Thermal Protection of the New-born: Women's Services and Children's Hospital guidelines

Trust ref: C166/2016

Contents

1. Introduction and who this guideline applies to:

This guideline is for medical, midwifery and nursing staff involved with the care of the newborn at and after delivery in hospital or in the community.

This guideline covers the principles of:

- Prevention of heat loss in the newborn
- Management of hypothermia
- Management of hyperthermia

This guideline has been informed by the World Health Organization document: Thermal Protection of the Newborn: a practical guide (see reference list at end).
This guideline applies to thermoregulation at birth and thermoregulation on the post-natal and children's hospital wards.

Related documents:

- Hypoglycaemia - Neonatal UHL Neonatal Guideline Trust ref: C22/2008
- Resuscitation at Birth UHL Neonatal Guideline Trust ref: B35/2008
- Transfer of Babies to Neonatal Unit from Home or Community Hospital UHL Obstetric and Neonatal Guideline Trust ref: C118/2008
- Admission to the Neonatal Unit UHL Neonatal Guideline Trust ref: C117/2008
- Safer Sleeping and Reducing the Risk of Sudden Infant Death Syndrome LPT Midwifery and Neonatal Guidelines Trust ref: E18/2016
- Neonatal Transitional Care UHL Neonatal SOP Trust ref: C9/2019
- Postnatal Ward Handbook UHL Neonatal Guideline Trust ref: C12/2021

Background:

Hypothermia is an important cause of morbidity and, occasionally, of mortality in the newborn. The effects of hyperthermia are less well-documented but equally important. The optimal temperature of a newborn is 36.5°c – 37.5°c. (Resus Council UK 2021)

The main principle of thermal management in the newborn is the prevention of hypothermia by providing an optimal neutral thermal environment immediately after and within the first few days of birth. With good management the incidence of severe adverse consequences is low.

Newborn babies are unable to regulate their body temperature as effectively as older individuals, and can only tolerate limited changes in environmental temperature. Most heat is lost in the first minutes after birth and this can result in falls in body temperature of 2-4℃ or more.

Key Points

1. Ensure the delivery room is appropriately warm
2. Dry and wrap the baby immediately using fresh, pre-warmed towels and a hat
3. Encourage skin-to-skin contact and breast feeding as soon after delivery as possible
4. Do not bathe for at least 6 hours after birth unless medically indicated
5. Use one or two layers of loose-fitting clothing and bedding for baby
6. Use a radiant heater if resuscitation is required
7. Ensure that baby is kept warm during transportation
8. Ensure that hypothermia is identified early and managed appropriately (see algorithm)

2. Prevention of Hypothermia at birth (Temperature <36°C)

General principles

2.1 Delivery room environment

- For term babies, the delivery room should be at an optimal temperature of at least 23-25ºC free from draughts.
- For preterm or low birth weight babies, the temperature may need to be increased to >25 ºC.
- Temperature should not be determined according to the comfort of adults present.
- Radiant heater, pre-warmed towels, blankets, hat and suitable clothes for the baby should be available.
- Be mindful if the room temperature is below the optimal range; take steps to ensure that the baby is kept warm.

2.2 Immediate drying

- If possible, deliver baby onto mother's abdomen (skin-to-skin contact).
- Dry baby immediately after delivery, including the head.
- Cover the baby with a, dry towel (discard wet towel) and well-fitting hat.
- If the mother is in the birthing pool, keep baby submerged in the warm water (keeping head above water), maintain skin-to-skin contact, dry and cover exposed areas with warmed towels.

2.3 Skin-to-skin contact

- Cover baby with a well-fitting warm hat and towel during skin-to-skin contact.

