiently by prioritizing specimens to ensure desired turnaround times.
- Comply with safety rules, policies, and guidelines for the area, department, and institution.
- Provide quality customer service for all internal and external customers.

Additional Duties as Required

- Assist in collecting and documenting monthly workload and record data.
- Perform quality-control protocols as specified in standard operating procedures, and perform and document instrument and equipment maintenance.
- Participate in continuing education (CE) programs such as Quality, Safety, Lean/Six Sigma, and Customer Service.
- Collect and perform POCT following all standard operating procedures.
- Prepare drafts of procedures for laboratory tests according to standard format.
- Perform appropriate laboratory computer information operations.
- Provide proper instruction to patients/customers for container specimen collection.
- Perform front office duties required by institution including scheduling, coding, itinerary updates, and obtaining Advance Beneficiary Notice (ABN).
- Train new technicians and students in duties and responsibilities.

Education Standards

Regardless of which member of the healthcare team performs phlebotomy, quality assurance demands that the highest standards be maintained and approved procedures followed. Many hospitals, vocational schools, and colleges offer phlebotomy programs. Phlebotomy programs that include classroom instruction and clinical practice can apply for approval from the **National Accrediting Agency for Clinical Laboratory Science (NAACLS)**. Approval is granted to programs that meet certain established qualifications and educational standards. NAACLS approval helps assure that graduates possess specific entry level competencies (knowledge and skills requirements) to successfully function as phlebotomists. Whether approved by NAACLS or not, most programs not only train students in phlebotomy procedures, but also prepare them for national certification or state licensure.

Official Recognition

FYI: For information about specific state laboratory regulations and licensure, go to that state's Department of Human Services (DHS) or Department of Health and Human Services (HHS) website, for instance, www.michigandhs.gov. In addition, state-by-state requirements for phlebotomists can also be found at www.ephlebotomist.com/phlebotomist-requirements-state-by-state/.

Certification

Certification is a voluntary process by which an agency grants recognition to an individual who has met certain prerequisites in a specific technical area. Certification indicates the completion of defined academic and training requirements and the attainment of a satisfactory score on an examination that tests proficiency in that area. This is confirmed by the awarding of a title or designation. Phlebotomist certification is signified by initials that the individual has the right to display after his or her name. Examples of national agencies that certify phlebotomists, along with the title and corresponding initials awarded, are listed in Table 1-1.

Key Point: Being nationally certified can help a phlebotomist get hired sooner than applicants who are not certified.

Licensure

Licensure is the act of granting a license. A license in healthcare is an official document or permit granted by a state agency that gives legal permission for a person to work in a particular health profession. Without a license, it would be against the law for a person to practice that profession in that state. Typically, the individual must meet specific education and experience requirements and pass an examination before the license is granted. The license indicates competency only at the time of examination. As a demonstration of continued competency, states normally require periodic license renewal, by either reexamination or proof of continuing education (CE).

FYI: Some states have several levels of licensure for certain professions. For example, California offers three levels of phlebotomy licensure: limited phlebotomy technician (LPT), certified phlebotomy technician I (CPT I), and certified phlebotomy technician II (CPT II).

Continuing Education

CE is designed to update the knowledge or skills of participants and is generally geared to a learning activity or course of study for a specific group of health professionals, such as phlebotomists. Many organizations, such as the American Society for Clinical Pathology (ASCP), the American Society for Clinical Laboratory Sciences (ASCLS), and the American Medical Technologists (AMT), sponsor workshops, seminars, and self-study programs that award **continuing education units (CEUs)** to those who participate. The most widely accepted CEU was created by the **International Association for Continuing Education and Training (IACET)** to provide a standard unit of measurement to determine CE and training activities for diverse providers and purposes. One CEU equals 10 contact hours of participation

Table 1-1. Phlebotomist Title and Initials Awarded by Certification Agency[a]

Certification Agency	Certification Title	Certification Initials
American Medical Technologists	Registered Phlebotomy Technician	RPT(AMT)
American Certification Agency	Certified Phlebotomy Technician	CPT(ACA)
American Society for Clinical Pathology	Phlebotomy Technician	PBT(ASCP)
National Center for Competency Testing	National Certified Phlebotomy Technician	NCPT(NCCT)

[a]Mailing and e-mail addresses and telephone numbers for the phlebotomy certification agencies listed and several others can be found in McCall R. *Phlebotomy Exam Review*. 7th ed. Baltimore, MD: Lippincott Williams & Wilkins.

in an organized experience under responsible sponsorship, capable direction, and qualified instruction.

Most certifying and licensing agencies require CEUs or other proof of CE for renewal of credentials. These requirements are intended to encourage professionals to expand their knowledge bases and stay up to date. It is important for phlebotomists to participate in CE to be aware of new developments in specimen collection and processing, personal safety, and patient care.

Key Point: Participating in continuing education can help prevent costly errors and reduce the risk of lawsuits.

Patient Interaction

As a member of the clinical laboratory team, the phlebotomist plays an important role in how the laboratory is portrayed to the public. The phlebotomist is often the only real contact the patient has with the laboratory. In many cases, patients equate this encounter with the caliber of care they receive while in a healthcare facility. Positive "customer relations" involves promoting goodwill and a harmonious relationship with fellow employees, visitors, and especially patients. A competent phlebotomist with a professional manner and a neat appearance helps put the patient at ease and establish a positive relationship.

Recognizing Diversity

Despite similarities, fundamental differences among people arise from nationality, ethnicity, and culture as well as from family backgrounds, life experiences, and individual challenges. These differences affect the personal health beliefs and behaviors of both patients and healthcare providers, including phlebotomists.

Culturally aware healthcare providers enhance their potential for more rewarding interpersonal experiences and greater job satisfaction. A continued awareness and knowledge of cultural differences by all employees can protect an organization from civil rights violations, promote an inviting workplace, and increase innovation and teamwork. More importantly, the healthcare organization benefits greatly in improved patient satisfaction with the services provided.

Critical factors in providing healthcare services that meet the needs of diverse populations include understanding the

- beliefs and values that shape a person's approach to health and illness.
- health-related needs of patients and their families related to the environments in which they live.
- knowledge of customs and traditions related to health and healing.
- attitudes toward seeking help from healthcare providers.

Key Point: By recognizing and appreciating diversity, the phlebotomist promotes good will and harmonious relationships that directly improve health outcomes, the quality of services, and customer satisfaction.

State how each quality contributes to professional attitude in Knowledge Drill 1-7 in the WORKBOOK.

Professionalism

Professionalism is defined as the conduct and qualities that characterize a professional person. As part of a service-oriented industry, individuals performing phlebotomy must practice professionalism.

The public's perception of the phlebotomy profession is based on the image created by the phlebotomist's conduct and appearance. In fact, general appearance and grooming directly influence whether the phlebotomist is perceived as a professional. It has been said that people form opinions of each other within the first three seconds of meeting, and this judgment of the superficial aspect of a person sets an image in the observer's mind that can affect the interaction.

Conservative clothing, proper personal hygiene, and physical well-being contribute to a professional appearance. It should be noted that healthcare institutional policies for attire are influenced by a federal standard that requires employers to provide protective clothing for laboratory workers, including phlebotomists.

Besides displaying a professional appearance, a phlebotomist is required to display attitudes, personal characteristics, and behaviors consistent with accepted standards of professional conduct. Some of the personal behaviors and characteristics that make up this professional image are as follows:

Self-Confidence

A phlebotomist who displays self-confidence is able to trust his or her own personal judgment. A phlebotomist's perception of self has an enormous impact on how others perceive him or her, and "perception is reality." The more self-confidence a phlebotomist has, the more professional he or she appears. Many factors affect being perceived as self-confident, for example, erect posture, professional appearance, courage, and tactfulness in communication.

Integrity

Integrity is a personal feeling of "wholeness" derived from honesty and consistency of character that can be seen in the person's actions, values, and beliefs. Professional standards of integrity or honesty require a person to do what is right regardless of the circumstances and in all situations and interactions. For example, a

phlebotomist often functions independently and may be tempted to take procedural shortcuts when pressed for time. A phlebotomist with integrity understands that following the standards for collection is essential to the quality of test results and therefore follows those standards regardless of circumstances.

Compassion

Compassion is a human emotion prompted by others' experiences and concerns; it is considered to be one of the greatest of virtues by major religious traditions. It is differentiated from empathy only by the level of emotion, as it tends to be more intense. Compassion means being sensitive to a person's needs and willing to offer reassurance in a caring and humane way. A phlebotomist may show compassion by appreciating the fear that illness or the unknown generates, by using empathy to sense others' experiences, and by demonstrating a calm and helpful demeanor toward those in need.

Self-Motivation

A person with motivation finds the workplace stimulating no matter what the tasks may entail. Motivation is a direct reflection of a person's attitude toward life. A phlebotomist who exhibits self-motivation takes initiative to follow through on tasks, consistently strives to improve and correct behavior, and takes advantage of every learning opportunity that is offered. A phlebotomist who is motivated makes every effort to provide excellence in all aspects of patient care in which he or she is involved.

Dependability

Dependability and work ethic go hand in hand. An individual who is dependable and takes personal responsibility for his or her actions is extremely refreshing in today's environment. A phlebotomist who works hard and shows constant, reliable effort, and perseverance is a valuable asset to a healthcare organization. This set of values makes a person a desirable candidate for new job opportunities and ultimately promotions in the healthcare setting or anywhere.

Ethical Behavior

Ethics is a system of moral principles or standards that govern conduct and the distinction between right and wrong. A phlebotomist should know that there are policies designed to regulate what should or should not be done by those who work in the healthcare setting. This system of policies or principles is called a "code of ethics." A code of ethics, though not enforceable by law, leads to uniformity and defined expectations for the members of that profession. The primary objective of any healthcare professional's code of ethics must always be to safeguard the patient's welfare.

Ethics are centered on an individual's conduct. **Ethical behavior** requires conforming to a standard of right and wrong conduct (i.e., following current standards of phlebotomy practice) to avoid harming the patient in any way. It requires putting the welfare of the patient before one's own needs, and making the right choices to maintain a high level of personal respect and respect for one's profession. Several professional organizations, such as the American Society for Clinical Laboratory Science (ASCLS), have developed a code of ethics for laboratory professionals.

FYI: The Latin phrase *primum non nocere* which means "first do no harm" describes one of the fundamental principles of healthcare. Although it does not include this exact phrase, the promise "to abstain from doing harm" is part of the Hippocratic oath given to new physicians and other healthcare professionals as they begin their practice.

Patients' Rights

All patients in a healthcare setting have rights and should be informed of these rights when care is initiated. Federal law guarantees the right to privacy of medical records and the ability to get a copy of them. Many states have additional patient protection laws, and most healthcare facilities have official statements concerning patient rights. In a hospital or outpatient surgery center, you must sign a statement that these rights have been explained, and the signed statement must be made a part of your medical record.

To affirm the importance of a strong relationship between patients and their healthcare providers, the **American Hospital Association (AHA)** publishes and disseminates a statement of patient rights and responsibilities. The AHA brochure or a similar pamphlet should be provided to consumers during inpatient admission procedures as evidence of patient advocacy and support. This easy-to-read brochure is called *The Patient Care Partnership*. It is designed to help patients understand what they should expect during their hospital stay regarding their rights and responsibilities. It states that the first priority of all healthcare professionals, including phlebotomists, is to provide high-quality patient care in a clean and safe environment, while also maintaining the patient's personal rights and dignity by being sensitive to differences in culture, race, religion, gender, and age. Expectations listed in the brochure are summarized in Box 1-2.

Confidentiality

Patient confidentiality is seen by many as the ethical cornerstone of professional behavior in the healthcare field. It serves to protect both the patient and the practitioner. The healthcare provider must recognize that

BOX 1-2

THE PATIENT CARE PARTNERSHIP

Understanding Expectations, Rights, and Responsibilities

What to Expect During Your Hospital Stay

- High-quality hospital care
- A clean and safe environment
- Involvement in your care
- Protection of your privacy
- Help when leaving the hospital
- Help with your billing claims

Adapted from the American Hospital Association's brochure. *The Patient Care Partnership*. Retrieved April 14, 2017 from http://www.aha.org. See that document for more details.

all patient information is absolutely private and confidential. Healthcare providers are bound by ethical standards and various laws to maintain the confidentiality of each person's health information. All questions relating to patient information should be referred to the proper authority. Unauthorized release of information concerning a patient is considered an invasion of privacy and can result in legal action against the person or organization that released the information.

