

respiratory status in acutely ill patients. They provide valuable information regarding lung function, lung adequacy, and tissue perfusion. The pH, PaCO₂, bicarbonate (HCO₃), and PaO₂ levels can provide information about whether the child is compensating and guide critical treatment decisions.

End-Tidal Carbon Dioxide Monitoring

End-tidal carbon dioxide (ETCO₂) monitoring measures exhaled carbon dioxide noninvasively. Capnometry provides a numeric display, and capnography provides a graph over time. Continuous capnometry is available in many bedside physiologic monitors, as well as stand-alone monitors. ETCO₂ differs from pulse oximetry in that it is more sensitive to the mechanics of ventilation rather than oxygenation. Hypoxic episodes can be prevented through the early detection of hypoventilation, apnea, or airway obstruction.

Children who are experiencing an asthma exacerbation, receiving procedural sedation, or who are mechanically ventilated may have ETCO₂ monitoring. Special sampling cannulas are used for nonintubated patients, and a small device is placed between the endotracheal (ET) tube and the ventilator tubing in intubated patients. Although ETCO₂ monitoring is not a substitute for arterial blood gases, it does have the information of providing ventilation information continuously and noninvasively. Normal ETCO₂ values are 30 to 43 mm Hg, which is slightly lower than normal PCO₂ of 35 to 45 mm Hg. During cardiopulmonary resuscitation (CPR), ETCO₂ values consistently below 15 mm Hg indicate ineffective compressions or excessive ventilation. Changes in waveform and numeric display follow changes in ventilation by a very few seconds and precede changes in respiratory rate, skin color, and pulse oximetry values.

For years, disposable colorimetric ETCO₂ detectors have been used to assess ET tube placement. A color change with each exhaled breath when there is adequate systemic perfusion indicates that the tube is in the lungs. These devices do not provide numbers or graphic representation and do not provide the same early detection of hypoventilation as the continuous quantitative monitors.

Additional uses of ETCO₂ monitoring have limited supporting