# Saving babies' blood; Reduction in frequency of blood sampling for laboratory investigations in NICU

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## Introduction

- Blood sampled for testing in critically unwell neonates can account for up to 58% of their total blood volume.
- ELBW infants (<1000g birth weight) at high risk of necrotising enterocolitis (NEC), bronchopulmonary dysplasia (BPD): both associated with significant morbidity and mortality, and evidence suggests that anaemia can contribute to this.
- We treat neonatal anaemia with transfusions of adult red cell concentrate, some studies have suggested that transfusion in extremely preterm neonates can be associated with BPD, retinopathy of prematurity and adverse neurodevelopmental outcomes.

## Aim

Quantify frequency of blood sampling for lab analysis in ELBW infants in 2010 and 2020 and identify any changes

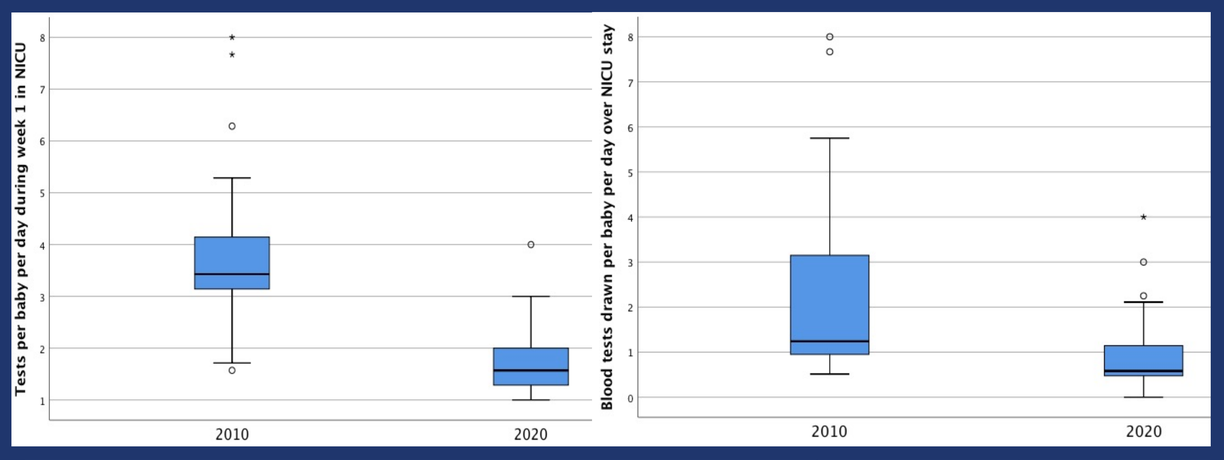
## Methods

- This study was undertaken in the NICU in NMH: this is a level 3 urban referral NICU
- Retrospective review of 25 smallest babies admitted to NICU in both 2010 and 2020.
- Cases identified using hospital information system.
- Lab data collected using the lab information system.
- Transfusion data retrieved from hospital transfusion records.
- Basic demographics (birthweight and gestational age at birth) were collected in order to compare groups.
- Statistical analysis was performed in SPSS Statistics 20 (IBM Corporation, Illinois)

## Results

| | | 2010 | 2020 | |
|---|---|---|---|---|
| Gestation at birth | Median | 27w4d | 25w2d | P = .005 |
| | Range | 24w-32w1d | 23w2d-29w2d | |
| Birth weight | Median | 740g | 615g | P <.001 |
| | Range | 565g-840g | 460g-745g | |
| Length of stay (days) | Median | 61 | 41 | P=.168 |
| | Range | 2-168 | 1-104 | |

## Results




| | 2010 | 2020 |
|---|---|---|
| Blood test volume per baby per day in first NICU week | 1.029ml | 0.471ml |
| Median total volume in week 1 in NICU | 7.2ml | 3.3ml |
| Blood test volume per baby per day in NICU stay | 0.36ml | 0.183ml |
| Total blood test volume per baby using median LOS | 21.96ml | 7.5ml |

## Discussion

- Difference in volumes sampled most pronounced in first week of life: time when HbF may be most vital.
- No statistical difference in number of transfusions in study period: study may have been too small
- Did not assess number blood gas analyses, did not account for any reduction in sample volumes due to improvements in laboratory technology
- Potential: potential to improve safety and cost of neonatal care
- Phlebotomy: painful procedure with a risk of infection from breaking fragile skin barrier.

| Estimated blood volume 70ml/kg | 2010 | 2020 |
|---|---|---|
| Median birth weight | 740g | 615g |
| Median baby blood volume | 51.8ml | 43.1ml |
| Volume sampled | 21.96ml | 7.5ml |
| Proportion of birth blood volume sampled | 42.4% | 17.4% |

## Conclusion

- Clinically and statistically significant reduction in frequency of phlebotomy in ELBW infants in our NICU between 2010 and 2020
- Reduced the total blood volume drawn over the median NICU length of stay from **42%** of median birth blood volume in 2010 to **17.4%** of median birth blood volume in 2020.