# Growth trajectory of preterm babies born with growth restriction in the Neonatal Intensive Care Unit

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## BACKGROUND

Small for gestational age (SGA) is the single biggest risk factor for stillbirth and is associated with fetal distress during parturition, neonatal hypoglycemia, low Apgar scores and perinatal mortality (1). It is defined by an estimated or actual birth weight less than the 10th centile, and is a surrogate marker for fetal growth restriction. SGA is very common, and often results from utero-placental insufficiency. As there is no medical treatment, delivery at preterm gestations is often required to reduce the risk of stillbirth.

The vast majority of SGA infants (82.5%) experience catch up growth by 2 years of age (2). While growth velocity plateaus after 12-24 months of age, infants born SGA have been found to have increased abdominal fat and increased insulin resistance biomarkers throughout childhood (3).

Whether catch up growth begins from birth in the Neonatal Intensive Care Unit (NICU) and Special Care Nursery (SCN) is not known. We were interested to compare the growth trajectory of babies born preterm with SGA compared to those born at preterm gestations with appropriate weight.
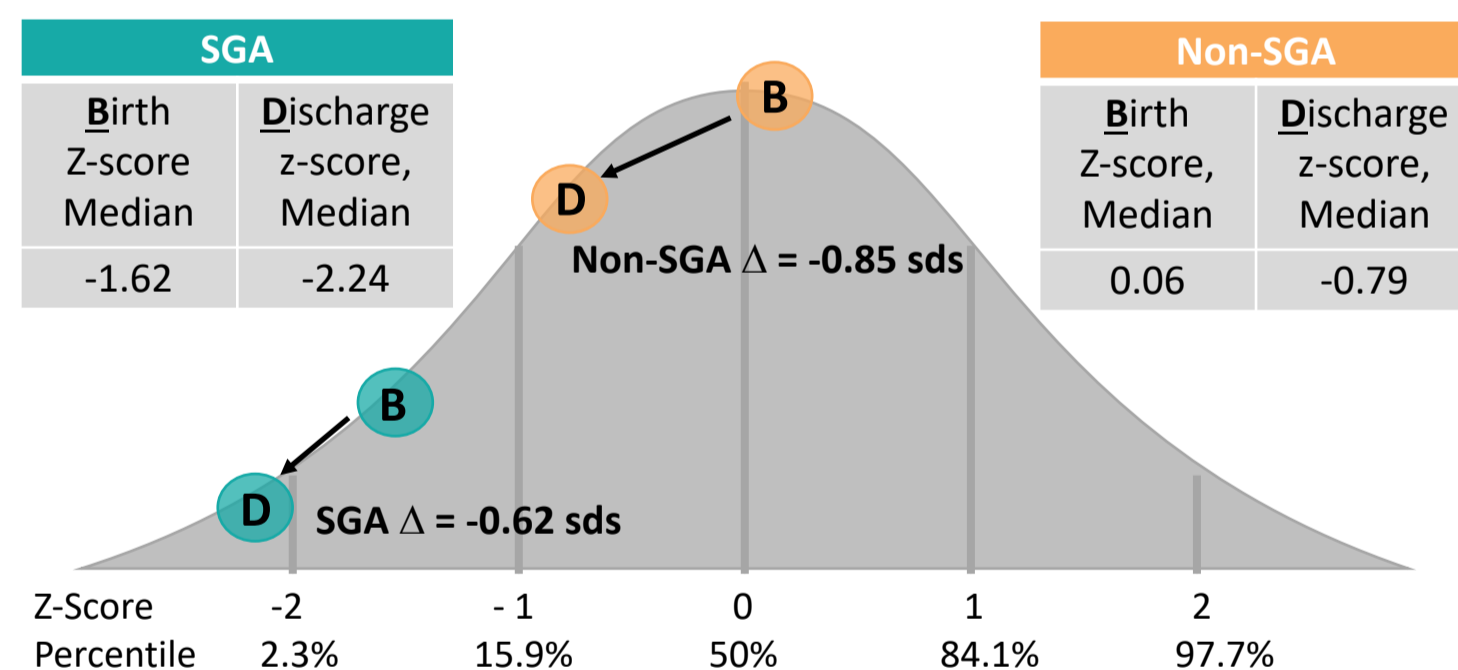
## METHODS

