

Background

- Neonatal encephalopathy (NE) is a complex syndrome characterised by depressed or abnormal neurological function, often caused by experiencing reduced oxygen or blood supply to the infant's brain before or during birth (hypoxic-ischaemic encephalopathy – HIE).
- Therapeutic Hypothermia (TH) is considered the standard treatment for term infants with NE. TH is a therapy during which the infant is cooled within six hours of birth to a targeted core body temperature of between 33°C to 34°C for a duration of 72 hours.
- Following the 72 hour period, the infant is rewarmed to normal body temperature over a 6-12 hour period.
- TH is regarded as the greatest single advance in Neonatology over the last 25 years as research has demonstrated it reduces the rate of death, severe disability and lifelong cerebral palsy reduction for these infants.

Purpose

- The purpose of the National Neonatal Therapeutic Hypothermia audit is to describe the epidemiology, antecedent obstetric, and intrapartum factors leading to NE, as well as the immediate and subsequent neonatal management and outcomes of the infants diagnosed with NE.
- To date five years of data has been collected contributing to important knowledge in the area of NE in the Republic of Ireland (2016 to 2020).

Methods

- In Ireland, TH is administered in four tertiary maternity hospitals. All infants born in other hospitals requiring this treatment are transferred to one of these four tertiary hospitals.
- Data were collected on all cases of neonatal therapeutic hypothermia from 2016 to 2020 by taking an active case ascertainment approach. Pseudonymised data were collected on site in the 19 maternity units/hospitals and neonatal intensive care units or special care baby units (NICU/SCBU) in the Republic of Ireland.

- Of the 357 infants who underwent TH in the period of 2016-2020, 60% were born in a tertiary hospital, and 40% required transfer from a regional or local hospital.
- The National Neonatal Transport Programme (NNTP) transferred 83% of outborn infants in 2020.
- It is encouraging to note that peripheral sites assessed, diagnosed, and initiated referral for 70% of cases in 2020 within 2 hours of life.

