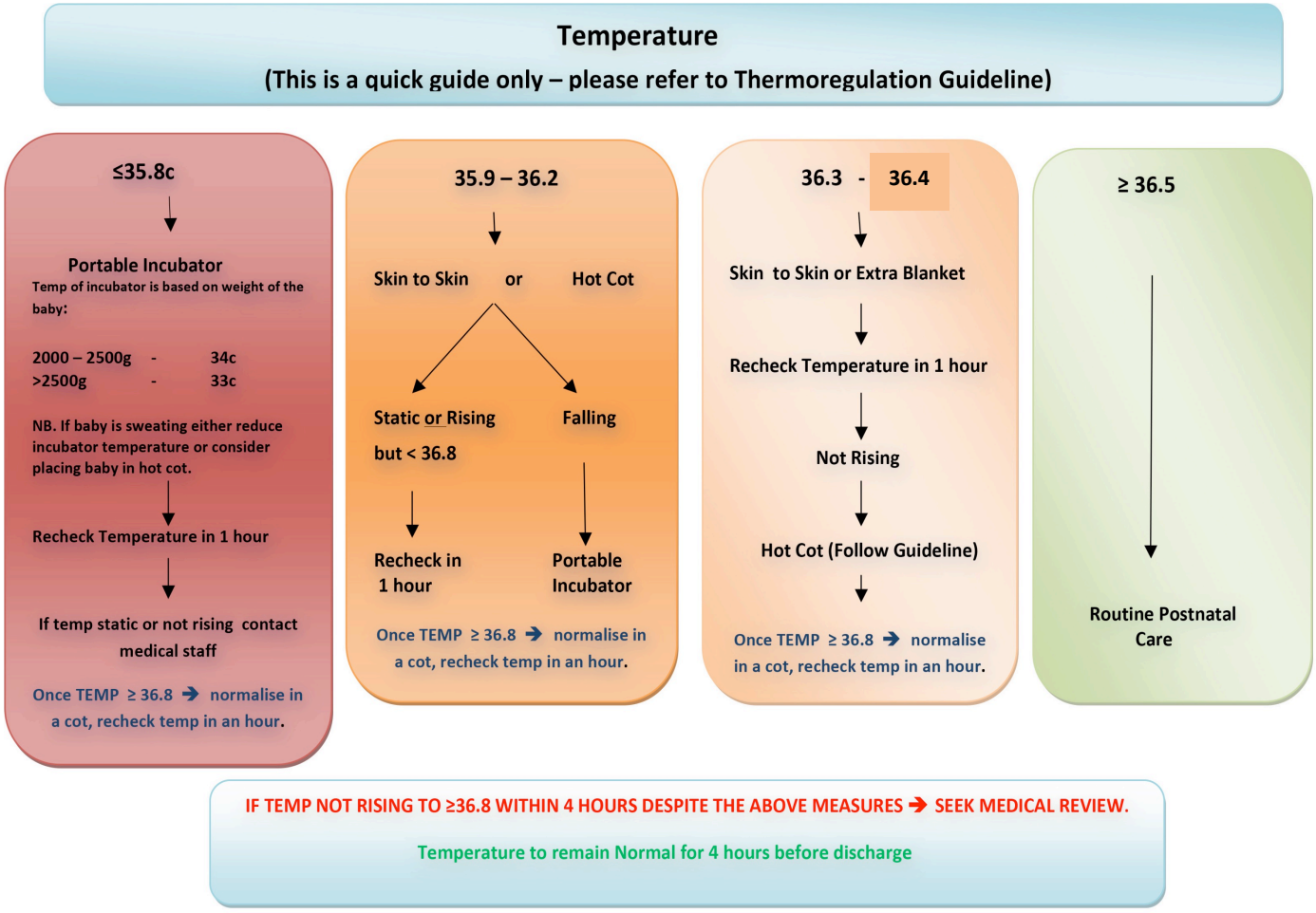
Temperature management of the newborn

Target audience	Maternity and neonatal staff
Patient group	Babies with additional thermoregulatory needs

Summary



Introduction

Babies should ideally be born into an environment that is warm enough to maintain the normal body temperature thereby minimizing oxygen consumption and calorie expenditure (Soll 2008), in other words a thermos-neutral environment. This environment can be achieved through various means including by skin to skin contact or through the use of incubators or hot-cot mattresses.

Babies have a small size compared to large surface area, as a result they can get cold very quickly. A small wet baby rapidly loses heat even quicker, in the first 10-20 minutes a newborn not kept warm may lose enough heat to drop its temp by 2-4˚C (and even further in the following hours).

Cold stress and hypothermia may have serious metabolic consequences for all newborns. Hypothermia results in a variety of physiological stresses which include - increased oxygen consumption, metabolic acidosis, hypoglycaemia, decreased cardiac output, increased peripheral vascular resistance and respiratory distress. Non-shivering thermogenesis is the main mechanism of heat production in neonates but this has a large caloric demand on the baby, which could lead to hypoglycaemia in cold babies (Soll 2008, Waldron & McKinnon 2008).

