

# **i-STAT** Alinity v

Utilization Guide





## i-STAT Alinity v

The i-STAT Alinity v delivers blood gas, acid-base, electrolyte, chemistry, and hematology measurements in a completely portable, handheld package. Accuracy is ensured by extensive quality checks and calibrations that occur automatically with each cartridge run. Results are obtained in as little as three minutes - making it the ideal solution for critical care situations, anesthetic monitoring, and fieldwork.

### **Cartridge Storage:**

Refrigerate at 2 °C to 8 °C (35 °F to 46 °F).

### **Cartridge Stability:**

Cartridges may be stored at room temperature 18-30 °C (64-86 °F), but this will decrease the shelf life. Refer to the cartridge box for room storage shelf life information. Once a cartridge has been warmed to room temperature, do not return it to the refrigerator.

Allow the cartridge to warm for 5 minutes at room temperature before removing from the pouch for analysis.

Use cartridges immediately after opening pouch.

### **Sample Preparation and Considerations:**

- Whole blood samples without anticoagulant or whole blood collected into a lithium heparin tube may be used.
- Blood may be either venous or arterial, depending on the analytes to be measured.
- Venipuncture is typically performed for acid-base, electrolyte, and hematology studies.
- Samples for iCa should be collected in balanced heparin.
- For most accurate results, run samples immediately after collection.
  - Samples for pH, pCO<sub>2</sub>, pO<sub>2</sub>, TCO<sub>2</sub>, and iCa should be tested within 10 minutes if stored anaerobically.
  - All other analytes should be tested within 30 minutes.

For additional information regarding individual cartridges and tests sample collection and handling, see Cartridge & Test Information sheets: [www.pointofcare.abbott](http://www.pointofcare.abbott)

## Acid-Base Utilization

### Acid-base analysis is vital to your diagnostic protocols<sup>1</sup>

Chemical reactions, especially those occurring *in vivo*, are dependent on many factors, none more important than optimal pH. Illness, whether acute or chronic, often results in pH abnormalities. Failure to recognize and address these abnormalities may result in:

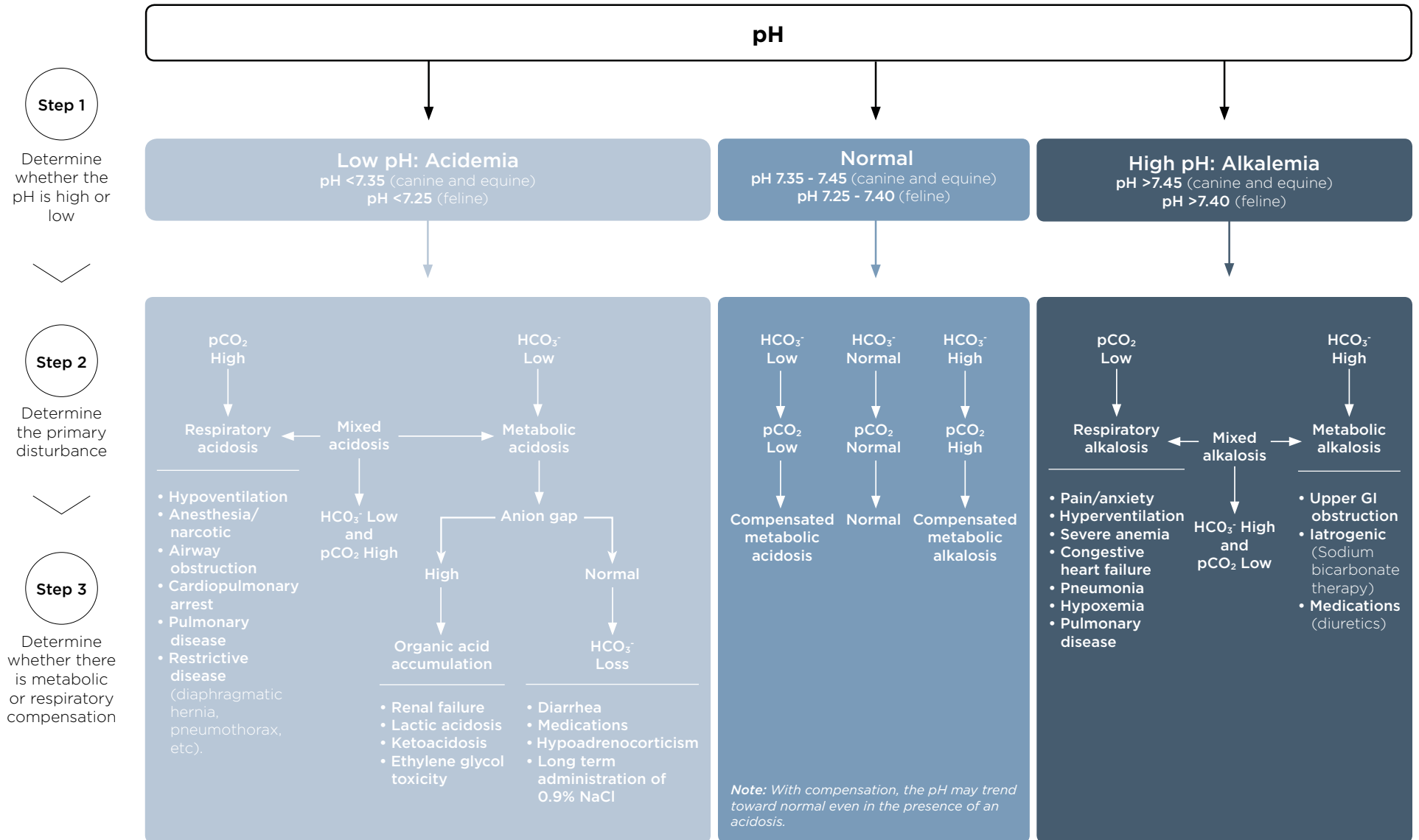
- Missed diagnoses
- Inappropriate treatment
- Delayed or poor patient response to therapy
- Increased time in hospital
- Frequent relapse
- Inability to thrive
- Patient death