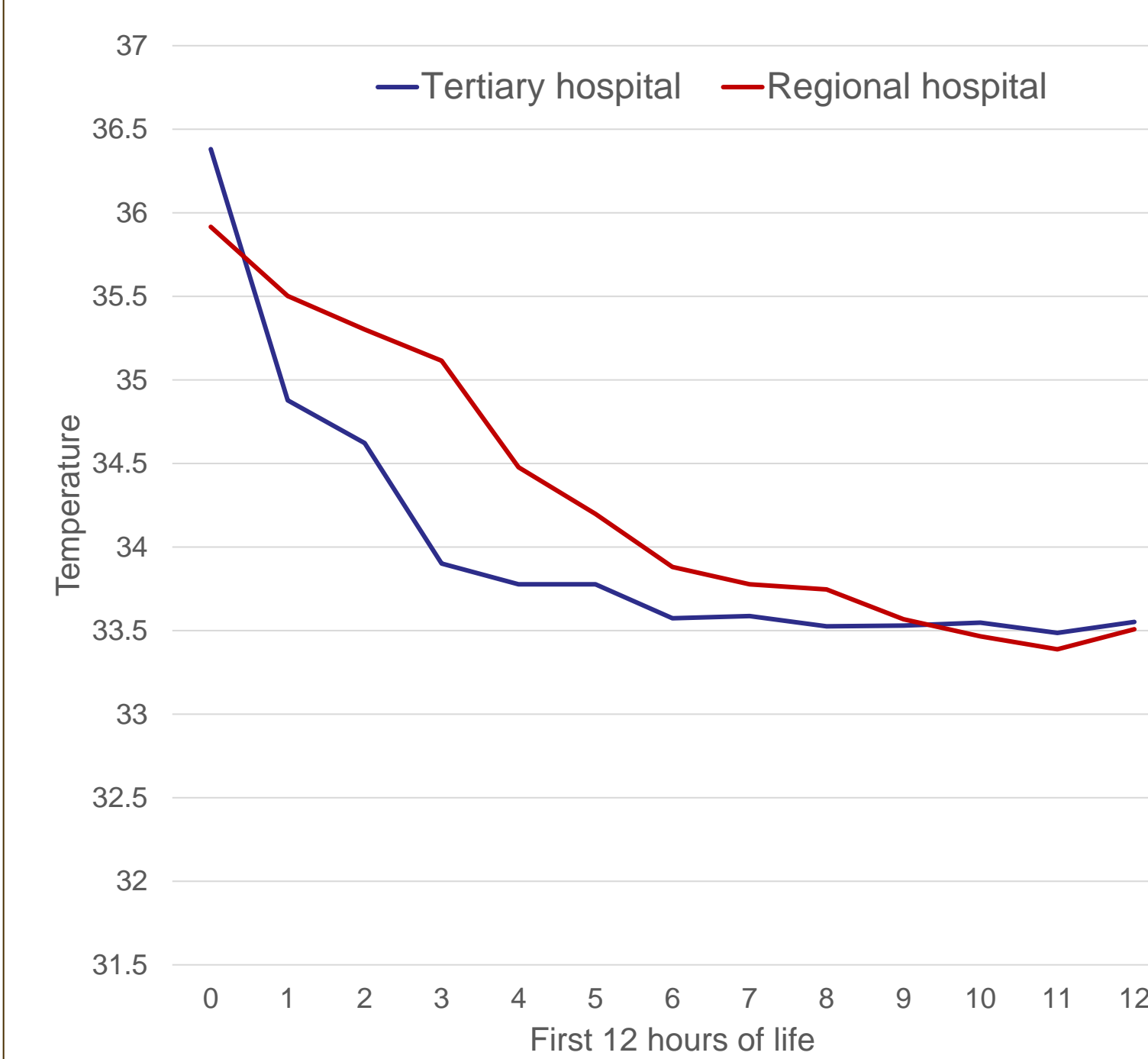
