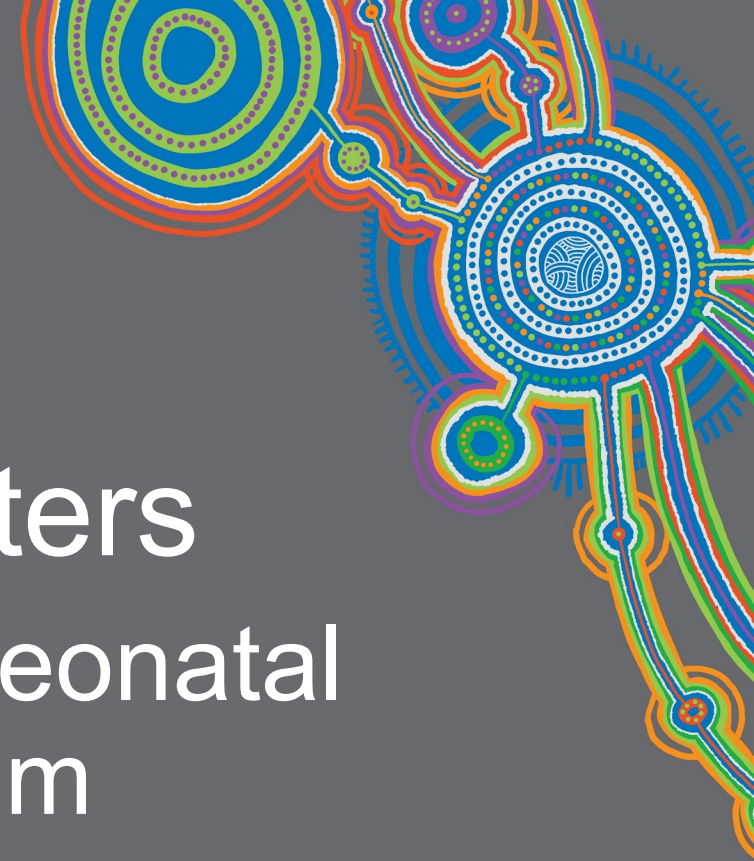




Government of Western Australia
Child and Adolescent Health Service



Expertise Matters

The Case for the Neonatal Specialist Team

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NETS WA

Compassion

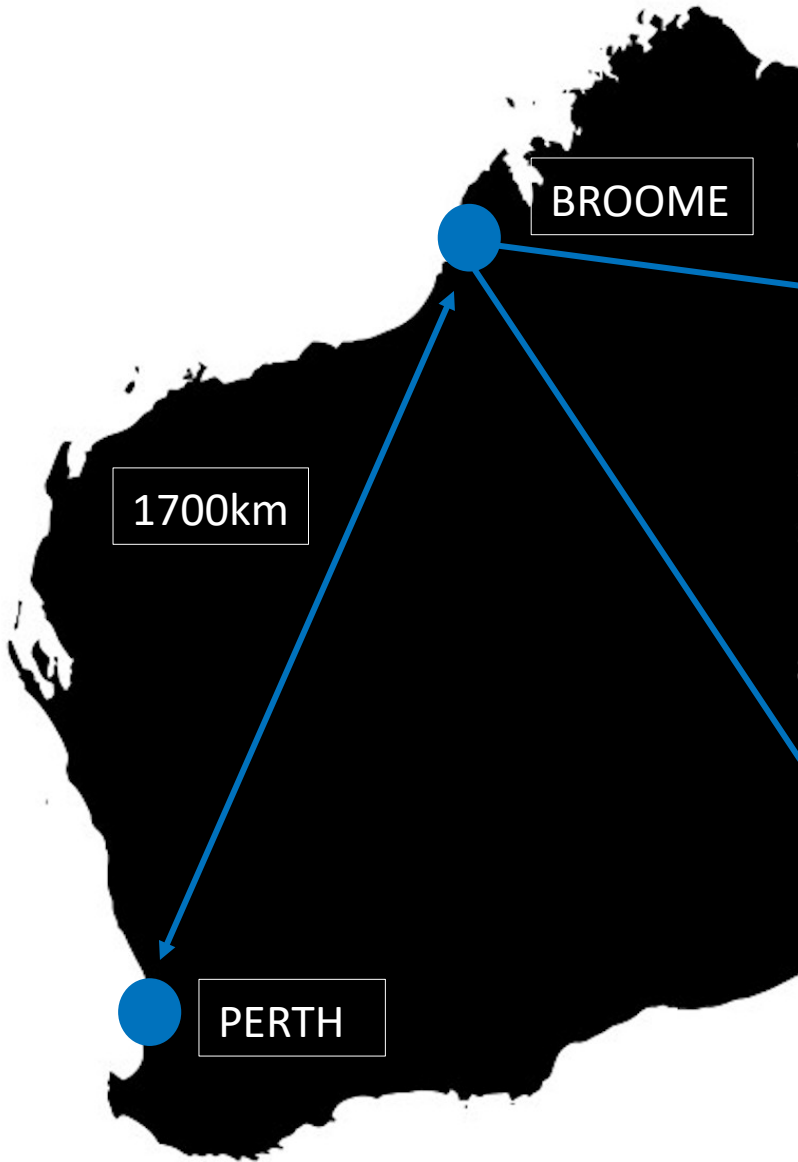
Excellence

Collaboration

Accountability

Equity

Respect



Non-Neonatal Specialist (NNS) – Working in paediatrics with some neonatal care

Neonatal Specialist (NS) = working primarily in NICU

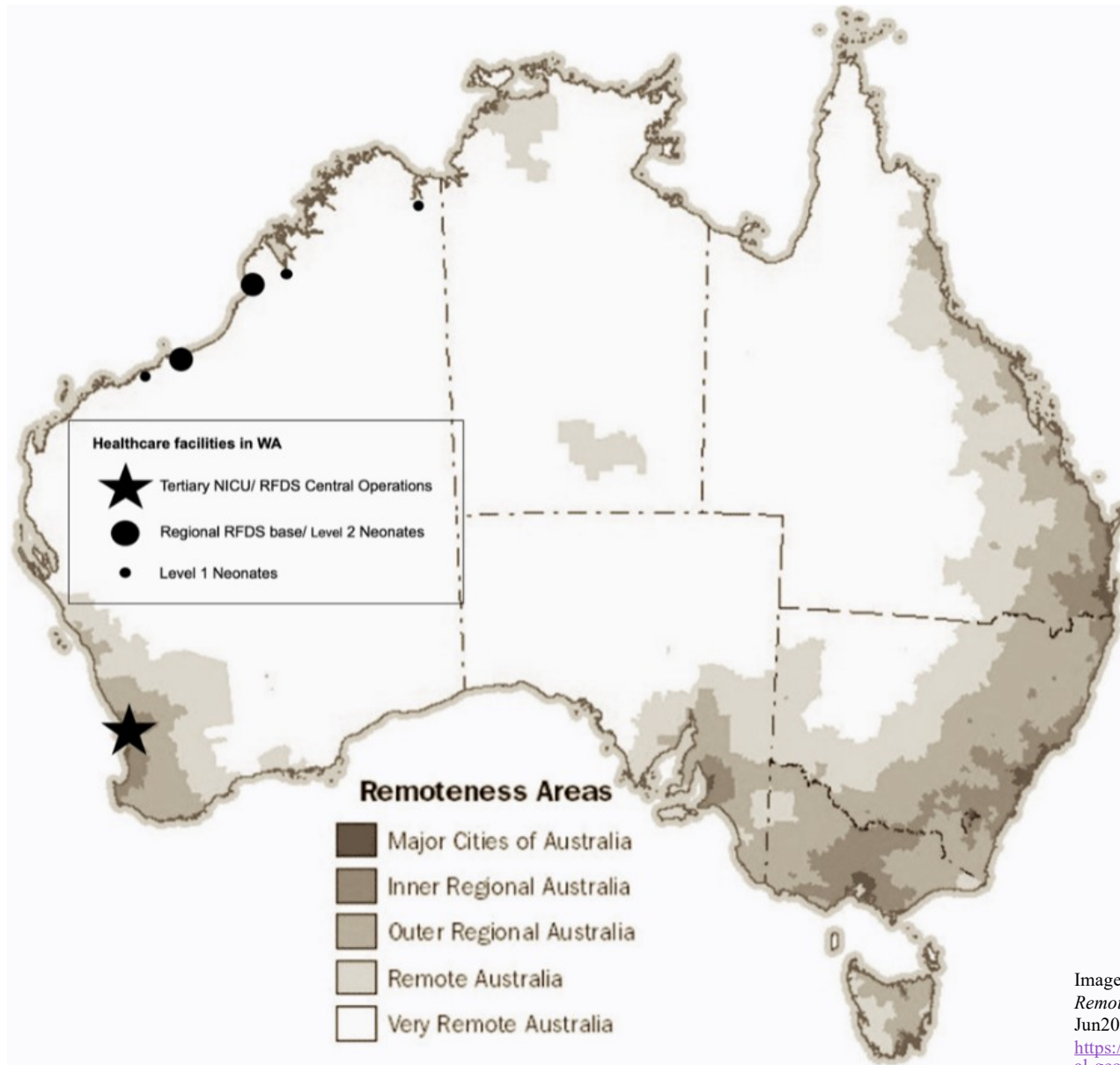


Image adapted from Australian Bureau of Statistics. *Remoteness Areas* [Internet]. Canberra: ABS; Jul2021-Jun2026 [cited 2023 November 27]. Available from: <https://www.abs.gov.au/statistics/standards/australian-statistical-geography-standard-asgs-edition-3/jul2021-jun2026/remoteness-structure/remoteness-areas>

Centralisation of perinatal care



- Preterm infants have improved survival and morbidity if born in a perinatal centre
- Desking of non-tertiary HCW?
- HCW inexperienced at newborn resuscitation
 - More attempts and take longer to intubate/ establish IV access
