Oesophageal High Resolution Manometry
and Ambulatory 24-hour pH / Impedance
Monitoring Policy

V3.0

October 2018
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Summary

Oesophageal physiology studies play an important role in the investigation and management of patients with oesophageal motility disorders as well as gastro-oesophageal reflux disease. Prior to the introduction of this service locally, patients were required to travel to Exeter.

Patients are referred via an electronic Maxims internal referral form and attend on two occasions, 24 hours apart, in order to complete this test. The analysis is performed locally by two Consultant surgeons and the results used to guide treatment accordingly.

This policy sets out the roles and responsibilities of those staff involved in delivering this service, the governance structure in place to support it, as well as details of how the procedure is performed.
1. **Introduction**

1.1. Oesophageal manometry plays a vital role in the diagnostic pathway for patients with oesophageal motility disorders (e.g. achalasia, jackhammer oesophagus, distal oesophageal spasm) as well in the pre-operative evaluation of patients undergoing anti-reflux surgery.

1.2. High resolution manometry is the most advanced technology currently available for this purpose.

1.3. Oesophageal ambulatory pH monitoring is also a valuable tool to confirm or refute the presence of acid reflux, including in the pre-operative evaluation of patients requiring anti-reflux surgery.

1.4. Ambulatory impedance monitoring is utilised in patients with atypical reflux symptoms or who are refractory to proton pump inhibitors, to detect the presence of non-acid reflux where standard pH monitoring is inconclusive.

1.5. NICE-accredited commissioning guidance, published in September 2013, states that all patients undergoing anti-reflux surgery should have ready access to these investigations.

1.6. Prior to the introduction of this service locally at RCHT, these investigations were being performed at both Royal Devon & Exeter Hospital and Derriford Hospital.

2. **Purpose of this Policy/Procedure**

This document outlines the indications, contraindications and procedural policies relating to these investigations to ensure they are delivered safely, effectively and to the appropriate recognised standards.

3. **Scope**

This policy is relevant to the two Consultant upper GI surgeons interpreting and reporting the investigations, the nurse specialist performing the procedure, the administration booking staff and all those making referrals to this service.

4. **Definitions / Glossary**

4.1. High resolution manometry (HRM): Technique for assessing oesophageal motor function. Multiple pressure measurements are recorded using a water-perfused catheter, placed nasally into the oesophagus, to generate a topographical diagram.

4.2. Oesophageal pH monitoring: Technique using a catheter placed nasally into the oesophagus for assessing acid reflux within the oesophagus over a 24-hour period.

4.3. Oesophageal impedance monitoring: Technique using a catheter placed nasally into the oesophagus for assessing non-acid reflux in patients with atypical symptoms or those refractory to proton pump inhibitor therapy.
5. **Ownership and Responsibilities**

Michael Clarke will be responsible for ensuring the implementation of this service according to the standards of practice outlined in this document.

5.1. **Role of the Managers**

Line managers are responsible for:

- Support time in the job plans for nurse specialist and two Consultant surgeons to deliver this test
- Setup an appropriate clinic code and EROS ordering code for disposables
- Ensure clinical coding is appropriately set against the correct HRG tariff

5.2. **Role of Individual Staff**

All staff members are responsible for:

5.2.1 **Secretary**

- Referrals will be received and subsequently vetted by the two responsible upper GI surgery Consultants before a date for the test is offered to the patient
- A patient appointment will be identified
- A letter will be sent to the patient, along with a patient information leaflet and GERD-HRQL questionnaire

5.2.2 **Clinical nurse specialist**

- Deliver 2 x 4-hour clinics per week
- Setup the equipment in line with manufacturer guidelines & cleaning / preventive maintenance
- Perform the procedure in line with the standards of practice outlined below and using the set protocol in Appendix 3
- Ensure storage of data confidentially
- Ensuring ordering of disposables through EROS to maintain adequate stock

5.2.3 **Consultant Upper GI Surgeons x 2**

- Reporting of all tests together for the first 60 cases
- Produce a report including the minimum dataset as listed in the BSG / AGIP guidelines
- Notify the referring Consultant once the result is available
- Where a test is deemed unsuitable due to a contraindication or relative contraindication it will be the responsibility of the upper GI surgery Consultant to discuss this with the referring Consultant
5.2.4 Coding staff
- Ensure outpatient procedure codes recorded for relevant agreed HRG