### Acid-base definitions<sup>2</sup>

<b>pH</b>	Measurement of the H <sup>+</sup> ion concentration
<b>pCO<sub>2</sub></b>	Partial pressure of the carbon dioxide; reflects the amount of carbonic acid present
<b>HCO<sub>3</sub><sup>-</sup></b>	Bicarbonate, the body's major buffer
<b>Anion Gap</b>	Represents the concentration of all unmeasured anions in the plasma; the difference between measured cations and measured anions (Na <sup>+</sup> + K <sup>+</sup> )-(Cl <sup>-</sup> + HCO <sub>3</sub> <sup>-</sup> ); helpful in determining the cause of acid-base abnormalities.
<b>Base Excess</b>	mEq/L of strong base or acid needed to return the pH to 7.40.
<b>Electrolytes</b>	Na <sup>+</sup> , K <sup>+</sup> , Cl <sup>-</sup>
<b>TCO<sub>2</sub></b>	Total carbon dioxide, which is primarily HCO <sub>3</sub> <sup>-</sup> (95%)
<b>pO<sub>2</sub></b>	Partial pressure of oxygen; measurement of the tension or pressure of oxygen dissolved in blood

*Note: A venous sample is acceptable for interpretation of acid-base parameters. For detailed information on pO<sub>2</sub>, an arterial sample is recommended.*