- If skin-to-skin is not achievable, wrap the baby in a well-fitting warm hat and a dry towel after being dried and place in mother's arms.
- **I**n theatre or recovery, the ambient temperature is significantly cooler than usual birth rooms so particular attention must be paid to supporting thermoregulation.
- Uncover the baby as little as possible whilst examining.
- Baby can be kept in skin-to-skin contact with the mother during delivery of placenta, suturing of tears, during transfer to the postnatal ward and for the first hours after birth.
- Skin-to-skin contact may be used later to keep the baby warm if the room is cool or to re-warm a baby whose temperature is 36ºC – 36.4ºC. Baby's temperature must be monitored to ensure that it is returning to normal.
- Take maternal temp into consideration, if mother is particularly cool ensure newborn isn't cooling, if mother has pyrexia, monitor newborn

2.4 Feeding

- Begin as soon as possible after delivery, preferably within an hour.
- Early and adequate supply of breast milk provides the newborn with calories to generate body heat.

2.5 Postpone bathing and weighing

- Bathing the baby after delivery is not necessary (unless indicated in the prevention of blood borne infections), and can cause hypothermia.
- Bathing should be delayed to after 24 hours of birth. In a healthy baby with normal temperature and this is not possible due to cultural reasons, bathing should be delayed for at least 6 hours. (WHO 2017)
- Bathing, if indicated, should be carried out in a warm room using warm water and baby dried and wrapped immediately.
- Where bathing is indicated ensure baby's condition is stable.
- Vernix does not need to be dried off as it is harmless, may reduce heat loss and is reabsorbed through the skin during the first days of life.

2.6 Appropriate clothing and bedding

- Clothing and bedding must be appropriate for the environmental temperature.
- Newborn babies need one or two more layers of clothes and bedding than adults. (WHO 2017)
- In the first hours after birth (at least until transfer to the ward and the second temperature taken; or until early transfer home), clothing should include a hat. (WHO 2017)
- Following transfer to the ward, well term babies should not need a hat indoors to maintain their temperature in the normal range.
- Clothing and bedding should not be too tight, to allow air spaces between the layers.
- Discourage swaddling, as it excludes air, reduces the efficiency of heat retention and restricts movement.

2.7 Warm transportation

- Keep baby warm during transportation (hat and blanket).

- Skin-to-skin contact with the mother is often an appropriate way to transport the newborn from delivery suite to the postnatal ward.
- A trans warmer mattress can be used, if deemed necessary, but be aware it can cause hyperthermia when used in conjunction with an external heat source.
- A temperature probe should be used to monitor the baby's temperature during transfer to the neonatal intensive care.

2.8 Warm resuscitation

- If resuscitation is required keep the baby warm during this procedure.
- After resuscitation, if the baby is stable and does not require admission to the neonatal unit, take temperature and, if necessary, re-warm using skin-to-skin contact and breastfeeding where possible.
- If there is an external radiant heat source, babies born under 32 weeks should be resuscitated with their bodies, without drying, in clear plastic bags.

2.9 Radiant heat therapy

- If an overhead heater is required, ensure that the baby is dressed with a hat; do not wrap the baby in towels as this will prevent the heat from penetrating where needed.
- Babies undergoing therapy under radiant heaters must have careful monitoring of their temperature to ensure that the therapy is effective and to prevent overheating.

2.10 Training and awareness*:*

- Parents and carers should be given advice and information on how to maintain a healthy body temperature in newborns.
- This may be supplemented by the NHS.UK (October 2021) https://www.nhs.uk/conditions/sudden-infant-death-syndrome-sids/

2.11 Preterm (<32 weeks) babies

- Require special management (See algorithm)
- Neonatal team should be present at the delivery

2.12 Unexpected delivery in a hospital location other than Delivery Suite

- Dry newborn and discard wet towels
- Wrap newborn in clean dry towels, wrapping the towel carefully around baby's body and top of head, leaving the face uncovered
- Keep new-born warm
- Infants born unexpectedly outside a normal delivery environment are at higher risk of hypothermia and subsequent poorer outcomes.
- They may benefit from placement in a food grade plastic bag after drying, followed by swaddling. (RESUS council UK 2021)
- Well newborns > 30 weeks gestation may be dried and nursed skin-to-skin to maintain their temperature during transfer as long as mothers are normothermic. (RESUS council UK 2021)
- Infants should be protected from draughts and watched carefully to ensure airway and breathing are not compromised.

