

Acid/Base			
Simple Acid Base Disorders			
Disorder	pH	pCO <sub>2</sub>	HCO <sub>3</sub>
Metabolic Acidosis	< 7.35	> 45	< 22
Metabolic Alkalosis	> 7.45	< 35	> 26
Respiratory Acidosis	< 7.35	> 45	< 22
Respiratory Alkalosis	> 7.45	< 35	> 26
<b>Bold</b> indicates primary disturbance -- non-bold indicates secondary response. ***Lower serum bicarbonate levels (as low as 18 mmol/L) can be physiologically normal in neonates*** <ul style="list-style-type: none"><li>• <b>Acidemia</b> → pH &lt; 7.35. <b>Acidosis</b> → process that makes pH ↓</li><li>• <b>Alkalemia</b> → pH &gt; 7.45. <b>Alkalosis</b> → process that makes pH ↑</li><li>• In <b>respiratory</b> disorders, the <b>pH</b> moves in the <b>same</b> direction as the <b>pCO<sub>2</sub></b></li><li>• Always look at the pH! A high bicarb on a chem often represents a metabolic alkalosis, but could also be a compensation for chronic respiratory acidosis (e.g., in patients with chronic lung disease).</li></ul>			
Metabolic Acidosis			
PowerPlans	Metabolism Lactic or Metabolic Acidosis NOS Admit Plan		
Approach	Is there a concomitant resp acidosis / resp alkalosis? Use Winter's Formula -- Expected pCO <sub>2</sub> = ([1.5 x HCO <sub>3</sub> <sup>-</sup> ] + 8 ± 2), then calculate AG → [Na <sup>+</sup> - (Cl <sup>-</sup> + HCO <sub>3</sub> <sup>-</sup> )]. Normal = 3*albumin +/- 2 (12 in healthy pts).		
Normal AG MAC	GI loss (diarrhea, laxative, ureteroenteric fistula) vs renal loss (RTA (see chart), acetazolamide use, renal failure (may also have elevated AG), aggressive rehydration with NS <ul style="list-style-type: none"><li>• Can calc urine AG, (UNa + UK) - (UCI); if positive → impaired renal acidification, if negative → GI loss of bicarb, works b/c urine Cl<sup>-</sup> = proxy for NH<sub>4</sub><sup>+</sup> secretion</li></ul>		
Renal Tubular Acidosis: Hyperchloremic Metabolic Acidosis w/ +Urine AG			
	Proximal (Type 2)	Distal (Type 1)	Hyperkalemic (Type 4)
Defect	Bicarb Reabsorption	H <sup>+</sup> secretion	Inadequate aldosterone
Potassium	Normal/Decreased	Normal/Decreased	Increased
Urine pH	< 5.5	> 5.5	< 5.5
Renal stones	No	Yes (high urine pH → CaPhos stones, low urine citrate)	No
Clinical correlates	Fanconi syndrome (generalized prox tubular dysfunction → lose glucose, phos, AAs)	Hereditary channelopathies (may be a/w SNHL)	DM, primary adrenal insufficiency, use of ACEIs/ aldo antagonists
Increased AG MAC	<b>MUDPILES</b> Methanol Uremia Diabetic ketoacidosis/starvation ketoacidosis Paraldehyde Infection/Isoniazid/Iron/IEM Lactic Acidosis Ethylene Glycol Salicylates (cause primary metabolic acidosis and respiratory alkalosis)		