# Acid-Base Diagnostic Chart<sup>3</sup>



## Common Disease States Where Acid-Base Analysis Is Beneficial

EXPECTED ACID-BASE ABNORMALITIES (depending on species)					
ACIDEMIA <sup>4</sup>				ALKALEMIA <sup>5</sup>	
<p>pH &lt; 7.35 (canine and equine) pH &lt; 7.25 (feline)</p>				<p>pH &gt; 7.45 (canine and equine) pH &gt; 7.40 (feline)</p>	
<p><b>Metabolic acidosis</b>                      ↑ H<sup>+</sup> &gt;&gt;&gt; ↓ pH (Most common presentation)                      ↓ HCO<sub>3</sub><sup>-</sup> &gt;&gt;&gt; ↓ pH (rare in small animals)</p>				<p><b>Metabolic alkalosis</b>                      ↑ HCO<sub>3</sub><sup>-</sup> or ↓ H<sup>+</sup> &gt;&gt;&gt; ↑ pH</p>	<p><b>Respiratory alkalosis</b>                      ↓ O<sub>2</sub> &gt;&gt;&gt; hyperventilation &gt;&gt;&gt; ↓ pCO<sub>2</sub> &gt;&gt;&gt; ↑ pH                      Reduced ability to uptake or exchange O<sub>2</sub></p>
LACTIC ACIDOSIS	VOMITING/DIARRHEA	RENAL FAILURE	DIABETIC KETOACIDOSIS	UPPER GI OBSTRUCTION	RESPIRATORY
<ul style="list-style-type: none"> <li>An increase in lactic acid production as a result of decreased tissue perfusion and/or decreased oxygenation</li> <li>Occurs in many disease states, most commonly:                             <ul style="list-style-type: none"> <li>Hypovolemia/shock</li> <li>Vomiting/diarrhea</li> <li>Colic</li> <li>Gastric torsion (GDV)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Lactic acidosis secondary to hypovolemia</li> <li>+/- loss of sodium bicarbonate (NaHCO<sub>3</sub>)</li> <li>Electrolyte abnormalities</li> <li>Anion gap often normal</li> </ul>	<ul style="list-style-type: none"> <li>Uremic toxins increase acid levels</li> <li>Loss of sodium bicarbonate (NaHCO<sub>3</sub>) OR hydrogen ion retention (H<sup>+</sup>)</li> <li>Electrolyte abnormalities</li> <li>Lactic acidosis with anemia and/or severe dehydration</li> </ul>	<ul style="list-style-type: none"> <li>Ketoacids</li> <li>Lactic acidosis</li> <li>Electrolyte abnormalities</li> <li>High/normal anion gap, depending on severity</li> </ul>	<ul style="list-style-type: none"> <li>Loss of Cl<sup>-</sup> in the form of HCl (hydrochloric acid)</li> <li>Hypochloremia is common</li> <li>Potential loss of free body water</li> </ul>	<ul style="list-style-type: none"> <li>Hyperventilation</li> <li>Pain</li> <li>Iatrogenic (mechanical ventilation)</li> <li>Decreased tissue perfusion (due to anemia, dehydration, other)</li> <li>Compensation for metabolic acidosis (hyperventilation)</li> <li>Head trauma</li> </ul>
CARTRIDGE CHOICES					
<p><b>CG4+: Acid-base, lactate, pO<sub>2</sub>, TCO<sub>2</sub></b>                      Helpful with GDV and other severe GI cases                      Diagnosis and monitoring for emergencies and/or severe cases</p>		<p><b>CG8+: Acid-base, pO<sub>2</sub>, HCT, glucose, Na, K, iCa</b>                      Helpful for monitoring diabetic and chronic kidney disease patients                      Diagnosis and monitoring for emergencies and/or severe cases                      Neoplasia diagnosis</p>		<p><b>EC8+: Acid-base, HCT, electrolytes</b>                      (best if high anion gap expected)                      Helpful in monitoring renal failure patients and GI disease</p>	
<p><i>Disclaimer: Cartridge examples are suggestions for diagnostics. Overall diagnosis should be based on medical history, physical examination and the patient's response to treatment.</i></p>					

## i-STAT Alinity v Cartridge Test Menu

The i-STAT Alinity v uses a wide range of disposable, single-use cartridges that contain the necessary reagents to provide reference lab quality results, while improving efficiency throughout the animal health continuum of care.

		CG4+	CG8+	G	Crea	E3+**	6+	CHEM8+	EC8+
Hematology	Hematocrit (Hct)		•			•	•	•	•
	Hemoglobin (Hb)*		•			•	•	•	•
Chemistry	Blood Urea Nitrogen (BUN)						•	•	•
	Creatinine (Crea)				•			•	
	Ionized Calcium (iCa)		•					•	
	Glucose (Glu)		•	•			•	•	•
Electrolytes	Chloride (Cl)					•	•	•	•
	Sodium (Na)		•			•	•	•	•
	Potassium (K)		•			•	•	•	•
Acid Base	pH	•	•						•
	Partial Pressure of Carbon Dioxide ( $PCO_2$ )	•	•						•
	Bicarbonate ( $HCO_3^*$ )	•	•						•
	Total Carbon Dioxide ( $TCO_2^*$ )	•	•					•	•
	Anion Gap (AnGap)*							•	•
	Base Excess (BE)*	•	•						•
Blood Gas	Partial Pressure of Oxygen ( $PO_2$ )	•	•						
	Oxygen Saturation ( $sO_2^*$ )	•	•						
Specialty	Lactate (Lac)	•							

\*Calculated Value

\*\*Chloride on the E3+ cartridge is only available for use on the VETSCAN i-STAT 1 and i-STAT Alinity v analyzers.

