pH PAPER 4.5 to 8.5: DETERMINATION OF VAGINAL, OCULAR, or GASTRIC pH

I. PURPOSE
To determine normal pH in vaginal, ocular, or gastric fluid.

Vaginal/Amniotic Fluid: pH determination is used as a screening system in detecting rupture of the amniotic membrane in pregnant women. Rupture of the amniotic membrane can result in leakage of small volumes of amniotic fluid into the upper vagina. The presence of amniotic fluid tends to elevate the pH, and detection of a pH increase using pH paper may assist in determining the presence of amniotic fluid.

Ocular pH: pH determination is also used for ocular purposes when flushing the eye after a chemical splash. Using a pH indicator dye has been shown to assist in determining the presence of acidic or base conditions, which are harmful to the eye; helping to determine when the ocular fluid is at a normal pH.

Gastric Fluid: pH determination is used to help determine correct placement of naso-gastric tubes in patients.

II. PRINCIPLE
pH paper is a test strip used for the determination of pH. In the presence of fluid with neutral pH (7.0), the pH paper will turn into a forest green color. In the presence of acidic fluids, the paper color will range from yellow to green in color; and in the presence of alkaline fluids, the paper will range from Zucchini green to dark midnight blue in color. The color reference card that comes with the pH paper roll correlates to a pH range of 4.5 to 8.5 and indicate the pH of the specimen (vaginal, ocular fluid or gastric). The pH of the upper vagina is also normally acidic, while amniotic fluid has a neutral pH. Normal ocular fluid should be near a pH of 7.0 (neutral). The pH of gastric fluid is normally acidic.

III. PERSONNEL
Intended for use by clinical personnel who have received training and demonstrated competency in this procedure. In the hospital setting, this includes Clinical Laboratory Scientists, Registered Nurses, Nurse Practitioners, Physician Assistants, Physicians, Respiratory Tech. and Perfusionists. In the ambulatory setting, this includes the aforementioned personnel as well as Medical Assistants, Licensed Vocational Nurses and other licensed Technologists. Personnel who have difficulties with color discrimination must demonstrate ability to read the test.
IV. REAGENTS, EQUIPMENT AND MATERIALS
A. pH paper (Hydrion 4.5 to 8.5 paper or equivalent), UCSF PMM # 198425
B. pH Color Reference Card
C. Sterile Gloves

V. STORAGE
pH paper must be stored in its container, at room temperature. Avoid excessive heat.

VI. QUALITY CONTROL
The Clinical Laboratory will complete all Quality Control. New orders will be QC’d prior to distribution to POCT sites. Once QC’d, pH rolls and box will be marked with QC date and POCT staff’s Initial. The pH rolls are good until the manufacturer’s expiration date printed on the pH roll color cards. QC results for each new order will be available online in the POCT Manual, under the “QC Results” section.

VII. SPECIMEN REQUIREMENTS
The paper may be applied directly to pooled vaginal fluid, ocular fluid, or gastric fluid.

VIII. TEST PROCEDURE
A. Vaginal Testing
1. Using two patient identifiers, verify patient identification, and explain procedure to patient and/or family.
2. Remove one to two inches of pH paper from the holder for each test. DO NOT allow it to come into contact with any liquid or other substance, which might affect pH.
3. Using a vaginal speculum, part the labia exposing the cervix and carefully insert the paper into the vagina. Do not allow the pH paper to come into contact with vaginal tissue during entry.
4. Allow first and only contact to the test paper to occur with upper vaginal tissue (posterior vaginal fornix and external cervical os).
5. Observe for immediate color change and read the pH from the color chart specific for this paper.
6. Record the pH value, corresponding to the color change, in the patient’s chart.
   a) Vaginal fluid pH is normally slightly acidic
   b) Amniotic fluid has a neutral pH and a vaginal sample pH > 6 suggests the presence of amniotic fluid
   c) Limitations: That antibiotic therapy, vaginal infection that can raise the vaginal pH or contamination with urine could result in a false positive impression for the presence of amniotic fluid.
B. Ocular Testing
1. Using two patient identifiers, verify patient identification and explain procedure to patient and/or family.
2. Remove one to two inches of pH paper from the holder for each test.
3. With care, apply the tip of the paper to pooled ocular fluid. Avoid direct contact with eye tissue.
4. Observe for immediate color change and read the pH from the color chart specific for this paper.
5. Record the pH value, corresponding to the color change, in the patient’s chart.
6. Repeat test as needed.
C. **Gastric Testing**
   1. Using two patient identifiers, verify patient identification. If appropriate, explain procedure to patient and/or family.
   2. Remove one to two inches of pH paper from the holder for each test.
   3. Apply the tip of the paper to aspirated gastric fluid. Avoid contact with fluids other than that being tested.
   4. Observe for immediate color change.
   5. Record the pH value, corresponding to the color change, in the patient’s chart.

IX. **INTERPRETATION OF RESULTS**

A. The color of the pH paper after use should be compared to the sample colors on the pH paper container. pH results should be reported as numeric values as measured against the pH color chart (as shown below).