3. Early identification of hypothermia

3.1 Measure the baby's axillary temperature

- As soon as practical after birth and ideally within the first hour.
- At 2-3 hours of age and on admission to the postnatal ward

3.2 Identify presence of risk factors for hypothermia

- Unplanned homebirth
- Suboptimal labour room temperature
- Low pre-delivery maternal body temperature
- Inadequate measures to keep the baby warm before and during transportation
- Traditional birth practices such as sprinkling cold water on the newborn
- Bathing soon after delivery
- Use of anaesthetic or analgesic drugs during delivery
- Prematurity and/or low birth weight
- The need for resuscitation at birth
- Difficulty in maintaining an optimal thermal environment postnatally

3.3 Aim to maintain the baby's body temperature within the normal range of 36.5 ºC -37.5 ºC

3.4 Observe for signs of hypothermia

- Cool feet and / or cold skin all over the body
- Reduced activity / lethargy
- Poor suck
- Weak cry
- Bright red face and extremities, be mindful that dark skinned new-born's may be more difficult to assess, use full clinical assessment
- Slow, shallow and irregular breathing
- Slow heart beat
- Respiratory distress

4. Management of hypothermia on delivery suite and the postnatal or Children's Hospital wards

Any infant whose temperature falls below 36.5 ºC requires the midwife or nurse to observe for overt signs of infection.

These include:

- Rapid breathing (>60/min) or grunting
- Poor tone
- Lethargy
- Duskiness
- No/very poor feeding within past 4 hours

If these signs are present, refer the baby for assessment by the neonatal or paediatric medical team.

Follow algorithm for the management of the term or preterm baby as appropriate.

5. Management of hypothermia within the home environment

Refer the baby for admission to hospital if:

- Temperature falls below 36. 0ºC, refer for admission to hospital
- Signs of infection are present, these include:
  - Rapid breathing (>60/min) or grunting
  - Poor tone ○ Lethargy ○ Duskiness
  - No/very poor feeding within past 4 hours

If there is no significant improvement in a baby who has a temperature of 36.0-36.4 ºC despite restorative measure.

6. If the temperature is 36.0-36.4 ºC and the baby has no sign of infection:

- Aim to raise the room temperature to at least 25ºC (slightly too warm for adults)
- Skin-to-skin contact in a warm room
- Replace cold clothes with warm clothes and hat
- Review environment
- Ensure baby's cot is off the floor
- Is there a draught?
- What is the parents' understanding of warm environment (consider whether advice about reducing the risk of cot death may have been misinterpreted?)
- Continue feeding the baby to provide calories and fluid
- If the baby is too weak to feed admission to hospital should be arranged
- Assess baseline observations
- Continue re-warming until a normal temperature is reached

Review the history for risk factors for hypothermia

- If there is no significant improvement within one hour, refer for admission to hospital

7. Referral pathway for hypothermic babies (following planned and unplanned homebirth):

- Transfer by emergency ambulance
- Admit to the hospital delivery suite where booked, if gestation or baby's condition requires level 3 neonatal care, transfer to a hospital with level 3 NNU facilities
- Document all care in case notes which are to accompany the baby
- Complete incident form for unexpected admission
- Use TransWarmer mattress if available

8. Referral pathway (following postnatal visit):

- Transfer by emergency ambulance.
- Admit to the nearest Paediatric Emergency Department
- Document all care in case notes which are to accompany the baby
- Complete incident form for unexpected admission
- Use TransWarmer mattress if available

9. HYPERTHERMIA (Temperature >37.5 ºC) Prevention of hyperthermia: general principles

Hyperthermia may occur as a result of the environment:

- Leaving the baby under a radiant warmer or an incubator that is not functioning properly and/or checked regularly, or is exposed to the sun's rays
- Wrapping the baby in too many layers of clothes / bedding
- Leaving a baby in direct sunlight
- Leaving a baby in a parked car in hot weather
- Putting a newborn too close to a fire or heater
- Putting the baby close to a hot water bottle

