I. PURPOSE
This procedure provides instructions for performing hydron pH testing. Hydron® pH paper is used as a semi-quantitative screening test to rapidly determine the pH in ocular chemical exposures within the pH range of 6.0 to 9.5.

II. ORDER
A physician’s order, standard protocol, or order by another health professional authorized to request laboratory tests is required for point-of-care hydron pH testing.

Keywords: chemical exposure, eye, hydron, ocular, pH
III. MATERIALS

<table>
<thead>
<tr>
<th>Reagents</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrion® pH Paper</td>
<td>POCT Program Office</td>
</tr>
<tr>
<td>pH 6.0 Buffer</td>
<td>POCT Program Office</td>
</tr>
<tr>
<td>pH 9.0 Buffer</td>
<td>POCT Program Office</td>
</tr>
</tbody>
</table>

**Supplies**

<table>
<thead>
<tr>
<th>Supplies</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable Gloves</td>
<td></td>
</tr>
<tr>
<td>JHMI-approved waste container</td>
<td></td>
</tr>
<tr>
<td>JHMI Date Opened Labels</td>
<td>Standard Register Item #0509N</td>
</tr>
</tbody>
</table>

IV. STORAGE AND HANDLING REQUIREMENTS

<table>
<thead>
<tr>
<th></th>
<th>Temperature</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrion® pH Paper</td>
<td>Room Temperature (15-30°C)</td>
<td>Manufacturer's expiration date.</td>
</tr>
<tr>
<td>pH Buffers (6.0, 9.0)</td>
<td>Room Temperature (15-30°C)</td>
<td>Manufacturer's expiration date.</td>
</tr>
</tbody>
</table>

A. The Hydrion® pH paper roll and pH Buffers must be labeled with the open date.
B. Never use Hydrion® pH paper or pH Buffers past the manufacturer's expiration date.
C. Protect the Hydrion® pH paper from exposure to the following:
   1. Excessive heat or sunlight.
   2. Acid or alkaline fumes.
D. Keep the pH Buffer aliquots tightly capped when not in use.

V. SPECIMEN TYPE

The preferred specimen for testing is sampling directly from the exposed eye, or from an eye lavage or eye wash following chemical exposure.

VI. SPECIMEN COLLECTION AND HANDLING

Prior to sample collection and testing, patient identification must be verified using two unique identifiers.

A. If the lavage or eye wash is to be tested, a clean collection container must be labeled with at least two unique patient identifiers in front of the patient (e.g. Name, DOB, MRN, and/or CSN).
   1. All labeling should be done on the cup instead of the lid, which may become separated from the specimen.
B. Alternately, ocular pH can also be obtained by gently pulling down on the lower lid of the affected eye and placing the Hydrion® pH paper in the cul-de-sac.

It is recommended that all samples be tested immediately following collection.

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VII. SAFETY PRECAUTIONS

A. Follow ICPM IFC023 Infection Control and Prevention: Standard and Transmission-based Isolation Precautions.
B. Wear gloves at all times when handling Hydrion® pH paper and testing chemical exposures to the eye(s).
C. Avoid unnecessary exposure to pH buffer solutions. Wash areas of contact with water immediately.
D. All patient specimens and used Hydrion® pH paper must be discarded in the appropriate JHMI-approved biohazard container or waste receptacle.

VIII. PERFORMING QUALITY CONTROL (QC) TESTS

A. Two levels of External Quality Control, using pH 6.0 and pH 9.0, will be performed:
   1. At least once per week on each opened container of Hydrion® pH paper and bottle of pH buffer solution.
   2. When opening a new roll of Hydrion® pH paper or bottle of pH buffer solution.
   3. When patient results are questionable.
   4. By all new operators as part of initial hands-on training prior to testing patient specimens.
   5. At least once a year by each operator to demonstrate compliance with ongoing competency regulations.

B. Procedure:
   1. Prepare materials for testing:
      a. Put on gloves.
      b. Verify that pH buffers and the Hydrion® pH paper roll are dated and within the manufacturer's expiration date.
      c. Tear off two (2) separate strips of Hydrion® pH paper from the roll and place on an absorbent material (i.e. chucks, paper towel, etc).
   2. Perform the test:
      a. Record the applicable information on the Hydrion pH QC Log Sheet (see Appendix A).
      b. Mix the pH buffers gently by inversion, then uncap and dispense one drop of pH 6.0 buffer solution onto one strip, and one drop of pH 9.0 buffer solution onto the second strip.
      c. Immediately match the color of the pH paper to the closest color on the color chart supplied with the Hydrion® pH paper.
         i. NOTE: Colors are unstable, and results should be read within 60 seconds.
      d. Record the actual number value of the pH test results on the Hydrion pH QC Log Sheet, confirming results fall within the acceptable range.
      e. Discard the used pH papers into a JHMI-approved receptacle.
      f. Both levels of QC must pass before patient testing can be performed.
   C. Corrective Action:
      1. If any QC test fails to give the expected results:
         a. Verify Hydrion® pH paper and pH Buffer Solution aliquots are within their expiration dates and that they have been properly stored.
         b. Ensure proper technique is being used, repeating testing with the same materials.
         c. If the QC fails a second time, open and date a new container of Hydrion® pH paper. Repeat test.
         d. If the QC fails a third time, open and date a new bottle of pH Buffer solution(s) from the POCT Office. Repeat test.
         e. If the QC fails with the new Hydrion® pH paper and pH Buffer solution(s), DO NOT PERFORM ANY PATIENT TESTING. Contact the POCT Office (5-2645) or send a CORUS message to "POCT Consult".
      2. Note any QC failures and corrective actions in the Comment Section of the Hydrion pH QC Log Sheet.
IX. PATIENT TEST PROCEDURE

