

## CHAPTER 4 –ORGANIZATION OF THE BODY

### OBJECTIVES

On completion of this chapter, you will be able to:

- Define terms that describe the body and its structural units.
- List the systems of the body and give the organs in each system.
- Define terms that are used to describe direction, planes, and cavities of the body.
- Understand word analysis as it relates to Head-to-Toe Assessment.
- Analyze, build, spell, and pronounce medical words.
- Comprehend the drugs highlighted in this chapter.
- Identify and define selected abbreviations.
- Define a medical record.
- Define HIPAA.
- List and describe the general components of a patient's medical record.
- List and describe the four parts of the SOAP Chart Note record.
- Complete the Study and Review section.

### OUTLINE

#### I. Anatomy and Physiology Overview

An introduction of terms describing body and structural units, which will be grouped into two major sections:

- Overview of the units that make up the human body
- Terms used to describe anatomical positions and locations

The following components of the human body normally function in a unified and complex process known as *homeostasis*, which is a state of equilibrium that is maintained within the body's internal environment. By maintaining homeostasis, the cells of the body are in an environment that meets their needs and permits them to function normally under changing conditions.

#### A. Human Body: Levels of Organization (Fig. 4–1, p. 43)

1. **Atoms** – the smallest chemical unit of matter.
  - a. **Nucleus** – center of atom
  - b. **Proton** – positively charged particle
  - c. **Neutron** – no electrical charge
  - d. **Electron** – negatively charged particle

**Chemical Elements (Table 4–1, p. 42)** – are made up of atoms.

Atoms can be classified into groups called elements, which are substances that cannot be separated into substances different from itself by ordinary chemical means, and are the basic component of which all matter is composed.

2. **Molecules** – a chemical compound of two or more atoms that form a specific chemical compound. In a water molecule (H<sub>2</sub>O), oxygen forms polar covalent bonds with two hydrogen atoms. **Water** is a tasteless, clear, odorless liquid that makes up 65% of a male's body weight and 55% of a female's body weight. Water is the

most important constituent of all body fluids, secretions, and excretions.

3. **Cells (Fig. 4–2, p. 45, Fig. 4–3, p. 46, and Table 4–2, p. 46)**
  - the basic building blocks for the various structures that together make up the human being. The body consists of trillions of cells working individually and with each other to sustain life.
  - a. **Cell Membrane** – the outer covering of the cell, which has the capacity of allowing some substances to pass into and out of the cell while denying passage to other substances. This selectivity allows cells to receive nutrition and dispose of waste.
  - b. **Cytoplasm** – the cell substance between the cell membrane and nuclear membrane. It is a jellylike material that is mostly water. The cytoplasm provides storage and work areas for the cells.
  - c. **Nucleus** – is responsible for the cell’s metabolism, growth, and reproduction. The nucleus consists of:
    - **Chromosomes** – microscopic bodies that carry the genes that determine hereditary characteristics
    - **Gene** – makes up each segment of deoxyribonucleic acid (DNA) and is located in a specific site on the chromosome. There are 23 pairs of chromosomes in the human body. Genes determine an individual’s physical traits and control hereditary disorders.
    - **Genome** – a complete set of genes and chromosomes tucked inside each of the body’s trillions of cells.
4. **Stem Cells** – cells of the body that are different from other kinds of cells in the body. They have three general properties:
  - a. They are capable of dividing and renewing themselves for long periods.
  - b. They are unspecialized.
  - c. They give rise to specialized cell types.Research on stem cells is advancing knowledge about how an organism develops from a single cell and how healthy cells replace damage cells in adult organisms. The science of these areas is often referred to as **regenerative or reparative medicine**. Some primary sources of stem cells are:
  - **Embryos** – an unspecialized cell that may turn itself into any type of tissue; derived primarily from frozen **in vitro** (in glass, as in a test tube) fertilization embryos.
  - **Adult Tissue** – more specialized cells found in many kinds of tissue, such as bone marrow, skin, and the liver.

