Royal Hospital for Women (RHW)
BUSINESS RULE
COVER SHEET

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EXECUTIVE SPONSOR	S Bolisetty (Medical Co-Director Newborn Care Centre); S Wise (Nursing Co-Director Newborn Care Centre)
AUTHOR	R Dunkerley (RN), E Jozsa (CNS)
SUMMARY	To guide clinicians to set up the Arctic Sun Temperature Management System safely for infants with hypoxic ischaemic encephalopathy who meet criteria for therapeutic hypothermia

Royal Hospital for Women (RHW)
BUSINESS RULE

Cooling – Therapeutic Hypothermia – Arctic Sun RHW CLIN020

This Clinical Business Rule is developed to guide safe clinical practice in Newborn Care Centre (NCC) at The Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this Clinical Business Rule. Using this document outside the Royal Hospital for Women or its reproduction in whole or part, is subject to acknowledgement that it is the property of NCC and is valid and applicable for use at the time of publication. NCC is not responsible for consequences that may develop from the use of this document outside NCC.

1. BACKGROUND

Cooling of infants after moderate to severe encephalopathy due to intra-partum hypoxia can potentially reduce the severity of damage that has occurred. The Arctic Sun Temperature Management System is designed to automatically modulate water temperature to achieve a set patient target temperature (33.0-34.0 °C).

2. RESPONSIBILITIES

Medical and Nursing Staff

3. PROCEDURE

3.1 Equipment

- Arctic Sun Temperature Management System
- Arctic Gel Pad Neonatal (1.8-4.5kg)
- Rectal Temperature Probe
- Hydrocolloid dressing (Comfeel)
- Adhesive tape
- Scissors

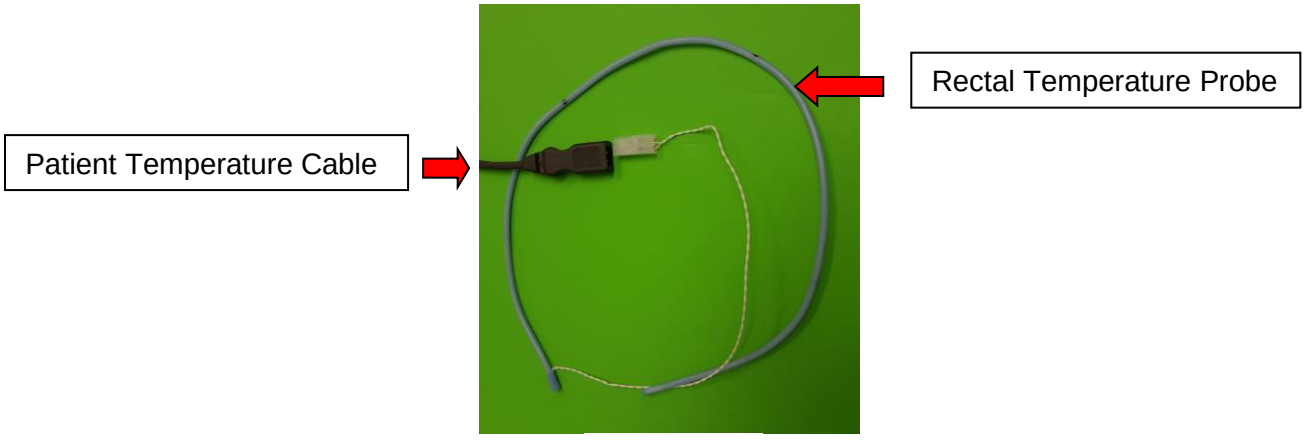
3.2 Clinical Practice

Preparation

- Confirm that neonate meets criteria to commence therapeutic cooling as per NCC policy.
- Make sure that all external heat sources are switched off.
- Discuss the cooling and rewarming procedure with the parents.
- Cut dressing and tape to secure rectal probe to thigh.