6. Standards and Practice

6.1. Referral process & patient selection

6.1.1. All referrals will be made using the electronic internal referral system on Maxims entitled ‘Oesophageal pH / manometry Request Service’

6.1.2. All referrals will be vetted weekly by the Consultant upper GI surgeons (Mr Michael Clarke & Mr Paul Peyser) or specialist nurse (Lou Maitland) according to indications and contraindications set out in the AGIP & BSG guidelines

6.1.3. All patients must have an OGD prior to referral for this investigation

6.1.4. Where the test is deemed unsuitable the vetting Consultant will contact the referring Consultant to inform them of the reason

6.2. Patient booking

6.2.1. Patients will have an appointment booked by the upper GI surgery secretary, confirmed on the phone with the patient

6.2.2. Patients will be informed by post of their appointment

6.2.3. A patient information leaflet (Appendix 4) will be sent to the patient, in addition to a quality of life questionnaire (GERD-HRQL)

6.3. Patient preparation

6.3.1. As per AGIP and BSG guidelines, all anti-reflux medication will be stopped prior to the procedure as per the information leaflet, unless otherwise indicated (e.g. refractory to PPI therapy or having impedance studies)

6.3.2. Patients should be nil by mouth for four hours prior to the procedure

6.3.3. In those with suspected achalasia a longer period of fasting may be required

6.3.4. On admission for the test the patient details will be checked on arrival and written consent obtained prior to the start of the procedure.

6.3.5. Patients will be informed that they can withdraw consent at any time during the procedure

6.3.6. Indications and contraindications for the test will be confirmed before proceeding. Where uncertainty arises this will be discussed by one of the two supervising upper GI surgery Consultants who will make a final decision
6.4. **Equipment preparation**

6.4.1. The equipment will be checked by the nurse practitioner carrying out the test

6.4.2. Calibration and zero of catheters as per manufacturer guidelines will be completed

6.4.3. Cleaning will be performed in line with manufacturer and local infection control guidance (Appendix 5)


6.4.4. Further disposables to be ordered via EROS using allocated code

6.5. **Procedure**

6.5.1. Staff will wear the appropriate protective clothing

6.5.2. Each step of the procedure will be explained to the patient

6.5.3. Where application of local anaesthesia to the nares is required, this will be prescribed and administered by a member of staff with the appropriate qualification

6.5.4. The procedure will follow a standardised protocol (appendix 3)

6.5.5. Patients discharged with a pH / impedance monitor will return the following day for removal of the nasogastric catheter by the nurse specialist and the monitoring box handed over for data analysis along with their symptom diary

6.6. **Post-procedure**

6.6.1. The single use water-perfused HRM catheter and/or pH/impedance catheter should be placed straight into the appropriate coloured bag for disposal

6.6.2. Analysis of the recording will be in line with the “Chicago Classification” for manometry (Appendix 6) and using Demeester score, symptom index (SI) and symptom association probability (SAP) for pH / impedance studies.

6.6.3. Analysis will be performed by a trained upper GI surgeon

6.6.4. Reporting will include the minimum dataset set out in the current BSG guidelines

6.6.5. All studies will be uploaded direct to the RCH Shared Folder (S:/RCH-STO/Surgery/UpperGI/OesophagealManometry) and can then be analysed using the relevant software.

6.6.6. A PDF version of the report is then uploaded to the same Shared Folder (as above in 6.6.5) and a copy imported to Maxims ‘Documents’ folder
6.6.7.  The notes and a notification that the report is now uploaded, will be sent to the referring Consultant

6.6.8.  The outpatient outcome form is completed by the specialist nurse carrying out the procedure (Appendix 7) and then actioned by the upper GI secretary

7. **Dissemination and Implementation**

7.1. It is anticipated that in the first year the service will predominantly be offered to those patients undergoing anti-reflux or achalasia surgery only

7.2. The procedure will be performed by a trained clinical nurse specialist

7.3. All investigations will be interpreted by one of two trained Consultant surgeons

7.4. Ongoing supervision and mentorship will be offered by experienced gastroenterological support through Ardmore Health

7.5. This policy will be presented at the surgical governance meeting, Divisional Governance meeting and subsequently uploaded to the intranet after approval.

