and indicates only whether the imbalance is more acidic or more alkaline. It does not reflect the nature of the imbalance (i.e., whether it is of metabolic or respiratory origin). Body metabolism affects primarily the base bicarbonate (HCO_3^-); therefore, alterations in the concentration of bicarbonate are termed *metabolic disturbances of acid–base balance*. Also, because the amount of carbon dioxide (CO_2) exhaled through the lungs affects the carbonic acid (H_2CO_3), changes in carbonic acid concentration are referred to as *respiratory disturbances*. Consequently, the simple disturbances (those with a single primary cause) are categorized as metabolic acidosis or alkalosis and respiratory acidosis or alkalosis.

When the fundamental acid–base ratio is altered for any reason, the body attempts to correct the deviation. In a simple disturbance, a single primary factor affects one component of the acid–base pair and is usually accompanied by a compensatory or secondary change in the component that is not primarily affected. For example, when the concentration of metabolic acids in the body increases they combine with bicarbonate (a buffer) to form carbonic acid. The lungs immediately attempt to compensate for the imbalance by eliminating the carbonic acid through exhaled carbon dioxide and water (compensation). The imbalance is corrected when the kidneys excrete hydrogen and ammonium ions in exchange for reabsorbed sodium bicarbonate.

When the secondary changes (the hyperventilation and renal excretion of hydrogen ions in the preceding example) succeed in preventing a distortion of the acid–base ratio and the pH is restored to normal, the disturbance is described as **compensated**. The **uncompensated** state exists when there is no compensatory effect and the pH remains uncorrected. The imbalance is said to be corrected when physiologic mechanisms fully correct the primary abnormality. *Mixed* acid–base imbalances may also occur in diseases states, and the patient will manifest two simultaneous acid–base imbalances rather than a single imbalance. It is not within the scope of this text to discuss the many variations of mixed acid–base imbalances; readers are referred to other published sources for such material (Fraser, 2012).

Cardiovascular Complications