Royal Hospital for Women (RHW)
NEONATAL BUSINESS RULE
COVER SHEET

Health
South Eastern Sydney
Local Health District

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NAME OF DOCUMENT	Humidified Resuscitation for Premature Neonates <32 Weeks at Birth
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FORMER REFERENCE(S)	Humidified and Heated Gas for Preterm Infants at Birth NSW Health Guideline GL2018_016- Maternity – Resuscitation of the Newborn Infant ANZCOR Newborn Resuscitation Guidelines 13.1-13.10
EXECUTIVE SPONSOR	Sally Wise, Nursing Co-Director Neonatal Services Srinivas Bolisetty, Medical Co- Director Neonatal Services
AUTHOR	E. Roylance (ACNE)
SUMMARY	To provide clinicians a guideline on the humidified resuscitation of preterm neonates <32 weeks at birth.
Key Words	Resuscitation, humidified resuscitation, face mask ventilation, neonate, preterm

Humidified Resuscitation for Premature Neonates <32 Weeks at Birth

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Humidified Resuscitation for Premature Neonates <32 Weeks at Birth

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1 BACKGROUND

The aim of this CBR is to highlight the importance of using humidified and heated gas during neonatal resuscitation. Heat and humidity are essential to prevent hypothermia during resuscitation. Preterm neonates, due to their physical characteristics and large skin-air temperature gradient, are particularly vulnerable to significant evaporative heat loss after delivery.

2 RESPONSIBILITIES

2.1 Staff

2.1.1 Medical – to identify neonates who are eligible for humidified resuscitation, provide humidified resuscitation to neonates <32 weeks at birth or when clinically indicated.

2.1.2 Nursing – to identify neonates who are eligible for humidified resuscitation, gather and set up the appropriate equipment attached to resuscitaire, check equipment is functioning prior to use, provide humidified resuscitation to neonates <32 weeks at birth or when clinically indicated. Dispose and/or clean appropriate equipment after returning to the ward.

3 PROCEDURE

3.1 Indications

- Preterm neonate <32 weeks gestation
- Congenital airway anomaly
- Extremely low birth weight ≥32 weeks gestation
- At medical officer's discretion

3.2 Equipment (Picture 1)

- Resuscitaire
- Fisher and Paykel (F&P) MR850 heated humidifier base

- Bracket
- 22 mm humidifier chamber
- T-piece Circuit- Humidified (900RD110 [F&P])
- Water for irrigation 500mL
- Neopuff adapter (900MR148 [F&P])
- Temperature probe (blue) and heating wire (yellow)
- Appropriate size face mask

3.3 Clinical Practice

3.3.1 Set up

- Collect equipment as above (Picture 1).
- Connect resuscitaire power cord to the wall outlet and switch on.
- Connect oxygen and air resuscitaire hoses to oxygen and air wall outlets.
- Connect bracket to the resuscitaire before connecting the MR850 heated humidifier base (Picture 2).
- Connect the power cord of the humidifier base to the wall power outlet and switch it on.
- Fit the humidifier chamber onto the humidifier base and remove all the blue caps (Picture 3)
- Fill the water chamber with 30 mL of sterile water for irrigation (to the grey line).
- Connect the dry line between the chamber inlet port and the Neopuff™ gas outlet using Neopuff™ adapter (Picture 3)
- Connect the blue inspiratory limb to the remaining chamber port (Picture 4).
- Ensure the temperature probe (blue) and heater wire (yellow) adapters are fully inserted (Picture 5).
- Turn on the humidifier base, ensure it is set to non- invasive mode. If not hold the mode button until the non- invasive mode light is lit (Picture 6).
- Attach the appropriate size face mask.
- Set the gas flow to 8 L/min.
- Set Positive End Expiratory Pressure (PEEP) and Positive Inspiratory Pressure (PIP) as per medical team.
- Check humidified resuscitation is functioning.
- Perform humidified resuscitation on neonate as required.

