

Thermoregulation During Transfer

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Purpose of the guideline:	To maintain the Neutral Thermal Environment (NTE) during Transport, in order to prevent thermal stress on the neonate and to carry out a safe and successful transfer
Who should use the guideline?	KIDSNTS Clinical Teams
How was the guideline developed?	Reviewing current neonatal network guidelines; reviewing current KIDSNTS service provision. Consultations with neonatal clinical leads
How will the guideline be monitored?	Audit of clinical outcomes; Key Performance Indicator's; review of Incident Reporting systems for adverse clinical incidents
Approved by:	
Date Approved:	
Review Date:	<i>(usually 3 years from approval date eg January yyyy)</i>

Content:

Introduction

Maintaining adequate thermoregulation is a significant factor in multi-systemic stability, particularly for preterm and low birth weight babies, and if left untreated has significant morbidity and mortality implications (Bissenger & Annibale, 2010; Turnbull & Petty, 2013). Hypothermia in babies comes with associated risks of increased oxygen consumption, lactic acid production, hypoglycaemia and in very low birth weight or preterm babies, decreased surfactant synthesis and secretion and decreased blood coagulation (Aylott, 2006). The baby's susceptibility to temperature

instability needs to be acknowledged to reduce the influence of cold or heat stress (Rennie & Kendall, 2013) The normal neonatal temperature range is 36.5 °C – 37.2°C per axilla (Waldron & MacKinnon, 2007) and should be maintained at all times. However, the only exception to this is Therapeutic Hypothermia for babies with hypoxic-ischemic encephalopathy (adhere to separate Hypoxic-ischemic Encephalopathy Guideline for 'cooling').

It is the responsibility of the NTS team to ensure that the baby's temperature is monitored continuously and documented every 15 minutes.

At time of referral:

- Enquire and document current temperature in extreme preterm babies
- Advise referring team accordingly to ensure neutral thermal environment maintained and to avoid temperature instability

En route to referring unit:

- Ensure incubator is plugged in with inverter switched on
- Check incubator is set to appropriate neutral thermal range for the weight and maturity of the baby
- Ensure Tecotherm charging and mattress on-board ambulance (For use in refractory hypothermia/hyperthermia when other adjuncts have been unsuccessful)

On arrival at referring unit:

- Once handover has been received, measure and record the baby's axilla temperature with a digital thermometer before any other procedures are carried out (except lifesaving), including medical examination
- Ensure transport incubator is set to the correct temperature for the baby i.e. if baby's temperature is between 36.5°C – 37.2°C, use current incubator settings (Patston, 2016)
- Observe accuracy of continuous monitoring, if in situ, via servo skin probe
- Apply temperature probe ready for transport
- Minimal Handling – If it is necessary to perform procedures on the baby ensure that every available method of warming the baby is utilised
- Baby's axilla temperature should ideally be >36° before leaving the referring unit (This will depend on the clinical status of the baby and in consultation with the KIDSNTS Consultant). Adjust incubator temperature as required to maintain neutral thermal environment - Recheck temperature with digital thermometer at 30 minute intervals If temperature remains <36° or >38.0°C
- If temp 36.0°C - Use warmed humidified respiratory support, pre-run using air flow to build up humidity in the circuit.
- Consider the use of the Tecotherm in refractory hypothermia when other adjuncts have been unsuccessful. Babies less than 27 weeks gestation, or less than 800grams or in more than 40% humidity should be placed on the

Tecotherm mattress prior to transfer so it can be turned on if the baby's temperature becomes an issue

- If the Tecotherm is to be utilised set to 'constant' and adjust setting to desired temperature required. Ensure axilla temperature taken and documented prior to use; skin probe in situ and with continuous monitoring and document readings at 15 minute intervals. Check axilla temperature every 30 minutes and document.
- Consider covering baby with bubblewrap during transfer
- Ensure draughts in the room are minimised
- Ensure baby is moved between incubators as quickly as it is safe to do so and ensure that every available method of warming the baby is being utilised
- Consider temperature outside and the baby you are transferring and decide if pre warming the ambulance is necessary, if it is cold then switch on the ambulance heater

Hyperthermia

- If the baby's temperature is more than 37.5 °C (Patston, 2016) and rising, observe for any of the following signs that the baby is becoming affected by heat stress; Tachycardia, Tachypnoea, Restlessness
- If any of the above are present and can be associated with the baby's temperature, the following should happen; Reduce environmental temperature by 0.5°C - 1°C (depending on size of baby) at 15 – 30minute intervals
- Remove excess layers of clothing
- Consider turning the transport incubator off if appropriate
- Consider the use of the Tecotherm in refractory hyperthermia when other adjuncts have been unsuccessful
- If the Tecotherm is to be utilised set to 'constant' and adjust setting to desired temperature. Ensure axilla temperature taken and documented prior to use; skin probe in situ and with continuous monitoring and document readings at 15 minute intervals. Check axilla temperature every 30 minutes and document.

En route to receiving hospital:

- Inform receiving hospital of any temperature issues, current incubator setting and any adjuncts currently in use
- Continuous monitoring of baby's temperature and 15 minute recordings
- Make appropriate changes to environmental, transport incubator and Tecotherm settings (if in use) to maintain neutral thermal environment

On arrival at receiving unit:

- Give handover to receiving team before moving baby
- Ensure all preparations are made for baby's transfer before opening the transport incubator: - receiving incubator should be warmed to appropriate temperature and humidity - ventilation circuits running with warmed humidification - fluids transferred to receiving syringe drivers

- If temperature control has been an issue during transfer, check and record axilla temperature with digital thermometer before moving baby from the transport incubator

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