TABLE 8-7

Laboratory Tests Used in Assessment of Acid–Base Status

Abbreviation	Test	Normal Values*	Description
pH	Partial pressure of hydrogen	Birth: 7.11 to 7.36 1 day: 7.29 to 7.45 Child: 7.35 to 7.45	Expression of hydrogen ion concentration
PCO_2	Partial pressure of carbon dioxide or carbon dioxide tension	Newborn: 27 to 40 mm Hg Infant: 27 to 41 mm Hg	Measure of carbon dioxide tension; reflects carbonic acid (H_2CO_3) concentrations of plasma
HCO_3^- (serum) arterial	Carbon dioxide content or carbon dioxide combining power	Infant: 21 to 28 mEq/ml Thereafter: 22 to 26 mEq/ml	Concentration of base bicarbonate
Base excess	Base excess (whole blood)	Newborn: −2 to −10 Infant: −1 to −7 Child: +2 to −4 Thereafter: +3 to −3	Used to express extent of deviation from normal buffer base concentration; indicates quantity of blood buffers remaining after hydrogen ion is buffered
Anion gap	Anion gap; using chemistry profile and serum bicarbonate	10 to 12,* (4 to 11)†	Reflects difference between measured cation sodium and anions (also measured) of chloride and bicarbonate

*Huether SE: The cellular environment: fluids and electrolytes, acids and bases. In McCance KL, Huether SE, Brashers VL, et al, editors: *Pathophysiology: the biologic basis for disease in adults and children,* ed 6, St Louis, 2010, Mosby/Elsevier.

†Data from Kliegman RM, Stanton BF, St. Geme JW, et al, editors: *Nelson textbook of pediatrics*, ed 19, Philadelphia, 2011, Saunders/Elsevier.

TABLE 8-8

Summary of Simple Acid–Base Disturbances (Partially Compensated)

Disturbance	Plasma pH	Plasma PCO_2	Plasma HCO_3^-
Respiratory acidosis	↓	↑	↑
Respiratory alkalosis	↑	↓	↓
Metabolic acidosis	↓	↓	↓
Metabolic alkalosis	↑	↑	↑

The pH represents the concentration of hydrogen (H^+) in solution