 - Higher rates of hypothermia
- What about those at higher gestations or those unexpectedly sick at delivery?
- What about the transport of these babies? Is one team better than the other?



Current evidence

Paediatric

1. Survival of paediatric patients is improved with use of specialist teams
2. Reduced morbidity and adverse events during interhospital transfers of older patients by specialist teams
3. AE more common in paediatric patients transferred by non-specialist teams esp airway events

Neonatal

- Insufficient evidence to support or refute the use of specialist teams for neonatal retrieval and improving outcomes

1. Ramnarayan Pet al Effect of Specialist retrieval outcomes in children admitted to paediatric intensive care units in England and Wales: A retrospective cohort study. The Lancet. 2010;376(9742):686-704
2. Edge WE et al Reduction of morbidity in interhospital transport by specialised paediatric staff. Crit Care Med. 1994;22(7):1186-91
3. Orr RA et al. Pediatric Specialised transport teams are associated with improved outcomes. Pediatrics 2009;124(1):40-8

- Chang AS et al Specialist teams for neonatal transport to neonatal intensive care units for prevention of morbidity and mortality. Cochrane Database Syst Rev 2015;2015(10):Cd007485





Challenges





Unintended Events in Long-Distance Neonatal Interhospital Transport in Western Australia: A Comparison of Neonatal Specialist and Non-Neonatal Specialist Transport Teams

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Hypothesis – Transports performed by NS teams in WA have fewer unintended events than those performed by NNS teams



Methods

- Retrospective chart review of prospectively collected data
- All babies transferred from Kimberley and Pilbara regions to NICU in Perth between 1/1/2018 and 30/6/2021
- Excluded babies
 - Intraregional e.g. Derby to Broome
 - Interstate (Darwin)
 - Not transported by NETS e.g. RFDS only



Unintended Events

- Clinical

- Unplanned events with ETT
- Unintentional hypothermia (<36.5C) /hyperthermia (>37.5C)
- Hypotension (clinical need for fluid therapy or inotropes as determined by treating clinician)
- Hypoglycaemia (<2.6mmol/L)

