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Epidemiology of hypothermia among very preterm-born neonates in Switzerland and its association with outcome

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Background

- Hypothermia = core body **T < 36.5 °C**
- Preterm infants are more **susceptible** to temperature changes
- **Risk factors**: low birth weight, low GA, low APGAR score, low delivery room temperature, c-section, lack of thermal protection measures, as well as maternal hypothermia[1-4]
- Hypothermia increases the risk of **mortality and morbidities** (e.g., ROP, NEC, IVH, early onset sepsis, and BPD)[5]
- High prevalence among very preterm infants, **mean = 42%** (14-88%)[6]

1. Hogeveen et al. 2025
2. Miller et al 2011,
3. Braa et al. 2024
4. Sharma et al. 2022
5. Garcia-Munoz et al. 2014
6. Lyu et al. 2015

Aim and objective

This study aims to determine

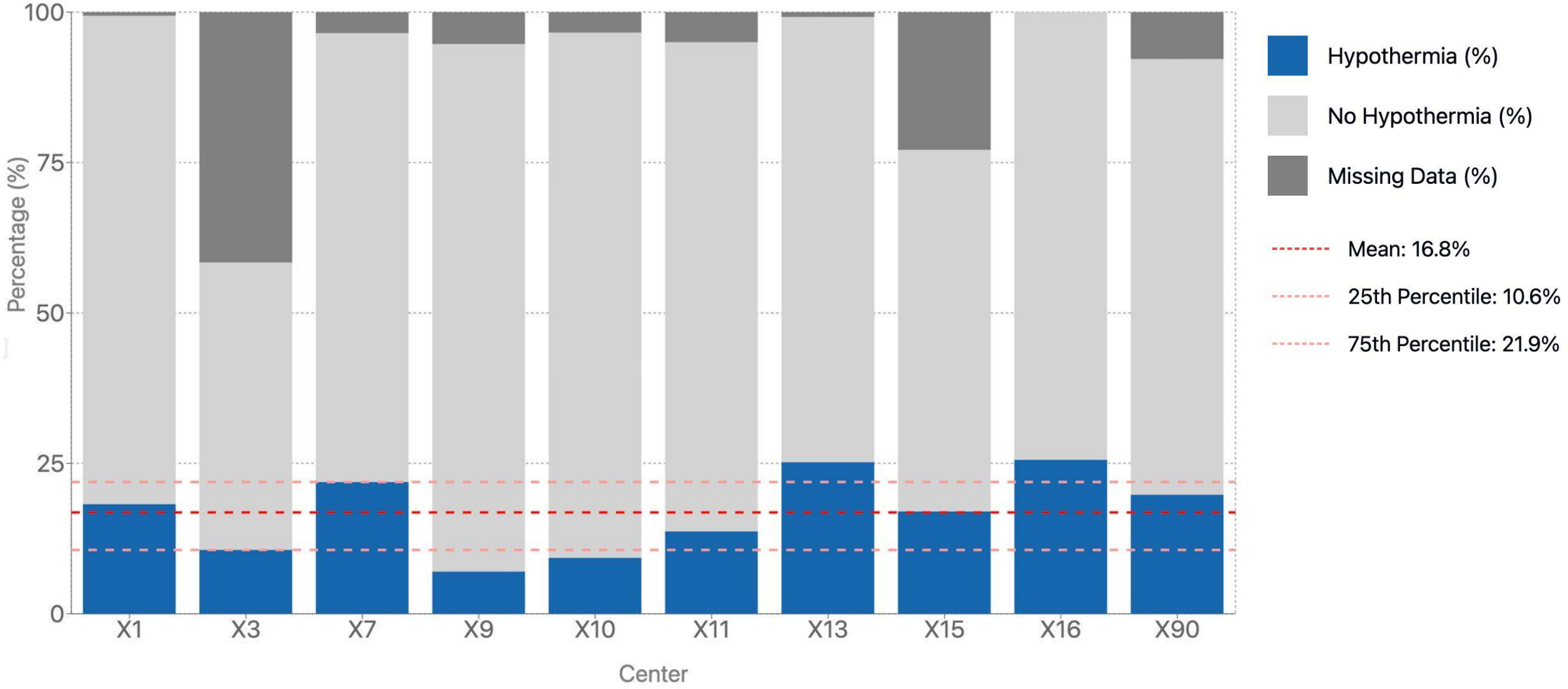
- the prevalence of hypothermia at admission to NICU among very preterm infants in Switzerland
- its association with any adverse outcome
- improvement potential in neonatal thermoregulation strategies

Materials and methods

Data collected from SwissNeoNet on infants born below 32 weeks gestation between 2017-2023 was analyzed using R

- N in study = 4455 after we excluded:
  - outborn infants admitted to the unit after day of life 3 (n=211)
  - infants with major malformation (n=213)
  - infants with missing temperature at admission (n=471)
- Univariable logistic regression
- Multivariable logistic regression
- 1:1 propensity score-matched analysis
- Kaplan-Meier Survival analysis