7.6. This document can then be made accessible to all interested parties

8. **Monitoring compliance and effectiveness**

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>1. Length of time from referral to diagnostic test (RTT)</th>
<th>2. Volume and source of referrals</th>
<th>3. Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Michael Clarke, Consultant Upper GI &amp; Bariatric Surgeon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>1. Audit referral times to diagnostic</td>
<td>2. Audit of volume / source of referrals</td>
<td>3. Audit complications</td>
</tr>
<tr>
<td>Frequency</td>
<td>Monitor annually</td>
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<td></td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Presented annually at the surgical directorate governance meeting</td>
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</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Where action is required it will be the responsibility of the lead named above to coordinate and instigate these accordingly</td>
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<td></td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Lessons learned or changes to be made will be communicated to all service users through email and at local surgical directorate governance meeting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. **Updating and Review**

9.1. This policy will be reviewed in three years

9.2. Revisions may be made ahead of the review date when the procedural document requires updating. Where the revisions are significant and the overall policy is changed, the revised document will be taken through the standard consultation, approval and dissemination processes.

9.3. Where the revisions are minor, e.g. amended job titles or changes in the organisational structure, approval can be sought from the Executive Director responsible for signatory approval, and can be re-published accordingly without having gone through the full consultation and ratification process.

9.4. Any revision activity will be recorded in the Version Control Table as part of the document control process.

10. **Equality and Diversity**

10.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Diversity & Human Rights Policy’ or the Equality and Diversity website.

10.2. **Equality Impact Assessment**

10.3. The Initial Equality Impact Assessment Screening Form is at Appendix 2.

**NB: References and Associated Trust Documents**

Up-to-date references, including details of supporting or associated Trust or Cornwall Health Community documents, must be listed in the Governance Information table at Appendix 1.

**References**


## Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Oesophageal High Resolution Manometry and Ambulatory 24-hour pH / Impedance Monitoring Policy V3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>21/05/2018</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>17/10/2018</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>17/10/2021</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Michael Clarke, Consultant Upper GI &amp; Bariatric Surgeon</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252589</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Policy outlining standards and procedures for providing this investigative procedure</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>High resolution manometry / pH monitoring / impedance / gastrointestinal physiology / oesophageal.</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>21/05/2018</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Oesophageal High Resolution Monitoring Policy</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Approved GI governance audit meeting Divisional Board.</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Vicky Peverelle</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Name and Signature of Divisional/Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
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Links to key external standards: Governance Team can advise

Related Documents: Reference and Associated documents

Training Need Identified? Yes – Training being provided both offsite and onsite by Ardmore Health

Version Control Table

<table>
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<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tr>
<td>22/05/2015</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Michael Clarke Consultant Surgeon</td>
</tr>
<tr>
<td>29/06/2015</td>
<td>V2.0</td>
<td>Added outpatient outcome form to Appendix</td>
<td>Michael Clarke Consultant Surgeon</td>
</tr>
<tr>
<td>21/05/2018</td>
<td>V3.0</td>
<td>New Chicago classification, new e-referral system, new Shared folder for centralised storage of investigation data and reports. Appendices renumbered. Adjusted Appendix 3 including section on 'Data Upload'. Updated Governance Information and IEIA forms. Reference to Appendix 7 included. Summary added.</td>
<td>Michael Clarke Consultant Surgeon</td>
</tr>
</tbody>
</table>

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.
This document is only valid on the day of printing

Controlled Document
This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 2. Initial Equality Impact Assessment Form.