- Logistical

- Delayed retrieval due to lack of aeromedical/ ambulance/ medical assets

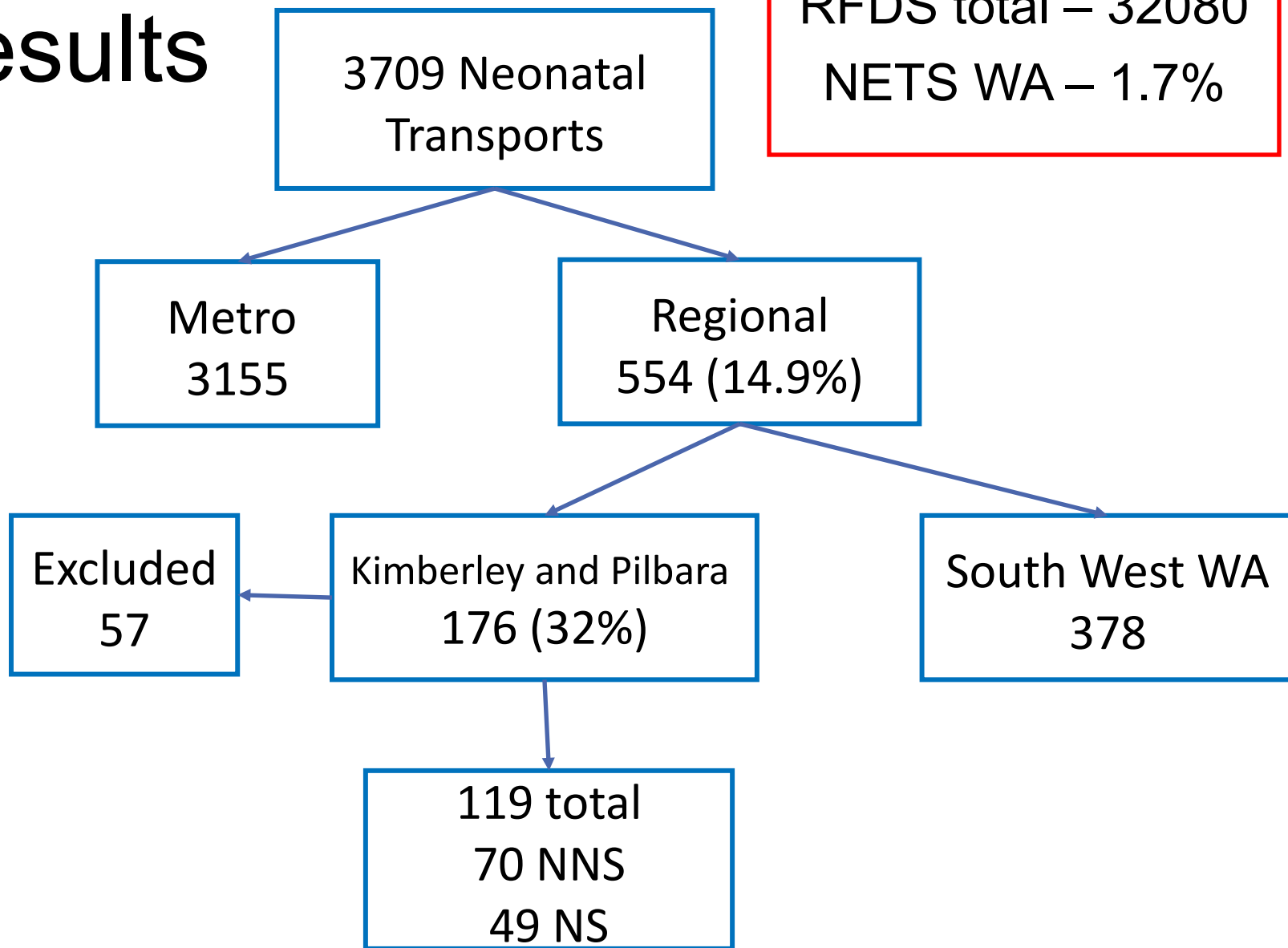
- Equipment

- Problems with cot, clipdecks, monitors etc



Results

RFDS total – 32080
NETS WA – 1.7%



Demographics

	Neonatal specialist transport team n=49	Non-Neonatal specialist transport team n=70
Male sex	27 (55)	36 (51)
Gestation (weeks)	38 (32 – 39; 25 – 41)	38 (34 – 39; 25 – 41)
Birth weight (kg)	2.7 (1.9– 3.5; 0.7- 4.7)	2.8 (2.1 – 3.2; 0.9 – 4.4)
Apgar Scores		
One minute	8 (4 – 9; 0 - 9)	8 (3 – 9; 0 - 9)
Five minutes	9 (7 – 9; 0 - 10)	9 (6 – 9; 1 - 10)
Diagnosis at time of retrieval		
Respiratory distress (n, %)	10 (20.4)	17 (24.3)
Preterm	14 (28.4)	11 (15.7)
Neurology	7 (14.3)	11 (15.7)
Surgical	4 (8.2)	11 (15.7)
Sepsis	3 (6.1)	5 (7.1)
Cardiac	8 (16.3)	3 (4.3)
Congenital anomaly	2 (4.1)	4 (5.7)
Other	1 (8.2)	8 (11.4)
Therapeutic Hypothermia	6 (12.2)	8 (11.4)

Table 1. Demographics of neonatal specialist teams (n=49) and non-neonatal specialist transport teams (n=70). Categorical data are presented as a number (%), and continuous data are presented as median (interquartile range and minimum to maximum capacity).



Respiratory Support

	Neonatal Specialist (n=49)	Non-Neonatal Specialist (n=70)
Ventilation*	26 (53.1)	23 (32.9)
nCPAP	7 (14.3)	12 (17.1)
HHF	1 (2)	1 (1.4)
Low flow nasal oxygen	0 (0)	3 (4.3)
No respiratory support	15 (30.6)	31 (44.3)
Nitric Oxide	4 (8.2)	0 (0)

*p=0.047

Unintended Events



n (%)	Neonatal specialist transport team n=49	Non-Neonatal specialist transport team n=70	P value
Unintended events with an endotracheal tube	0/26 (0)	7/23 (29)	0.004
Hypoglycaemia	1 (2.1)	3 (4.2)	-
Unintended temperature outside range (<36.5 or >37.5)	12 (33.3)	30 (47.6)	-
Total unintended clinical event	28 (57)	54 (77)	0.03
Total unintended logistical event	32 (65)	26 (37)	0.003
Total unintended equipment event	16 (33)	18 (26)	-