HIPAA

As a person's health information became more easily transferable from one facility or entity to the next through electronic exchange, a growing problem with protecting a person's rights and confidentiality surfaced. In 1996, a federal law called the **Health Insurance Portability and Accountability Act (HIPAA)** was passed that required all healthcare providers to obtain a patient's consent in writing before disclosing medical information such as a patient's test results, treatment, or condition to any unauthorized person. The HIPAA law was enacted to more closely secure this information and regulate patient privacy. HIPAA provisions protect a broad range of health information. Safeguarding the confidentiality of **protected health information (PHI)** is one of the primary aims of the HIPAA privacy rule. The law defines PHI as "individually identifiable health information that is transmitted by electronic media; maintained in any medium described in the definition of electronic media or transmitted or maintained in any other form or medium." The law established national standards for the electronic exchange of PHI and states that patients must be informed of their rights concerning the release of PHI and how it will be used. Penalties for HIPAA violations include disciplinary action, fines, and possible jail time.

Key Point: HIPAA violations can result in civil penalties of $100 per violation up to $25,000 per person per year. Knowingly disclosing PHI can result in a fine up to $50,000 and a year in prison. Selling or intending to sell PHI for personal gain or malicious intent can result in fines up to $250,000 and 10 years in prison.

The law states that **healthcare workers (HCWs)** must obtain the patient's written authorization for any use or disclosure of PHI unless the use or disclosure is for treatment, payment, or healthcare operations. To avoid litigation in this area, all HCWs and healthcare students must sign a confidentiality and nondisclosure agreement affirming that they understand HIPAA and will keep all patients' information confidential.

Law and Ethics: Phlebotomists sometimes encounter public figures and other types of celebrities who are being treated in a healthcare facility. It is very tempting to tell coworkers, friends, or family who they saw or from whom they drew blood. Not only is this unethical and undoubtedly a violation of institution policy that could get the phlebotomist fired, it is a HIPAA violation that could land the phlebotomist in legal trouble.

Communication

Defined as the means by which information is exchanged or transmitted, communication is one of the most important processes that takes place in the healthcare system. Communication involves using words, sounds, writing, or other means to express or exchange information when interacting with one or more persons. Effective communication in the workplace can improve productivity, reduce errors resulting from miscommunication, and help organizations run smoothly. The ability to communicate effectively is an important asset to the phlebotomist during interactions with supervisors, coworkers, nursing staff, physicians, visitors, and especially patients. Patient perceptions of a healthcare facility are often based on interactions with the employees, such as phlebotomists, who they deal with on a one-to-one, sometimes daily, basis. Favorable impressions can result when phlebotomists respond properly to patient needs, and this requires good communication between the phlebotomist and the patient.

Law and Ethics: The ethical phlebotomist shows respect for the profession by taking the time to communicate with clarity, courtesy, and compassion for the patient. A phlebotomist who lacks this ability increases the chances of becoming part of a legal action should any difficulty arise while a specimen is being obtained.

Interpersonal Communication Components

Effective communication between individuals involves three main components: verbal communication, active listening, and nonverbal communication.

Test your knowledge of communication components in Labeling Exercise 1-1 in the WORKBOOK.

Verbal Communication

Expression through the spoken word is the most obvious form of communication. Face-to-face verbal communication is the most common type of communication a phlebotomist uses with other HCWs and patients. Effective face-to-face verbal communication between two individuals should be an interaction in which both participants play a role. It involves a sender (speaker), a receiver (listener), and, when complete, a process called feedback, creating what is referred to as the communication feedback loop (Fig. 1-5). Accurate verbal exchange depends on feedback. It is through feedback that the listener or receiver is given the chance to clarify ideas or correct miscommunication, which may be due to preformed biases or barriers.

Normal human behavior and circumstances set up many **communication barriers** (prejudices or filters) that become obstructions to hearing and understanding what has been said; these are frequent causes of miscommunication. Communication barriers can be caused by tone of voice, language used (e.g., medical terminology or jargon), language limitations or differences, background noise or chatter, cultural diversity, emotions, age, gender, and physical disabilities such as hearing loss.

To encourage good verbal communication, the phlebotomist should use vocabulary that is easily understood by the receiver. To avoid creating suspicion and distrust in individuals from other countries, the phlebotomist should be aware of cultural differences and avoid clichés and nonverbal cues that could be misunderstood. It is important that the phlebotomist practice active listening to what is being said in order to achieve good communication.

Active Listening

True communication is not just about speaking. It is more difficult to communicate than just to speak, because effective communication requires that the listener participate by focusing on what is being said and giving appropriate feedback. It is always a two-way process. The ordinary person can absorb verbal messages at about 500 to 600 words per minute, and the

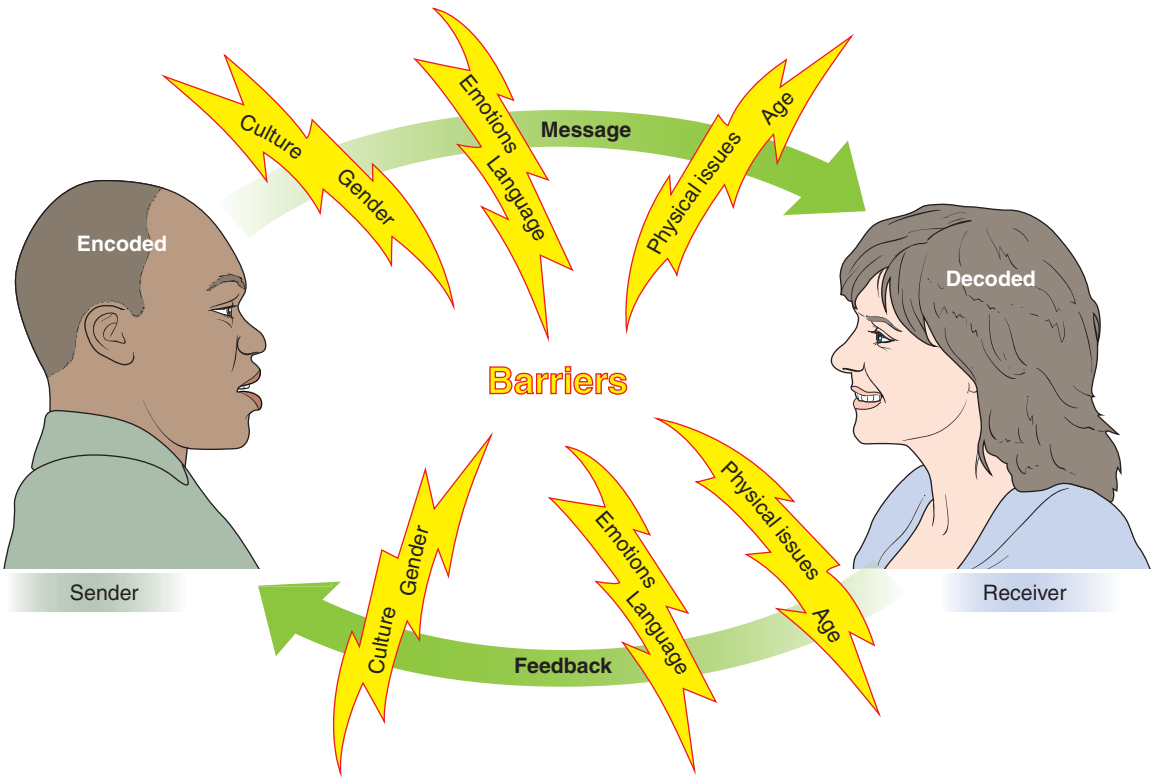

Figure 1-5. The verbal communication feedback loop.

average speaking rate is only 125 to 150 words per minute. Therefore, to avoid distraction, the listener must use the extra time for active listening. Active listening means taking positive steps through feedback to ensure that the listener is interpreting what the speaker is saying exactly as the speaker intended. Listening is the foundation of good interpersonal communication. The phlebotomist will find that listening carefully to what is being said and watching for nonverbal cues is the way to quickly build mutual trust with patients.

Nonverbal Communication

It has been stated that 80% of language is unspoken. Unlike verbal communication, formed from words that are one-dimensional, nonverbal communication is multidimensional and involves the following elements.

Kinesics

The study of nonverbal communication is also called **kinesics**; it includes characteristics of body motion and language such as facial expression, gestures, and eye contact. Figure 1-6 illustrates an exaggerated and simplified form of the six emotions that are most easily read by nonverbal facial cues. Body language, which most often is conveyed unintentionally, plays a major role in communication because it is continuous and more reliable than verbal communication. In fact, if the verbal and nonverbal messages do not match, it is called a **kinesic slip**. When this happens, people tend to trust what they see rather than what they hear.

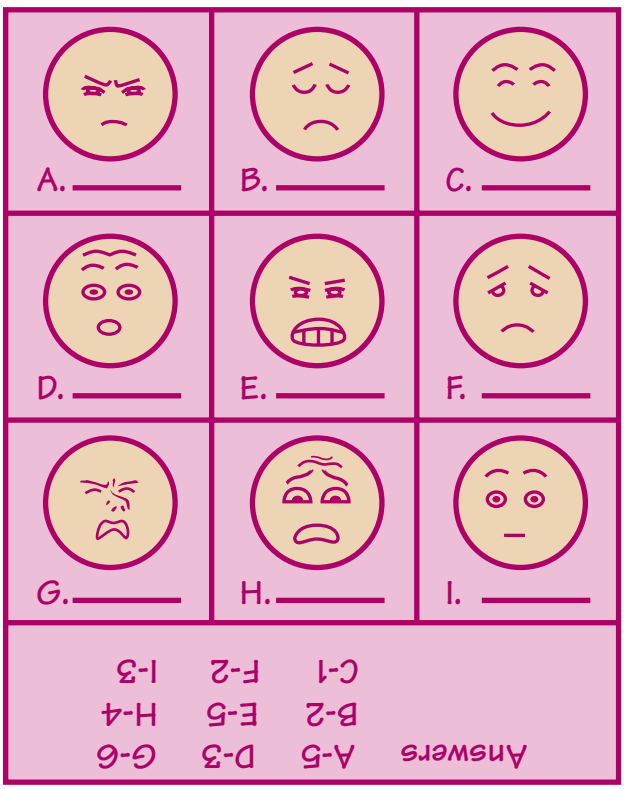

Figure 1-6. Nonverbal facial cues. Can you match the sketches with the correct effects? (1) Happy, (2) Sad, (3) Surprise, (4) Fear, (5) Anger, (6) Disgust.

Key Point: To communicate effectively with someone, establish good eye contact. A patient or client may be made to feel unimportant and more like an object rather than a human being if eye contact is not established.

FYI: In the United States and other Western cultures, eye contact is important for good communication. It is important to understand that this may not be the case in other cultures. In Middle Eastern cultures, for example, making eye contact is less common, and women are taught to avoid too much eye contact with men. Eye contact is often considered inappropriate or even rude in Asian cultures, especially between subordinates and their superiors. In some African and Latin American countries, eye contact that is too penetrating may be seen as aggressive or disrespectful.

As health professionals, phlebotomists can learn much about patients' feelings by observing nonverbal communication, which seldom lies. The patient's face often tells the health professional what the patient will not reveal verbally. For instance, when a patient is anxious, nonverbal signs may include tight eyebrows, an intense frown, narrowed eyes, or a downcast mouth (Fig. 1-6A). Researchers have found that certain facial appearances, such as a smile, are universal expressions of emotion. Worldwide, we all recognize the meaning of a smile; however, strong cultural customs often dictate when it is used.

