

## CHAPTER 1:

# CARDIOVASCULAR ANATOMY AND PHYSIOLOGY

## INTRODUCTION

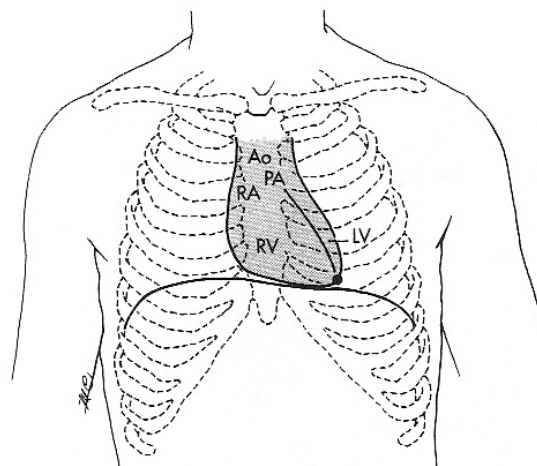
Cardiac anatomy and physiology form a critical foundation for understanding cardiovascular nursing. All clinical application builds on this foundation. Even in the field of medicine, *“in this technology driven era, a new appreciation of cardiac anatomy has emerged as the cornerstone for clinical cardiology”* (Fuster et al., 2001, p. 45).

## BASIC CARDIAC ANATOMY

The heart is a hollow, muscular, four-chambered organ. It is positioned in the mediastinum (middle of the thoracic cavity) between the lungs, above the diaphragm and in front of the esophagus. The heart is attached to the thorax by the great vessels. The great vessels include the aorta, pulmonary artery, inferior vena cava, and superior vena cava. The adult heart is approximately 5 inches by 3½ inches by 2½ inches or roughly the size of a person’s fist. The tip of the left ventricle forms the apex (bottom) of the heart. The apex is located at about the fifth intercostal space, at the left midclavicular line. The base, or top, of the heart is located at approximately the second intercostal space (Figure 1.1).

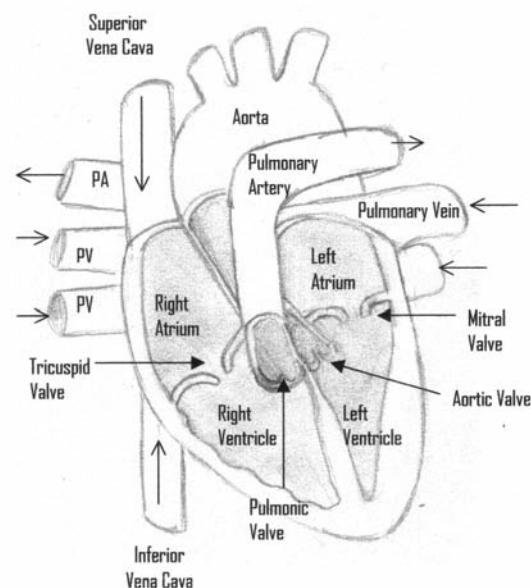
### Cardiac Chambers

The right and left atria (upper chambers) are separated by a mass of connective tissue called the interatrial septum. The right and left atria are low-pressure, thin-walled chambers that receive blood and act as reservoirs. The right atrium receives deoxygenated blood from the venous system via the inferior and superior venae cavae, as well as from the coronary sinus (the primary coronary vein). The left atrium receives oxygenated blood from the pulmonary veins after the blood has traveled through the lungs (Figure 1.2). Both the right and left atria have an ear like structure attached to the atrium called the atrial appendage. Patients with atrial fibrillation, mitral valve disease and other disorders are at a high risk for the development of thrombus in the atrial appendage due to the relative static nature of the blood in the atrial appendage. The right and left ventricles (lower chambers) are the pumping chambers of the heart and receive blood from the atria. The ventricles are separated by the interventricular septum. The right ventricle is a thin-



**Figure 1.1:** Location of the heart in the chest cavity. (Ao: Aorta; PA: Pulmonary artery; RA: Right atrium; RV: Right ventricle; LV: Left ventricle.

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**Figure 1.2**