Hyperthermia may also be a sign of underlying infection or other illness. Examples of signs to look out for are listed. If any of these signs are present in association with a high temperature, refer the baby for assessment by the neonatal neonatal team if baby is being cared for on the post-natal wards or paediatric medical team if baby is being cared for in ED or on the paediatric ward:

- Restless, crying baby
- Baby gradually becomes lethargic
- Rapid breathing
- Rapid heart rate
- Hot skin to touch
- Flushed face and extremities
- Shock, convulsions and coma can result in severe cases

10. Management of hyperthermia

- If temperature >38℃ refer to neonatal team if baby is being cared for on the post-natal wards or paediatric medical team if baby is being cared for in ED or on the paediatric wards team for further assessment and management plan.
- If temperature 37.5℃ to 38℃:

1. Assess baby for any signs of illness and refer to neonatal team if any concerns.
2. Move baby away from source of heat, if necessary
3. Undress baby partially or fully
4. If the baby is in an incubator the air temperature should be lowered
5. Baby should be fed more frequently to replace fluids

6. If the baby cannot feed extra fluids should be given intravenously or by tube

- If the baby's temperature does not return to the normal range within one hour, refer to the neonatal or paediatric team
- Where a baby's temperature has been measured as >37.5ºC, measure the temperature 4 hourly until stable within normal range (2 normal temperatures 4 hours apart)

11. DOCUMENTATION

- In babies identified as at risk of hypo- or hyperthermia, a plan for monitoring should be documented in the health care record and communicated to relevant health care professionals.
- In babies requiring treatment for hypo- or hyperthermia, all actions taken, response and where appropriate further plan of care should be documented in the health care record.
- Any discussion with the parents relating to the baby's condition should also be clearly documented.

HYPOTHERMIA IN TERM BABY (≥37 weeks)

Prior to delivery:
Recommended appropriate delivery room temperature: 25℃ to 28℃
Ensure availability of pre-warmed towels, bedding and clothes for baby
Deliver baby onto mother's abdomen where possible and allow to breast feed

Immediately after delivery:
Remove wet towel
Dry and wrap the baby using pre-warmed towels

Does the baby require resuscitation?

NO

- Wrap baby in pre-warmed blankets and hat
- Place in skin to skin contact (cover mother and baby with pre warmed blanket)
- Offer feed within 1 hour of birth

YES

During resuscitation:
- Dry and wrap baby
- Use radiant warmer
- Use warm towels & hat

Does the baby require NNU admission?

NO

YES

Measure baby's axillary temperature:
- Ideally within 60 minutes of delivery
- At 2-3 hours of age if remains on delivery suite and on postnatal ward admission
- Continue 4 hourly measurements if risk factors for sepsis or hypothermia are present

Temperature remains within normal range (36.5-37.5°C)

Temperature between 36.0 and 36.4°C

Temperature below 36.0°C

Use skin-to-skin contact to re-warm (cover mother and baby with pre-warmed blanket)

Continuing thermal care:
- Do not bathe before 6 hours of age.
- Bathe and dry quickly in a warm room
- Dress with several layers of clothing in first few days of life

- **Nurse baby in heated cot, under radiant heater or in incubator**
- **Refer to neonatal medical team for assessment and evaluation for sepsis or other pathology**
- **Consider admission to Neonatal Unit**

After stabilisation:
Transfer baby to Neonatal Unit in pre-warmed transport incubator or on resuscitaire

NB. If the baby's temperature remains below 36.5˚C despite restorative measures after 4 hours, refer to neonatal team

Check blood glucose

Title: Thermal protection of the new born
V: 4 Approved by: Women's Services Quality & Safety Board Chairs approval: January 2024 Next Review: July 2024
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HYPOTHERMIA IN PRETERM BABY (<37 weeks)

Prior to delivery:
Recommended optimal delivery room temperature is up to 25 - 35℃
Ensure availability of pre-warmed towels, bedding and clothes for baby and polyethylene bag as appropriate

NB. All preterm babies are at increased risk of hypothermia

32-36 weeks

Immediately after delivery
Dry and wrap the baby using pre-warmed towels

Does the baby require resuscitation?