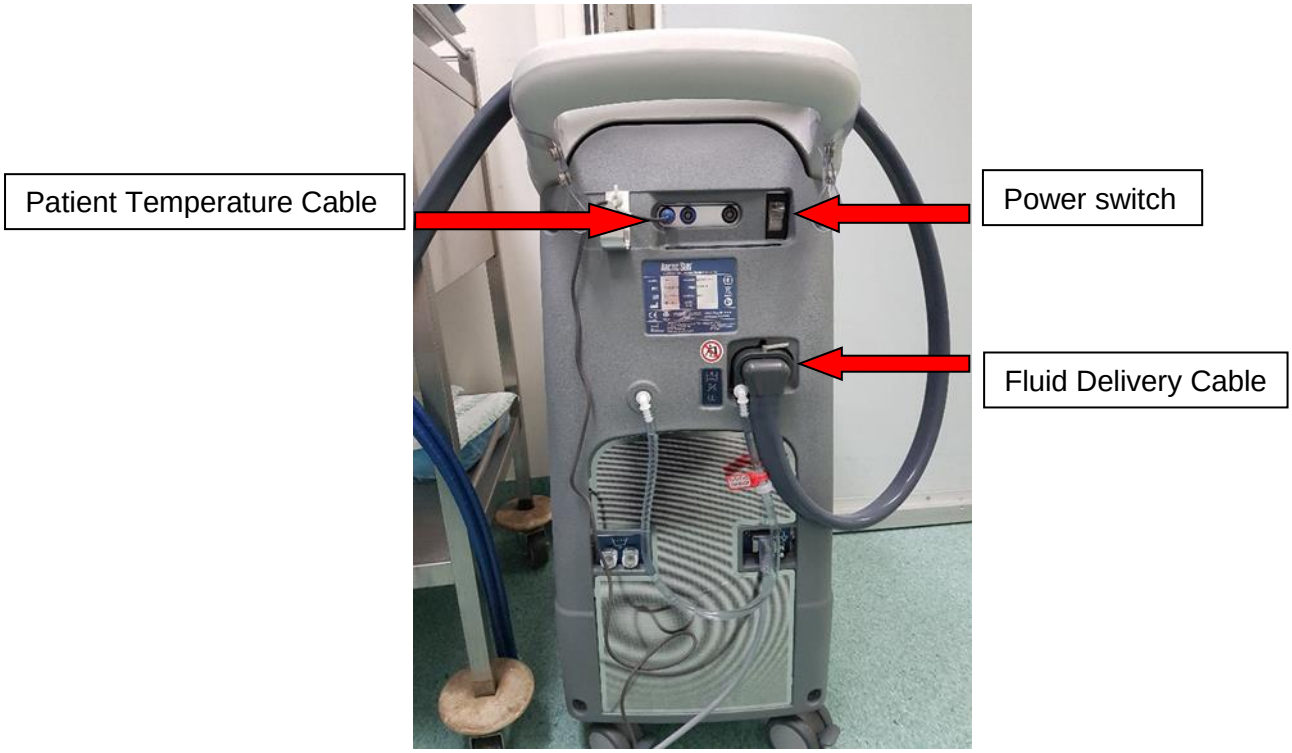
Active Cooling

- Insert rectal temperature probe into rectum at least 5cm and secure it to the upper inner thigh with adhesive dressings. (Picture 1)



Picture 1

- Connect Arctic Sun to main power supply and push the power switch at the rear of the unit. (Picture 2)



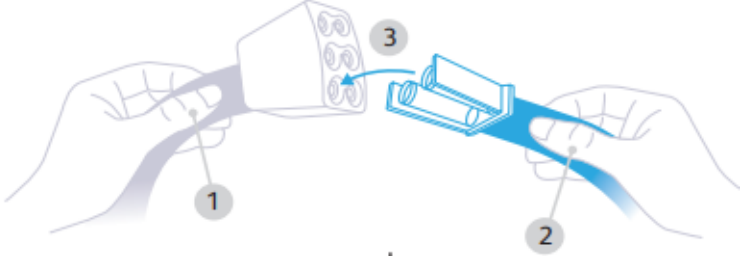
Picture 2

- After the system's self-test is completed, select POWER ON (front screen)
- Place undressed infant (nappy stays on) with intact skin directly on top of cooling pad with white mesh side up. (Picture 3)

