

# Beaumont

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 Applicability Royal Oak

## Fluid and Stool pH - Royal Oak

Document Type: Procedure

### I. PURPOSE AND OBJECTIVE:

- A. The purpose of this document is to provide technical staff with a procedure for fluid and stool pH. pH is defined as the negative logarithmic value of a hydrogen ion  $[H^+]$  concentration in solution, and is expressed without a unit of measure. The pH scale ranges from 0.00 to 14.00, and is represented by the equation:  $pH = -\log [H^+]$ . The identification of the pH value allows fluids to be classified as acidic, neutral or alkaline. An acidic solution has a low pH, in the range of 0.00 to 7.34, while a neutral solution pH = 7.35 to 7.45, and an alkaline solution pH = 7.46 to 14.00.
- B. Fluid pH is used to assist in the monitoring of non-specific physiologic changes in the body. For example, the pleural, pericardial and peritoneal cavities normally contain a small amount of interstitial fluid that bathes the organ surfaces. Inflammation or infections affecting these cavities cause fluid to accumulate that has an abnormal pH. Stool pH is used as a screening test for carbohydrate and fat malabsorption, and as an aid in the evaluation of small intestinal disaccharidase deficiencies. Urinary pH is monitored to determine the existence of systemic acid-base disorders and in the management of urinary conditions that require the urine to be maintained at a specific pH. Tests for gastric acidity are used to screen for the ability of the parietal cells in the stomach to produce hydrochloric acid. Parietal cells are affected by various auto-immune disorders, pernicious anemia, mucopolipidosis and stomach cancers.

### II. SPECIMEN COLLECTION AND HANDLING:

- A. **Pleural, pericardial, or peritoneal fluid:** sample should be collected anaerobically in a heparinized syringe and placed on ice.
- B. **Stool:** Fresh, random stool. Refrigerate. Stool must be liquid. **Test will not be performed on solid samples.**

- C. **Stability:** Freeze specimen if testing is not performed within one hour of collection.

### III. REAGENTS:

- A. **Body Fluid:** pH test strips and pH buffers.
- B. **Pleural fluid:** See Blood Gas instrument procedure (Radiometer ABL-825).
- C. **Stool:** pH test strips and pH buffers.

### IV. QUALITY CONTROL (QC):

- A. **Body fluid and Stool:** Assay two levels of pH buffers (see QC sheet for which levels to run). Buffer solutions are pH 4.00, pH 7.00 and pH 10.00, this is completed to verify proper performance of the pH test strips.
1. pH Buffer 4.00 – Orion Application Solutions, purchased from Fisher through Thermo Scientific, manufacturer reference number 910460
  2. pH Buffer 7.00 - Orion Application Solutions, purchased from Fisher through Thermo Scientific, manufacturer reference number 910760
  3. pH Buffer 10.00 - Orion Application Solutions, purchased from Fisher through Thermo Scientific, manufacturer reference number 911060
- B. **Pleural fluid:** One level of Qualicheck® quality control, supplied by Radiometer America is run once per shift per instrument.

### V. PROCEDURE:

- A. Perform manually by dipping pH test strip into liquid/solution and match to the color chart immediately.
- B. **Pleural fluid:** See [Radiometer ABL-800 Series Operating Procedure](#)

### VI. INTERPRETATIONS:

- A. **Pleural:** A fluid pH value less than 7.20 in a patient with a parapneumonic effusion indicates the need to drain the fluid (1,2). In a patient with malignant pleural effusion, a pleural fluid pH value less than 7.30 is associated with a shorter survival and poorer response to chemical pleurodesis (3). A finding of a pH as low as 6.0 may indicate esophageal rupture (4).
- B. **Stool:** Decreased stool pH may be due to intestinal lactase deficiency, high lactose intake or decreased absorption of fat or carbohydrates. Increased stool pH may be seen in secretory diarrhea without food intake, colitis, villous adenoma or increased protein breakdown.

### VII. REPORTABLE RANGE:

- A. (AMR) Analytical Measurement Range = pH 0.00-10.00
- B. (CRR) Clinical Reportable Range = pH 0.00-10.00

## VIII. REFERENCE RANGE:

### A. Stool:

1. Newborns (0- 30 days) = 5.0-7.0
2. 31 days old – unlimited = 7.0-7.5

### B. Urine: 5.0-8.0

### C. Gastric: 1.5 – 3.5

### D. Pleural, pericardial, or peritoneal fluid: No reference ranges have been determined.

## IX. LIMITATIONS/INTERFERING SUBSTANCES:

**Stool:** Barium procedure and laxatives should be avoided for one week prior to the collection of the specimen.

## X. REFERENCES:

1. Colice GL, Curtis A, Deslauriers J, Heffner J, Light R, Littenberg B, et al. Medical and surgical treatment of parapneumonic effusions: an evidence-based guideline. Chest. 2000;118:1158-71.
2. Davies CW, Gleeson FV, Davies RJ Pleural Diseases Group. Standards of Care Committee, British Thoracic Society. BTS guidelines for the management of pleural infection. Thorax. 2003;58(suppl 2):ii18-28.
3. Light RW. Clinical practice. Pleural effusion. N Engl J Med. 2002;346:1971-7.
4. Houston MC. Pleural fluid pH: Diagnostic, therapeutic, and prognostic value. Am. J. Surg. 1987; 154:333-7.

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## Attachments

[pH Strip Quality Control Documentation.pdf](#)

## Approval Signatures

Step Description	Approver	Date
Medical Director	Ann Marie Blenc: System Med Dir, Hematopath	4/17/2023

Policy and Forms Steering Committee Approval (if needed)	Colette Kessler: Mgr, Division Laboratory	4/5/2023
Policy and Forms Steering Committee Approval (if needed)	Gail Juleff: Project Mgr Policy	4/5/2023
Lab Chemistry Best Practice Committee	Caitlin Schein: Staff Physician	4/5/2023
Lab Chemistry Best Practice Committee	Nga Yeung Tang: Tech Dir, Clin Chemistry, Path	4/3/2023
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