Proxemics

Proxemics is the study of an individual's concept and use of space. This subtle but powerful part of nonverbal communication plays a major role in patient relations. Every individual is surrounded by an invisible "bubble" of personal territory in which he or she feels most comfortable. The size of the bubble or territorial "zone of comfort" is influenced by variables such as age, gender, culture, and the individual's needs at the time. Four categories of naturally occurring territorial zones and the radius of each are listed in Table 1-2. These zones play a significant role in human interaction, and it is important for the phlebotomist to be aware of them since it is often necessary in the healthcare setting to enter personal or intimate zones. If this is not carefully handled, the patient may feel threatened, insecure, or out of control.

Table 1-2. Territorial Zones and Corresponding Radii

Territorial Zone	Zone Radius
Intimate	1–18 in
Personal	1½–4 ft
Social	4–12 ft
Public	More than 12 ft

Phlebotomists must work in the intimate zone as they search and palpate to find a vein and perform venipuncture. As a phlebotomist, make your presence known, state your intentions, and establish some rapport with the patient before entering the intimate zone. Be aware that in this close proximity to the patient, many other factors come into play that affect the interaction, such as conduct, hygiene, grooming, and appearance.

Appearance

Most healthcare facilities have dress codes because it is understood that appearance makes a statement. The impression the phlebotomist makes as he or she approaches the patient sets the stage for future interaction. The right image portrays a trustworthy professional. A phlebotomist's physical appearance should communicate cleanliness and confidence as shown in Figure 1-7. Lab coats, when worn, should completely cover the clothing underneath and should be clean and pressed. Shoes should be conservative and polished. Close attention should be paid to personal hygiene. Bathing and deodorant use should be a daily routine. Strong perfumes or colognes should not be worn. Hair and nails should be clean and natural-looking. Long hair must be pulled back and fingernails kept short to ensure safety. In addition, according to current Centers for Disease Control and Prevention (CDC) hand hygiene guidelines, HCWs with direct patient contact cannot wear artificial nails or extenders.

FYI: Phlebotomists will find that when dealing with patients who are ill or irritable, a confident and professional appearance will be most helpful to them in doing their job.

Touch

Touching can take a variety of forms and convey many different meanings. For example, accidental touching may happen in a crowded elevator. Social touching takes place when a person grabs the arm of another while giving advice. Today, therapeutic touch that is designed to aid in healing has found a new place in medical practice. This special type of nonverbal communication is very important to the well-being of human beings and even more so to those suffering from disease.

Figure 1-7. A picture of a confident and professional phlebotomist.

Because medicine is a contact profession, touching privileges are granted to and expected of HCWs under certain circumstances. Whether a patient or healthcare provider is comfortable with touching is based on his or her cultural background. Because touch is a necessary part of the phlebotomy procedure, it is important for the phlebotomist to realize that patients are often much more aware of your touch than you are of theirs; there may even be a risk of the patient questioning the appropriateness of touching. Generally, patients respond favorably when touch conveys a thoughtful expression of caring.

Effective Communication in Healthcare

It is not easy for the patient or the health professional to face disease and suffering every day. For many patients, being ill is a fearful and even terrifying experience; having blood drawn only contributes to their anxiety. Patients reach out for comfort and reassurance through

conversation. Consequently, the phlebotomist must understand the unusual aspects of healthcare communication and its importance in comforting the patient.

Elements in Healthcare Communication

Communication between the health professional and patient is more complicated than normal interaction. Not only is it often emotionally charged, but in many instances, it also involves other people who are close to the patient and who may tend to be critical of the way the patient is treated. Recognizing the elements in healthcare communication—such as empathy, control, trust, respect, and confirmation—will help the phlebotomist interact with the patient successfully.

Empathy

Defined as identifying with the feelings or thoughts of another person, empathy is an essential factor in interpersonal relations. It involves putting yourself in the place of another and attempting to feel like that person. Thoughtful and sensitive people generally have a high degree of empathy. Empathetic health professionals help patients handle the stress of being in a healthcare institution. A health professional who recognizes the needs of the patient and allows the patient to express his or her emotions helps to validate the patient's feelings and gives the patient a very necessary sense of control.

Control

Feeling in control is essential to an individual's sense of well-being. People like to think that they can influence the way things happen in their lives. An important element relating to communication in the healthcare setting is recognizing fear in patients, which stems from a perceived lack of control. A hospital is one of the few places where individuals give up control over most of the personal tasks they normally perform. Many patients perceive themselves as unable to cope physically or mentally with events in a hospital because they feel fearful and powerless owing to this loss of control. Consequently, the typical response of the patient is to act angry, which characterizes him or her as a "bad patient," or to act extremely dependent and agreeable, which characterizes him or her as a "good patient."

A perceived lack of control may result in the patient refusing a procedure such as a blood draw. If a patient refuses to have blood drawn, the phlebotomist should allow that statement of control to be expressed and even agree with the patient. Patients who are given the chance to assert that right will often change their minds and agree to the procedure because then it is their decision. Sharing control with the patient may be difficult and often time-consuming, but awareness of the patient's need is important.

FYI: Phlebotomists can help patients feel in control by asking them for permission to draw their blood as opposed to simply stating that they are there to draw blood and assuming patients are willing if they do not voice an objection.

Trust

Another variable in the process of communication is trust. Trust, as defined in the healthcare setting, is the unquestioning belief by the patient that health professionals are performing their job responsibilities as well as they possibly can. As is true with most professionals, healthcare providers tend to emphasize their technical expertise while at times completely ignoring the elements of interpersonal communication that are essential in a trusting relationship with the patient. Having blood drawn is just one of the situations in which the consumer must trust the health professional. Developing trust takes time, and normally, phlebotomists spend very little time with each patient. Consequently, during this limited interaction, the phlebotomist must do everything possible to win the patient's confidence by always appearing knowledgeable, honest, and sincere.

Respect and Confirmation

Respect is shown in both a positive feeling for a person and in specific action demonstrating that positive feeling. It is an attitude that conveys an understanding of the importance of that person as an individual. Believing that all people are worthy of respect at some level is extremely important in healthcare communication. The effect of honoring and respecting the person as a unique individual is confirmation of the patient's presence and needs.

If a HCW shows disrespect for a patient, it cannot help but be noticed by the patient and may affect the patient's condition in a negative way. Too often, busy HCWs like phlebotomists resort to labeling patients when communicating with coworkers and even with patients themselves. They may say, for example, "Oh, you're the one with no veins" or "You're the bleeder, right?" Such communication is dehumanizing and is a subtle way of "disconfirming" patients. A confirming exchange with the patient in the first example could be, "Mrs. Jones, I seem to remember that we had a hard time finding a suitable vein last time we drew your blood." Or, in the second case, "Mr. Smith, wasn't there a problem getting the site to stop bleeding after the draw last time?"

In summary, by recognizing the elements of empathy, control, trust, respect, and confirmation, the phlebotomist can enhance communication with patients and assist in their recovery by making the interaction pleasant even when the blood draw is difficult. Understanding these communication elements will help when they

are used with other means of communication, such as using the telephone.

Telephone Communication

At present, the telephone is a fundamental part of communication. It is used 24 hours a day in the laboratory. To phlebotomists or laboratory clerks, it becomes just another source of stress, bringing additional work and uninvited demands on their time. The constant ringing and interruption of the workflow may cause laboratory personnel to overlook the effect their style of telephone communication has on the caller. To maintain a professional image, every person given the responsibility of answering the phone should review proper protocol. Each one should be taught how to answer, put someone on hold, and transfer calls properly. To promote good communication, proper telephone etiquette (Table 1-3) should be followed.

Written Communication

Written communication in healthcare, whether written by hand or typed into a computer, including e-mail, must be clear, concise, accurate, and contain correct spelling, grammar, and punctuation. In addition, handwritten communication must be legible and written in ink. When documenting events or problems, write them down as soon as possible after the occurrence, and be as precise as possible when recording dates and times. Use work e-mail for work-related communication only. Respond to work-related e-mails in a timely manner, and use an automatic reply message if you will be off work and not checking your e-mail for more than 24 hours.

The Healthcare Setting

Virtually everyone in the United States becomes a healthcare consumer at some time. For many, working through the bureaucracy involved in receiving healthcare can be confusing. Healthcare personnel who understand how healthcare is organized and financed and their role in the system can help consumers obtain quality care with minimal repetition of services and therefore at lower cost.

FYI: The healthcare provider, such as the phlebotomist, in addition to being an employee of an institution that relies on third-party payers for a major portion of its income, is also a healthcare consumer.

Healthcare Delivery

There are three main levels of medical care currently delivered in the United States—primary, secondary, and tertiary.

- **Primary care** involves medical care by a physician or other healthcare professional who is the patient's main source for routine medical care and generally the patient's first contact with the healthcare system. The primary care professional coordinates all the patient's medical care and provides referrals to specialists if needed.
- **Secondary care** is medical care provided by a specialist or facility that has expertise in the problem or concern of a patient who has usually been referred by a primary care professional.
- **Tertiary care** is highly specialized medical or consultative care that often involves advanced and complex procedures for investigation and treatment of certain disorders or issues of a patient who has usually been referred by a primary or secondary healthcare professional.

Two general categories of facilities, **ambulatory** (outpatient) and **nonambulatory** (inpatient), support all three levels of healthcare. Nonambulatory facilities include hospitals and other facilities where treatment or care requires the patient to stay over one or more nights. Ambulatory facilities include hospital outpatient centers, clinics, surgery centers, physical therapy centers, and all sorts of other facilities where patients receive treatment or care but do not stay overnight. See Box 1-3 for a listing of services and practitioners associated with the two categories.

Nonambulatory Care and Inpatient Services

Hospitals are the largest provider of inpatient services. They are typically large organizations with a complex internal structure required to provide acute care to patients who need it. The term "hospital" can be applied to any healthcare facility that has the following four main characteristics:

- Permanent inpatient beds
- 24-hour nursing service
- Therapeutic and diagnostic services
- Organized medical staff

The healthcare delivery system in hospitals is designed to function 24 hours a day, seven days a week with high-quality service delivered every hour of the day. This means that the organizational structure has many layers of management arranged by departments or medical specialties. The lines of authority are structured so that functions and services are clustered under similar areas with an executive, such as a vice president, administering each area. This grouping allows for efficient management of the departments and a clear understanding of the chain of command by the specialized staff in each area. The private practice physicians at the hospital have been granted clinical privileges (i.e., permission to provide patient care at that facility)

Table 1-3. Proper Telephone Etiquette

Proper Etiquette	Communication Tips	Rationale
Answer promptly.		• If the phone is allowed to ring too many times, the caller may assume that the people working in the laboratory are inefficient or insensitive.
State your name and department.		• The caller has the right to know to whom he or she is speaking.
Be helpful.	Ask how you can be of help to the caller and facilitate the conversation. Keep your statements and answers simple and to the point to avoid confusion.	• When a phone rings, it is because someone needs something. Because of the nature of the healthcare business, the caller may be emotional and may benefit from hearing a calm, pleasant voice at the other end.
Prioritize calls.	Inform a caller if he or she is interrupting a call from someone else.	• It takes an organized person to coordinate several calls. Being able to triage is an important skill that takes a knowledgeable and experienced person to handle well.
	Always ask permission before putting a caller on hold in case it is an emergency that must be handled immediately.	• The caller needs to know where he or she is in the queue. Handling an important call or an emergency immediately will save the laboratory from problems in the future.
Transfer and put callers on hold properly.	Tell a caller when you are going to transfer the call or put it on hold, and learn how to do this properly. Note: Do not leave the line open, and do not keep the caller waiting too long.	• Disconnecting callers while transferring or putting them on hold irritates them. • Leaving the line open so that other conversations can be heard by the person on hold is discourteous and can compromise confidentiality. • Check back with the caller when on hold for longer than expected; this keeps him or her informed of the circumstance. • If a caller is waiting on hold too long, ask if he or she would like to leave a message.
Be prepared to record information.	Have a pencil and paper close to the phone. Listen carefully, which means clarifying, restating, and summarizing the information received.	• Documentation is necessary when answering the phone at work to ensure that accurate information is transmitted to the necessary person. • Reading back the information when complete is one of the best ways to ensure it is correct.
Know the laboratory's policies.	Make answers consistent by learning the laboratory's policies.	• People who answer the telephone must know the laboratory policies to avoid giving the wrong information. Misinformation given to the patient can result in unnecessary worry and additional expense. • Consistent answers help establish the laboratory's credibility, because a caller's perception of the lab involves more than just accurate test results.
Defuse hostile situations.	When a caller is hostile, you might say, "I can see why you are upset. Let me see what I can do."	• Some callers become angry because of lost results or errors in billing. • Validating a hostile caller's feelings will often defuse the situation. • After the caller has calmed down, the issue can be addressed.
Try to assist everyone.	If you are uncertain, refer the caller to someone who can address the caller's issue. Remind yourself to keep your attention on one person at a time.	• It is possible to assist callers and show concern even if you are not actually answering their questions. • Validate callers' requests by giving a response that tells them something can be done. • Sincere interest in the caller will enhance communication and contribute to the good reputation of the laboratory.