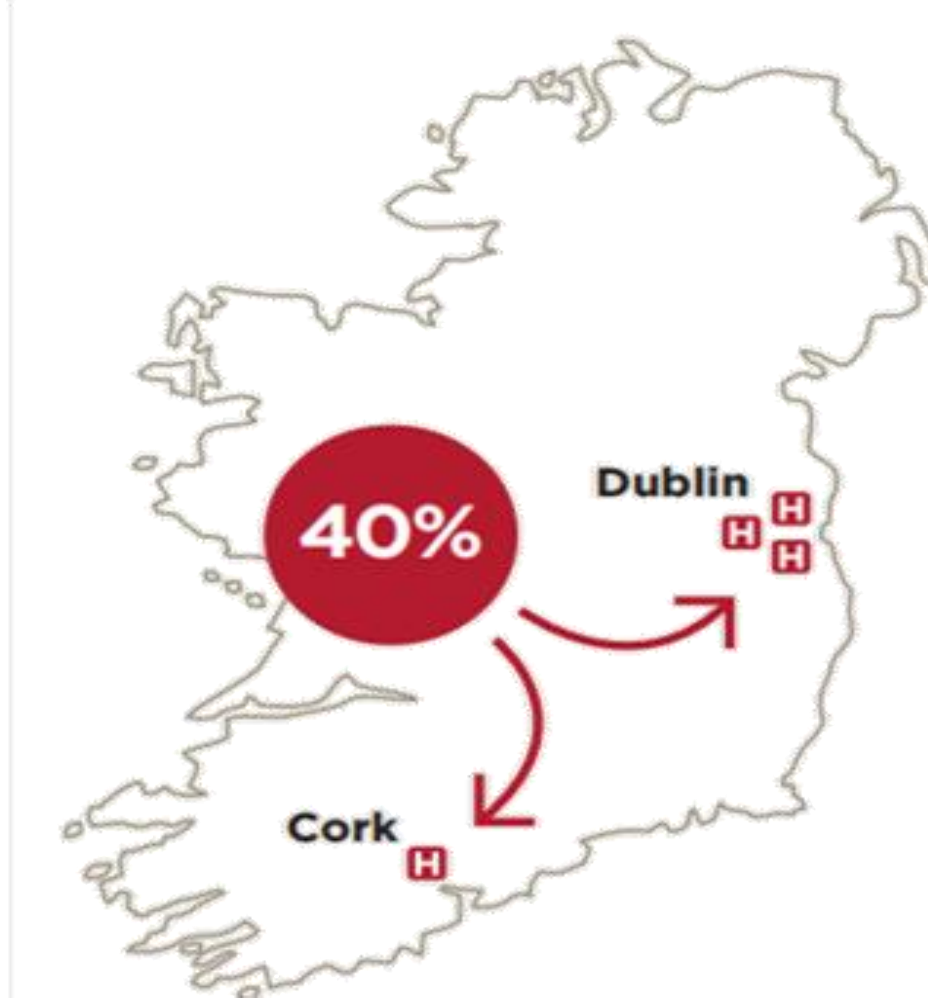