A. Prepare for the test:
   1. Confirm Hydrion® pH paper is not expired, and that QC testing has been performed successfully and documented within the last week. If not, QC must be completed prior to patient testing. Refer to Performing Quality Control (QC) Tests.
   2. Put on gloves.
   3. Positively confirm the identity of the patient using a minimum of two unique identifiers, neither of which may be the room number.
      a. If an eye lavage specimen has been collected in a container, confirm proper specimen labeling, with at least two unique patient identifiers on the cup rather than the lid.
   4. Tear off a strip of Hydrion® pH paper from the roll.

B. Perform the test:
   1. Bring the strip of Hydrion® paper into contact with the specimen, either by dipping the paper into the eye cul-de-sac or eye lavage.
   2. Within 60 seconds, match the color of the Hydrion® pH paper to the closest color on the Color Chart supplied with the paper dispenser.
   3. If a computer is not in the same room as that in which patient testing is performed, complete the Hydrion pH Patient Result Log (see Appendix B). This log must then be used to document the results in the patient's electronic medical record.
      a. If a computer is available in the same room as testing, immediately result the test in the patient's electronic medical record.
   4. Discard the used Hydrion® pH paper and patient specimen, when applicable, into a JHMI-approved receptacle.

X. EXPECTED RESULTS

Following chemical exposure, the eye must be irrigated sufficiently to achieve a neutral pH.

Neutral pH of eye: 7.4 – 7.6
Neutral pH of eye wash: At least 7.2

XI. RESULTS INTERPRETATION

The Hydrion® pH paper covers a pH range of 6.0 to 9.5. Each container includes a Color Chart that must be utilized within 60 seconds after application of the sample to the Hydrion® pH paper to determine the pH value of the specimen. The color that most closely matches the Hydrion® pH paper is the reported pH value of the specimen.

NOTE: All test results should be considered in relation to a specific patient's condition and therapy; inconsistent results should be repeated or supplemented with additional test(s), per unit policy.

XII. RESULTS REPORTING

All patient test results must be manually documented on the Hydrion pH Patient Result Log (see Appendix B), if there is not a computer in the room where testing is performed. This log must then be used to ensure results are properly documented in Epic using manual entry. If there is a computer in the testing room, patient result entry must occur immediately following the completion of testing.

A. Each of the fields must be filled out completely when completing the Hydrion pH Patient Result Log.
   1. Record the patient's pH value exactly as it appears on the color chart of the Hydrion® pH Paper container.

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In the event of an Epic downtime, all patient results must be recorded on the Hydrion pH Patient Result Log until the downtime is over, at which time all patient results must be manually entered into Epic.

 XIII. INTERFERENCES

The accuracy of Hydrion® pH paper is affected by salts, proteins, and other factors. Deviations may, under certain conditions, exceed 0.5 pH units.

 XIV. LIMITATIONS

A. Hydrion® pH paper is not to be used for pH determinations of specimen types such as urine and/or gastric fluid.
B. Do not touch Hydrion® pH paper with bare fingers. Gloves must be worn at all times when completing testing - QC and patient.
C. Avoid color comparison under fluorescent lights alone.
D. The color of the pH paper and pH colors on the Color Charts may vary from lot to lot. As such, only the Color Chart accompanying each specific package of Hydrion® pH paper should be used for results interpretation.
   1. NOTE: If the Color Chart is missing, discard the container and open a new container of Hydrion® pH paper. The open date must be recorded and QC completed and documented prior to use on patient specimens.

 XV. OPERATOR TRAINING

A. Testing may only be performed by currently certified staff members who have been trained by a Point-of-Care Coordinator, Nurse Educator, or designated unit trainer. Training records must be kept in the employee's personnel file, and a copy sent to the Point-of-Care Testing Office.
   1. NOTE: Staff members who are color blind may not perform pH Hydrion testing.
B. Initial Training will include:
   1. Review the policy online.
   2. Completion of the Initial Training and Competency Assessment Checklist (see Appendix C), to be kept in the employee's personnel file
   3. Successful performance and documentation of both levels of quality control (pH 6.0 and pH 9.0).
   4. Passing score on the quiz following the MyLearning module.

 XVI. OPERATOR COMPETENCY

In order to maintain competency, all operators must successfully complete and document both levels of quality control and the MyLearning module and quiz once a year. The competency calendar follows the fiscal year: July 1-June 30.
XVII. REFERENCES


XVIII. SIGNATURES

<table>
<thead>
<tr>
<th>Electronic Signature(s)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>William Clarke</td>
<td>12/21/2021</td>
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