Are We Cooling Effectively and Safely During Transport?

NNCA conference 2017
Fiona Dineen, Sarah Cody & Jelena Mladenovic

Background

- Perinatal hypoxic ischaemic encephalopathy is the second leading cause of neonatal death. Treatment should be started early and it is necessary to transfer the infant to a tertiary NICU for ongoing care including effective cooling and aEEG monitoring
- Neural damage after hypoxic ischaemia is delayed in response to several hours of acute hypoxic ischaemia, and therapeutic hypothermia can be used in newborn infants with HIE to reduce the risk of death and neurological impairments.
- Therapeutic hypothermia is now the standard of care for hypoxic-ischemic encephalopathy.

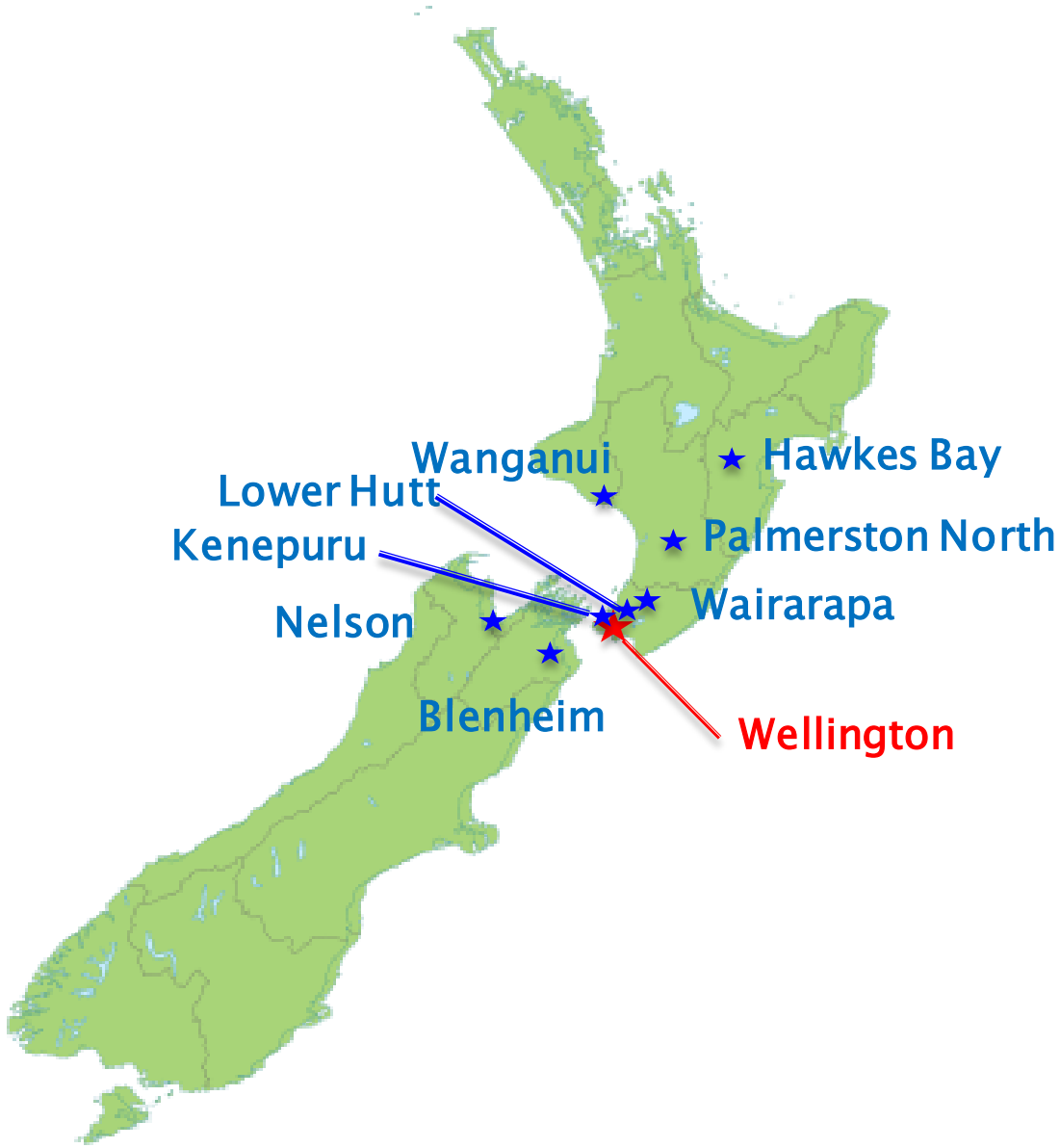
Aim of Audit

- To evaluate effectiveness and safety of therapeutic hypothermia performed by Wellington transport team.
- Whether changes implemented after 2014 audit have improved temperature management during transport

Catchment area

Average 380 transports per year

Fixed wing 60%
Helicopter 6%
Road Ambulance 34%



First Audit 2014

- In 2014, Dr Maria Saito-Benz (Wgtn NICU Fellow) carried out an audit to evaluate effectiveness and safety of therapeutic hypothermia performed by NICU Wellington transport team.