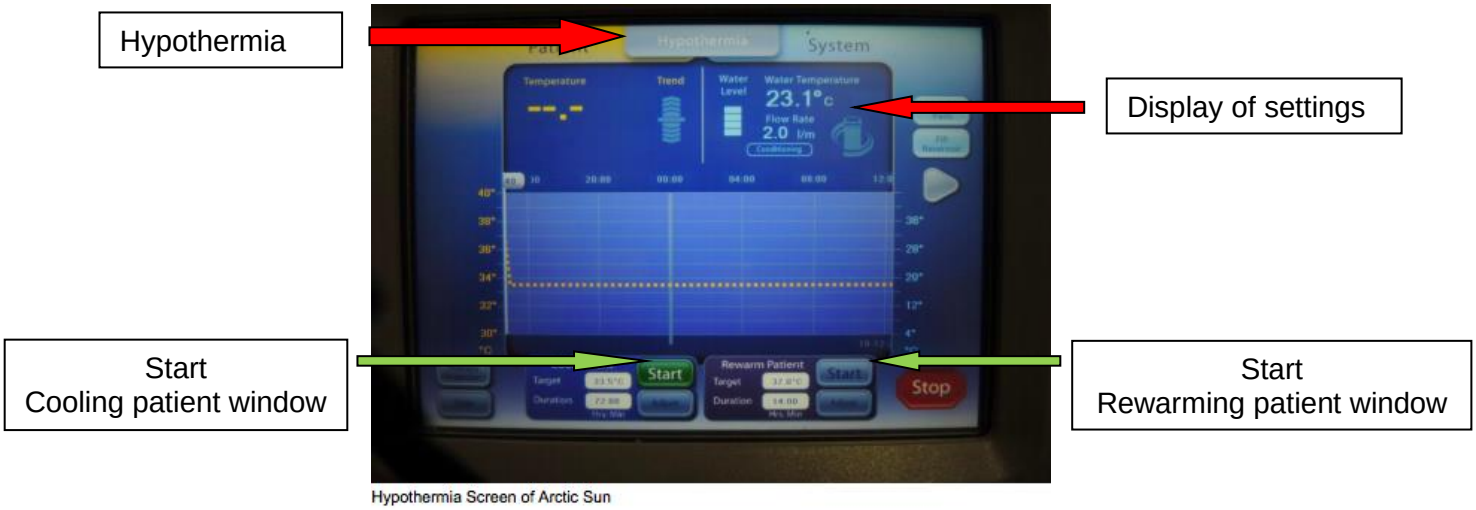
Picture 3

- Place the fluid delivery cable (1) at the foot of the bed and connect to the ports of the gel pad (2) by grasping the grey cable and the blue pad line and push into place (3) until an audible click is heard. (Picture 4)

Picture 4



- Ensure that the rectal probe is connected via the patient temperature cable to the back of the unit**.** (Picture 2)
- Select HYPOTHERMIA on the system's home screen. (Picture 5)



Hypothermia Screen of Arctic Sun

Picture 5

- Verify the target temperature and settings required displayed on the screen. (Picture 5)
- Press the green START button on the Cool Patient window at the left bottom of the screen. (Picture 5)
- A tone and voice will confirm that cooling is in progress and the Cool Patient window will blink.
- Record time of commencement of active cooling, check rectal temperature every 15 minutes and record hourly in eRIC.
- The duration of active cooling can be altered based on consultant discretion.

Nursing Care

- Monitoring
  - Continuous rectal temperature.
  - Position of rectal probe every 15 minutes
  - Continuous arterial blood pressure or at least 4 hourly non-invasive blood pressure monitoring.
  - Continuous aEEG monitoring for the duration of cooling.
  - Blood Gas 4 hourly at least initially then as required by clinical state.
  - Electrolytes 8-12 hourly initially then at least daily until day 3-5.
  - Full Blood count 12 hourly initially then at least daily until day 3-5.
  - INR and APPT clotting studies on day 1 and at least daily until normal.
  - LFTs and troponin on day 1, day 2 and day 5.
  - Pain score
- Documentation
  - Hourly rectal temperature
  - Hourly skin temperature
  - 4 hourly axilla temperature

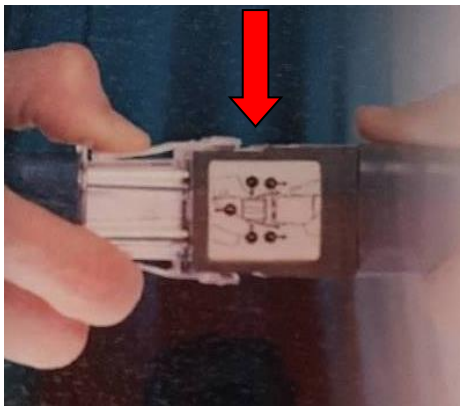
Rewarming

- Rewarming begins automatically at 72 hours after the start of active cooling. Once cooling phase is complete, an alert sound will indicate that the rewarming phase is initiated.