**Name of the strategy / policy / proposal / service function to be assessed**
Oesophageal High Resolution Manometry and Ambulatory 24-hour pH / Impedance Monitoring Policy V3.0

<table>
<thead>
<tr>
<th>Directorate and service area:</th>
<th>Is this a new or existing Policy?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of individual completing assessment:</th>
<th>Telephone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Clarke</td>
<td>01872 252589</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   - **Who is the strategy / policy / proposal / service function aimed at?**
   - Outline standards and procedures for the delivery of this diagnostic test

2. **Policy Objectives***
   - Understand why test will be carried out
   - Understand protocol for referral through to post-procedural care

3. **Policy – intended Outcomes***
   - Enable safe delivery of oesophageal manometry and pH monitoring service

4. **How will you measure the outcome?**
   - Referral to diagnostic test timing
   - Report accuracy
   - Patient tolerance

5. **Who is intended to benefit from the policy?**
   - All members of staff involved in referring to or delivering this service

6a. **Who did you consult with**
   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   **b). Please identify the groups who have been consulted about this procedure.**

What was the outcome of the consultation?

7. **The Impact**
   Please complete the following table. **If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.**

   **Are there concerns that the policy could have differential impact on:**

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td></td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>----------------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage and Civil partnership</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any policies which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended.  
   | Yes | No |

9. If you are not recommending a Full Impact assessment please explain why.

Signature of policy developer / lead manager / director  
Date of completion and submission

Names and signatures of members carrying out the Screening Assessment  
1. Michael Clarke, Consultant Surgeon  
2. Human Rights, Equality & Inclusion Lead

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed __ Michael Clarke, Consultant Surgeon _____________

Date ____ 21/05/2018 ______________
Appendix 3. Protocol for conducting oesophageal high resolution manometry and pH / impedance

Preparation

A) Equipment: Set-up, checks and calibration ‘zero’
B) Patient: Check identity, patient history (including fasting and medications), consent form 3.

High resolution manometry

A) Intubate patient’s nose with catheter whilst in upright position
B) Lie patient supine with tube in place
C) Note position of lower oesophageal sphincter in centimetres from the nares
D) Baseline: 30 seconds no swallowing (“Resting Pressure”)
E) Wet swallows x 10 – syringe 5ml water bolus every 30 seconds whilst patient supine
F) Repeat baseline (“Resting pressure”)
G) Remove catheter and dispose in appropriate coloured bag

pH / impedance monitoring

A) Attach catheter to omega pH module
B) pH catheter pre-soaked in each buffer solution following on-screen instructions
C) Pass catheter via nose and position 5cm above top of lower-oesophageal sphincter
D) Secure catheter to nose
E) Provide symptom diary to patient and provide measuring box to patient with carrying bag
F) Commence recording and arrange appointment following day for removal of catheter and download of data

Data Upload

A) Upload data onto RCH Shared Drive
   (S:/RCHSTO/Surgery/UpperGI/OesophagealManometry into the dated folder, along with a word document regarding the patient assessment and details of the tests conducted
B) Information during consultation completed on generic Maxims document for oesophageal manometry and pH studies. Consent and patient diary scanned and uploaded to Maxims.

Coding (see Appendix 7)

Day 1 Outpatient attendance (new) – Tick relevant OPCS codes (being added)
Day 2 Outpatient attendance (follow-up)
Appendix 5. Maintenance instructions

MMS Solar Perfusion Pump

Maintenance Instructions

The information in this document provides you with maintenance instructions for the MMS Solar Perfusion Pump as supplied with your Solar GI measurement system. Some information and instructions may differ from earlier documents. MMS reserves the right to change instructions as part of its continuous improvement process. Contact your distributor for the latest version of these maintenance instructions. Refer to the Solar manuals as supplied with the system for more detailed information.

MMS advises that cleaning and preventative maintenance of the whole perfusion pump is performed on a regular basis to obtain a maximum hygienic system. The aim is to maintain a high level of quality and safety of measurements.

Summary of the maintenance instructions:

<table>
<thead>
<tr>
<th>Daily maintenance</th>
<th>Weekly procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blow dry the complete perfusion pump and store dry.</td>
<td>70% alcohol (ethanol) and store dry.</td>
</tr>
<tr>
<td>Flush the flow resistors with (70% alcohol) and store dry.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monthly procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace the 20 µm water filter.</td>
</tr>
<tr>
<td>If inspection for bacterial growth, dirt or debris is not possible: high level disinfect the water container and the flow resistors, and replace all remaining wetted parts.</td>
</tr>
</tbody>
</table>

Use the catheter and pressure transducers according to the manufacturer’s specifications.

Safety information

WARNING Follow the installation instructions carefully. An improper set-up of the perfusion pump may result in an unstable pole system.