- Specifically –
  - Target temperature (33.0 – 34.0C) within 6 hours?
  - Mobilisation times
  - Overcooling

- Audit of all babies with HIE transported by Wellington Transport team between 2012-2014

- 22 neonates
  - >35 weeks gestation
  - BW >1800 grams

What changed after 2014 review?

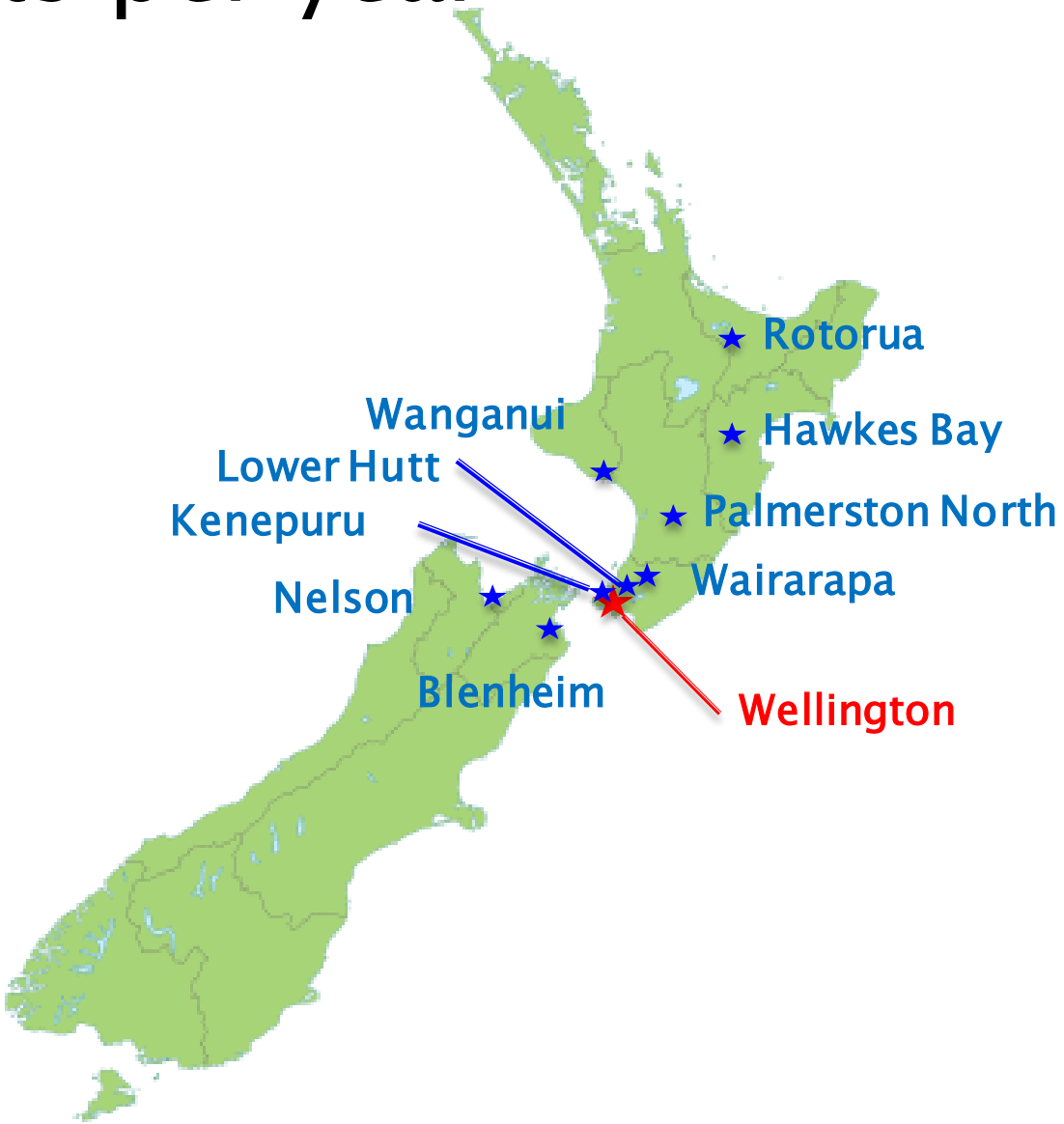
- Standard practise for HIE babies; Review of Cooling Protocol and Teaching
- Cooling initiated after hypoxic injury; pH <7, lactates >7 and low Apgar score.
- Initiate cooling within the first 6 hours.
- Temperature to be kept between 33 – 34°C
- Continuous rectal temperature monitoring in SCBU's

