> **Reference**
> The following discussion is a summary of the American Association of Critical-Care Nurses' Essentials of Critical Care Nursing (Burns), Chapter V: Airway and Ventilatory Management (Robert E. St. John and Maureen A. Seckel)

Diagnostic Tests, Monitoring Systems, and Respiratory Assessment Techniques

KNOWLEDGE COMPETENCIES for this chapter include:

1. Interpretation of normal and abnormal arterial blood gas results, and common management strategies for treatment.
2. Identify indications, complications, and management strategies for artificial airways, oxygen delivery, and monitoring devices.
3. Identify indications, principles of operation, complications, and management strategies for mechanical ventilation
4. Describe the concepts of respiratory muscle fatigue, rest, and conditioning as they relate to the mechanically ventilated weaning patient.
5. Identify essential components for the successful design and use of weaning predictors, protocols for weaning trials, and multidisciplinary institutional approaches to the care of long-term mechanically ventilated patients.

Arterial Blood Gas Monitoring

ABG monitoring is frequently performed on critically ill patients to assess acid-base balance, ventilation, and oxygenation. The blood gas analyzer determines oxygen tension (PaO_2), carbon dioxide tension ($PaCO_2$), and pH, from which several other parameters are calculated, including base excess (BE), bicarbonate (HCO^-_3), and oxygen saturation (SaO_2).

Arterial blood gas samples are obtained by a direct puncture of an artery, usually the radial artery, or by withdrawing blood from an **indwelling arterial catheter system**. A heparinized syringe is used to draw the sample to prevent clotting prior

to analysis. The samples are kept on ice unless the sample will be immediately analyzed in order to prevent further shifting of CO_2 and O2