- **Umbilical Cord Blood** – rich source of precursors of mature blood cells obtained from cord blood at the time of birth.
5. **Tissues** – grouping of similar cells that perform specialized functions. There are four basic types of tissue in the body:
    - a. **Epithelial Tissue** – this tissue forms the outer layer of skin, covers organs, lines cavities, and form tubes, ducts, and portions of certain glands; responsible for protection, absorption, secretion, and excretion.
    - b. **Connective Tissue** – is most abundant of tissue and is responsible for supporting organs of the body, providing sheaths for muscles, and connects muscle to bone and bones to joints.
    - c. **Muscle Tissue** – consist of three different types of tissue:
      - **Voluntary or striated** – under control of a person’s will.
      - **Cardiac** – specialized form of striated tissue under the control of the autonomic nervous system.
      - **Involuntary or smooth** – under control of the autonomic nervous system.
    - d. **Nerve Tissue** – consist of nerve cells (neurons) and supporting cells called *neuroglia*. Nervous tissue has the properties of excitability and conductivity, and functions to control and coordinate the activities of the body.
  6. **Organs** – groups of tissues that serve a common purpose or function.
  7. **Systems** – a group of organs that function together for a common purpose (**Fig. 4–4, p. 48**).
- B. Anatomical Locations and Positions – The Anatomical Position** – the body is erect, head facing forward, arms by the side with palms to the front. Left and right are from the subject’s point of view, not the examiner’s.
1. **Direction**– describes the location of organs or body parts in relationship to one another; used in describing physical assessments of a patient presenting complaints and in pinpointing the location of a given sign or symptom. The terms are as follows:
    - a. **Superior** – above, in an upward direction, toward the head.
    - b. **Anterior (ventral)** – in front of or before, the front side of the body.
    - c. **Posterior (dorsal)** – toward the back, back side of the body.
    - d. **Cephalic** – pertaining to the head.
    - e. **Medial** – nearest the midline or middle.
    - f. **Lateral** – to the side, away from the middle.

- g. **Proximal** – nearest the point of attachment or near the beginning of a structure.
  - h. **Distal** – away from the point of attachment or far from the beginning of a structure.
2. **Planes** – imaginary surfaces that pass through the body and divide it into various sections (**Fig. 4–5, p. 50**).
- a. **Midsagittal Plane** – vertically divides the body as it passes through the midline to form a **right** and **left half**.
  - b. **Transverse or Horizontal Plane** – any plane that divides the body into **superior** and **inferior** portions.
  - c. **Coronal or Frontal Plane** – any plane that divides the body at right angles to the midsagittal plane into **anterior** (ventral) and **posterior** (dorsal) portions.
3. **Cavities** – a hollow space containing body organs (**Fig. 4–6, p. 51**). They are classified into two groups according to their location.
- a. **Ventral Cavity** – a hollow portion of the human torso extending from the neck to the pelvis that contains the organs of respiration, digestion, reproduction, and elimination. Consists of:
    - **Thoracic Cavity** – chest area containing the **heart** (**pericardial cavity**), space around the **lungs**, (**pleural cavity**), esophagus, trachea, thymus, major blood and lymph vessels.
    - **Abdominal Cavity** – space below the diaphragm, commonly referred to as the belly, that contains the kidneys, stomach, intestines, and other organs of digestion.
    - **Pelvic Cavity** – the space formed by the bones of the pelvis and contains the organs of elimination and reproduction.
  - b. **Dorsal Cavity** – contains the structures of the nervous system and is subdivided into:
    - **Cranial Cavity** – space containing the brain.
    - **Spinal Cavity** – space within the bony spinal column that contains spinal cord and spinal fluid.
  - c. **Abdominopelvic Cavity** – a combination of the abdominal and pelvic cavity that is divided into nine regions.
4. **Nine Regions of the Abdominopelvic Cavity (Fig. 4–7A, p. 52)** – the abdominopelvic cavity is divided into a tic-tac-toe pattern and used as a ready reference for locating visceral organs. They are:
- a. **Right Hypochondriac** – upper right region at the level of the ninth rib cartilage.
  - b. **Left Hypochondriac** – upper left region at the level of the ninth rib cartilage.
  - c. **Epigastric** – region over the stomach.

- d. **Right Lumbar** – right middle lateral region.
  - e. **Left Lumbar** – left middle lateral region.
  - f. **Umbilical** – in the center, between the right and left lumbar region; at the navel.
  - g. **Right Iliac (Inguinal)** – right lower lateral region.
  - h. **Left Iliac (Inguinal)** – left lower lateral region.
  - i. **Hypogastric** – lower middle region below the navel.
5. **Abdomen Divided into Quadrants (Fig. 4–7B, p. 52)** – the abdomen is divided into four corresponding regions that are used for descriptive and diagnostic purposes. They are:
- a. **Right Upper Quadrant (RUQ)** – contains the right lobe of the liver, gallbladder, part of the pancreas, and part of the small and large intestines.
  - b. **Left Upper (LUQ)** – contains the left lobe of the liver, stomach, spleen, part of the pancreas, and part of the small and large intestines.
  - c. **Right Lower (RLQ)** – contains part of the small and large intestines, appendix, right ovary, right fallopian tube, and right ureter.
  - d. **Left Lower (LLQ)** – contains part of the small and large intestines, left ovary, left fallopian tube, and left ureter.
- Some organs are located half in the right quadrant and half in the left quadrant. These organs are referred to as being in the midline of the body.