Method

- In 2017 decide to review practises in place.
- Retrospective audit from April 2014 – May 2017
- 89 fitted criteria for transport for HIE
- Used existing admission/discharge/transport database

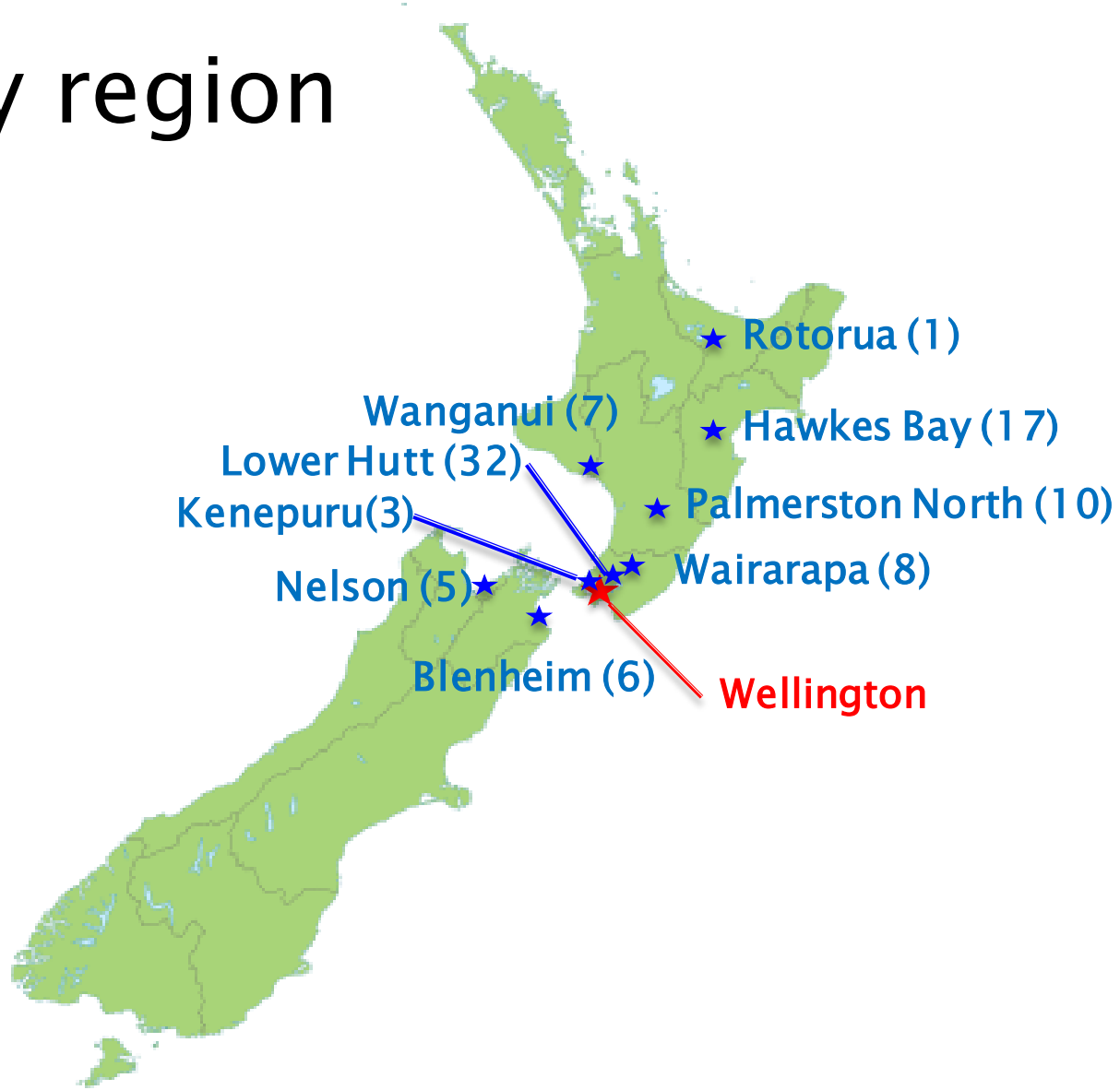
Number of transports per year

Year	Transfer
2014	23
2015	29
2016	26
2017	11



HIE transports by region

Year	Transfer
2014	23
2015	29
2016	26
2017	11



Causes of HIE

- CTG/Decels/Fetal bradys – 26
- Shoulder Dystocia – 10
- No resp effort/flat – 10
- Unknown – 7
- Abruption/Cord prolapse – 7
- Difficult extraction – 6
- Home birth /water birth – 5
- Meconium – 5
- Cord around neck – 5
- Failure to progress – 3
- Sepsis – 2