WARNING Always use flow resistors to guarantee an accurate measurement and to prevent that too much water is infused into the patient.

WARNING Never drop the water container. Do not use the water container in case of visible damage. The water container is pressurized and may burst in case of damage.

WARNING Ensure that the catheter and tubes are placed safely to prevent splashing the personnel during disinfection.

WARNING Do not use glutaraldehyde based disinfectants, because of (1) risk of splashing, (2) it may be difficult to remove all the glutaraldehyde from the system after disinfection, and (3) glutaraldehyde based disinfection is only short term effective.

CAUTION Water is not allowed to flow into the air compressor. This may damage the compressor. Never hold the water container up side down.

CAUTION Always use the float in the water container. Air bubbles will reduce the pressure response rate and the accuracy of the pressure recording.
CAUTION Always use distilled water for maintenance.

CAUTION For patient studies use demineralised or distilled water. Never use e.g. saline, tap water or mineral water; minerals can cause blockages and support bacterial growth.

CAUTION The tubes connected to the water container and air compressor all have a connector with locking mechanism. Do not attempt to disconnect by pulling the tubes. Loosen the lock by pressing the lever on the connector.

CAUTION Prior to each investigation, verify the proper functioning of the perfusion pump.

CAUTION Always release pressure from the water container first before removing the lid or the refill plug.

CAUTION It is only allowed to autoclave these parts and accessories described in this document as being autoclavable.

CAUTION Make sure that the internal surfaces of the water container are not polluted with small particles.

CAUTION Replace the water filter once a month to prevent contamination and to prevent blocking of pressure channels resulting in poor pressure recording.

Inspection for bacterial growth

The hygiene department of the hospital should inspect the perfusion pump for bacterial growth at regular intervals, according to the hospital guidelines and the guidelines applicable in your country. High level disinfection of the water container and the flow resistors as well as replacement of all the remaining wetted parts are needed:

- if bacterial growth exceeds the limits, threatens to exceed the limits, or in case of doubt.
- whenever inspection reveals dirt or debris in the water container or in one of the wetted parts.

The remaining wetted parts are:

- Stopcocks and connection tubes.
- Flushing tube.
- Tube from water container to water filter.
- Water container tube.
- Water filter.

Refer to the monthly decontamination procedure for thermal (autoclave) disinfection of the water container and flow resistors.
Daily maintenance (post-use)

All water should be removed from the complete system at a daily base and all wetted parts must be stored dry.

MMS advises to clean the flow resistors separately, because it is difficult to remove water from the system when these parts are still in place. Remove the flow resistors from the system and connect the stopcocks to the pressure transducers. Take a syringe and flush each flow resistor with air to flush the water out. Flush each flow resistor with 70% alcohol by using a syringe and then flush dry air. Store the flow resistors separate from the Solar perfusion pump for the next manometry procedure.

The procedure is as follows:
- After conclusion of the last manometry procedure for the day, do not yet remove the catheter and pressure transducers for an easy blow dry procedure.
- Use a soft cloth to wipe dry all exposed surfaces of the pump.
- If applicable, discard the water filter and connect the tube (from water container to water filter) to the stopcock.
- Disconnect the tubes from the water container lid.
- Empty the water container and use a soft cloth to wipe dry all parts.
- Reconnect the tube to the water outlet of the (empty) water container.
- Reconnect the tube to the compressed air inlet of the water container.
- Start the compressor in the diagnostic program. Let the pump run approximately 20 minutes until all wetted parts are air dry.
- Stop the perfusion pump and release the pressure.
- Discard single-use catheters; disinfect re-usable catheters according to the manufacturer’s instructions.
- Cover the pressure transducers with a soft, clean cloth; do not place caps on the pressure transducers.
- The water container and lid should be stored dry with lid off.
Weekly decontamination procedure

MMS recommends to disinfect the wetted parts with alcohol (70% ethanol). MMS is not liable for any damage to the perfusion pump or harm to patient of personnel caused by improper use of disinfectant or procedure.