BOX 1-3

TWO CATEGORIES OF HEALTHCARE FACILITIES

Ambulatory/Outpatient	Nonambulatory/Inpatient
Principal source of healthcare services for most people	The key resource and center of the American healthcare system
Offers routine care in physician's office and specialized care in a freestanding ambulatory setting	Offers specialized instrumentation and technology to assist in unusual diagnoses and treatments
Serves primary care physicians (PCPs) who assume ongoing responsibility for maintaining patients' health	Serves tertiary care (highly complex services and therapy) practitioners; usually requires that patients stay overnight or longer
Serve secondary care physicians (specialists) who perform routine surgery, emergency treatments, therapeutic radiology, and so on in same-day service centers	Examples are acute care hospitals, nursing homes, extended care facilities, hospices, and rehabilitation centers

by a hospital-governing board. These members of the medical team are not actual employees of the facility. However, many hospitals directly employ radiologists, critical care specialists, hospitalists, and a general physician who assumes the care (admission and ongoing treatment) of inpatients in the place of a PCP.

Ambulatory Care and Outpatient Services

Changes in healthcare practices that have significantly decreased the amount of time a patient spends in tertiary care or the hospital have led to innovative ways to provide care, including a wide range of ambulatory services defined as medical care delivered on an outpatient basis. These services include observation, diagnosis, treatment, and rehabilitation for patients who either do not require an overnight stay in a healthcare facility or, after having been discharged from the hospital, still require follow-up procedures.

Ambulatory care is generally classified into two types: (a) freestanding medical care settings and hospital-owned clinics and (b) outpatient departments and urgent care facilities. In recent times, outpatient demands have fallen heavily on hospital emergency departments (EDs), which are a very costly way of delivering care and distract the staff from true emergencies.

Today, urgent care centers are a way to decrease the overcrowded emergency rooms and provide significant savings to patients and insurers. These centers were designed to bridge the gap between an injury that is too urgent to wait for an appointment with a PCP and a life-threatening situation that calls for a trip to the emergency room. Over the past several decades, the industry has continued to expand and to gain respect as a viable place to receive care when a person cannot get into a "regular" physician office.

Key Point: Many homebound elderly and those in hospice require ambulatory services where they reside, either in their homes or in assisted living facilities. Usually, a home healthcare agency coordinates the services that the physician has ordered. These agencies employ nurses, respiratory therapists, physical therapists, phlebotomists, and other HCWs to provide these services.

Public Health Service

Another way of delivering healthcare to the citizens of the United States is through the **Public Health Service (PHS)**. The mission of this primary division under the Department of Health and Human Services (HHS) is to promote the protection and advancement of the nation's physical and mental health. It does so by sponsoring and administering programs for the development of health resources, prevention and control of diseases, and dealing with drug abuse. PHS agencies at the local or state level offer defense against infectious diseases that might spread among the populace. These agencies constantly monitor, screen, protect, and educate the public (see Box 1-4

BOX 1-4

EXAMPLES OF SERVICES PROVIDED BY LOCAL HEALTH DEPARTMENTS

Vital statistics collection	Tuberculosis screening
Health education	Immunization and vaccination
Cancer, hypertension, and diabetes screening	Operation of health centers
Public health nursing services	Sexually transmitted disease (STD) clinics

for examples of services provided by local health departments). Public health departments provide their services for little or no charge to the entire population of a region, with no distinction between rich or poor, simple or sophisticated, interested or disinterested. Public health facilities offer ambulatory care services through clinics, much like those in hospital outpatient areas, military bases, and Veterans Administration and Indian Health Service facilities.

FYI: Because containment of healthcare costs is the driving force behind major changes to healthcare coverage, proactive public health programs are increasing as a way to significantly reduce overall healthcare costs.

Healthcare Financing

Healthcare is expensive, and the cost continues to escalate. Paying for healthcare services involves multiple payers and numerous mechanisms of payment. In an effort to remove barriers to quality and affordable healthcare, lawmakers have attempted to create and recreate mechanisms for distribution and funding of healthcare on state and national levels. Attempts at insurance market reform such as the Affordable Care Act (ACA) passed in 2013 are efforts to provide the consumer with insurance options and increased accessibility to affordable healthcare. As part of the ACA law, everyone in the United States is to have access to healthcare, and no one can be denied coverage or charged more for pre-existing conditions by insurance companies or third-party payers.

Key Point: An important component in ensuring that the healthcare system is sustainable is the primary care physician (PCP). It has been shown that consistent primary care results in better health outcomes and lower spending, including avoidable emergency room visits and hospital care.

Third-Party Payers

A **third-party payer** can be an insurance company, the federal government, a managed care program, or a self-insured company that pays for healthcare services on behalf of its employees. Payment methods used may be either direct or indirect. Payments to the provider by the patient are referred to as direct pay, self-pay, or out-of-pocket pay. Indirect pay involves a third party other than the patient (first party) or the healthcare provider (second party). Some healthcare providers are even beginning to contract directly with the employers to provide healthcare, thus eliminating insurance carriers. Third-party payers have greatly influenced the direction of medicine.

In the past decade, major changes have come about in healthcare payments and third-party reimbursements. Table 1-4 shows methods of payment and coding that have been used to standardize healthcare expenses.

Diagnosis and Billing Codes

Healthcare organizations face major challenges in remaining fiscally strong in the coming years due to sweeping

Table 1-4. Methods of Payment and Diagnosis Coding

	Abbreviation	Description
Method of Payment		
Prospective payment system	PPS	Begun in 1983 to limit and standardize the Medicare/Medicaid payments made to hospitals
Diagnosis-related groups	DRGs	Originally designed by the American Hospital Association, hospitals are reimbursed a set amount for each patient procedure using established disease categories
Ambulatory patient classification	APC	A classification system implemented in 2000 for determining payment to healthcare facilities for Medicare and Medicaid patients only
Fee for service	FFS	Traditional payment model of reimbursement for healthcare services by third-party payers to the healthcare provider after service is rendered
Diagnosis Codes		
International Classification of Diseases, 9th rev., Clinical Modification	ICD-9-CM	Used in the past by all major payers; it grouped together similar diseases and operations for reimbursement
International Classification of Diseases, 10th rev., Clinical Modification	ICD-10-CM	For coding of diagnoses; contains more codes and covers more content than ICD-9
International Classification of Diseases, 10th rev., Procedural Coding System	ICD-10-PSC	A procedural classification system for use only in the United States inpatient hospital settings; a clinical modification of ICD-10 that has a much broader range of codes with room for expansion and greater specificity

reforms in this industry. For that reason, it is imperative that all services be billed correctly and as quickly as possible, but with the advent of new technologies and electronic transfer of data, billing has become even more challenging. The lack of standardization and confusion in the diagnostic and procedural coding led to the passage in 1996 of HIPAA. This bill was designed to improve the efficiency of the healthcare system by establishing standards for electronic data exchange, including coding systems. The goal of HIPAA regulations is to move to one universal procedural coding system (PCS) as the future standard. In 2014, the **Centers for Medicare and Medicaid Services (CMS)**, the federal agency that manages Medicare and Medicaid programs, replaced the list of procedure codes called ICD-9-CM with a new code set called the PCS or better known as **ICD-10-PCS**, the **International Classification of Diseases—Tenth Revision, Procedural Coding System**. The new coding system must be used by all HIPAA-covered entities. ICD-9 diagnosis and procedure codes can no longer be used.

The **current procedural terminology (CPT)** codes were originally developed in the 1960s by the American Medical Association to provide a terminology and coding system for physician billing. Physicians' offices have continued to use it to report their services. Now all types of healthcare providers use CPT to classify, report, and bill for a variety of healthcare services. In 2014, when the new ICD-10-PCS procedure codes became available for use in inpatient settings, the CPT procedure codes remained the codes used by physicians for reporting procedures in ambulatory settings and for their professional services in inpatient settings.

Reimbursement

The history of institutional reimbursement is tied to federal programs such as Medicare, and public welfare in the form of Medicaid, both started in 1965 and run by CMS. **Medicare** is a medical insurance program that primarily serves individuals over age 65 and certain younger individuals who are disabled or on dialysis. **Medicaid** is an assistance program that serves low-income individuals of any age. Although Medicaid is a federal program, each state is responsible for sharing the cost and administering the Medicaid funding at the state level.

A comparison of Medicare and Medicaid programs is listed in Box 1-5.

BOX 1-5

MEDICARE AND MEDICAID PROGRAM COMPARISON

Medicare	Medicaid
First enacted in 1965	First enacted in 1965
Federally funded insurance program that serves individuals over age 65, regardless of income, and to certain younger individuals who are disabled, or are dialysis patients	Federal and state medical assistance program that serves low-income individuals of any age
Program is run by CMS and is basically the same throughout the United States	Program is run by state and local governments within federal guidelines, and varies from state to state
Medical bills are paid from trust funds paid into over the years by those covered. Patients pay some costs through deductibles for hospital and other costs, and monthly premiums for non-hospital coverage	Patients usually pay no part of costs for covered medical expenses, although a small co-payment is sometimes required
An entitlement program because it is a right earned by individuals through employment	No entitlement feature; recipients must prove their eligibility
Financed through Social Security payroll deductions and copayments	Funds come from federal grants and state and local governments and are administered by the state
Two main choices of coverage: 1. Original Medicare: includes hospital insurance (Part A) and medical insurance (Part B) to which you can add optional supplementary medical insurance (SMI), and prescription drug coverage (Part D) 2. Medicare Advantage (Part C): includes Part A and Part B through private companies; adding Part D is optional	Benefits cover inpatient care, outpatient care and diagnostic services, skilled nursing facilities, and home health and physician services

FYI: Details about Medicaid in individual states can be found at: https://www.medicaid.gov/medicaid/by-state/by-state.html.

Law and Ethics: A healthcare facility may not want to treat patients who are uninsured or unable to pay. In emergency situations, providing treatment is not only the ethical thing to do, it is required by law. The Emergency Medical Treatment and Labor Act (EMTALA) passed in 1986 requires Medicare-participating hospitals (which includes most hospitals in the United States) that offer emergency services to provide a medical screening exam (MSE) and emergency medical stabilization to anyone having a medical emergency (including active labor) regardless of insurance status or ability to pay. If the facility is unable to stabilize the patient or if the patient requests, the hospital may transfer care to a facility that is able to provide the necessary care. As an employee of a healthcare facility, it is important to know your responsibilities when encountering someone having a medical emergency at the facility.

Accountable Care Organizations

Healthcare systems are currently undergoing major revisions due to an environment that many see as fragmented and wasteful. The driving force behind these changes is the ever-increasing demands on healthcare services to deliver patient-centered care and improve outcomes at a much lower cost. One of the goals of the ACA was to streamline the delivery of healthcare by reducing duplication through a new kind of integrated care offered by an accountable care organization (ACO). An ACO is a network of hospitals, physicians, and other healthcare providers who voluntarily offer to coordinate care for their Medicare patients. In an ACO, the providers are jointly accountable for the health of their patients, giving them financial incentive to cooperate and seamlessly share information to avoid unnecessary testing and expense.

If the ACO succeeds in offering quality patient care and spending less, it gets to share in the savings it achieves for the Medicare program. Today, all healthcare organizations and services find they must do more with less and have implemented some form of managed care to survive.

Managed Care

"Managed care" is a generic term for a payment system that attempts to control cost and access to healthcare and strives to meet high-quality standards. Some of the methods used to control costs include

- limiting the providers that the enrollee/patient can use.
- use of PCPs as gatekeepers to control referrals.
- use of case managers to monitor and coordinate patients.
- utilization review of all healthcare services.