## i-STAT Alinity v System and Reference Ranges

		Units	System Range	Reference Range**		
				Canine	Feline	Equine
Hematology	Hematocrit (Hct)	% PCV	15 - 75	35 - 50	24 - 40	30 - 45
	Hemoglobin (Hb)*	g/dL	5.1 - 25.5	12.0 - 17.0	8.0 - 13.0	10.0 - 15.0
Chemistry	Blood Urea Nitrogen (BUN)	mg/dL	3 - 140	10 - 26	15 - 34	11 - 27
	Creatinine (Crea)	mg/dL	0.2 - 20.0	0.5 - 1.3	1.0 - 2.2	0.4 - 2.2
	Ionized Calcium (iCa)	mmol/L	0.25 - 2.50	1.12 - 1.40	1.20 - 1.32	1.25 - 1.75
	Glucose (Glu)	mg/dL	20 - 700	60 - 115	60 - 130	62 - 134
Electrolytes	Chloride (Cl)	mmol/L	65 - 140	106 - 127	112 - 129	100 - 111
	Sodium (Na)	mmol/L	100 - 180	139 - 150	147 - 162	128 - 142
	Potassium (K)	mmol/L	2.0 - 9.0	3.4 - 4.9	2.9 - 4.2	1.9 - 4.1
Acid-Base	pH		6.5 - 8.2	7.35 - 7.45	7.25 - 7.40	7.35 - 7.45
	Partial Pressure of Carbon Dioxide ( $PCO_2$ )	mmHg	5 - 130	35.0 - 38.0	33.0 - 51.0	36.0 - 46.0
	Bicarbonate ( $HCO_3^-$ )*	mmol/L	1.0 - 85.0	15.0 - 23.0	13.0 - 25.0	25.0 - 30.0
	Total Carbon Dioxide ( $TCO_2$ )*	mmol/L	5 - 50	17 - 25	16 - 25	24 - 32
	Anion Gap (AnGap)*	mmol/L	(-10) - (+99)	8 - 25	10 - 27	5 - 15
	Base Excess (BE)*	mmol/L	(-30) - (+30)	(-5) - 0	(-5) - (+2)	(-5) - (+5)
Blood Gas	Partial Pressure of Oxygen ( $PO_2$ )	mmHg	5 - 800	85 - 100	90 - 110	90 - 110
	Oxygen Saturation ( $sO_2$ )*	%	0 - 100	>90	>90	>90
Specialty	Lactate (Lac)	mmol/L	0.30 - 20.00	0.6 - 2.9	0.5 - 2.7	0.3 - 1.5

\*Calculated Value

\*\*Reference ranges are for venous samples unless specified

Highlighted cells reflect ranges for arterial samples. No venous reference ranges are yet available.

These normal intervals are provided only as a guideline. The most definitive reference intervals are those established for your patient population. Test results should be interpreted in conjunction with the patient's clinical signs.

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<sup>1</sup> Monnig AA. Practical Acid-Base in Veterinary Patients. *Veterinary Clinics of North America: Small Animal Practice*. 2013; 43: 1273-1286. doi:10.1016/j.cvsm.2013.07.009.

<sup>2</sup> George JW, Zabolotzky SM. Water, Electrolytes, and Acid Base [Chapter 5]. *Duncan & Prasse's Veterinary Laboratory Medicine*. 2011: 147-150.

<sup>3</sup> Kerl ME. Acid-Base, Oximetry, and Blood Gas Analysis [Chapter 128]. *Textbook of Veterinary Internal Medicine Expert Consult*. Eighth Edition. 2016: 531-535.

<sup>4</sup> Flaherty D, Blackwood L. Blood gas analysis and acid-base disorders [Chapter 9]. *BSAVA Manual of Canine and Feline Clinical Pathology*, Third Edition. 2016: 169-171.

<sup>5</sup> Flaherty D, Blackwood L. Blood gas analysis and acid-base disorders [Chapter 9]. *BSAVA Manual of Canine and Feline Clinical Pathology*, Third Edition. 2016: 172-173.

For Cartridge & Test Information sheets, please visit: [www.pointofcare.abbott](http://www.pointofcare.abbott)

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