Nursing Procedure: Measuring and Monitoring Temperature in the Highly Dependent or Critically Ill Infant or Child – Bladder Temperature

<table>
<thead>
<tr>
<th>Lead Manager:</th>
<th>Elaine Johnstone, Lead Nurse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible Director:</td>
<td>Dr. N. Spenceley, Clinical Director, PICU</td>
</tr>
<tr>
<td>Author(s):</td>
<td>Jeanette Grady, PICU Clinical Nurse Educator</td>
</tr>
<tr>
<td>Approved by:</td>
<td>PICU Clinical Guideline Group</td>
</tr>
<tr>
<td>Date approved:</td>
<td>Jan 2016</td>
</tr>
<tr>
<td>Date for Review:</td>
<td>Jan 2018</td>
</tr>
<tr>
<td>Replaces previous version:</td>
<td>July 2013</td>
</tr>
</tbody>
</table>
1. **Introduction**

Temperature measurement is a commonly used assessment parameter when caring for acutely and critically ill children. In the critically ill child an abnormal temperature may reflect changes in their physiological status. Therefore, temperature measurement and temperature trends must be accurate and consistent, as decisions about therapeutic intervention may be based upon it. Pulmonary artery temperature measurement is still considered to be the ‘gold standard’ for measuring core body temperature. However, in practice this is too invasive and not a practical method of thermometry. Instead, body temperature is usually measured from a site, or ‘shell’ sites that are thought to reflect the core temperature. The site and measuring device chosen is based upon a number of factors including age, clinical condition, degree of accuracy required, safety and ease of use. It is responsibility of the nurse to determine the best method for monitoring patient temperature and to use the temperature monitoring device correctly. Whichever site/equipment chosen, the nurse must be aware of the benefits and limitations of each.

This nursing procedural guideline is intended as a resource for nursing staff involved in caring for children in the Paediatric Intensive care and High Dependency units that require monitoring and measurement of body temperature. The guideline has been constructed after literature search and review of sourced textbooks, Medline and CINHAL, and external nurse expert peer review and opinion.

See also recommendations and further information at end of this guideline.

2. **Scope**

This nursing procedural guideline is intended to be followed by nurses involved in caring for the highly dependent or critically ill infant or child requiring body temperature monitoring within the Paediatric Intensive Care and High Dependency Units at R.H.S.C. Yorkhill.

3. **Roles and responsibilities**

All nursing staff involved in the measuring and monitoring of temperature in the Paediatric Intensive care and High Dependency unit should be familiar with this nursing procedural guideline.
4. BODY OF POLICY OR PROCEDURE

**Equipment:**

Suitable monitoring module and probe (E.g. Phillips monitor)
Non-sterile gloves
Disposable apron

**If appropriate urinary catheter with thermistor not already in situ:**

Disposable sterile indwelling latex free adapted urinary catheter with temperature probe compatible with monitoring system. (E.g. Foley’s)
Sterile dressing pack
Sterile gloves
Sterile foil bowl
Disposable apron
Drainage measurement system (E.g. Prosyst Urimeter)
0.9% Sodium chloride or sterile water (NHS GGC 2012) – for cleansing
Sterile local anaesthetic lubricant gel (E.g. Instagel®)
Adhesive tape for fixing catheter
5ml syringe & sterile water – for catheter balloon


**PROCEDURE:**

| **Before any patient ‘handling’ or checking of monitoring probes, wash hands thoroughly with appropriate antibacterial skin cleanser and don apron and non-sterile gloves.** | **To minimise the risk of cross infection.** |
| **Procedure:** | **Rationale:** |
| If the infant or child has been admitted to PICU/HDU with an appropriate adapted indwelling urinary catheter then connect the temperature probe into the specific monitoring module. | To get an initial and baseline temperature recording. |
| Provide age appropriate explanation to child (where applicable) and/or parents. | To ensure the child (and parent) understand need for and consent to continued indwelling bladder probe use. |
| If no urinary catheter in situ and bladder temperature monitoring is required, then select appropriate catheter (see equipment) and insert. (see separate guideline for urinary catheterisation). | Using an evidence-based guideline for urinary catheter insertion & care of urinary catheter should minimise the risk of associated complications such as urethral trauma, pain and cross infection. |
Using the urinary catheter insertion guideline will also help ensure the catheter (and temperature sensor) is in the best position to obtain a more accurate bladder temperature.