Most managed care systems do not provide medical care to enrollees; instead, they contract with healthcare facilities, physicians, and other healthcare providers to supply medical services to the enrollees/clients in the plan.

Benefits or payments paid to the provider are based on a set fee schedule, and enrollees must comply with managed care policies such as preauthorization for certain medical procedures and approved referral to specialists for claims to be paid. Because the association of provider, payer, and consumer is the foundation of managed care systems, several concepts have been developed to control this relationship, including gatekeepers and large services networks.

Case Management

One of the most important concepts in managed care is that of the designated case manager (primary care provider, gatekeeper), whose responsibility is to coordinate all of a patient's healthcare. The case manager is an experienced healthcare professional, not necessarily a physician, who knows the patient's condition and needs and where available resources for support and treatment can be found. As the patient's advocate, this person has the responsibility to advise the patient on healthcare needs and coordinate responses to those needs. The case manager's responsibilities also include providing early detection and treatment for disease, which can reduce the total cost of care.

Network Service Systems

Today's large **managed care organizations (MCOs)** evolved from prepaid healthcare plans such as **health maintenance organizations (HMOs)** and **preferred provider organizations (PPOs)**. HMOs are group practices reimbursed on a prepaid, negotiated, and discounted basis of admission. PPOs are independent groups of physicians or hospitals that offer services to employers at discounted rates in exchange for a steady supply of patients. MCOs contract with local providers to establish a complete network of services. The goal of the MCO is to reduce the total cost of care while maintaining patient satisfaction, and this can best be done if the patient can get the right care from the right provider at the right time. To accomplish this, integrated delivery networks (IDNs), also called IDSs, have been developed. An IDN or IDS is a healthcare provider that includes several associated medical facilities that can furnish coordinated healthcare

services from pre-birth to death. Some of the institutions through which the services are offered along this continuum of care are acute care hospitals, ambulatory surgery centers, physician office practices, outpatient clinics, pharmacies, rehabilitation centers, and skilled nursing facilities (SNFs). The focus of an IDN arrangement is holistic, coordinated, cost-effective care rather than fragmented care performed by many medical specialists.

Medical Specialties

In managed care, the primary physician is most often a family practitioner, pediatrician, or internist. As a manager of a person's care, he or she is expected to refer to the appropriate specialist as needed. Some of the many healthcare areas in which a doctor of medicine (MD) or doctor of osteopathy (DO) can specialize are listed in Table 1-5.

Managed care has led to a reduction in the number of healthcare personnel, whereas the number of services remains the same. This has resulted in cross-trained personnel and the continuous consolidation of services. Such reengineering, as it is called, is designed to make the healthcare delivery system more process-oriented and customer-focused. This shift in design brings significant savings with the efficient use of supplies and space, thereby reducing costs and increasing productivity. Although the lines between former departments are becoming blurred, Table 1-6 shows the hospital service areas that are typically considered essential.

Clinical Laboratory Services

Clinical laboratory (lab) services perform tests on patient specimens. Results of testing are used by physicians to confirm health or aid in the diagnosis, evaluation, and monitoring of patient medical conditions. Clinical labs are typically located in hospitals, large reference laboratories, and outpatient clinics.

Traditional Laboratories

There are two major divisions in the clinical laboratory, the clinical analysis area and the anatomic and surgical pathology area. All laboratory testing is associated with one of these two areas (Box 1-6). Like hospitals, large laboratories have organizational arrangements based on management structure or hierarchy. People who do similar tasks are grouped into departments (Fig. 1-8), the goal being to perform each task accurately, efficiently, and cost-effectively, while producing reliable test results.

Match laboratory departments with laboratory tests in Matching Exercise 1-4 in the WORKBOOK.

Clinical Analysis Areas

The clinical analysis area is usually the largest area of a medical laboratory, performing the most tests, and

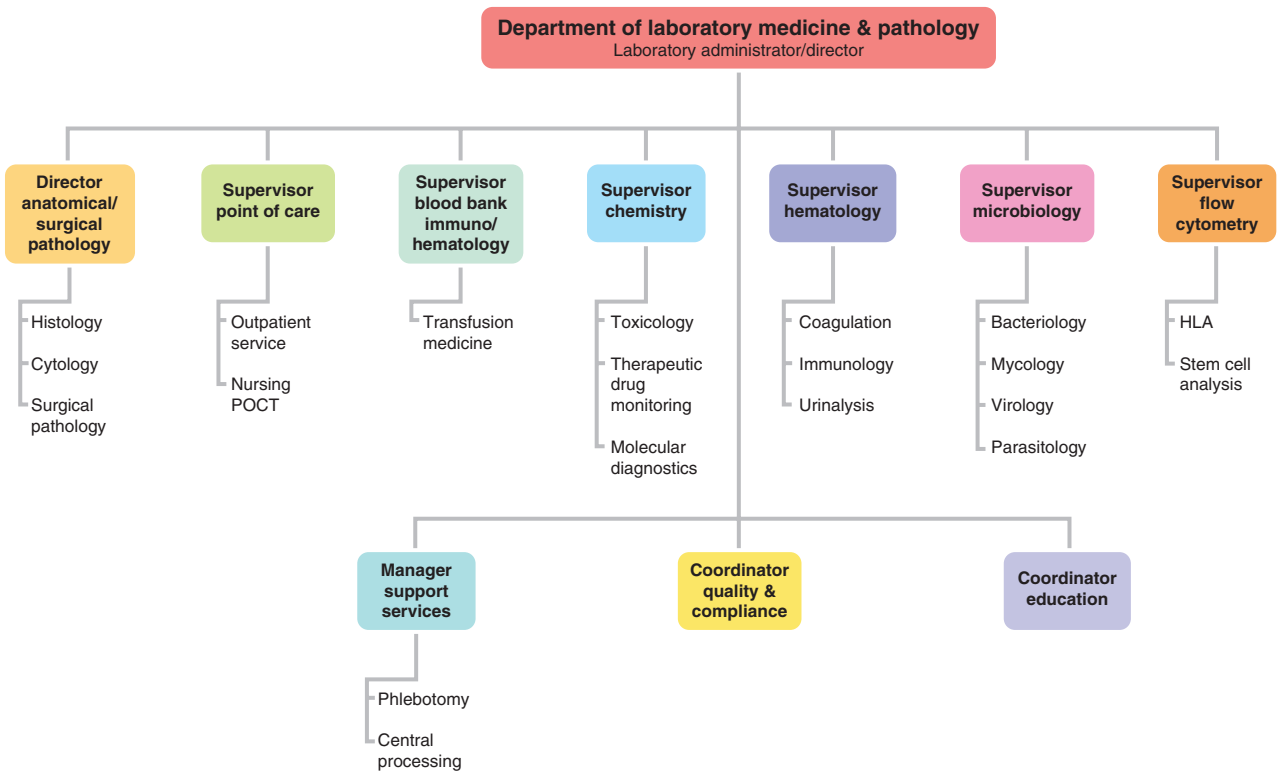

Figure 1-8. An example of a clinical laboratory organizational chart.

Table 1-5. Medical Specialties

Specialty	Area of Interest	Specialist Title
Allergy and immunology	Disorders of the immune system resulting in hypersensitivity	Allergist–immunologists
Anesthesiology	Partial or complete loss of sensation, usually by injection or inhalation	Anesthesiologist
Cardiology	Diseases of the heart and blood vessels and cardiovascular surgery, a subspecialty of internal medicine	Cardiologist
Dermatology	Diseases and injuries of the skin; concerned with skin cancer prevention	Dermatologist
Emergency medicine	Emergent or acute medical care due to trauma, accident, or major medical event	Physician, medical specialist
Endocrinology	Disorders of the endocrine glands, such as sterility, diabetes, and thyroid problems	Endocrinologist
Family medicine	Continuous and comprehensive healthcare for individuals and family	General or family practitioner
Gastroenterology	Digestive tract and related structural diseases, a subspecialty of internal medicine	Gastroenterologist
Gerontology	Effects of aging and age-related disorders	Gerontologist
Hematology	Disorders of the blood and blood-forming organs	Hematologist
Infectious diseases	Contagious and noncontagious infections caused by pathogenic microorganisms	ID specialist
Inpatient care	General medical care of hospitalized patients	Hospitalist
Internal medicine	Diseases of internal organs and general medical conditions; uses nonsurgical therapy	Internist
Nephrology	Diseases related to the structure and function of the kidney	Nephrologist
Neurology	Disorders of the brain, spinal cord, and nerves	Neurologist
Obstetrics and gynecology	Pregnancy, childbirth, disorders of the reproductive system, and menopause	Gynecologist
Oncology	Tumors, including benign and malignant conditions	Oncologist
Ophthalmology	Eye examinations, eye diseases, and surgery	Ophthalmologist
Orthopedics	Disorders of the musculoskeletal system, including preventing disorders and restoring function	Orthopedist
Otorhinolaryngology	Disorders of the ear, nose, and throat (ENT) and related structures of the head and neck	Otorhinolaryngologist
Pathology	Examination of tissues, cells, and body fluids for evidence of disease	Pathologist
Pediatrics	Diseases of children from birth to adolescence, including wellness checks and vaccinations	Pediatrician
Primary care physician	Undiagnosed health-related issues and continuous care for varied medical conditions	General practitioner
Psychiatry	Mental illness, clinical depression, and other behavioral and emotional disorders	Psychiatrist
Pulmonary medicine	Function of the lungs; treatment of disorders of the respiratory system	Pulmonologist
Rheumatology	Rheumatic diseases (acute and chronic conditions characterized by inflammation and joint disease)	Rheumatologist
Sports medicine	Injuries or illnesses resulting from participation in athletic activities	Sports medicine specialist
Urology	Urinary tract disease and disorders of the male reproductive system	Urologist

Table 1-6. Essential Service Areas of a Hospital

Service Area	Departments Within Area	Services Performed
Patient care services	Nursing care	Direct patient care. Includes careful observation to assess conditions, administering medications and treatments prescribed by a physician, evaluation of patient care, and documentation in the health record that reflects this. Staffed by many types of nursing personnel including registered nurses (RNs), licensed practical nurses (LPNs), and certified nursing assistants (CNAs)
	Emergency services	Around-the-clock service designed to handle medical emergencies that call for immediate assessment and management of injured or acutely ill patients. Staffed by specialists such as emergency medical technicians (EMTs) and physicians who specialize in emergency medicine
	Intensive care units (ICUs)	Designed for increased bedside care of patients in fragile condition. Found in many areas of the hospital and named for the type of patient care they provide (e.g., trauma ICU, pediatric ICU, medical ICU)
	Surgery	Concerned with operative procedures to correct deformities and defects, repair injuries, and cure certain diseases. All work is performed by licensed medical practitioners who specialize in surgery
Support services	Central supply	Prepares and dispenses all the necessary supplies required for patient care, including surgical packs for the operating room, intravenous pumps, bandages, syringes, and other inventory controlled by computer for close accounting
	Dietary services	Selects foods and supervises food services to coordinate diet with medical treatment
	Environmental services	Includes housekeeping and groundskeepers whose services maintain a clean, healthy, and attractive facility
	Health information technology	Maintains accurate and orderly records for inpatient medical history, test results and reports, and treatment plans and notes from doctors and nurses to be used for insurance claims, legal actions, and utilization reviews
Professional services	Cardiodiagnostics (EKG or ECG)	Performs electrocardiograms (EKGs/ECGs, or actual recordings of the electrical currents detectable from the heart), Holter monitoring, and stress testing for diagnosis and monitoring of therapy in cardiovascular patients
	Pathology and clinical laboratory	Performs highly automated and often complicated testing on blood and other body fluids to detect and diagnose disease, monitor treatments, and, more recently, assess health. There are several specialized areas of the laboratory called departments or clinical laboratory areas (see Box 1-6)
	Electroneurodiagnostic technology (ENT) or electroencephalography (EEG)	Performs electroencephalograms (EEGs), tracings that measure electrical activity of the brain. Uses techniques such as ambulatory EEG monitoring, evoked potentials, polysomnography (sleep studies), and brain wave mapping to diagnose and monitor neurophysiological disorders
Professional services	Occupational therapy (OT)	Uses techniques designed to develop or assist mentally, physically, or emotionally disabled patients to maintain daily living skills
	Pharmacy	Prepares and dispenses drugs ordered by physicians; advises the medical staff on selection and harmful side effects of drugs, therapeutic drug monitoring, and drug use evaluation
	Physical therapy (PT)	Diagnoses physical impairment to determine the extent of disability and provides therapy to restore mobility through individually designed treatment plans
	Respiratory therapy (RT)	Diagnoses, treats, and manages patients' lung deficiencies (e.g., analyzes arterial blood gases [ABGs], tests lung capacity, administers oxygen therapy)
	Diagnostic radiology services	Diagnoses medical conditions by taking x-ray films of various parts of the body. Uses latest procedures, including powerful forms of imaging that do not involve radiation hazards, such as ultrasound machines, magnetic resonance (MR) scanners, and positron emission tomography (PET) scanners