The procedure is as follows:
- After conclusion of the last manometry procedure for the week, do not yet remove the catheter and pressure transducers for an easy procedure. Place the catheter and the flushing tube in an empty bottle so you can easily discard the alcohol.
- Disconnect the tubes from the water container lid.
- Empty the water container and use a soft cloth to wipe dry all parts.
- Fill the water container with 100 ml alcohol (70% ethanol) and reconnect the tubes to the water container.

- Start the compressor in the diagnostic program. Let the pump run and flush the whole system until alcohol drips out of the catheter lumen.
- Open the clamp of the flushing tube for some time to flush this tube.
- Continue flushing the system and let the solution stay in the system for approximately 10 minutes.
- Stop the perfusion pump and release the pressure.
- Disconnect both tubes from the water container and discard the remaining alcohol if applicable.
- Rinse the water container thoroughly with distilled water.
- Fill the water container ¾ full with distilled water.
- Start the compressor in the diagnostic program. Flush the whole system until water has purged all the alcohol from the complete system.
- Open the clamp of the flushing tube for some time to clean this tube.
- Stop the perfusion pump and release the pressure when the water container is almost empty.
- Empty the water container and use a soft cloth to wipe dry all parts.
- If applicable, discard the water filter and connect the tube (from water container to water filter) to the stopcock.
MMS advises to clean the flow resistors separately, because it is difficult to remove water from the system when these parts are still in place. Remove the flow resistors from the system and connect the stopcocks to the pressure transducers. Take a syringe and flush each flow resistor with air to flush the water out. Store the flow resistors separate from the Solar perfusion pump for the next manometry procedure.

- Reconnect the tube to the water outlet of the (empty) water container.
- Reconnect the tube to the compressed air inlet of the water container.
- Start the compressor in the diagnostic program. Let the pump run approximately 20 minutes until all wetted parts are air dry.
- Stop the perfusion pump and release the pressure.
- Discard single-use catheters; disinfect re-usable catheters according to the manufacturer’s instructions.
- Cover the pressure transducers with a soft, clean cloth; do not place caps on the pressure transducers.
- The water container and lid should be stored dry with lid off.

Monthly decontamination procedure

If inspection for bacterial growth, dirt or debris is not possible in your institution, then MMS advises to replace the following parts at least once a month to obtain a maximum hygienic system: stopcocks and connection tubes, flushing tube, tube from water container to water filter, water filter and water container tube.

MMS recommends to high level disinfect the water container (with float, lid, gasket and refill plug) and the flow resistors at least once a month via thermal (autoclave) disinfection up to a temperature of +121 °C (+250 °F). A short 3 minute sterilizing cycle of +134 °C (+273 °F) is allowed but at the expense of accelerated wear. Replace the flow resistors after they have been exposed to thermal (autoclave) disinfection for 10 times.

Fluid path materials

The fluid path contains the following materials:

- ABS
- Acetal
- HDPE
- Polyethylene
- Polypropylene
- Polysulfone
- PVC

MMS part numbers

- Stopcock and connection tube combination (set of 4). MMS part number MPP-TTV.
- Tubes (flushing tube, tube from water container to water filter, water container tube) and gasket, MMS part number MPP-T.
- Water filters (set of 10). MMS part number MPP-F.
- Flow resistors for 0.6 ml/min (set of 4). MMS part number MPP-FR0.6.
- Flow resistors for 0.15 ml/min (set of 4). MMS part number MPP-FR0.15.

Recommended reading

Appendix 6. CHICAGO CLASSIFICATION 3
### Appendix 7 – Outpatient outcome Form

**PLEASE TAKE THIS FROM TO THE CLINIC RECEPTION BEFORE LEAVING TODAY**

#### Discharged or Care to remain in Outpatients

| Patient did not wait | 15 | J |
| Patient commenced treatment today | 8 | H |
| Patient has declined treatment | 9 | J |

#### Surveillance follow up

| Routine surveillance (Endoscopy/imaging) | 4 | I |
| Routine surveillance – (patients already undergone first definitive treatment) | 4 | A |

#### Follow up required

| Decision to commence active monitoring | 1 | I |
| Continued active monitoring | 1 | B |
| 1st definitive treatment commenced today | 1 | H |
| Treatment already given / started (f/u only) | 1 | A |