	Neonatal specialist transport team n=49	Non-neonatal specialist transport team n=70	P value
Time (minutes) to stabilise in local hospital	65.0 (47.5-130.0)	68.5 (42-140.3)	-
Length of retrieval - dep to arrival in tertiary NICU (min)	675 (610-735) 11.25 hours	508 (433-610) 8.5 hours	<0.0001
Time between DTR and arrival in NICU (min)	871 (770-1035) 14.5 hours	715 (567-840) 12 hours	<0.0001



Team composition

Team composition					
Lead Practitioner on retrieval	Neonatal Senior Doctor	43 (88)	Paediatric Senior Doctor/ PNP	42 (60)	p<0.001
	Neonatal Junior Doctor	6 (12)	Paediatric Junior Doctor	28 (40)	
Neonatal transport nurse present	36 (73.5)		6 (9)		p<0.001



Flight information

Propeller aircraft	19 (39)	58 (83)	p<0.001
Jet aircraft	30 (61)	12 (17)	
Pressurised Cabin Altitude (ft)	6640 (5600 – 7500)	6900 (6060 – 7095)	
Maximum altitude (ft)	36,000 (24,000 – 40,000)	24,000 (22,675 – 26,000)	p<0.001



Deaths

- None prior to or during retrieval
- 4 deaths within 7 days of transport
- Care redirected in all 4 cases
 - 2 HIE
 - 2 extreme preterm – severe IVH, pulmonary haemorrhage



Summary

- EVERY baby took a LONG time to reach NICU
- Neonatal Specialist teams took longer
- Improved safety profile (↓ number of unintended airway events)
- More logistical issues

- Is there a difference because of highly trained neonatal nursing staff
 - Anticipating deterioration
 - Familiarity with clinical status/ equipment



Criteria for NS?*

- < 32 weeks
- Any ICU baby
- HIE requiring therapeutic hypothermia
- Any ventilated baby
- Sick respiratory baby - ?nitric oxide

- BUT there are some time critical transfers e.g. bilious vomiting and ?volvulus where priority is to get to NICU ASAP

*in an ideal world if the stars all align



Acknowledgements



Dr Jonathan Davis NETS WA Medical Director
RFDS WO Clinical Coordinators
NETS WA/RFDS teams for transporting our babies
safely to Perth

Thankyou