BOX 1-6

TWO MAJOR DIVISIONS IN THE CLINICAL LABORATORY

Clinical Analysis Areas	Anatomical and Surgical Pathology
Specimen processing, hematology, chemistry, microbiology, blood bank/ immunohematology, immunology/serology, and urinalysis	Tissue analysis, cytologic examination, surgical biopsy, frozen sections, and performance of autopsies

BOX 1-7

EXAMPLE OF A RISK PANEL OF TESTS FOR CARDIOVASCULAR ASSESSMENT

- Apolipoprotein B (ApoB), the primary component of LDL
- 9p21, the strongest genomic marker for coronary artery disease
- N-terminal prohormone of brain natriuretic peptide (NT-proBNP)
- High-sensitivity C-reactive protein (hsCRP)
- Homocysteine, elevated levels increase risk for heart and blood vessel disease
- Fibrinogen, a biomarker associated with cardiovascular disease

consequently producing the most test results. The following are typical clinical analysis areas or departments.

Chemistry

Chemistry in a medical laboratory is concerned with the detection and measurement of chemical substances in body fluids. This department typically performs the most laboratory tests. It may have subsections such as toxicology, therapeutic drug monitoring, and molecular diagnostics. Highly automated computerized instruments (Fig. 1-9) used in this area can perform discrete (individualized) tests or metabolic panels (multiple tests) from a single sample. Because there are often several tests for various conditions, risk panels that include a battery of tests for a specific organ or body system can also be performed. An example of a risk panel of tests for cardiovascular assessment is shown in Box 1-7. Examples of other panels that might be ordered to evaluate a single organ or specific body system are listed in Table 1-7.

FYI: The use of genetic markers like a locus (position) on a chromosome (e.g., locus 9p21 associated with coronary artery disease and heart attack) is the new medical model for customized healthcare or personalized medicine (PM).

The two most common chemistry specimens are serum (fluid separated from clotted blood) and plasma (fluid separated from blood that has been prevented from clotting). Other types of specimens tested include whole blood (blood that has been prevented from clotting), urine, and various other body fluids. Examples of tests normally performed in chemistry can be found in Appendix A.

Hematology

Hematology is the study of the blood and blood-forming tissues. The hematology department performs laboratory tests that discover, identify, and monitor diseases and other problems associated with blood and blood-forming tissues. Most hematology tests are performed on samples of whole blood collected in tubes with lavender stoppers. The most commonly ordered hematology test is the complete blood count (CBC). The CBC is performed using automated instruments (Fig. 1-10) that electronically count the blood cells and calculate results. A CBC

Figure 1-9. Laboratory chemists monitor and review chemistry results from the cobas® 6000 chemistry analyzer.

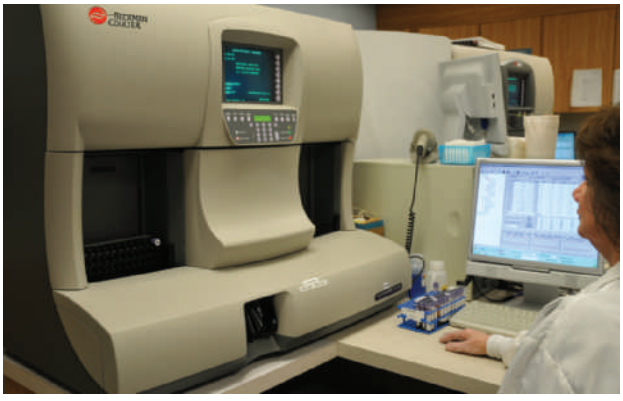

Figure 1-10. A medical technologist checks CBC results on the Beckman Coulter® LH780 Hematology Analyzer.

Table 1-7. Disease- and Organ-Specific Chemistry Panels (CMS-Approved)

Panel Grouping	Battery of Selected Diagnostic Tests
Basic metabolic panel (BMP)	Glucose, blood urea nitrogen (BUN), creatinine, sodium, potassium, chloride, carbon dioxide (CO_2), calcium
Comprehensive metabolic panel (CMP)	Albumin, glucose, BUN, creatinine, sodium, potassium, chloride, CO_2, aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase, total protein, total bilirubin, calcium
Electrolyte panel	Sodium, potassium, chloride, CO_2
Hepatic function panel A	AST, ALT, alkaline phosphatase, total protein, albumin, total bilirubin, direct bilirubin
Lipid panel	Cholesterol, lipoprotein, high-density cholesterol (HDL) triglycerides
Renal function panel	Glucose, BUN, creatinine, sodium, potassium, chloride, CO_2, calcium, albumin, phosphorus

is a multipart assay typically reported on a form called a hemogram (Table 1-8).

Misconception Alert: Do not confuse hematology tests with microbiology tests like some students did who answered the following question from Wolters Kluwer's adaptive learning systems, powered by PrepU:

Which department performs blood cultures?

Forty percent of the students who answered this question mistakenly chose "Hematology." The students may have been confused by the word "blood," because hematology tests such as cell counts are performed on whole blood. However, a blood culture is also performed on whole blood, but it is a test that is looking for microbes in the blood. The most common microbiology tests are culture and sensitivity tests. A culture detects any microbes in a specimen. A sensitivity test is performed when a microbe is detected to determine which antibiotics will be effective against it. Consequently, a blood culture would be performed in the microbiology department.

Table 1-8. Hemogram for Complete Blood Count (CBC) Assay

Name of Test	Abbreviation	Examples of Clinical Significance
Hematocrit	Hct	Values correspond to the red cell count and hemoglobin level; when decreased, indicate anemic conditions
Hemoglobin	Hgb	Decreased values indicate anemic conditions; values normally differ with age, sex, altitude, and hydration
Red blood cell count	RBC count	Measure of erythropoietic activity; decreases in numbers are related to anemic conditions
White blood cell count	WBC count	Abnormal leukocyte response indicative of various conditions, such as infections and malignancies; when accompanied by low WBCs, differential test becomes more specific
Platelet count	Plt count	Decreased numbers are indicative of hemorrhagic diseases; values may be used to monitor chemotherapy or radiation treatments
Differential white count	Diff	Changes in the appearance or number of specific cell types signify specific disease conditions; values are also used to monitor chemotherapy or radiation treatments
Indices		Changes in RBC size, weight, and Hgb content indicate certain types of anemias
Mean corpuscular hemoglobin	MCH	Reveals the weight of the hemoglobin in the cell, regardless of size. Decreased hemoglobin content is indicative of iron-deficiency anemia; increased hemoglobin content is found in macrocytic anemia
Mean corpuscular volume	MCV	Reveals the size of the cell. Decreased MCV is associated with thalassemia and iron-deficiency anemia; increased MCV suggests folic acid or vitamin B12 deficiency and chronic emphysema
Mean corpuscular hemoglobin concentration	MCHC	Reveals the hemoglobin concentration per unit volume of RBCs. Below-normal range means that RBCs are deficient in hemoglobin, as in thalassemia, overhydration, or iron-deficiency anemia; above-normal range is seen in severe burns, prolonged dehydration, and hereditary spherocytosis
Red blood cell distribution width	RDW	Reveals the size differences of the RBCs. An early predictor of anemia before other signs and symptoms appear

Table 1-9. Common Coagulation Tests

Test	Examples of Clinical Significance
Activated partial thromboplastin time (aPTT)	Prolonged times may indicate stage 1 defects; values reflect adequacy of heparin therapy
D-dimer	Evaluates thrombin and plasmin activity and is very useful in testing for disseminated intravascular coagulation (DIC); also used in monitoring thrombolytic therapy
Fibrin split products (FSP)	High levels result in FDP fragments that interfere with platelet function and clotting
Fibrinogen	Fibrinogen deficiency suggests hemorrhagic disorders and is used most frequently in obstetrics
Prothrombin time (PT) or international normalized ratio (INR)	Prolonged times may indicate stage 2 and 3 coagulation defects; values are used to monitor warfarin therapy and to evaluate liver disease and vitamin K deficiency
Thrombin time (TT)	The main use for this test is to detect or exclude the presence of heparin or heparin-like anticoagulants when used in conjunction with other tests for evaluating unexplained prolonged clotting times

Coagulation

Coagulation is the study of the ability of blood to form and dissolve clots. Coagulation tests are closely related to hematology tests and are used to discover, identify, and monitor defects in the blood-clotting mechanism. They are also used to monitor patients who are taking medications called anticoagulants (chemicals that inhibit blood clotting) or "blood thinners." The two most common coagulation tests are the prothrombin time (PT), used to monitor warfarin therapy, and the activated partial thromboplastin time (aPTT), for evaluating heparin therapy. Most coagulation tests are performed on plasma that has been separated from a whole blood sample collected in a tube with a light-blue stopper. Common coagulation tests are shown in Table 1-9.

Serology or Immunology

The term "serology" means the study of serum. **Immunology** involves the study of the immune system. **Serology** tests are used to identify antibodies and antigens that are the body's response to the presence of bacterial, viral, fungal, or parasitic diseases. Immunology tests investigate immune system problems such as autoimmune reactions, in which autoantibodies produced by B lymphocytes attack normal cells. Immunology tests are also used to determine the compatibility of organs, other tissues, and bone marrow for transplant purposes. Testing can be done by polymerase chain reaction (PCR), enzyme-linked immunosorbent assay (ELISA), fluorescent antibodies, agglutination, or precipitation to determine the antibody or antigen present and to assess its concentration or titer. See Table 1-10 for common serology/immunology tests.

Urinalysis

Urinalysis (UA) is the analysis of urine. The UA department, which is often housed in the hematology or chemistry area, performs tests on urine specimens. The specimens may be analyzed manually or using automated instruments (Fig. 1-11). The most common urine test is called a UA. It is a routine test that includes physical, chemical, and microscopic evaluations (Table 1-11). The physical examination assesses the color, clarity, and specific gravity of the specimen. The chemical evaluation, which is usually performed using chemical reagent

Figure 1-11. A medical laboratory technician loads the Iris automated urine analyzer.

Table 1-10. Common Serology and Immunology Tests

Test	Examples of Clinical Significance
Bacterial Studies	
Antinuclear antibody (ANA)	Positive results indicate autoimmune disorders, specifically systemic lupus erythematosus
FTA-ABS	Fluorescent treponemal antibody absorption test, confirmatory test for syphilis
Rapid plasma reagin (RPR)	Positive screen indicates syphilis; positives must be confirmed
Viral Studies	
Human immunodeficiency virus (HIV) HIV-1 Ab HIV-2 Ab HIV p24 antigen HIV NAAT	Detects human immunodeficiency virus HIV-1 Ab and HIV-2 Ab can detect antibodies to HIV. (HIV-1 is the most common type of HIV in the U.S. HIV-2 is more common in Africa) HIV p24 antigen test can detect an HIV antigen 10–14 days after infection HIV nucleic acid amplification test (HIV NAAT) can detect HIV RNA seven to 14 days after infection
Cytomegalovirus antibody (CMV)	Screening for evidence of current or past infection
Epstein–Barr virus (EBV)	Presence of this heterophil antibody indicates infectious mononucleosis
Hepatitis B surface antigen (HBsAg)	Screens for the presence of an HBV antigen that indicates current HBV infection
Hepatitis C virus (HCV) HCV-ab (or anti-HCV) HCV-RNA	HCV-ab (or Anti-HCV) screens for the presence of HCV antibody, that indicates past exposure or current HCV infection. HCV-RNA identifies active HCV infection
General Studies	
Cold agglutinins	Detects cold-reacting autoantibodies that destroy RBCs when the person is exposed to cold temperatures. High levels can cause anemia. Levels also increase with lymphoma and some infections such as mycoplasma pneumonia
High-sensitivity C-reactive protein (hs-CRP)	Increased levels of this protein are present in inflammatory conditions
Human chorionic gonadotropin (HCG)	Confirms pregnancy because it is a hormone produced by cells in the developing placenta. It appears in serum and urine by 14 days after conception
Immunoglobulins	Can show presence of five subclasses of antibodies made by immune system to neutralize foreign antigens, such as bacteria or toxins
Rheumatoid factor (RF)	Presence of antibody indicates rheumatoid arthritis

strips, screens for substances such as sugar and protein, and can be read by hand, visually, or with a urine analyzer. A microscopic examination establishes the presence or absence of blood cells, bacteria, crystals, and other substances.