Results - Hypothermia by center



Results – Univariable Odds Ratios for Hypothermia Risk Factors

Risk Factor	OR	95% CI	p
Gestational age	0.85	(0.82–0.88)	<0.1
Birth weight z-score	0.68	(0.61–0.75)	<0.1
Multiple births	0.74	(0.61–0.89)	<0.1
Male Sex	0.79	(0.66–0.93)	<0.1
Outborn status	1.67	(1.17–2.37)	<0.1
Delivery room endotracheal intububation	1.8	(1.51–2.14)	<0.1
Full antenatal steroids	0.79	(0.66–0.95)	<0.1
Clinical chorioamnionitis (no histological)	0.92	(0.72–1.16)	>0.4
C-section	0.93	(0.74–1.15)	>0.4

Results – Multivariable Odds Ratio for Adverse Outcome

Outcome	OR	95% CI
Mortality	1.81	(1.32–2.5)
Severe IVH	1.18	(0.84–1.65)
NEC stage ≥2	1.12	(0.73–1.72)
Late onset sepsis	1.03	(0.76–1.39)
Supplemental oxygen at 36 weeks GA	1.33	(1.00–1.76)
Severe ROP	0.76	(0.45–1.28)

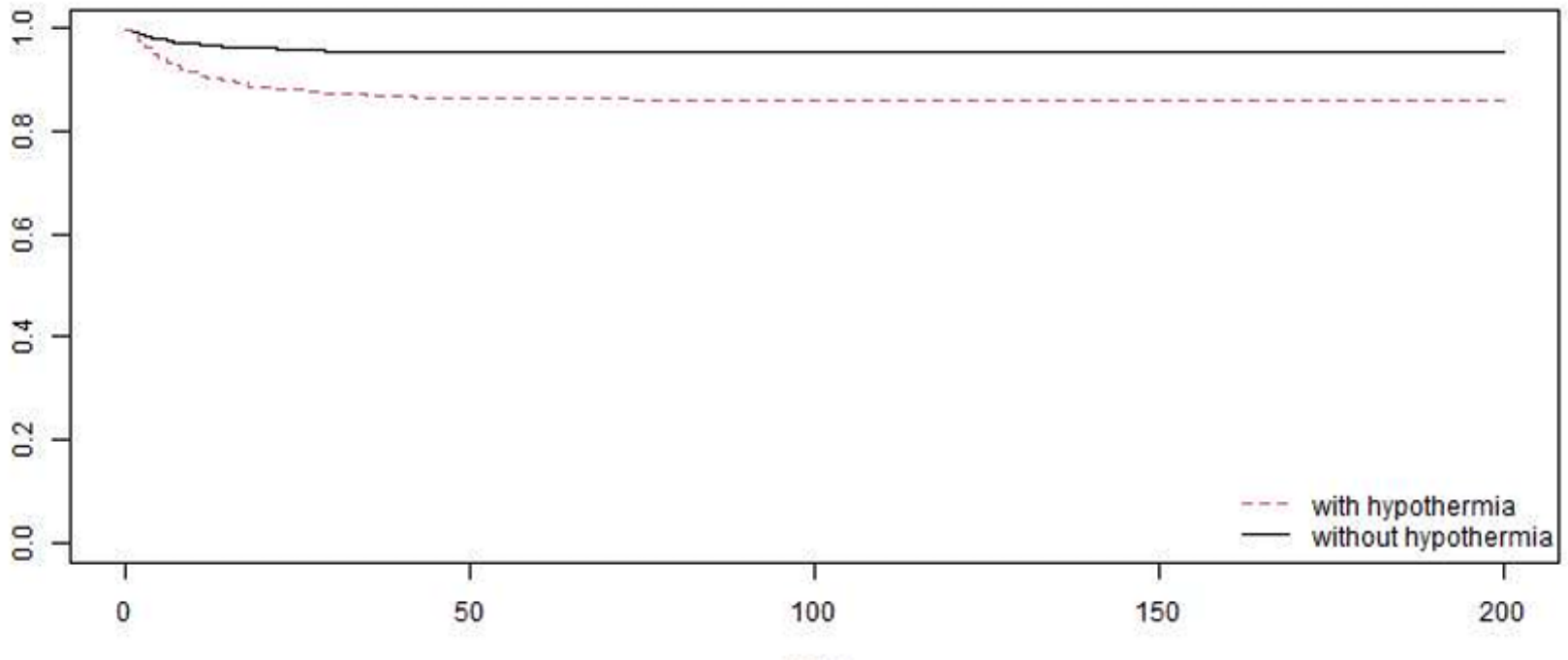
Significantly higher risk of death in hypothermic infants.

Results - Multivariable Odds Ratio after Propensity Score Matching

Outcome	OR	CI Low	CI Up
Mortality	1.52	1.09	2.12
Severe IVH	1.12	0.77	1.63
NEC stage ≥2	1.07	0.65	1.74
Late onset sepsis	1.11	0.8	1.55
Supplemental oxygen at 36 weeks GA	1.25	0.93	1.67
Severe ROP	0.8	0.47	1.37

Hypothermia is still significantly associated with mortality

Results - Kaplan Meier Survival Analysis



The gap between the curves is most prominent early on (first 30–50 days), suggesting hypothermia may particularly affect early neonatal survival

Conclusion

- Hypothermia at admission is common and significantly associated with increased mortality
- Targeted strategies to prevent hypothermia may improve neonatal outcomes particularly in units with higher incidence

Questions?

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