<table>
<thead>
<tr>
<th>When choosing a bladder temperature monitoring catheter, check disposable temperature measurement probe packaging is sealed and does not appear ‘used’ or opened.</th>
<th>To ensure that the probe is sterile, unused, not broken, suitable for use and to minimise the risk of cross infection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check expiry date on probe packaging prior to use.</td>
<td>Temperature probe may no longer be sterile if out of date.</td>
</tr>
<tr>
<td>Once the bladder temperature monitoring catheter is in the correct position it should be secured to the infant or child’s leg with non-irritant tape.</td>
<td>Securing the probe will help ensure it does not slip further in or out of the bladder thus affecting the temperature measurement and trend.</td>
</tr>
<tr>
<td>The bladder temperature will be displayed continuously via the infant or child’s monitor and will automatically be recorded on the hour. Each hour the nurse should check and validate (if accurate) the infant or child’s temperature and the site - bladder.</td>
<td>The Clinical Information System will record whatever temperature is being monitored. It will not take account of other factors that may lead to an inaccurate recording. E.g. if the catheter has slipped out or bladder lavage has been given.</td>
</tr>
<tr>
<td>It is vital that the nurse checks the temperature ‘recorded’ and where from and adds additional comments or events where applicable.</td>
<td></td>
</tr>
</tbody>
</table>

**RECOMMENDATIONS & PRECAUTIONS:**

In certain circumstances, the bladder site for temperature measurement has been considered to be an accurate reflection and estimation of core body temperature in infants and children where it has not been possible to use a pulmonary artery catheter.

Bladder thermometry requires the use of a specific sterile, disposable indwelling urinary catheter with a temperature sensor running through the catheter. The temperature sensor is usually located 13mm from the catheter tip. Many infants and children in the paediatric intensive care unit routinely have a urinary catheter in situ so the use of a catheter with a thermistor probe is no more invasive than a ‘normal’ catheter and if cared for correctly should cause no additional discomfort to the infant or child.
Bladder thermometry is used in paediatric, neonatal and adult intensive care units as well as during some operative procedures, as it is thought to provide a continuous temperature reading or trend without being influenced greatly by changes in ambient temperature. Some earlier studies have suggested that accuracy of bladder temperature monitoring may be influenced by urine flow rate. Whereas, other studies have found that bladder temperature remains reliable with changes in urine flow rate.

The nurse must be aware of the limitations of bladder thermometry if choosing this method of temperature monitoring. For example, urinary catheters with thermistor probes are available in a variety of sizes. However, the smallest catheter available at present is a size 8FG; too large for neonates and smaller infants less than 4kg.

Bladder thermometry readings may be unreliable and inaccurate where there are extremes of temperature and thermal flux such as during the cooling and warming phases of cardiopulmonary bypass. In shock states where there is poor perfusion to the lower abdomen and kidneys, or in the presence of fever, a ‘lag’ in bladder temperature reading, compared to other temperature sites (including pulmonary artery) has been reported.

There are documented risks when using bladder thermometry although these are related to the fact that the infant or child has an indwelling catheter. These include urethral trauma (from insertion), urinary tract infection, blockage and haematuria.

If the nurse finds any abnormal temperature measurements using bladder thermometry technique, then first check the catheter is still in situ. If the temperature reading appears accurate then this should be reported and documented. Another method & site of thermometry should also be considered.

5. Review

This nursing procedural guideline should be reviewed every two years from date of approval.

6. References


**A Communication and Implementation Plan**

PICU/HDU Clinical Guidelines group
PICU/HDU Band 7 nursing staff, Band 6 nursing staff and nursing teams

**B Monitoring**

Monitoring the implementation of this nursing procedural guideline should be by Lead Nurse, Band 7, Band 6 and Band 5 experienced PICU/HDU clinical nursing staff.
Monitoring of any adverse events related to rectal thermometry should be documented via critical incident reporting.

**C Impact Assessment**

EQIA not relevant to this nursing procedural guideline as there are no discriminatory practices identified in implementing this guideline.