



**NCCU CLINICAL GUIDELINES**  
**SECTION: 4**

**THERMOREGULATION**

Section 4: Thermoregulation  
Grading out of an incubator to an open cot (GOOI)/Heated Mattress  
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## **GRADING OUT OF AN INCUBATOR TO AN OPEN COT (GOOI) / HEATED MATTRESS**

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Thermal challenging should take place on a daily basis once the infants PA temperature has remained stable in the target range. Transition from a thermally regulated environment to an open cot can occur if the following criteria are met:

- Birth weight regained and weight gain following a normal curve on the growth chart (average 15 – 30 gms per day for a healthy preterm infant)
- Weight not <1200gms
- Parenteral fluids ≤ 50% of total daily fluid allowance
- Tolerating full enteral feeds (intermittent or continuous)
- No apnoea and bradycardias requiring stimulation
- Incubator air temperature has been consistently 32<sup>0</sup>C or less over a minimum of 24-hr period prior to weaning temperature by reducing 0.5<sup>0</sup>C each 4-8 hours until the temperature is 29<sup>0</sup>C.

### **KEY POINTS**

- The infant's temperature will increase once he/she has been dressed because of the insulation effect of clothing. It is important that the infant remains dressed and a **hat** left on.
- Energy demands for thermal control take precedence over demands for growth, potentially leading to poor weight gain.
- During the thermal challenge the incubator should **NOT** be turned off and the portholes should **NOT** be left open. It is not possible to control the decrease in incubator temperature in these circumstances causing undue thermal stress for the infant, and having the port holes open is a safety issue.
- Infants nursed in incubators for reasons other than thermal management (such as phototherapy, observation or isolation) can be lifted out of the incubator into an open cot without following these guidelines.

**BATHING:** should not occur until core temperature has been maintained after transition for at least 48hrs and the weight is >1500gms.

### **EQUIPMENT**

- Perspex cot
- Thin mattress
- Sheet
- 1 -2 blankets

- Clothing – hat and booties, singlet, top and cardigan (pre-warmed).

## PROCEDURE

1. A portable skin probe **may** be attached under the axilla to allow continuous monitoring of skin temperature. If temperature probe is not correlating 0.5°C with axilla temperature - resite the probe.
2. The incubator temperature should be reduced by 0.5°C at intervals of 4-8 hours until reaching a setting of 29°C (whilst maintaining axilla temperature in the target range).
3. Once the incubator temperature is 29°C the infant should then be dressed and wrapped in cuddly and blankets then placed in a perspex cot away from drafts.
4. Adding or removing of blankets or clothing may be required once transition has taken place in order to maintain temperature in the target range. Skin temperature monitoring may continue for the next 8 hours then cease.
5. Monitor PA temperature with cares 3 - 4<sup>th</sup> hourly.

## FAILING TRANSITION

- If the infant's axilla temperature fails to be maintained in the target range during any of the above steps the procedure should be discontinued and the infant returned to an incubator or overhead warmer in order to regain normothermia. In this case undress infant & remove blankets.
- Other signs of unsuccessful transition include vomiting, apnoea and bradycardia and weight loss after transition.
- The incubator temperature should be set at the last setting tolerated before transition commenced.

## HEATED MATTRESS / COSY THERM©

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The heated mattress is an external conductive heating device used for maintaining warmth for infants requiring thermoregulatory support. It can aid transition from an incubator to open cot for those infants who are more at risk of developing hypothermia. It is not recommended to be used as a re-warming device for infants who are hypothermic or who have failed transition to an open cot.

Temperature selection of the heated mattress is manual and is adjusted to deliver the required set temperature to maintain normothermia. It has an inbuilt pressure relief to reduce the risk of pressure injury to the infant.

## INCLUSION CRITERIA:

- Birth weight regained and weight gain is following a normal curve on the growth chart (average 15 – 30 gms per day for a healthy preterm infant)
- Weight is not <1200gms
- Parenteral fluids less than or equal to 50% of total daily fluid allowance

- Tolerating full enteral feeds (intermittent or continuous)
- No apnoea and bradycardias requiring stimulation
- Incubator air temperature has been consistently 32°C or less over a minimum of 24-hr period prior to weaning temperature by reducing 0.5°C each 4-8 hours until the temperature is 30°C.
- Infants dressed (hat, singlet, top and nappy) in an incubator and maintaining axilla temperature with the incubator temperature set at 30°C

### **NURSING CARE OF INFANTS ON A HEATED MATTRESS:**

1. Set heated mattress at 37°C and place a thin cotton sheet over mattress. Ensure the perspex cot is in a draft free area of the nursery.
2. Infant should be lightly dressed with one layer of clothing including a hat. Jump suits may be used if the infant is likely to cool during cares and feeds. Cover the infant with sheet and cuddly and blanket (do not swaddle).
3. A skin temperature probe is recommended to observe sudden changes in the infant's temperature. This should be sited and correlated with PA temperature prior to transferring to the heated mattress.
4. Post transfer, take PA temperature at 30mins. The mattress temperature should be adjusted every 30 minutes +/- 0.5°C in response to the infant's temperature readings
5. Continue to record axilla temperature every 30 minutes for 2 hours.
6. If normothermia is maintained for 2 hours then temperature is monitored as standard with routine cares/feeds.

### **FAILURE TO MAINTAIN NORMOTHERMIA**

The mattress temperature may be increased 0.5°C every 30mins until reaching 38.5°C, if the PA temperature remains <36.5°C but >36.0°C for four consecutive readings then the infant should be placed back in an incubator for at least 24 hours.

Infants must be returned to the incubator at any time the PA temperature is ≤ 36°C or if their clinical condition deteriorates.

### **WEANING FROM THE HEATED MATTRESS**

- Reducing the mattress temperature setting should commence when infant's PA temperature is stable and has remained within normal limits for 3 - 4 hours.
- Reduce the mattress temperature by 0.5°C 3 - 4hrly with feeds/cares as tolerated until the mattress setting is 35°C.
- Once the infant is maintaining PA temperature at ≥37°C for 3 - 4 hours the heated mattress can be removed from the cot and replaced with standard thin mattress.

### **CLEANING AND STORAGE**

Follow standard cleaning of equipment prior to storage.

## FURTHER READING

Agar K, Alston E (2010) East Cheshire NHS. Guidelines for the Prevention, Detection and Treatment of Hypothermia in the Newborn.

Bradshaw JP (2010) East Cheshire NHS Guidelines for the Use of Heated Cot.

Inditherm Medical CosyTherm operating instructions 2007

New, K, Flenady, V, Davies, M.W. (2008). Transfer of preterm infants from incubator to open cot at lower versus higher body weight ratio. *The Cochrane Collaboration* (4).

New, K, Bogossian, F. East, C. Davies, M.W. (2009). Practice variation in the transfer of premature infants from incubators to open cots in Australian and New Zealand neonatal nurseries: Results of an electronic survey. *International Journal of Nursing Studies*.

Waeber L T. Rewarming infants on a heated mattress. *Archives Dis Child* 1989 64:1642