NO

- Wrap baby in pre-warmed blankets and hat
- Measure baby's axillary temperature
- Place in skin to skin contact (cover mother and baby with pre-warmed blanket)
- Offer feed within 1 hour of birth

Measure baby's axillary temperature:
- As soon as possible after delivery (ideally within 60 minutes)
- At 2-3 hours of age if remains on delivery suite and on postnatal ward admission
- Continue 4 hourly measurements

Temperature remains within normal range (36.5-37.5°C)

Temperature between 36.1 and 36.4°C

Temperature below 36.0°C

Use skin-to-skin contact to re-warm
Recheck temperature after one hour

Continuing thermal care:
- Do not bathe before 6 hours of age.
- Bathe and dry quickly in a warm room
- Dress with several layers of loose clothing in first few days of life

YES

During resuscitation/stabilisation
- Discard wet towel
- Dry and wrap the baby in pre-warmed towels
- Use radiant heater
- Use wool hat

Does the baby require NNU admission?
(NB ALL babies <34+0 or birth weight <1.6 kg (see transitional care SOP) weeks will require admission)

NO

YES

- **Refer to neonatal medical team for assessment and evaluation for sepsis or other pathology**
- **Consider admission to Neonatal Unit**

<32 weeks

During resuscitation/stabilisation
- Use radiant heater
- Do not dry baby
- Wrap completely in polythene with face free.
- Use wool hat if head not covered

After stabilisation:
Transfer baby to Neonatal Unit in pre-warmed transport incubator or on resuscitaire

NB. If the baby's temperature remains below 36.5˚C despite restorative measures after 4 hours, refer to neonatal team

Check blood glucose recordings on NEWS chart

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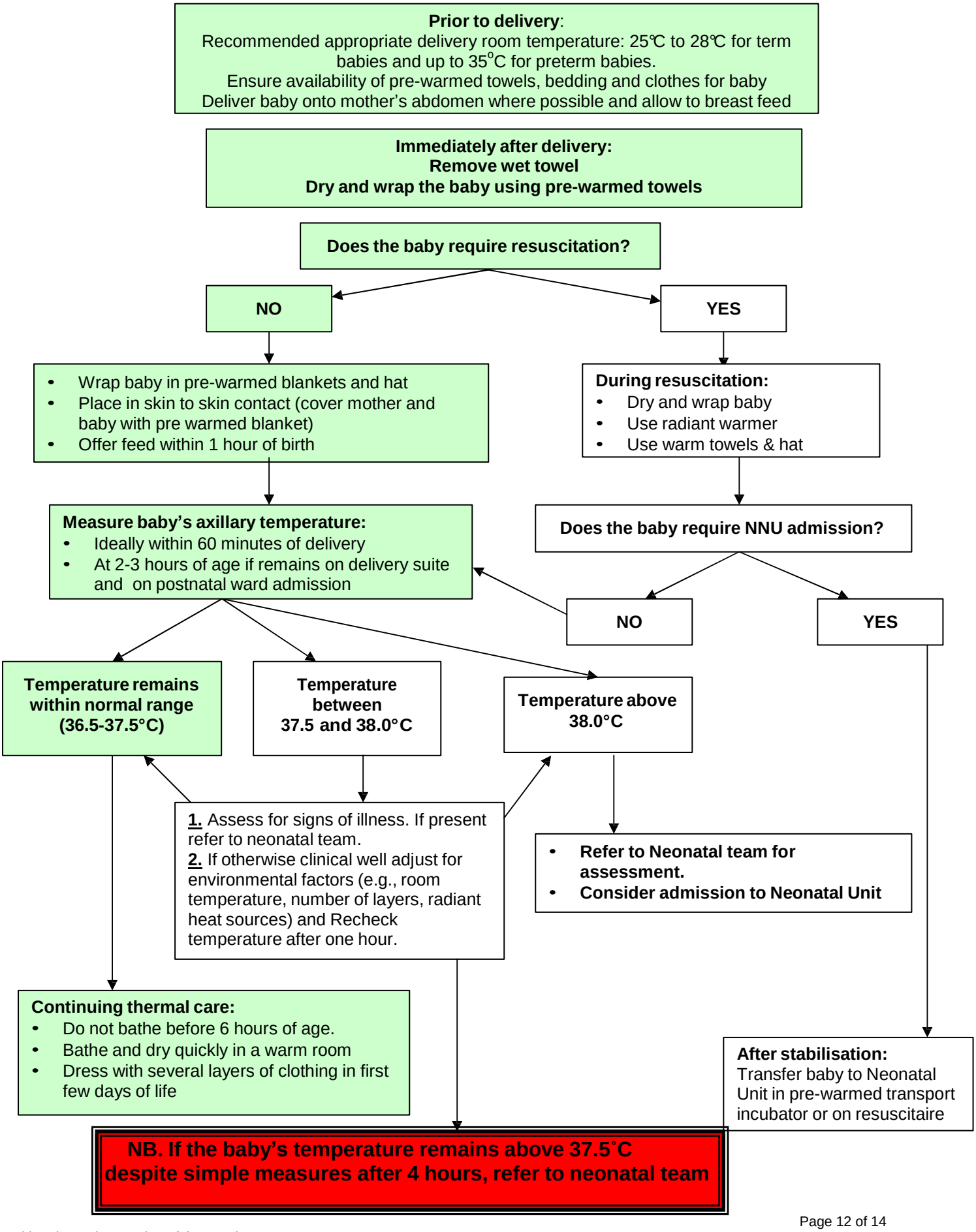
Management of Hyperthermia (Temperature >37.5^{0}C)