Babies have already undergone the stress of labour and therefore preparation for their birth and the immediate attention to prevent heat loss is vital (SMMDP 2011). The room should be warm, the baby dried thoroughly including the head and placed skin to skin with mum (or dad). If skin to skin is not possible, the baby should be wrapped in pre-warmed blankets and a hat applied. The temperature should be checked within 1 hour of birth (WHO 1997).

Following skin to skin, Clothe the baby in a vest, baby-grow, cardigan and apply 2-3 double folded blankets. This amount of clothing would provide about 4.6 Tog insulation sufficient for air temperature 20-22C. The addition of extra bedding will add an extra 0.1 Tog per layer of blanket patterns. A hat may reduce heat loss in the first 2 hours after birth; however, it is important to remove the hat once the temperature has reached normal range.

Temperatures below 36.5^{0}C

Term babies who have a temperature below 36.5 should be nursed skin to skin with their mother as long as the mother is warm, there is nothing between the skin of the baby and the skin of the mother and they are both dry. They are covered with 2 pre-warmed blankets.

If skin to skin is not possible or mother is cold,

- Temp 36.4 – 36.5 ˚C → extra blanket may suffice, and recheck temp in 1 hour.
- Temp 36.3 ˚C or less → nurse in a hot cot set at 37°C (There should be only one layer of clothing between the hot cot mattress and baby, place 2 blankets over baby and tuck under mattress). Hat not required, however if baby coming in and out of hot cot consider apply a hat.

Before using the hot cot, ensure that:

- There is only one sheet between the mattress and the baby.
- The baby has only one layer of clothing between its body and the mattress.
- Hat not required however if baby coming in and out of the hot cot consider applying a hat.
- The baby is being nursed on its back.
- There are two double blankets over the baby to the level of the neck and tucked in around the mattress (not sitting on top of the baby or wrapped completely around the baby)

Heated mattress:

1. Place the mattress into the cot on top of the cot mattress with the white circular air vents facing down with cable at the foot end of the cot.
2. Secure the control unit to the metal edge of the cot frame.
3. Switch on mattress.
4. To switch on the heated mattress, press the on/off button at the right hand side.
5. A system check will be carried out and an alarm will sound when complete.
6. The pre-set temperature of 37 ˚C should appear on screen.
7. Press the orange flashing play button, it will initially go blue indicating that the temperature is below 37°, it will subsequently change to green indicating the desired pre-set temperature of 37° has been achieved, at this time place baby on the mattress. *(See appendix 1 for online video – hot cot)*

It is important to check the mattress temperature each time you assess the baby and record the mattress temperature on the observation chart as well as the baby's temperature.

Demonstration of hot cot use: *https://youtu.be/RoN4vBbVzNA?si=Ai8LY6BxT5dFvzno*

Ongoing observations:

Recheck the temperature in hour.

a. If temperature is rising but not yet at 36.8 leave the baby and recheck in 1 hr.
b. Once maintaining temperature 36.8-37 for 2 hours in the hot cot
c. Put on a well-fitting vest, baby grow, and cardigan (all pre warmed), cover with 2 double blankets tucked in.
d. Recheck temp in one hour from taking out of hot cot.
e. If temperature maintained and feeding well then recheck in 4 hours

A normal term baby should be able to maintain their temperature 36.6 and above in an open cot for 4 hrs after removal from a hot cot before it can be allowed home.

Key points:

1. Early feed should be given (WHO 1997)
2. If temperature not rising after one hour in the hot cot (but not falling) re check in 1 hour and if still not rising then transfer into a portable incubator.
3. If temperature falling whilst in hot cot (used appropriately) then transfer to portable incubator.
4. Once the baby's temperature is ≥ 36.8°C, put on a well fitting vest, baby grow, and cardigan (all pre warmed), **remove hot cot mattress completely from the cot** and cover baby with 2 pre warmed double blankets tucked in. Recheck temperature in an hour.
5. If temperature is less than 35.8 or not rising in the hot cot → nurse in portable incubator. A Portable incubator set at the appropriate temperature should be used, this temperature would be determined by the weight of the baby as follows:

Weight	Incubator temperature
2000-2500 grams	34^0C
>2500 grams	33^0C

Key points on the use of portable incubators:

When baby is in the incubator remove all clothing except nappy –recheck temp in 1 hr and hourly thereafter until temperature reaches ≥ 36.8°C

If baby sweating, then reduce incubator temp or consider putting in hot cot instead. Note: if a baby is sweating it will be cooling itself down and will not heat up.

Once the temperature has reached ≥ 36.8°C

- Put on a vest, baby grow, and cardigan (all pre warmed), **move into open cot** and cover with 2 pre warmed double blankets tucked in.

- Recheck temp in one hour from taking out of portable incubator.

- If temperature maintained and feeding well then recheck in 4 hrs

NOTE: Should the baby's temperature not come up to or above 36.6 in 4 hrs despite the above measures then please ask for medical review.

If there are any other signs of cold stress i.e. pale, lethargic, poor feeding, tachypnoeic or triggering NEWTT (Waldron & McKinnon 2008), then please contact medical staff. Consider other causes of hypothermia i.e. infection.

References

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