Microbiology

The **microbiology** department analyzes blood and other body fluids and tissues for the presence of microorganisms, primarily by means of **culture and sensitivity (C&S)** testing. A culture grows and identifies organisms that are in the urine, and a sensitivity test identifies antibiotics that will be effective against them. Results of a C&S tell the physician the type of organisms present and the antibiotics that would be most effective for treatment. An automated, computerized identification and susceptibility testing system (Fig. 1-12) allows for continuous monitoring, customized antibiotic panels, and the reporting of results more quickly. It is very important to collect, transport, and handle microbiology specimens properly to accurately determine the presence of microorganisms and identify them appropriately. An instrument (Fig. 1-13) used only for detection of bloodstream infections makes observation and identification of microbial growth in blood culture vials much more efficient.

Figure 1-12. A microbiologist checks a computer readout for antibiotic sensitivities from the BD Phoenix™ automated microbiology system.

Table 1-11. Tests Included in a Complete Urinalysis (UA)

Test	Examples of Clinical Significance
Physical Evaluation	
Color	Abnormal colors that are clinically significant result from blood melanin, bilirubin, or urobilin in the sample
Clarity	Turbidity may be the result of chyle, fat, bacteria, RBCs, WBCs, or precipitated crystals
Specific gravity	Variation in this indicator of dissolved solids in the urine is normal; inconsistencies suggest renal tubular involvement or ADH deficiency
Chemical Evaluation	
Blood	Hematuria may be the result of hemorrhage, infection, or trauma
Bilirubin	Aids in differentiating obstructive jaundice from hemolytic jaundice, which will not cause increased bilirubin in the urine
Glucose	Glucosuria (excretion of glucose in the urine) could be the result of diabetes mellitus, renal impairment, or ingestion of a large amount of carbohydrates
Ketones	Elevated ketones occur in uncontrolled diabetes mellitus and starvation
Leukocyte esterase	Certain white cells (neutrophils) in abundance indicate urinary tract infection
pH	Variations in pH indicate changes in acid–base balance, which is normal; loss of ability to vary pH is indicative of tissue breakdown
Protein	Proteinuria is an indicator of renal disorder, such as injury and renal tube dysfunction
Nitrite	Positive result suggests bacterial infection but is significant only on first-morning specimen or urine incubated in bladder for at least four hours
Urobilinogen	Occurs in increased amounts when patient has hepatic problems or hemolytic disorders
Microscopic Evaluation	Analysis of urinary sediment reveals status of the urinary tract, hematuria, or pyuria; the presence of casts and tissue cells is a pathologic indicator

Misconception Alert: Some students have confused microscopic examinations done in the urinalysis department with microbiology tests. For example, when confronted with the following question in Wolters Kluwer's adaptive learning systems, powered by PrepU:

> For the presence of crystals, casts, bacteria, and blood cells.

This department examines specimens microscopically thirty-seven percent of the students mistakenly chose "microbiology." The word "bacteria" may have confused them because one of the most common tasks of the microbiology department is to perform tests that identify bacteria. However, crystals and casts are elements sometimes found in urine specimens. One of the tasks of the urinalysis department is to perform microscopic examinations of urine specimens to look for crystals and casts, as well as bacteria and blood cells.

Figure 1-13. A microbiologist reviews blood cultures processed by the BD BACTEC™ FX blood culture instrument.

Subsections of microbiology are bacteriology (the study of bacteria), parasitology (the study of parasites), virology (the study of viruses), and mycology (the study of fungi). Most recently, the mycology section in larger laboratories is using DNA-based testing to identify invasive fungal infections (IFIs) that have become an important issue for patients who are very sick and lack the ability to fight infection. See Table 1-12 for a list of common microbiology tests.

FYI: Patients who have suppressed immune systems due to aggressive chemotherapy for cancer, organ, and stem cell transplants are susceptible to unusual types of yeast infections that can be deadly unless correctly detected and identified.

Table 1-12. Common Microbiology Tests

Test	Examples of Clinical Significance
Acid-fast bacilli (AFB)	Positive stain means pulmonary tuberculosis (TB); used to monitor the treatment of TB
Blood culture	Positive culture results (bacterial growth in media) indicate bacteremia or septicemia
CLO test	Presence of *Helicobacter pylori*
Culture and sensitivity (C&S)	Growth of a pathogenic microorganism indicates infection (culture); in vitro inhibition by an antibiotic (sensitivity) allows the physician to select the correct treatment
Fungus culture and identification	Positive culture detects the presence of fungi and determines the type
Gram stain	Positive stain for specific types of pathogenic microorganisms permits antimicrobial therapy to begin before culture results are known
Occult blood	Positive test indicates blood in the stool, which is associated with gastrointestinal bleeding from carcinoma
Ova and parasites	Microscopic examination of stool sample showing ova and parasites solves many "etiology unknown" intestinal disorders
Viral studies	Tests used to detect or confirm exposure to infection-causing viruses

Blood Bank or Immunohematology

The **blood bank** or **immunohematology** department of the laboratory prepares blood products to be used for patient transfusions. Blood components dispensed include whole blood, platelets, packed cells, fresh frozen plasma, and cryoprecipitates. Blood samples from all donors and the recipient must be carefully tested before transfusions can be administered so that incompatibility and transfusion reactions can be avoided. One of the most common tests performed in this department is a type and screen. In large clinical laboratories, automated instruments (Fig. 1-14) support a demanding workload by producing several hundred quality-controlled type and screen results per hour. Transfusion services offered by the blood bank department collect, prepare, and store units of blood from donors or patients who wish to donate their own units for autologous transfusion should that be needed. Common blood bank and immunohematology tests are listed in Table 1-13.

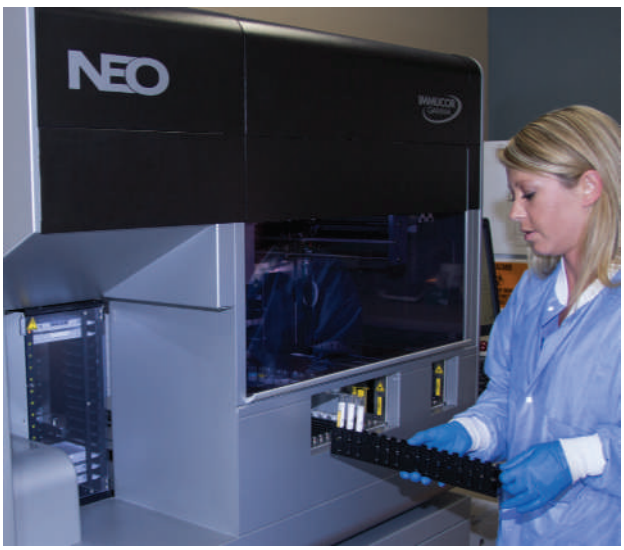

Figure 1-14. NEO Immucor Gamma blood bank automated instrument being loaded with blood samples for type and screen.

Cytogenetic and Flow Cytometry

Two areas found in larger labs are **cytogenetics** and flow cytometry. In cytogenetics, samples are examined microscopically for chromosomal deficiencies that relate to genetic disease. Specimens used for chromosomal studies include fresh blood, solid tissues, prenatal specimens, and bone marrow.

Flow cytometry has many applications in routine clinical diagnosis and is also used for clinical trials and in basic research to analyze and sort cells. A modular analyzer that can be used for stem cell analysis, T- and B-lymphocyte assays, and human leukocyte antigen (HLA) tissue typing and crossmatching for organ transplants is shown in Figure 1-15.

Anatomic and Surgical Pathology

Anatomic and surgical pathology is concerned with the diagnosis of disease through the examination of organs and tissues by a pathologist (a physician trained in diagnosing disease by analyzing tissues removed during surgery or at autopsy).

Histology

Histology is defined as the study of the microscopic structure of tissues. In this department, pathologists evaluate samples of tissue from surgeries and autopsies under a microscope to determine if they are normal or pathological (diseased). Two of the most common diagnostic techniques used in histology are: (1) biopsy, obtaining samples by removal of a plug (small piece) of tissue from an organ and examining it microscopically; and (2) frozen

Table 1-13. Common Blood Bank and Immunohematology Tests

Test	Examples of Clinical Significance
Antibody (Ab) screen	Agglutination indicates abnormal antibodies present in patient's blood
Direct antiglobulin test (DAT)	Positive results point to autoimmune hemolytic anemia, hemolytic disease of the newborn (HDN), and transfusion incompatibility
Type and Rh	Determines blood group (ABO) and type (Rh) by identifying agglutinins present or absent
Type and screen	Determines blood type (ABO and Rh) and screens for the presence of atypical antibodies
Type and crossmatch	Determines blood group and serves as a general screen for antibodies of recipient's blood; then, recipient and donor blood are checked against each other for compatibility
Compatibility testing	Detection of unsuspected antibodies and antigens in recipient's and donor's blood, which could cause a severe reaction if transfused

section, obtaining tissue from surgery, freezing it, and then examining it while the patient is still in the operating room to determine whether more extensive surgery is needed. Before tissues can be examined, they must be processed, which includes slicing them into very thin sections using an instrument called a microtome, and staining them. This is the role of a person called a histologist.

Cytology

Cytology and histology are often confused. While histology tests are concerned with the structure of tissue, cytology tests are concerned with the structure of cells. In this department, cells in body tissues and fluids are identified, counted, and studied to diagnose malignant and premalignant conditions. Histologists often process and prepare the specimens for evaluation by a pathologist or cytotechnologist. The Papanicolaou (Pap) smear, a test for early detection of cancer cells, primarily of the cervix and vagina, is one of the most common examinations performed by this department.

Figure 1-15. Medical Laboratory Scientist loads BD FACSCalibur™ modular flow cytometry analyzer with tissue samples for HLA testing.

FYI: The Pap test is named after Dr. George N. Papanicolaou, who developed a staining technique used to detect malignant cells.

Satellite Laboratories

In today's rapidly changing healthcare environment, some laboratory services in large tertiary care facilities have had to set up satellite labs. These specialized labs are located close to the populations they serve to facilitate better outcomes for the patients by drastically reducing **turnaround time (TAT)** for test results. Examples are a NICU lab in the newborn intensive care unit, a critical care lab located close to the operating and recovery room, and a STAT lab in the ED. Each satellite lab has a test menu designed for its specific population. Tests performed in these labs are those needed to respond to medical emergencies, such as the microscopic examination of a newborn's blood in the ICU shown in Figure 1-16. Many hospital laboratories have become primarily STAT labs, outsourcing most noncritical testing to reference laboratories.

Reference Laboratories

Reference laboratories are large independent laboratories that receive specimens from many different facilities located in the same city, other cities in the same state, or even cities that are out of state. They provide routine and more specialized analysis of blood, urine, tissue, and other patient specimens. One of the benefits of sending specimens to a reference laboratory is the cost per test is reduced due to the high volume of tests that are performed at these sites. Reference laboratories offer "STAT" testing, but since it is off-site, the TAT cannot compare to an on-site laboratory. Specimens sent to off-site laboratories must be carefully packaged in special containers designed to protect the specimens and meet federal safety regulations for the transportation of human specimens.