- Breech – 2
- Birth in ambulance – 1

- **Mechanical ventilated:** 37 no
- 47 ventilated / 4 CPAP / 1 NR

- **Nitric Oxide:** 81 no / 7 yes / 1 NR

- **Inotropes:** 78 No, 10 yes, 1 NR

- **Clinical seizures:** 58 no / 29 yes /1NR/1 unclear

- **aEEG seizures:** 58no / 29 yes / 2 unclear

Temperature

Target range (33.0-34.0° C) within 6hrs: 53/89 (60%)

During Transport:-

Passive cooling incubator off n = 62 (69%)

Active cooling using icepacks n = 9 (10%)

Not cooled n=5 (6%)

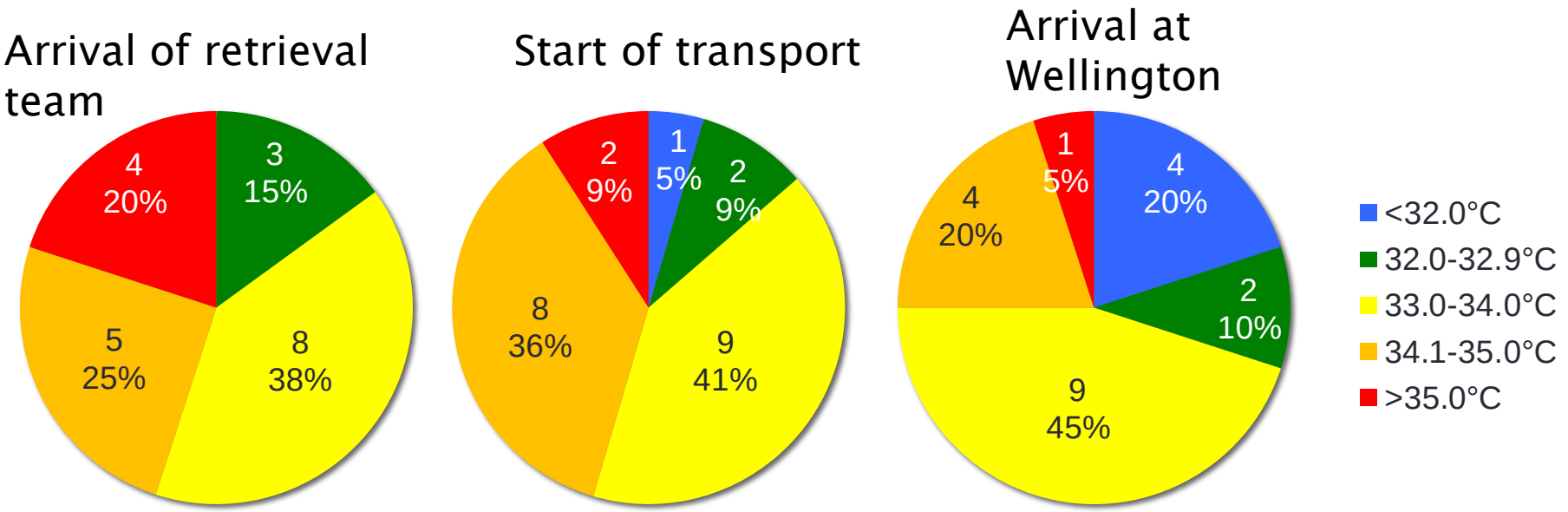
Not recorded 13 (14%)

Temperature continue:

- Rectal temperature during transport 72
- No rectal temperature during transport 6
- Not Recorded 11