Figure 1: Infant core temperature for the first 12 hours of life, 2019-2020

- Figure 1 illustrates the average temperatures for the first twelve hours of life of TH infants at each hour in 2019-2020.
- It is recommended that infants who are treated with TH reach an optimal core temperature of 33 to 34 degrees Celsius before six hours of life.
- This shows that infants born in a tertiary hospital reached optimum core temperature (33.0-33.4C) sooner than infants that were outborn requiring transfer.
- The Sarnat grading scale is an internationally recognised classification assessment tool for NE in the newborn infant. All neonates with a history of perinatal asphyxia should undergo a detailed neurological examination to evaluate the existence of neurological dysfunction and grade the severity.
- The Sarnat classification assess severity based mainly on the level of consciousness, the alteration of muscle tone and reflexes and the existence of clinical convulsions.

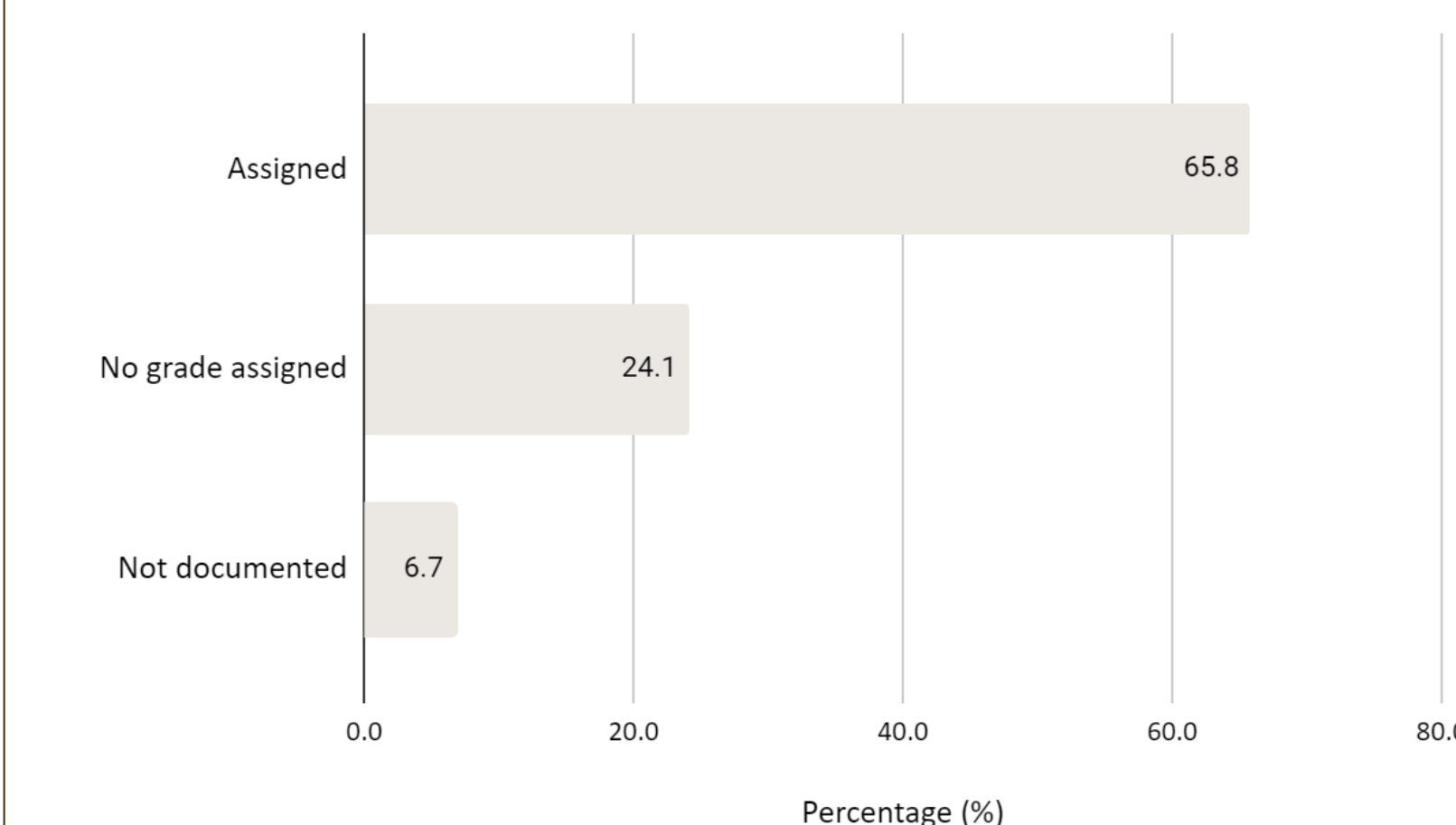


Figure 2: Encephalopathy assigned, 2016-2020

- Figure 2 shows the need to improve the undertaking of this tool at discharge.
- There was a grade of encephalopathy assigned to 66% of infants during their admission in 2016-2020 (n=235 of 357).

