

- ✦ **Right or left lateral recumbent position (recovery position).** The patient is lying on the right side or the left side (Figure 6-4c).
- ✦ **Semi-Fowler position.** The patient is lying on his back with the upper body elevated at a 45° to 60° angle (Figure 6-5).
- ✦ **High-Fowler position.** The patient is on his back with the upper body elevated at a 90° angle at the waist.
- ✦ **Trendelenburg position.** The patient is lying on his back, forming an inclined plane in which the legs are elevated above the head (Figure 6-6).

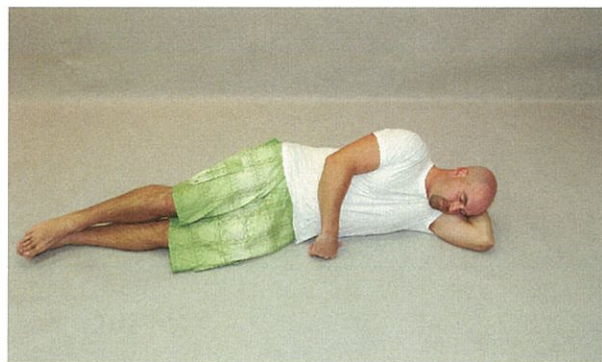


Figure 6-4c The lateral recumbent position.
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Body Cavities

The **organs** of the body, with the exception of the skin, are located within hollow spaces in the body referred to as body cavities. The five major body cavities are (Figure 6-7):

- ✦ **Cranial cavity.** Located inside the skull, the cranial cavity contains the brain and the membranes that surround it.
- ✦ **Spinal cavity.** This cavity extends from the bottom of the skull (where the brain ends) to the tailbone and is a canal formed by the vertebrae of the spinal column. The spinal cavity contains the spinal cord and the membranes that surround it.
- ✦ **Thoracic (chest) cavity.** Located in the central part of the body, or trunk, between the diaphragm and the neck, the thoracic cavity contains the lungs, heart, and great vessels. The rib cage, sternum, and the upper portion of the spine protect it. The diaphragm separates it from the abdominal cavity.
- ✦ **Abdominal cavity.** Located in the trunk below the ribs, between the diaphragm and the pelvis, the abdominal cavity is described as having four quadrants: the right and left upper quadrants, and the right and left lower quadrants (Figure 6-8). The abdominal cavity contains the organs of digestion, including the liver, gallbladder, pancreas, stomach, and intestines. The abdominal cavity also includes the spleen, which is an organ of the lymphatic system. The kidneys are located just outside and posterior to the abdominal cavity.
- ✦ **Pelvic cavity.** The pelvic cavity is located just inferior to the abdomen and is encased by the pelvic bones and the lower portion of the spine. It contains the bladder, the rectum, and the internal reproductive organs.

✦ **6-4** List the five body cavities.

organ a structure containing similar tissues that act together to perform specific body functions.

Figure 6-5 Semi-Fowler position.



Figure 6-6 Trendelenburg position.



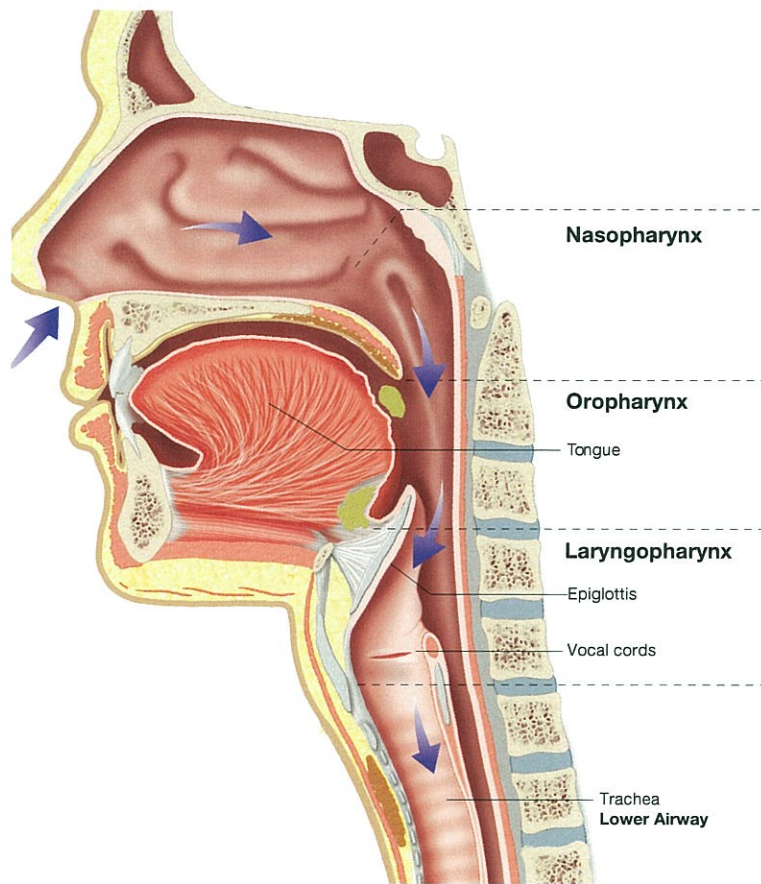


Figure 6-9 The structures of the upper airway.

sites of carbon dioxide and oxygen exchange between the air and the blood. The lungs are thus the organs responsible for gas exchange, and they house thousands of alveoli.