Temperature results in 2014

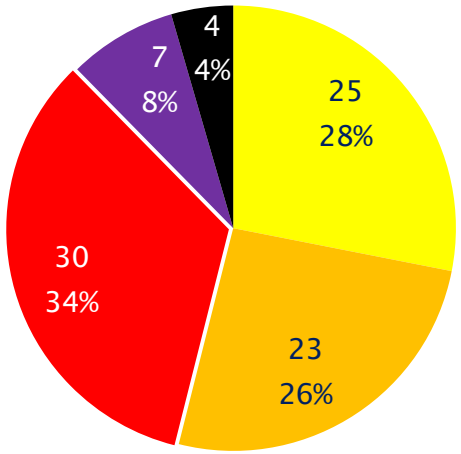
Target range (33.0–34.0° C) within 6hrs: **12/22 (57%)**



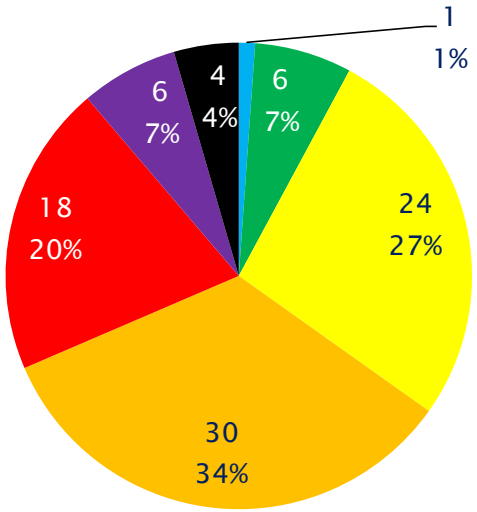
Temperature results in 2017

Target range (33.0–34.0°C) within 6 hours : 53/89(60%)

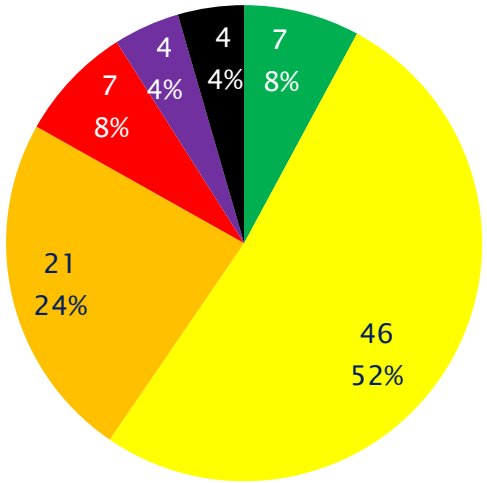
Arrival of Transport Team

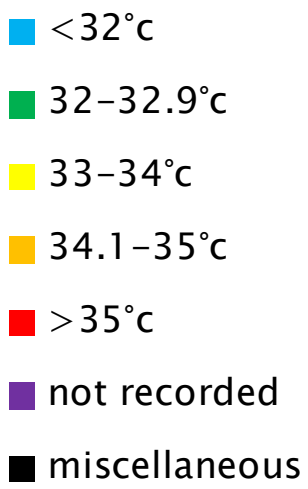


Start of Transport



Arrival at Wellington





Safety Issues: Overcooling

Temperature	2014	2017
Babies in total	22	89
Below 33.0° C	36%	14%
Below 32.0° C	18%	1%
Below 30.0° C	9%	0%

Mobilisation Time

	Median time in Hours (range)
Wellington NICU contacted	2 (0–70)
Arrival of retrieval team	4 (0.50–72)
Start of Transport	5.25 (1–75)
Arrival at Wellington NICU	6.75 (1.5–77)

Findings

- Timely neuroprotective temperature in 60%, 3% improvement since 2014 audit.
- Overcooled 15%, compared with 63% in 2014. Only 1% went below 32° C
- Level 2 units within Wellington Region initiated therapeutic hypothermia appropriately and effectively in majority of cases.
- Poor documentation both pre transport and during transport made audit challenging

Raised Awareness

- Although rectal temperature monitoring in regional SCBUs was introduced, there needs to be ongoing education on managing the application of icepacks or passive cooling.
- Highlighted the importance of documentation.
- Managing passive/active cooling in unit without automated cooling mattress
- The importance of notifying tertiary hospital ASAP if HIE suspected
- Managing passive/active cooling while transporting remains challenging

Recommendations for improved performance pre transport

- Regular training for nursing and medical staff
  - Wellington offer HIE Study days for nurses to all SCBU in our area
- Facilitating collaboration with level 2 units.
- Having cooling protocol available to all units
- Timely referral to tertiary centre
- Good documentation

And during transport

- Continued training for transport team
- Good communication with primary units
- Improved documentation, reviewing transport form
- Introducing new transport cooling machines to aid in keeping temperature within therapeutic boundaries

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Thank you