

Not too hot, not too cold, but

just right

Creating a thermoneutral
environment for the neonate

Barbara Howard

Creating a thermoneutral environment for the neonate



We need to understand

- What is the normal temperature for the newborn
- Why do Newborns loose heat so easily?
- How is heat lost?
- What can happen if heat is lost
- What we can do to reduce heat loss

What is just right?



- Term baby – 36.5-37C axilla
- Premature baby – 36.4-37.2C axilla
- But every hospitals' porridge is different!
Use your local guidelines, and look at the condition of the baby as a whole.



Definition

- A thermoneutral environment is one in which the neonate is neither gaining nor losing heat, and has minimal oxygen consumption
- On the first day of life, for a term baby this is achieved with an air temperature @ 34C, but for an 800g 26/40 this is @ 39C
- The smaller and more premature the neonate, the more difficult it is to achieve a thermoneutral environment
- The smaller and more premature the neonate, the more important it is that you do so!



Why do newborns loose heat so easily?

- Large surface area: body mass ratio
- Wet
- In Utero temperature @37 C; outside temperature of room much lower
- May have limited ability for heat production

How is heat made?



Internal mechanisms: Neonatal Thermogenesis is prompted at delivery by

- Cutaneous cooling
- Increased oxygenation
- Placental separation

Which trigger the metabolism of brown fat



Brown Adipose Tissue

- Develops in utero from 20/40
- Is well differentiated and thermogenically active from 27/40
- Produces heat rather than energy
- Is distributed around the neck, across the clavicle line and between scapulae. It surrounds major thoracic vessels and pads the kidneys
- The more premature a baby is, the less brown fat it has
- The more hypoxic a baby is, the less heat brown fat can produce

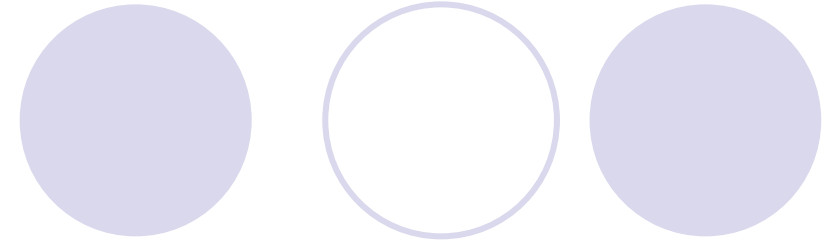
How is heat lost?

- **Conduction** – is the loss of heat due to temperature difference between the body and any solid of a lower temperature in direct contact with it



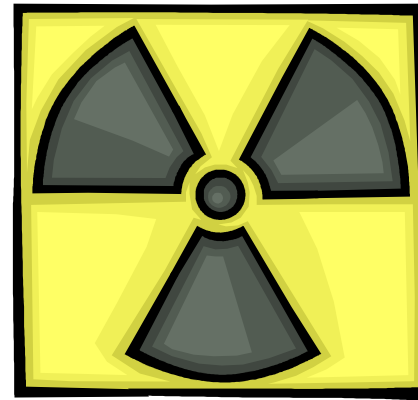
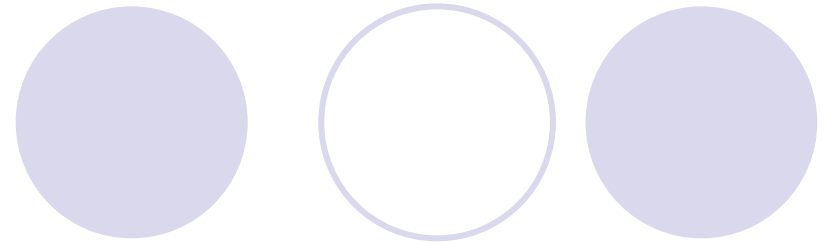
How is heat lost?

- **Evaporation** – water evaporates from the skin when environmental temperature exceeds body temperature, and has a cooling effect as the process utilises heat



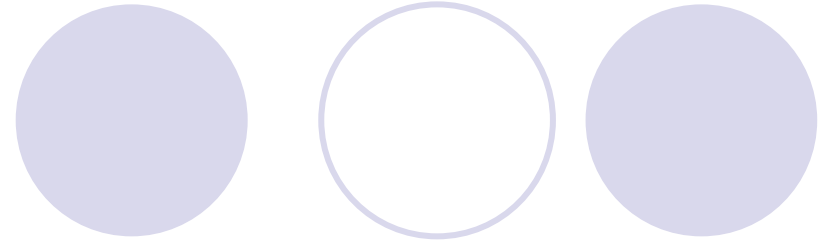
How is heat lost?