<table>
<thead>
<tr>
<th>Color</th>
<th>Approximate pH value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>4.5</td>
</tr>
<tr>
<td>Yellow Green</td>
<td>5.0</td>
</tr>
<tr>
<td>Citrus Green</td>
<td>5.5</td>
</tr>
<tr>
<td>Apple Green</td>
<td>6.0</td>
</tr>
<tr>
<td>Green</td>
<td>6.5</td>
</tr>
<tr>
<td>Forest Green</td>
<td>7.0</td>
</tr>
<tr>
<td>Zucchini Green</td>
<td>7.5</td>
</tr>
<tr>
<td>Midnight Blue</td>
<td>8.0</td>
</tr>
<tr>
<td>Teal</td>
<td></td>
</tr>
<tr>
<td>Dark Midnight</td>
<td>8.5</td>
</tr>
</tbody>
</table>

B. For vaginal fluid, a pH greater than 6 suggests the presence of amniotic fluid, and the possible rupture of membranes. **See LIMITATIONS below.**

X. **LIMITATIONS**

A. pH paper used in the detection of vaginal, ocular or gastric pH, is intended for use by qualified medical and nursing staff and is intended as an aid to professional treatment.
B. pH paper can only indicate a pH value and should be used only as a monitoring tool.
C. Antibiotic therapy or infections of the vagina can lead to elevated vaginal pH resulting in a false interpretation of determining the presence of amniotic fluid.
D. Where doubt exists, standard microbiological testing should be employed to exclude infection.
E. pH testing cannot distinguish amniotic fluid from urine. In instances where there is the possibility of urine contamination and/or where the patient has received antibiotic therapy, “fern” testing may be of value to verify the presence of amniotic fluid.

XI. ASSAY PROCEDURAL NOTES
A. Do not use pH paper that does not have “QC’d” and the date printed on the product label.
B. Following contact with the vagina, eye or gastric fluid, the pH paper should be considered potentially infectious and standard precautions appropriate for microbiological hazards must be observed.
C. Do not reuse pH paper.

XII. RESULTS AND REPORTING
A. Record the numeric pH value on the patient’s medical record chart.
B. NOTE: Whenever a user identifies that an incorrect result has been reported, they are responsible for correcting/commenting the incorrect result (if possible), contacting the ordering provider, notifying them of the error, and documenting this notification, including the time and date, in the patient record.

XIII. REPORTABLE RANGE
pH 4.5 – 8.5

XIV. RECORDS MAINTENANCE
A. Patient Records are stored in their Medical Record Charts indefinitely.
B. Quality Control logs are stored in the POCT Clinical Laboratory for at least 3 years.
C. Documentation of training and competency are kept in each staff member’s personnel file.

XV. STAFF EDUCATION AND COMPETENCY
A. Super users are trained by POCT CLS staff.
B. Each user, using the pHydron paper (pH 4.5-8.5) becomes competent through the training provided by the Nurse Educators or Unit managers in either the Department of Nursing or Ambulatory Services.

XVI. DATA MANAGEMENT SYSTEM – N/A

XVII. REFERENCES
pHydrion Paper Procedure for Review

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim Lee (029124187) for Cynthia Ishizaki (024044224)</td>
<td>POC CLS SPEC SUP</td>
<td>6 Nov 2013, 12:17:36 PM</td>
<td>Reviewed</td>
</tr>
</tbody>
</table>

Med Dir Apprvl

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tim Hamill MD (023335003)</td>
<td>PA CB MED DIRECTOR</td>
<td>12 Nov 2013, 08:35:26 AM</td>
<td>Approved</td>
</tr>
</tbody>
</table>

PMM# added to pH Paper 4.5-8.5 SOP.

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim Lee (029124187)</td>
<td>POC CLS SPEC SUP</td>
<td>6 Feb 2014, 04:33:12 PM</td>
<td>Complete</td>
</tr>
<tr>
<td>Elizabeth Lucas (023127574)</td>
<td>POC CLS</td>
<td>7 Feb 2014, 10:51:30 AM</td>
<td>Complete</td>
</tr>
</tbody>
</table>

Step 2 - Supervisor Approval

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim Lee (029124187)</td>
<td>POC CLS SPEC SUP</td>
<td>7 Feb 2014, 10:55:51 AM</td>
<td>Approved</td>
</tr>
</tbody>
</table>

3-POC Forms Notification

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elizabeth Lucas (023127574)</td>
<td>POC CLS</td>
<td>7 Feb 2014, 10:55:52 AM</td>
<td>Email Sent</td>
</tr>
</tbody>
</table>

Quick Approval
### Approve Now

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim Lee (029124187)</td>
<td>POC CLS SPEC SUP</td>
<td>7 Feb 2014, 11:43:50 AM</td>
<td>Approved</td>
</tr>
</tbody>
</table>

### Quick Approval

<table>
<thead>
<tr>
<th>Name/Signature</th>
<th>Title</th>
<th>Date</th>
<th>Meaning/Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim Lee (029124187)</td>
<td>POC CLS SPEC SUP</td>
<td>4 Mar 2014, 09:22:04 AM</td>
<td>Approved</td>
</tr>
</tbody>
</table>