Physiology of the Respiratory System

Breathing, or ventilation, is the mechanical process of moving air into and out of the lungs to exchange oxygen and carbon dioxide between body tissues and the environment (Figure 6-11■). The flow of air into the lungs is caused primarily by contraction of the diaphragm, the large muscle that separates the thoracic and abdominal cavities. Contraction of the diaphragm results in the expansion of the lungs by creating negative pressure within the thoracic cavity, drawing air into the lungs. Air then flows out of the lungs in a passive process resulting from the combination of relaxation of the diaphragm and recoil of the chest wall, which together decrease the lung size. Accessory muscles between the ribs and in the neck are able to expand the chest directly, aiding inspiration, especially during labored or rapid breathing.

Each breath entails the movement of a volume of air into and out of the body. This volume is known as the minute ventilation and is the product of the respiratory rate (breaths per minute) and the tidal volume (volume of air moved per breath). Understanding minute ventilation will help you to understand how the body adapts to respiratory problems. For example, a person with a lung infection or a collapsed lung has

The Nervous System

The **nervous system** is the most complex of all the body systems. The center of the nervous system, the brain, is responsible for the control of all the other body systems. The brain coordinates the function of sensation, regulates the motor system, and integrates consciousness, memory, emotions, and the use of language.

nervous system a group of organs and other structures that regulate all body functions.

Anatomy of the Nervous System

The nervous system can be divided into two main anatomical parts: the central nervous system and the peripheral nervous system (Figure 6-17■). The central nervous system consists of the brain and spinal cord. Both are encased in bone (the brain within the skull, and the spinal cord within the vertebrae).

The brain can be divided into three major portions: the cerebrum, the cerebellum, and the brainstem (Figure 6-18■). The cerebrum, the largest and outermost structure of the brain, is responsible for higher functions such as thought, memory, and the voluntary use of muscles. The cerebellum is beneath the cerebrum and is responsible for certain constant and involuntary functions such as coordinating movement. Lastly, the brainstem is the most primitive part of the brain and is the brain's connection with the spinal cord. The brainstem is the control center for vital functions, including respiration, cardiac function, and vasomotor status (dilation and constriction of the blood vessels). The pons and the medulla oblongata are parts of the brainstem.

The brain and spinal cord are covered by three protective layers, collectively known as the meninges (Figure 6-19■), which are in turn protected by the bones of the skull, the vertebrae and soft tissues. Circulating within these layers, bathing the brain and spinal cord and providing further protection, is cerebrospinal fluid (CSF).

The outer meningeal layer, known as the dura mater, is a tough, fibrous membrane that lies just inside the skull and within the vertebral canal and covers the brain and spinal cord like a sheet. In several places, the dura mater folds inward to separate the larger portions of the brain from each other, providing support for the brain and dispersing forces generated in a traumatic injury. The middle meningeal layer, the arachnoid mater, is transparent and gets its name from the web-like pattern its cells exhibit when viewed under a microscope. The pia mater is the finest of the meninges and lies in intimate contact with the convoluted surface of the brain.

Cerebrospinal fluid (CSF) is a clear, colorless fluid that is produced inside the brain and circulates throughout the central nervous system in a network of canals within the meninges. The CSF provides three beneficial properties:

- ✦ **Buoyancy.** The brain and CSF are of similar density, so the brain neither sinks nor floats in CSF but exists in suspension.
- ✦ **Cushioning/protection.** CSF protects the brain from striking the inside of the skull.
- ✦ **Chemical stability.** The flow of CSF carries metabolic wastes away from the nervous system tissues and helps regulate chemical concentrations and pH.

The cerebrum constitutes the majority (approximately 75%) of the brain's mass and is responsible for higher functions such as sense perception, voluntary movement, speech, thought, and memory. It is divided along the longitudinal fissure into left and right cerebral hemispheres. Much of the cerebrum's mass is white matter: nerve fibers (tracts) that connect "pools" of nerves. The rest of the cerebrum's mass is gray matter, composed mainly of neuron bodies. The cerebellum lies inferior to the posterior aspect of the cerebrum and superior to the brainstem. Like the cerebrum, it is divided into left and right hemispheres, and has an outer cortex composed of gray