C. **Head-to-Toe Assessment** – terminology associated with head-to-toe assessment can be useful when studying the organization of the body and in understanding information combined in patient’s medical records. The following are body areas with their corresponding word parts:

<u>Body Area</u>	<u>Word Part(s)</u>
abdomen	abdomin/o
ankle (tarsus)	tars/o
arm	brach/i
back	poster
bones	oste/o
breast	mast; mamm/o
cheek	bucc/o
chest	thorac/o
ear	ot/o
elbow	cubital; olecran/o
eye	ophthalm/o; ocul/o; opt/o
finger	dactyl/o
foot	pod/o
gums	gingiv
hand	manus; chir/o
head	cephal/o

heart	cardi/o
hip	coxa
leg	crur
liver	hepat/o
lungs	pulm/o; pulmon/o; pneum/o; pneumon/o
mouth	or/o
muscles	muscul/o
navel	umbilic; omphal/o
neck	cervic/o
nerves	neur/o
nose	nas/o; rhin/o
ribs	cost/o
side	later
skin	derm/a; dermat/o; derm/o; cutane/o
skull	crani/o
stomach	gastr/o
teeth	dent
temple	tempor
thigh bone	femor/o
throat (pharynx)	pharyng/o
thumb	pollex
tongue	lingu/o; gloss/o
wrist (carpus)	carp/o

## II. Building Your Medical Vocabulary

A. **Medical Words and Definitions** – this section provides the foundation for learning medical terminology. Medical words can be made up of four types of word parts:

1. **Prefix (P)**
2. **Root (R)**
3. **Combining Forms (CF)**
4. **Suffixes (S)**

By connecting various word parts in an organized sequence, thousands of words can be built and learned. In the text, the word list is alphabetized so one can see the variety of meanings created when common prefixes and suffixes are repeatedly applied to certain word roots and/or combining forms. Words shown in *pink* are additional words related to the content of this chapter that have not been divided into word parts. Definitions identified with an *asterisk icon* (\*) indicate terms that are covered in the Pathology Spotlights section of the chapter.

## III. Drug Highlights

A. A **drug** is a medicinal substance that may alter or modify the function of a living organism. There are thousands of drugs that are available as either **over-the counter (OTC) medicines** and **prescription medications**,

which is a written legal document that gives directions for compounding, dispensing, and administering a medication to a patient. The five medical uses for drugs are:

1. **Therapeutic Use** – drugs used in the treatment of a disease or condition to relieve the symptoms or to sustain the patient until other measures are instituted.
  2. **Diagnostic Use** – certain drugs are used in conjunction with radiology to allow physicians to pinpoint the location of a disease process.
  3. **Curative Use** – certain drugs that kill or remove the causative agent of a disease.
  4. **Replacement Use** – certain drugs are used to replace substances normally found in the body.
  5. **Preventive or Prophylactic Use** – certain drugs are used to ward off or lessen the severity of a disease.
- B. Drug Names** – most drugs may be cited by their *chemical*, *generic*, and *trade* or *brand (proprietary)* name. These are formulated as follows:
1. **Chemical Name** – usually the formula that denotes the composition of the drug. It is made up of numbers and letters that represent the drug's molecular structure.
  2. **Generic Name** – the drug's official name and is descriptive of its chemical structure. The generic name is written in lowercase and can be manufactured by more than one pharmaceutical company.
  3. **Trade or Brand Name** – registered by the U.S. Patent Office as well as approved by the Food and Drug Administration (FDA). A trade or brand name is capitalized.
- C. Undesirable Actions of Drugs** – most drugs have the potential for causing an action other than their intended action thus resulting in certain side effects.
1. **Adverse Reactions** – is an unfavorable or harmful unintended action of a drug.
  2. **Drug Interaction** – may occur when one drug potentiates substance.
- D. Medication Order and Dosage** – the medication order is given for a specific patient and denotes the name of the drug, the dosage, the form of the drug, the time for or frequency of administration, and the route by which the drug is to be given.