- To commence the rewarm phase press CLOSE and then press the green START button on the Rewarm Patient Window at the right bottom of the screen. (Picture 5)
- A tone and voice will confirm that rewarming is in progress and the Rewarming Patient Window will blink.
- The duration of rewarming can be altered based on consultant discretion.

Terminating Therapy

- Press STOP at the bottom left of the screen. (Picture 5)
- Remove the cooling pad from under the infant.
- A request of purging water from the Arctic Gel pad will occur on the screen.
- Follow the prompts and press START to enable recirculation of water to the system.
- Disconnect the fluid delivery line from the pad by squeezing and pushing the connections. (Picture 6)
- Discard the used gel pad.
- Clean the device with neutral detergent and store in the storeroom.



Picture 6

3.3 Educational Notes

- Sinus bradycardia and hypotension more frequently observed in the active cooling of an infant.
- Nurse infant supine in open care bed with full cardiopulmonary monitoring throughout the treatment.
- Ensure that the edges of the gel pad are not causing pressure area.
- Warmed and humidified gases must be used for infants on respiratory support.
- All fluid delivery lines are permanently attached to the back of the cooling device.
- The device has a prefilled water reservoir therefore does not require water to be added to the system prior to use.
- The unit will automatically default to hospital settings, but if required can be changed by selecting the ADVANCED SET UP screen.
- The cooling pad is radiolucent therefore suitable for all radiological investigations.
- The water reservoir does not require to be drained upon completion of treatment.
- New User Training Option - for further information prior to using the Arctic Sun select the New User Training button at the bottom right of the screen when the monitor initially turns on.

3.4 Abbreviations

aEEG	Amplitude-integrated Electroencephalography	INR	International Normalised Ratio

APTT	Activated Partial Thromboplastin Time	LFT	Liver Function Test
eRIC	electronic Record of Intensive Care		

3.5 References

1. Bard Medical, Arctic sun 5000. Setting a new standard for whole body cooling. Arctic Sun™ 5000 Temperature Management System | BD. Accessed on 10/1/2024
2. Jacobs SE, Berg M, Hunt R, Tarnow-Mordi WO, Inder TE, Davis PG. Cooling for newborns with hypoxic ischaemic encephalopathy. Cochrane Database Syst Rev. 2013 Jan 31;2013(1)
3. Whole Body Cooling - Neonates Suspected Moderate or Severe Hypoxic Ischaemic Encephalopathy (HIE); NSW health policy directive 2010, PD2010_006
4. Sakr M, Balasundaram P. 2023. Neonatal Therapeutic Hypothermia. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK567714/. Accessed on 10/01/2024.

4. RELATED BUSINESS RULES AND POLICY DOCUMENTS

- RHW NCC Medical - Cooling – Therapeutic Hypothermia for Hypoxic-Ischaemic Encephalopathy (HIE) In Infants ≥ 35 Weeks Gestation

5. CULTURAL SUPPORT

- When clinical risks are identified for an Aboriginal family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services.
- For a Culturally and Linguistically Diverse CALD family, notify the nominated cross-cultural health worker during Monday to Friday business hours.
- If the family is from a non-English speaking background, call the interpreter service: NSW Ministry of Health Policy Directive PD2017_044-Interpreters Standard Procedures for Working with Health Care Interpreters.

6. IMPLEMENTATION PLAN

This revised CBR will be distributed to all medical, nursing and midwifery staff via @health email. The CBR will be discussed at ward meetings, education and patient quality and safety meetings. Education will occur through in-services, open forum and local ward implementation strategies to address changes to practice. The staff are asked to respond to an email or sign an audit sheet in their clinical area to acknowledge they have read and understood the revised CBR. The CBR will be uploaded to the CBR tab on the intranet and staff are informed how to access.

7. RISK RATING

- Low

8. NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 2 Partnering with Consumers
- Standard 3 Preventing and Controlling Infections

- Standard 5 Comprehensive Care
- Standard 6 Communicating for Safety
- Standard 8 Recognising and Responding to Acute Deterioration

9. REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
18/1/2024 12/02/2024	1	R Dunkerley (RN), E Jozsa (CNS); Approved RHW NCC CBR Committee Approved out of session by RHW Safety and Quality Committee