12. Education and Training:

None

13. Monitoring criteria

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Newborn temperature assessment performed and recorded twice within the first 4 hours after birth	Audit of maternity records	Audit lead	Rolling audit	CMG Q&S Board

14. References:

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4. World Health Organization (2022) WHO recommendations for care of the preterm or low birthweight infant. www.who.int

5. Cheah F-C, Boo N-Y (2000) 'Risk factors associated with neonatal hypothermia during cleaning of newborn infants in labour rooms' *Journal of Tropical Pediatrics* 46:46-50.

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8. National Collaborating Centre for Primary Care (2006). *Postnatal care: routine postnatal care of women and their babies*.London: National Collaborating Centre for Primary Care
9. Resuscitation Council Uk. (2021) Newborn resuscitation and support of transition of infants at birth guidelines - Thermal control. https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth#thermal-control
10. NHS.UK (October 2021) Sudden infant death syndrome https://www.nhs.uk/conditions/sudden-infant-death-syndrome-sids/

15. Key Words

Hyperthermia, Hypothermia, Radiant Heat, Skin to skin, Temperature, Warm

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.
As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified

CONTACT AND REVIEW DETAILS			
Guideline Lead (Name and Title) E Tewley, Ward Manager , Labour Ward			**Executive Lead** Chief Nurse
Details of Changes made during review:			
Date	**Issue Number**	**Reviewed By**	**Description Of Changes (If Any)**
October 2022 - Jan 2023	**3**	L Taylor – Clinical risk & quality standards midwife Maternity guidelines group Maternity Governance group J Gill – Consultant neonatologist Women's services quality & safety board	Specified 'optimal' room temperature Added consideration of maternal temperature Added radiant heat section 2.9 Reworded section 3.4 when assessing for bright red face and extremities Added check blood glucose to persistent hypothermia Added statement - Following transfer to the ward, well term babies should not need a hat indoors to maintain their temperature in the normal range. Added RESUS Council UK advice re-Unexpected delivery in a hospital location other than Delivery Suite
January 2024	**4**	L Taylor S Moran	Included Children's Hospital in the title and incorporated this throughout the text. Escalation to paediatric team added for instances where the baby is being cared for in children's ED or on the children's ward. Changes given Chairs urgent approval with a view to review fully over following 6 months.