#### IV. Abbreviations (p. 59)

#### V. The Medical Record

- A.** The **medical record** is a written transcript of information about a patient and his or her health care. The record contains the observation, medical or surgical interventions, and treatment outcomes provided during hospitalization or a visit to a doctor's office. It includes information that the patient provides concerning his or her symptoms (Sx) and medical history,

the result of examinations, reports of x-rays and laboratory tests, diagnoses, and treatment plans. Medical records, which belong to the health care provider, serve as a:

1. Basis for planning care and treatment
2. Means by which doctors, nurses, and others caring for the patient can communicate
3. Legal document describing the care the patient received
4. Means by which the patient or insurance company can verify that services billed were actually provided

**B. Health Insurance Portability and Accountability Act (HIPAA)** – is a set of rules passed in 1996 that must be followed by doctors, hospitals, and other health care providers to ensure that all medical records, medical billing, and patient accounts meet certain consistent standards with regard to documentation, handling, and privacy. In addition, HIPAA requires that all patients be able to assess their own records, correct errors or omissions, and be informed about how personal information is shared or used, as well as be notified about privacy procedures. HIPAA also:

1. Includes provisions designed to encourage electronic transactions.
2. Requires safeguards to protect the security and confidentiality of health information, covering health plans, health care clearinghouses, and those health care providers who conduct certain financial and administrative transactions

**C. Types and Components of a Medical Record** – there are various types of medical records, which are also referred to as a *chart* or *file*. They can be kept on:

- **Microfilm** – photographs of records in a reduced size
- **Microfiche** – sheets of microfilm
- **Electronic**

The following are the general components of a patient's medical records:

1. **Patient Information Form** – a document that is filled out by the patient on the first visit to the physician's office and then updated as necessary, providing data that relates directly to the patient including last name, first name, sex, date of birth (DOB), marital status, street address, city, state, zip code, telephone number, social security number, employment status, address and phone number of employer, the name and contact information for the person who is responsible for the patient's bill, and vital information concerning who should be contacted in the case of an emergency.
2. **Medical History (Hx)** – a document describing past and current history of all medical conditions experienced by the patient.
3. **Physical Examination (PE)** – a record that includes a current head-to-toe assessment of the patient's physical condition.
4. **Consent Form** – a signed document by the patient or legal guardian giving permission for treatment.
5. **Informed Consent Form** – a signed document by the patient or legal guardian that explains the purpose, risks, and benefits of a procedure

and serves as proof that the patient was properly informed before undergoing a procedure.

6. **Physician's Orders** – a record of the prescribed care, medication, tests, and treatments for a given patient.
7. **Nurse's Notes** – a record of a patient's care that includes vital signs, particularly temperature, pulse and respiration (TPR) and blood pressure (BP), and treatments, procedures, and patient's response to such care.
8. **Physician's Progress Notes** – a documentation given by the physician regarding the patient's condition, results of the physicians examination, summary of test results, plan of treatment, and updating data as appropriate (**assessment and diagnosis [Dx]**).
9. **Consultation Reports** – documentation given by specialist whom the physician has asked to evaluate the patient.
10. **Ancillary/Miscellaneous Reports** – documentation of procedures or therapies provided during a patient's care, such as physical therapy, respiratory therapy, or chemotherapy.
11. **Diagnostic Test/Laboratory Reports** – documents providing the results of all diagnostic and laboratory tests performed on the patient.
12. **Operative Report** – a documentation from the surgeon detailing the operation, including the preoperative and postoperative diagnosis, specific details of the surgical procedure, how well the patient tolerated the procedure, and if there were any complications.
13. **Anesthesiology Report** – a documentation from the attending anesthesiologist or anesthesiologist that includes a detailed account of anesthesia during surgery, which drugs were used, dose, and time given, patient response, monitoring of vital signs, how well the patient tolerated the anesthesia, and if there were any complications.
14. **Pathology Report** – a documentation from the pathologist regarding the findings or results of samples taken from the patient such as bone marrow, blood, or tissue.
15. **Discharge Summary (Clinical Resumé, Clinical Summary, or Discharge Abstract)** – an outline summary of the patient's hospital care, including date of admission, diagnosis, course of treatment and patient's response, tests results, final diagnosis, follow-up plans, and date of discharge.

**D. SOAP: Chart Note**

**SOAP (subjective, objective, assessment, plan)** chart notes are written to improve communication among all those caring for the patient. It is a method of displaying patient's data in a concise, organized format. The four parts are explained as follows:

1. **Subjective** – symptoms the patient feels and describes to the health care observer. These symptoms arise within the individual and are not perceptible to an observer; includes any allergies as reported by the patient and the patient's chief complaint (CC).

2. **Objective** – symptoms that can be observed including vital signs, data relating to the physical examination (PE), such as height (Ht), weight (Wt), general appearance, condition of the lungs, heart, abdomen, musculoskeletal and nervous systems, and the skin. The results of laboratory and diagnostic tests may be included.
3. **Assessment** – includes diagnosis of the patient's condition.
4. **Plan** – includes the management and treatment regimen for the patient; may include laboratory tests, physical therapy, diet therapy, medication, medical and surgical interventions, patient referrals, patient teaching, and follow-up directions.

**VI. Study and Review (pp. 64–69)**