Results

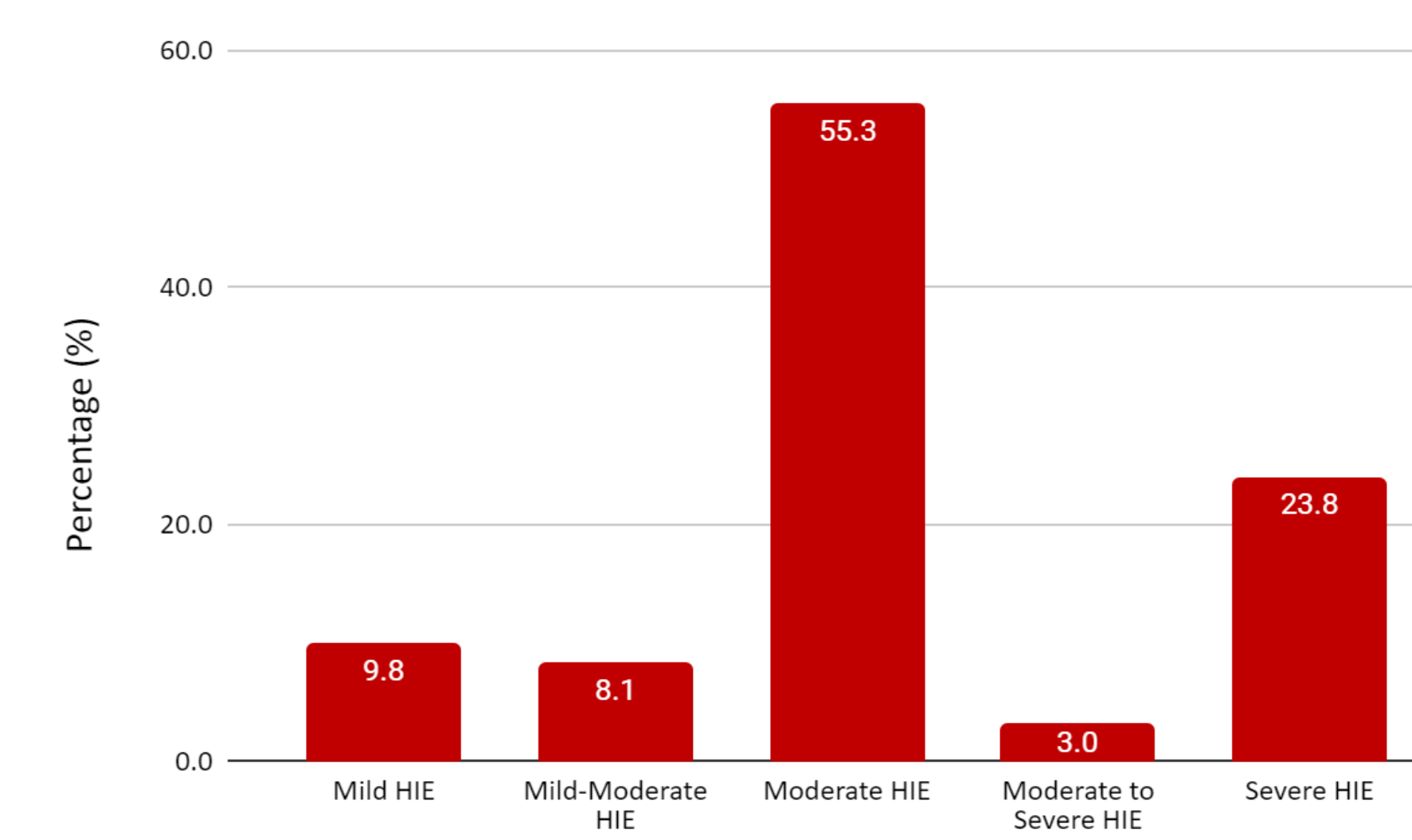


Figure 3: Grade of encephalopathy assigned, 2016-2020

- As we can see in figure 3, there is a need to standardise the grade of encephalopathy given to infants with TH, as other type of degrees have been given in the infant's clinical notes such as: mild-moderate, moderate to severe.
- Figure 4 shows the Apgar's scores for TH infants in 2020. Very briefly, the Apgar score is a quick test that assesses the infants' general condition after birth based on observations in the first moments of life including heart rate, breathing, muscle tone, reflex response and colour of the skin.