Picture 1

Humidified Resuscitation for Premature Neonates <32 Weeks at Birth

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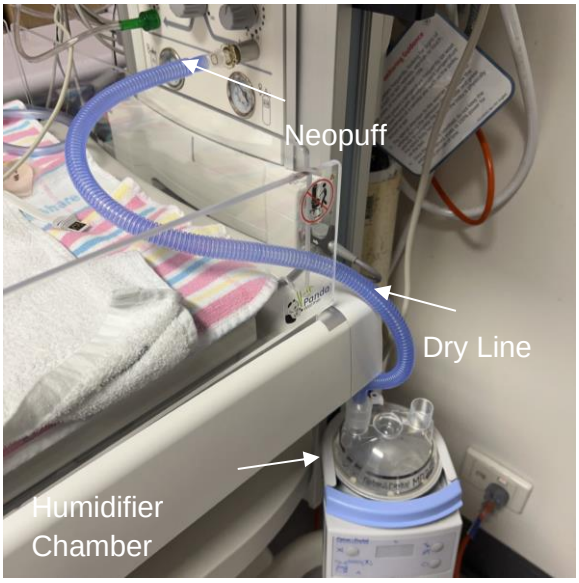
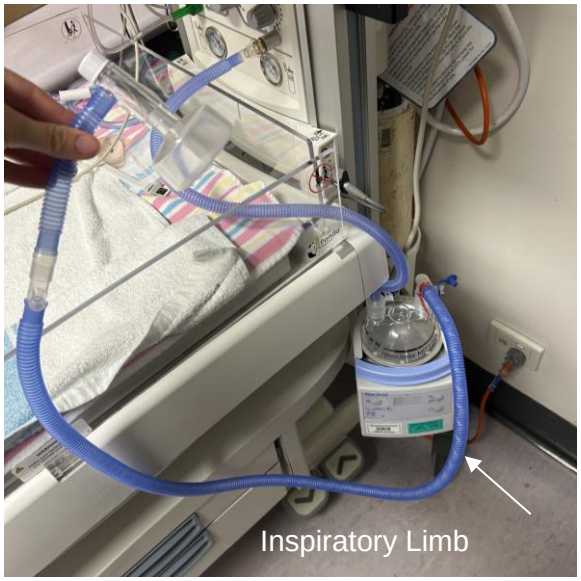
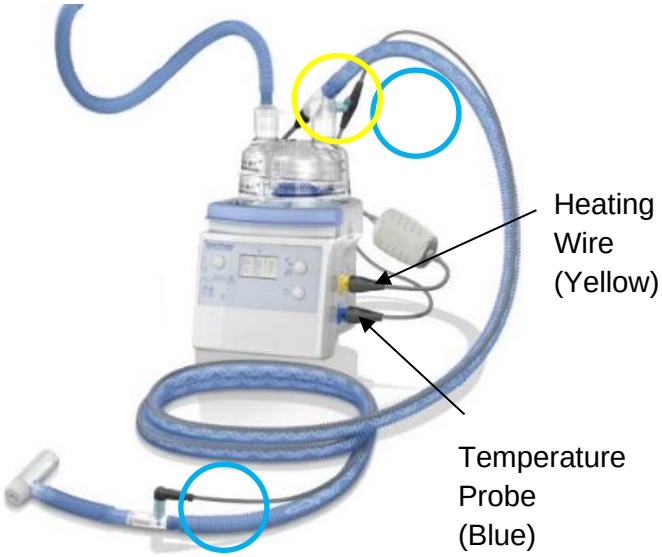
Picture 2



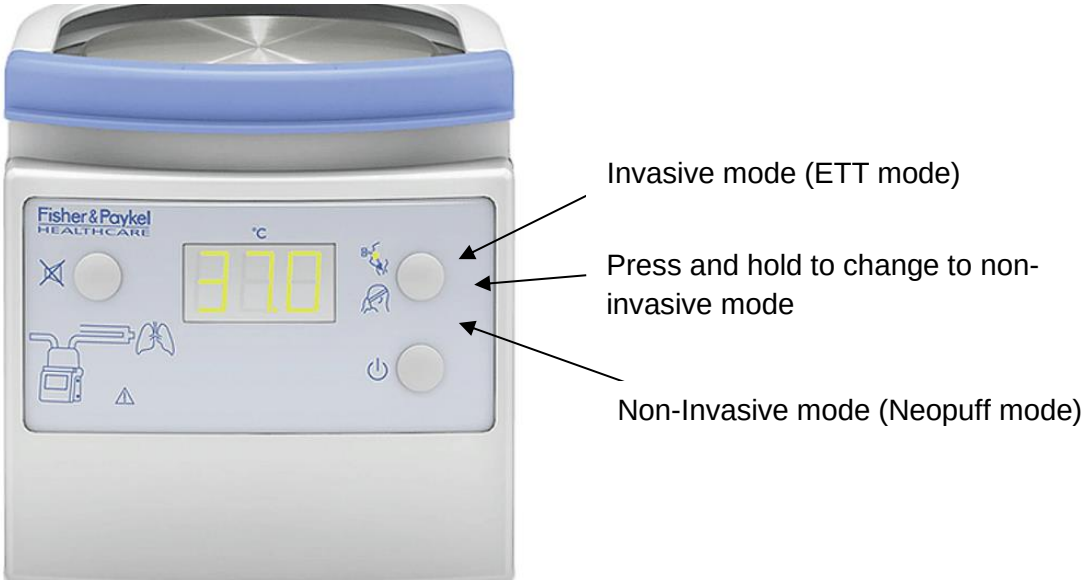
Picture 3



Picture 4



Picture 5



Picture 6

3.2.2 Transferring the neonate to NCC

- Disconnect humidifier base from power outlet prior to transfer.
- Disconnect oxygen and air resuscitaire hoses from oxygen and air wall outlets and connect to oxygen and air cylinders on the back of resuscitaire.