- **Radiation** – is the loss of heat due to the emission of heat rays by the body



How is heat lost?

- **Convection** – is the loss of heat due to the rising away from the body of air warmed by it, and its replacement by cooler air





What can happen if a baby gets cold?

- ❖ Hypothermia
- ❖ Increased utilisation of calorific reserves
- ❖ Hypoglycaemia
- ❖ Hypoxia
- ❖ Acidosis
- ❖ Metabolic disorders
- ❖ Depletion of Surfactant
- ❖ Increased neonatal morbidity

How can we stop heat being lost?

In the delivery room

- Keep the temperature 25% C
- Shut doors and windows, turn off fans
- Warm hands!
- Dry baby, wrap in warm towels
- Skin to skin after baby dried
- Cover mother and baby with warm towel/blanket.





How can we stop heat being lost?

Using Plastic Bags!

- Babies under 1.5 kgs
- Babies under 30 wks gest
- Place baby in bag wet, immediately after birth (feet first!!)
- Bag sticks to baby's skin and retains critical body heat.

How can we stop heat being lost?

In the postnatal ward/ SCBU

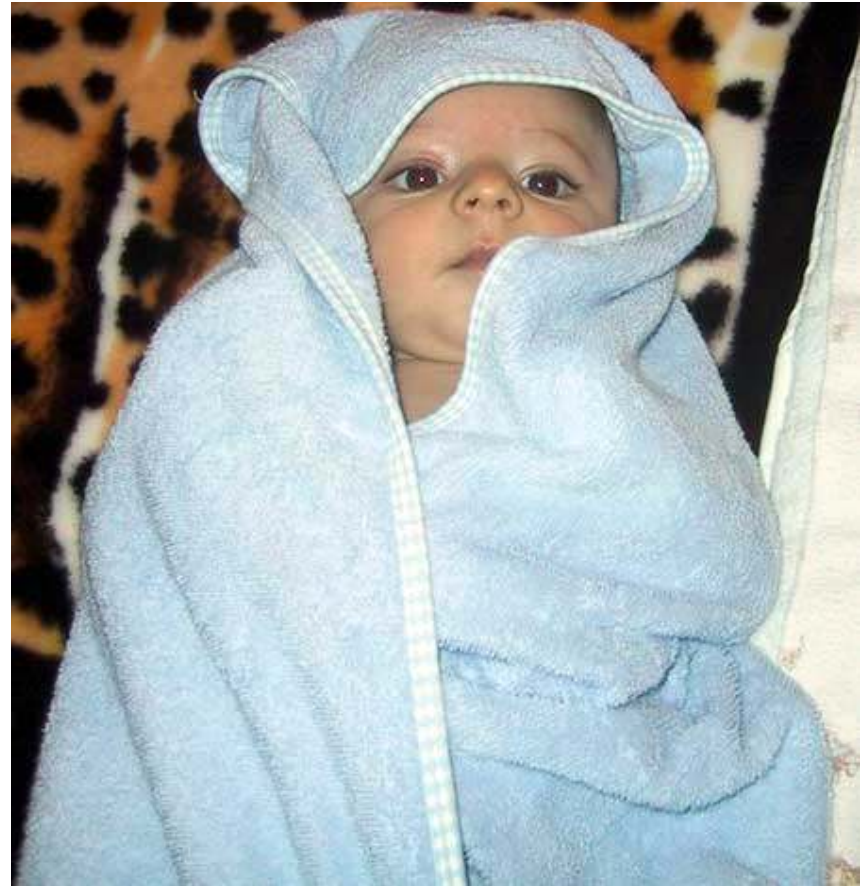
Keep warm using layers of clothing and bedding

Place cot in draught free spot

Bathe in warm and draught free room

Use skin to skin in warm and draught free room

Talk to parents about temperature control





How can we stop heat being lost?

If these steps fail to keep babies temperature above 36.2 C, then we need to consider external mechanisms of heating, such as heated cots, radiant heaters, incubators or neocribs

Summary

Maintain newborn
temperature between

- 36.5 – 37 C Term
 - 36.4 – 37.2 C Preterm
- for good progress,
and early discharge
home