**Figure 1 – Patient Recruitment Flow Diagram**
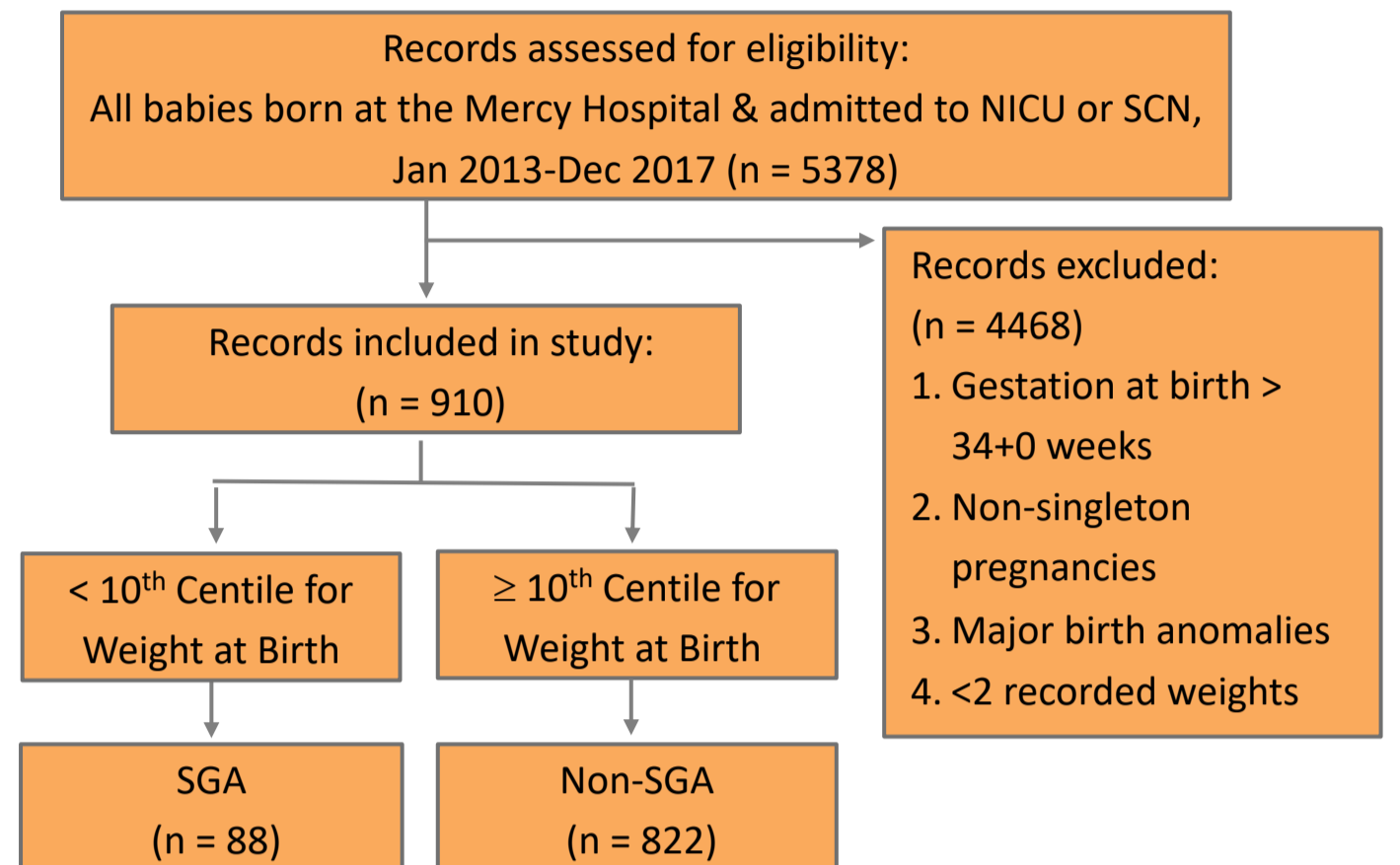


Birth weight, as well as serial weights obtained while in the NICU or SCN, were recorded. Weight centiles and weight z-scores (WAZ) were calculated using the 2013 Fenton Growth Charts (3), which are sex-specific and based on actual-age.

## RESULTS

**Figure 2 – Change in weight z-score (z-score) across admission, normal distribution for neonatal weights:**



| SGA | |
| --- | --- |
| **B**irth Z-score Median | **D**ischarge z-score, Median |
| -1.62 | -2.24 |

Non-SGA Δ = -0.85 sds

| Non-SGA | |
| --- | --- |
| **B**irth Z-score, Median | **D**ischarge z-score, Median |
| 0.06 | -0.79 |

SGA Δ = -0.62 sds

| Z-Score | -2 | -1 | 0 | 1 | 2 |
| --- | --- | --- | --- | --- | --- |
| Percentile | 2.3% | 15.9% | 50% | 84.1% | 97.7% |

**Table 1 – Change in WAZ across admission**

| | SGA | Non-SGA | Odds Ratio | *p*-value |
| --- | --- | --- | --- | --- |
| Change in WAZ from birth to discharge, Median (IQR) | -0.62 (-0.89, -0.26) | -0.85 (-1.21, -0.50) | | **<0.0001** |
| Change in WAZ from birth to discharge > 0, n (%) | 17 (19.3%) | 46 (5.6%) | 4.04 (2.23-7.48) | **<0.0001** |

**Table 2 – Neonatal Morbidity & Mortality in the NICU & SCN:**

| | SGA | Non-SGA | *p*-value |
| --- | --- | --- | --- |
| Length of stay in NICU/SCN, days, Median (IQR) | 37 (22.3, 81.7) | 28 (14, 53) | **0.0003** |
| Neonatal mortality (prior to discharge), % (n) | 1.1% (1) | 2.6% (21) | **<0.0001** |
| Neonatal morbidity, % (n) | | | |
| - Respiratory Distress Syndrome (RDS) | 67.1% (59) | 71.4% (587) | 0.39 |
| - Necrotizing Enterocolitis (NEC) | 10.2% (9) | 4.4% (36) | **0.032** |
| - Interventricular Haemorrhage (IVH) | 0% (0) | 12.3% (101) | **<0.0001** |

## CONCLUSION

Both SGA and non-SGA babies experience a reduction in their weight percentile across their NICU/SCN admission. Babies born SGA experience a smaller reduction than their non-SGA counterparts. They are also four times more likely to increase their weight-for-age z-score across their admission.

This is important information that can be used to counsel parents of SGA babies during the perinatal period.

## REFERENCES

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