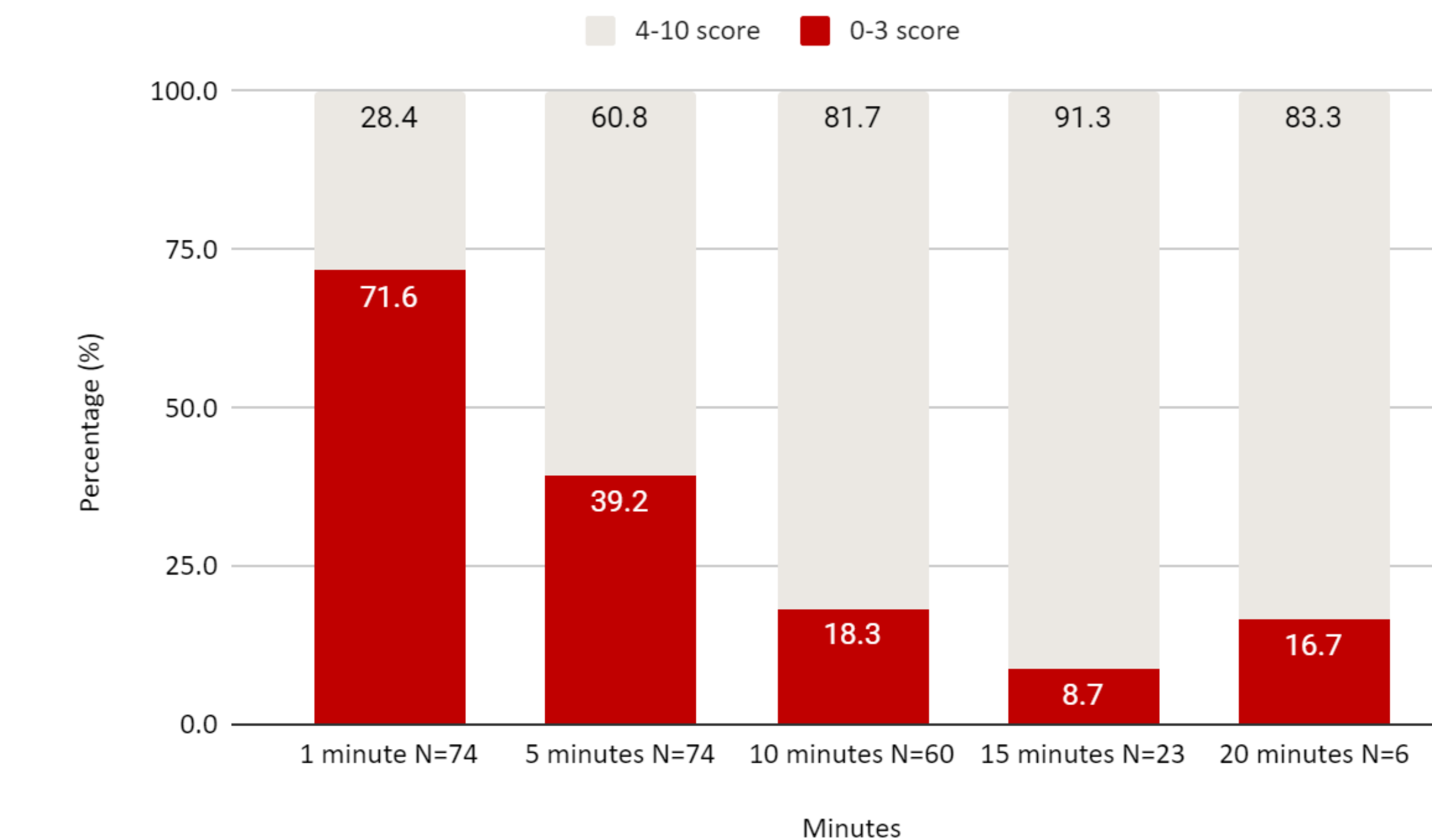


Figure 4: Apgar's Scores for TH infants in 2020

- In very easy terms, an Apgar score:
 - **From 7 to 10** means a newborn is in good to excellent health, usually only requiring routine post-delivery care.
 - **From 4 to 6** means a newborn is in fair condition and may require some resuscitation measures.
 - **From 3 to 0** means a newborn is in poor condition and needs immediate medical attention.
- When looking at our data, 72% of infants born requiring TH had an Apgar score of ≤ 3 at one minute of life in 2020. This score was reduced over the first 15 minutes.
- In fact, at 10 minutes after birth, there was a reduction of more than half of the infants having an Apgar score of 3 or less than 3 in the Apgar test.

- Of the 357 infants, 89% had a MRI completed during admission (n=317). However, less than half of the infants had a MRI report available in the charts (n=173 of 317, 54.6%).
- Of these MRI reports available, 62% of the infants had a normal result, and 38% had an abnormal result in the MRI reports.
- A good practice indicator is assessed when infants with NE had an MRI done by the 10th day of life in order to attain optimal images to inform diagnosis
- In 2020, 98% of infants who underwent TH treatment had their MRI scan done by day 10th of life (Figure 5).