#### Booked for Diagnostic or Waiting list

<table>
<thead>
<tr>
<th>Management Plan</th>
<th>Additional Clarification</th>
<th>Tick</th>
<th>Reception</th>
</tr>
</thead>
</table>
| **Await diagnostic**
Please use request form | Refer to diagnostic from 1st new appointment /initial investigations | 4 | F |
| | Following active monitoring | 4 | D |
| **Add to Day case waiting list**
Please complete waiting list booking form | Decision to treat following 1st new appt/ initial investigations | 6 | G |
| | Following active monitoring | 6 | C |
| **Add to Inpatient Waiting list**
Please complete waiting list booking form | Decision to treat following 1st new appt/ initial investigations | 5 | G |
| | Following active monitoring | 5 | C |

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Oesophageal High Resolution Manometry and Ambulatory 24-hour pH / Impedance Monitoring Clinical Policy V3.0
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| Admit Direct | Patient admitted directly to ward following outpatient visit | 7 | H |

### Referred to another Consultant / provider

<table>
<thead>
<tr>
<th>Management Plan</th>
<th>Additional Clarification</th>
<th>Tick</th>
<th>Reception</th>
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<tbody>
<tr>
<td>Referred to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Con.</td>
<td>Another Consultant for the same condition</td>
<td>2</td>
<td>F</td>
</tr>
<tr>
<td>Dept.</td>
<td>Another Consultant for a new condition</td>
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<td>N</td>
</tr>
<tr>
<td></td>
<td>Another Department</td>
<td>12</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Another Hospital outside of RCHT</td>
<td>11</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>To Primary care for first definitive treatment</td>
<td>8</td>
<td>S</td>
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</table>
Select procedure/s for this outpatient appointment and tick if MDT clinic:

<table>
<thead>
<tr>
<th>PAS code</th>
<th>OPCS</th>
<th>Clinic Type</th>
<th>Tick</th>
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<tbody>
<tr>
<td>500</td>
<td>X623</td>
<td>Multi disciplinary clinic</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>X622</td>
<td>Multi professional team</td>
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To be completed by Consulting Clinician – IF NO BOX IS TICKED PLEASE RETURN TO THE CLINICIAN TO COMPLETE

<table>
<thead>
<tr>
<th>PAS code</th>
<th>OPCS</th>
<th>Procedure/high cost drug</th>
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<tbody>
<tr>
<td>0</td>
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<td>No procedure performed</td>
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<tr>
<td>H281</td>
<td></td>
<td>Rigid Sigmoidoscopy and Biopsy</td>
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<td>H289</td>
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<td>Rigid Sigmoidoscopy</td>
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<td>Proctoscopy</td>
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<tr>
<td>H523</td>
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<td>Injection into Haemorroids</td>
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<td>Banding of Piles</td>
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<tr>
<td>T877</td>
<td>Y204</td>
<td>Fine needle aspiration biopsy of lymph node in groin</td>
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<tr>
<td>T872</td>
<td>Y204</td>
<td>Fine needle aspiration biopsy of lymph node in neck</td>
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<tr>
<td>S432</td>
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<td>Removal of Skin Clips</td>
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<td>S434</td>
<td></td>
<td>Removal of Sutures</td>
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<td>S574</td>
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<td>Wound Dressing</td>
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<tr>
<td>X363</td>
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<td>Venous Sampling</td>
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<td>S472</td>
<td>Drainage Seroma on body</td>
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<td>H259</td>
<td>Flexible Sigmoidoscopy</td>
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<td>G212</td>
<td>Intubation of oesophagus for pressure manometry</td>
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<tr>
<td></td>
<td>H463</td>
<td>Intubation of rectum for pressure manometry</td>
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<td></td>
<td>J218 +</td>
<td>Cholecystostomy drain removal</td>
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<tr>
<td></td>
<td>Y037</td>
<td>Removal of drain from peritoneal cavity</td>
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<tr>
<td></td>
<td>T468 +</td>
<td>Removal of drain from peritoneal cavity</td>
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<td></td>
<td>Y037</td>
<td>Removal of drain in soft tissue</td>
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<td>T96</td>
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</tr>
<tr>
<td></td>
<td>Y037</td>
<td>Removal of biliary drain</td>
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</tr>
</tbody>
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