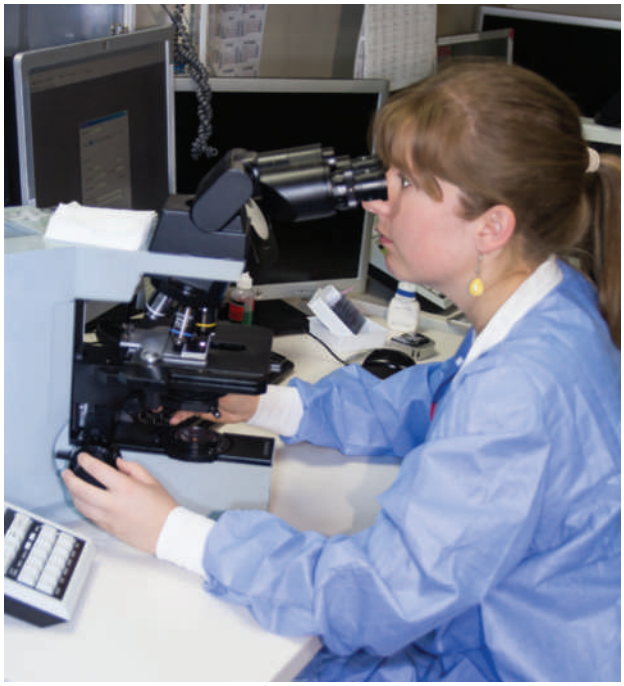

Figure 1-16. A medical technologist checks a differential in the ED STAT lab.

Misconception Alert: Be careful answering questions where "All of the choices are correct" is one of the choices. For example, either some students were confused about the role of reference laboratories or assumed "All of the choices are correct" would be the correct answer. When the following question appeared in Wolters Kluwer's adaptive learning systems, powered by PrepU:

Reference laboratories can offer tests that have:

an immediate TAT.

more accurate results.

reduced cost per test.

All of the choices are correct.

42% of the students chose "All of the choices are correct." Reference laboratories do not offer an immediate TAT. That is why most hospitals have a STAT lab. Reference lab results are not necessarily more accurate either. The big factor is that reference labs can offer a reduced price per test because they perform many more tests than a smaller lab and have the advantage of cost efficiencies that the higher volume enables.

Clinical Laboratory Personnel

Standards for most laboratory personnel are set by the **Clinical Laboratory Improvement Amendments of 1988 (CLIA '88)**, a federal law administered by the CMS. This law established standards that apply to all clinical laboratories. In addition to personnel qualifications, the standards address quality assurance (QA), quality control (QC), proficiency testing, and laboratory records (see Chapter 2 for a more complete explanation of CLIA regulations).

Laboratory Director/Pathologist

The pathologist is a physician who specializes in diagnosing disease using laboratory test results by analyzing tissues removed during operations and from postmortem examinations. It is his or her duty to direct laboratory services so that they benefit both the physician and the patient. The laboratory director may be a pathologist or a clinical laboratory scientist with a doctorate. The laboratory director and the laboratory administrator share responsibilities for managing the laboratory.

Laboratory Administrator/ Laboratory Manager

The laboratory administrator is usually a technologist with an advanced degree and several years of experience. Duties of the administrator include overseeing all operations involving physician and patient services. Today, the laboratory administrator may supervise several ancillary services, such as radiology and respiratory therapy, or all the laboratory functions in a healthcare system consisting of separate lab facilities across a large geographic area.

Technical Supervisor

For each laboratory section or subsection, there is a technical supervisor who is responsible for the administration of the area and who reports to the laboratory administrator. This person usually has additional education and experience in one or more of the clinical laboratory areas.

Medical Technologist/Medical Laboratory Scientist

The medical technologist (MT) or **medical laboratory scientist (MLS)** generally has a bachelor's (BS) degree plus additional studies and experience in the clinical laboratory setting. Some states require licensing for this level of personnel. The responsibilities of the MT/MLS include performing all levels of testing in any area of the laboratory, reporting results, performing quality control, evaluating new procedures, and conducting preventive maintenance and troubleshooting on instruments.

FYI: When the ASCP Board of Registry and the National Certification Agency for Clinical Laboratory Personnel (NCA) were unified into a single certifying agency, all individuals with an active NCA credential were transitioned over to the ASCP Board of Certification (BOC) without further requirements until recertification is due.

Medical Laboratory Technician

The **medical laboratory technician (MLT)** is most often an individual with an associate degree from a two-year program or certification from a military or proprietary (private) school. As with the MT/MLS, some states may require licensing for MLTs. The technician is responsible for performing routine testing, operating all equipment, performing basic instrument maintenance, recognizing instrument problems, and assisting in problem solving.

Clinical Laboratory Assistant

Before the arrival of computerized instrumentation in the laboratory, the clinical laboratory assistant (CLA) was a recognized position. Today, because of reductions in laboratory staff, this category of personnel has been revived. A CLA, also called a clinical assistant (CA) or a medical laboratory assistant (MLA), is a person with phlebotomy experience who has skills in specimen processing and basic laboratory testing. These individuals are generalists, responsible for assisting the MLS or MLT with workloads in any area.

Phlebotomist

The phlebotomist is trained to collect blood for laboratory tests that are necessary for the diagnosis and care of patients. Some facilities use phlebotomists as laboratory assistants or specimen processors (see Box 1-1 for duties). Formal phlebotomy programs in colleges and private schools usually require a high school diploma or the equivalent to enroll. After completing the program or acquiring one year of work experience, a phlebotomist can become certified by passing a national examination. A few states (e.g., California, Louisiana, Nevada, and Washington) require licensing for phlebotomists.

Other Laboratory Personnel

Other positions in the lab may include the

- laboratory information systems (LIS) manager who ensures proper functioning of the information processing system and oversees upgrades and maintenance of the software and hardware.
- quality and compliance coordinator who oversees procedures, policies, and processes for continuous quality improvement.
- point-of-care supervisor who works closely with the nursing staff and outpatient services personnel to ensure that POCT results are correct and that the maintenance and QC checks on POCT instruments are performed correctly by the operators of the instruments.
- education coordinator who oversees students who do their clinical practicum in that laboratory. It is the coordinator's job to verify student credentials, make certain they meet the facility's health and safety requirements, and generally serve as a "gatekeeper" for anyone wishing to intern in that area. He or she also provides educational activities and CE for the laboratory personnel.
- supervisor of support services, such as phlebotomy and central processing, who makes certain all specimens are correctly collected, received, and prepared for testing. He or she provides phlebotomy and central processing staff with training, technical direction, training support, and resolution of problems that arise in the laboratory on a day-to-day basis.

Study and Review Questions

See the EXAM REVIEW for more study questions.

1. **Early equipment used for bloodletting included all of the following except the**
   a. fleam.
   b. hemostat.
   c. lancet.
   d. leech.

2. **A factor that contributes to the phlebotomist's professional image is**
   a. age.
   b. attitude.
   c. heritage.
   d. religion.

3. **The initials for the title granted after successful completion of the American Society for Clinical Pathology phlebotomy examination are**
   a. CLPlb.
   b. CLT.
   c. CPT.
   d. PBT.

4. **The principles of right and wrong conduct as they apply to professional problems are called**
   a. ethics.
   b. kinesics.
   c. proxemics.
   d. rules.

5. **The law that established national standards for the electronic exchange of protected health information is**
   a. CLIA.
   b. HIPAA.
   c. OSHA.
   d. PHS.

6. **Which of the following may be a duty of the phlebotomist?**
   a. Analyze specimens
   b. Chart patient results
   c. Perform POCT
   d. Process billing

7. **Which of the following is an example of proxemics?**
   a. Eye contact
   b. Facial expressions
   c. Personal hygiene
   d. Zone of comfort

8. **Which of the following is proper telephone technique?**
   a. Being careful of the tone of your voice when answering the phone
   b. Not identifying yourself to the caller in case there is a problem later
   c. Listening carefully, but not writing anything down so as to save time
   d. Waiting for the phone to ring three or four times to appear less anxious

9. **An example of an institution that provides inpatient services is a**
   a. clinic.
   b. day surgery.
   c. doctor's office.
   d. hospital.

10. **State and federally funded insurance is called**
    a. ACO.
    b. HIPAA.
    c. Medicaid.
    d. Medicare.

11. **The specialty that treats disorders of old age is called**
    a. cardiology.
    b. gerontology.
    c. pathology.
    d. psychiatry.

12. **The department in the hospital that prepares and dispenses drugs is**
    a. central supply.
    b. pharmacy.
    c. physical therapy.
    d. radiology.

13. **The microbiology department in the laboratory performs**
    a. compatibility testing.
    b. culture and sensitivity testing.
    c. electrolyte monitoring.
    d. enzyme-linked immunoassay.

14. **The abbreviation for the routine hematology test that includes hemoglobin, hematocrit, a red blood cell count, and a white blood cell count is**
    a. CBC.
    b. CDC.
    c. CPK.
    d. CRP.

15. **Which of the following laboratory professionals is responsible for the administration of a specific clinical area, such as chemistry?**
    a. Laboratory manager
    b. Medical laboratory scientist
    c. Medical laboratory technician
    d. Technical supervisor

Case Studies

See the WORKBOOK for more case studies.

Case Study 1-1. Telephone Etiquette and the Irate Caller

Sally is a new phlebotomist working for a small hospital in the suburbs of Chicago. As she finds out in a short time, her coworkers have many different job responsibilities and are required to cover for one another. Today, it is Sally's turn to cover the reception area of the lab while the regular person takes a few days off. This is Sally's first time, and she is rather hesitant to answer the first call because she is afraid that she does not know enough to answer all inquiries. Consequently, she lets the phone ring more than 10 times. She finally answers it. The caller, a nurse, sounds irritated. He has been anxious to obtain certain results on a patient. He tells Sally that they were to be faxed two days earlier and he has not yet received them. Sally tells him she will transfer him to the technician in the back. Being unfamiliar with this phone, she loses his call in the process. The nurse calls back in a few minutes and wants to speak to "someone who knows what he or she is doing." The other line starts ringing. This time, rather than losing the caller, Sally keeps the line open, puts the phone down on the counter, and calls out, "Someone please take this call. I have a call on the other line."

Questions

1. Name three telephone etiquette errors that Sally made.
2. Which error creates the chance for a HIPAA violation to occur? Explain why.
3. What should Sally have done differently that would have prevented all three errors?
4. What responsibility does the laboratory administrator have?

Case Study 1-2. Phlebotomy and PHI

The phlebotomist, Matt, is doing the morning blood collections on the surgery floor of the hospital. As he begins to put the last tube in his cart and head for the clinical lab, the nurse asks him to draw blood from one more patient. She quickly points in the direction of the patient's room and turns to get the requisition. Matt did not see the exact room, so he shouts across the common area, "Do you mean the young, Hispanic man in room 412 who just had an appendectomy?" The nurse put her finger to her mouth and says "shhh" as she hands him the lab requisition.

Questions

1. Why did the nurse indicate Matt needed to be quiet?
2. What policy had the phlebotomist ignored?
3. What law governs Matt's actions?
4. What should Matt have done?

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MEDIA MENU

Online Ancillaries

- Animations and videos
- Flashcards
- Audio Glossary

Internet Resources

- Center for phlebotomy education: www.phlebotomy.com; Code of ethics: www.ascls.org/about-us/code-of-ethics; CLIA regulations: www.cdc.gov/CLIA/Regulatory/
- CMS.gov
- HealthCare.gov
- HHS.gov/HealthCare
- medicaid.gov
- medicare.gov
- ghlabtest.partners.org/PhlebotomyInfo.htm
- Museum of Quackery: museumofquackery.com
- www.pbs.org/wgbh/nova/body/leeches.html
- State licensure and certification requirements: www.ephlebotomist.com/phlebotomist-requirements-state-by-state/

Other Resources

- Ruth McCall 7. *Student Workbook for Phlebotomy Essentials.* Enhanced 7th ed. (Available for separate purchase.)
- Ruth McCall 7. *Phlebotomy Exam Review.* Enhanced 7th ed. (Available for separate purchase.)