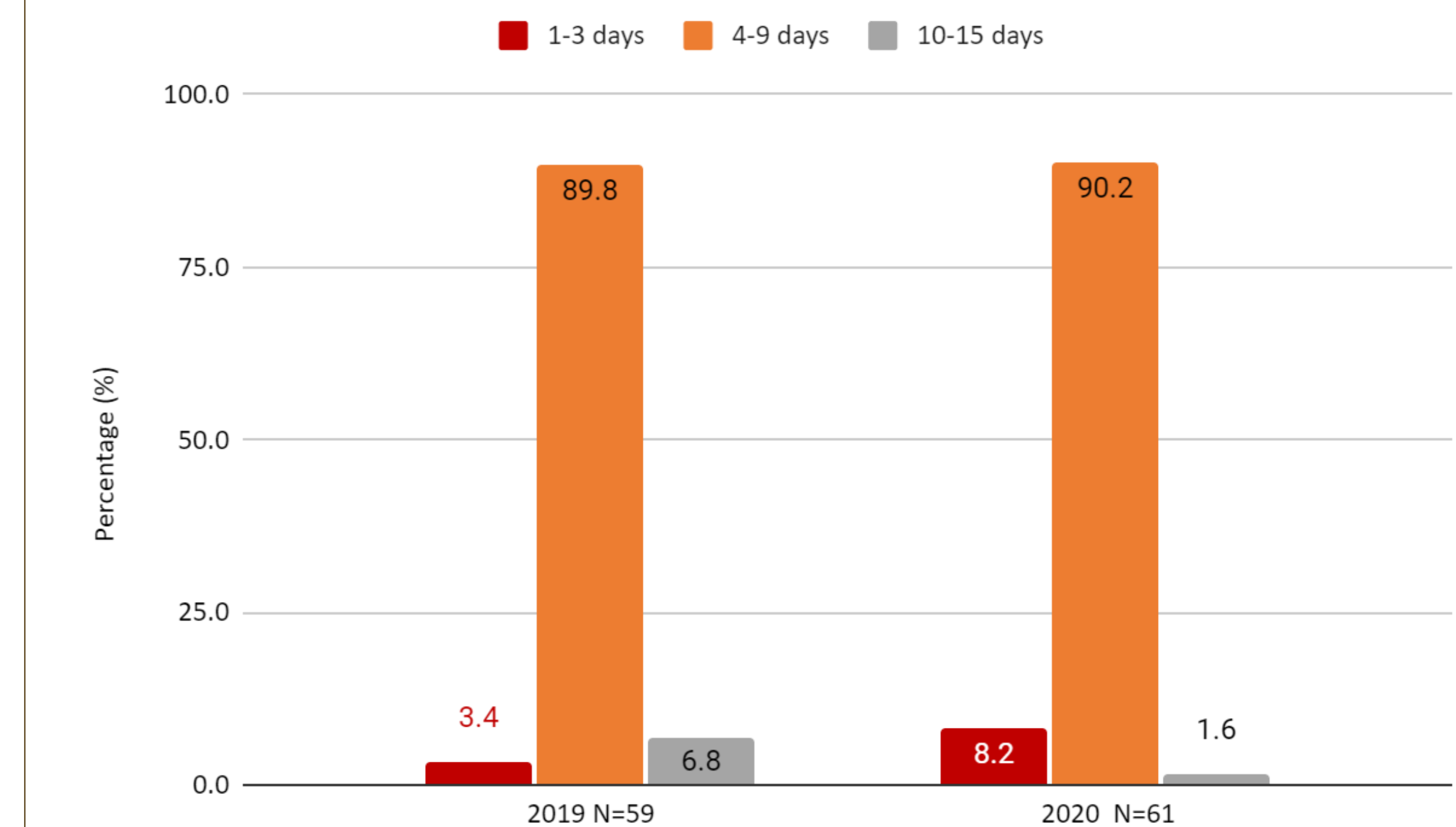


Figure 5: Day of life MRI undertaken in 2019-2020

Recommendations

1. Work is undertaken by the NWIHP to standardise the grade of encephalopathy on discharge through all the units.
2. All infants receiving TH require a daily Sarnat assessment during the three days of cooling

Next Steps

- Work is undertaken by the NWIHP to standardise the grade of encephalopathy on discharge through all the units.
- Good documentation is the platform for improvement in the assessment, categorisation, and management of infants with NE.
- This report serves as a platform to continue the national review process in order to attain valuable data which can influence clinical practice in a constructive way.