3.2.3 Disposing/cleaning of equipment

- Once the neonate has arrived in NCC, place neonate on prescribed respiratory support.
- Turn off oxygen and air cylinders on resuscitaire.
- Clean Neopuff™ adapter and place in drawer of resuscitaire.
- Clean temperature probe (blue) and heating wire (yellow) and return to NCC storeroom.
- Clean MR850 humidifier base and bracket and return to NCC storeroom.
- Dispose of all remaining equipment.

3.4 Documentation

- eRIC
- NSW Health Neonatal Resuscitation Record

3.5 Education Notes

- During spontaneous breathing, humidification takes place in the nasal turbinates. However, during the resuscitation of a premature neonate, the upper airway is often bypassed. When an endotracheal tube or large minute volume is used it may prevent

inadequate humidification of the inspired gases. This can lead to increased heat loss, raising the risk of hypothermia.[1]

- Increased rates of mortality and morbidity have been observed in neonates with an admission temperature below 36.5°C. Recent randomized controlled studies have demonstrated a reduction in admission hypothermia and an increase in the number of neonates admitted with a normal temperature (36.5–37.5°C) when heated, humidified gases were used for the initial stabilisation of preterm neonates.[2]
- Neonates who are exposed to cold dry respiratory gases experience detrimental respiratory effects such as decreased lung compliance, increased work of breathing, release of proinflammatory cytokines and damage to the mucociliary layer.[2] Studies have shown that dry non-humidified gas can cause distal airway and alveolar damage.[1]
- A multicenter trial compared the effects of heated humidified gases (HHG) versus cold, dry gas as initial respiratory support from delivery until arrival at the neonatal unit. It was observed that HHG not only led to an increase in normothermia (69% vs 55%) on admission but it was also more effective in reducing severe hypothermia than cold, dry gas (2% vs 12%).[3]

3.5 Abbreviations

F&P	Fisher and Paykel	PEEP	Peak End Expiratory Pressure
PIP	Peak Inspiratory Pressure	HHG	Heated Humidified Gases

3.6 Related Policies/procedures

- Australia and New Zealand Committee on Resuscitation Neonatal Resuscitation Guidelines 13.1-13.10
- NSW Health Guideline GL2018_016- Maternity – Resuscitation of the Newborn Infant
- NSW Health Policy PD2012_069- Health Care Records - Documentation and Management
- RHW NCC CBR- Continuous Positive Airway Pressure (CPAP) Therapy (Neonate)
- RHW CBR- Neonatal Resuscitation at Birth
- RHW NCC CBR- Management of Preterm Infants <32 weeks in the first 2 hours of life
- RHW NCC CBR- Preterm Infants – Delivery Management for Extremely Preterm Infants less than 26 Weeks Gestation
- RHW NCC CBR- TransWarmer

3.7 References

1. Carlo WA, Chatburn RL. Is It Necessary to Heat and Humidify Respiratory Gases for Resuscitation in Preterm Infants? The Journal of Pediatrics. 2018; 1;193:10–1.
2. Meyer MP, Owen LS, te Pas AB. Use of Heated Humidified Gases for Early Stabilization of Preterm Infants: A Meta-Analysis. Frontiers in Pediatrics. 2018; 25;6:319
3. Meyer MP, Hou D, Ishrar NN, et al. Initial respiratory support with cold, dry gas versus heated humidified gas and admission temperature of preterm infants. J Pediatr. 2015;166:240-50.

4 ABORIGINAL HEALTH IMPACT STATEMENT DOCUMENTATION

- Considerations for culturally safe and appropriate care provision have been made in the development of this Business Rule and will be accounted for in its implementation.
- When clinical risks are identified for an Aboriginal and/or Torres Strait Islander woman or family, they may require additional supports. This may include Aboriginal health professionals such as Aboriginal liaison officers, health workers or other culturally specific services

5 CULTURAL SUPPORT

- For a Culturally and Linguistically Diverse CALD woman, notify the nominated cross-cultural health worker during Monday to Friday business hours
- If the woman 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 NATIONAL STANDARDS

- Standard 1 Clinical Governance
- Standard 5 Comprehensive Care
- Standard 6 Communicating for Safety
- Standard 8 Recognising and Responding to Acute Deterioration

7 REVISION AND APPROVAL HISTORY

Date	Revision No.	Author and Approval
20/06/2016	Primary	A Singla (Neonatal Fellow), E Jozsa (CNE), S Bolisetty (Lead Clinician)
19/03/2020	2	NCC LOPs Committee
02/04/2025 10.4.2025	3	E. Roylance (A/CNE) Endorsed by NCC CBR Committee
24.4.25	3	RHW BRGC