Customised and non-customised birthweight centiles and prediction of stillbirth and infant mortality and morbidity: a population based cohort study of 979,912 term deliveries.

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Declaration of interests – none
No consensus on defining SGA and LGA at term.

**SGA**
- <10\(^{th}\) centile
- <2,500 g
- <3\(^{rd}\) centile
- < 2SD

**LGA**
- >90\(^{th}\) centile
- > 4,000 g
- >95\(^{th}\) centile
- > 2SD

Current thresholds have not been tested against “hard” outcomes.

Customised centiles are adopted without being tested against “hard” outcomes.

Papageorghiou At et al. *Lancet* 2014
Sovio U et al. *Lancet* 2015
Koyanagi A et al. *Lancet* 2013
Gardosi J et al. *BMJ open* 2013
• Are the current birthweight thresholds adequately associated with mortality and morbidity?

• Are customised birthweight centiles better in predicting mortality and morbidity than non customised?
We assessed 979,912 term deliveries over 19 years from population data

Linked deliveries in Scotland from 1992-2010 (n=1,062,390)

Records Excluded (some with multiple exclusions, n= 82,478, 7.76%)
- Multiple pregnancies (n= 15,426, 1.45%)
- Gestational age <37 or >43 weeks (n= 73,799, 6.95%)
- Maternal age < 10 years (n= 7, <0.001%)
- Missing birthweight or birthweight < 500 g or > 8000 g (n= 1,223, 0.12%)
- Deaths due to congenital anomaly or isoimmunisation (n= 2,189, 0.21%)

Singleton term pregnancies (n= 979,912)

Outcomes
- Infant deaths (n= 1,093, 0.11%)
- Stillborn (n= 1,672, 0.17%)
- Total mortality (stillborn and infant) (n= 2765, 0.28%)
- Apgar score < 7 at 5 mins (n= 12,044, 1.23%) (n= 9,713, 0.99% missing values)
- Admission to Neonatal Unit (n= 62,217, 6.35%) (n= 11,385, 1.16% missing values)
The risk of adverse outcomes increased with birthweight $\leq 25^{\text{th}}$ centile and $\geq 85^{\text{th}}$ centile

Non customised
The risk of adverse outcomes increased with birthweight $\leq 25^{\text{th}}$ centile and $\geq 85^{\text{th}}$ centile.
Similar associations for potentially preventable deaths

Non-customised

Customised

Similar associations when stratified by parity or year of delivery
In diabetic pregnancies: the larger the birthweight the greater the risk

Non customised

Customised
Customisation did not improve the performance of birthweight centiles.

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<th>Model</th>
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<th>P value</th>
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NRI (95% CI) = -0.027 (-0.039, -0.016), p<0.001
Conclusions

- Birthweight ≤25th or ≥85th centile (both customised and non-customised) are associated with greater risk of adverse outcomes compared with the frequently used 10th and 90th centiles.

- Partially-customised centiles did not identify more fetuses at risk of death compared with non-customised centiles.

- Replication of our finding with fully customised centiles and long term offspring outcomes is warranted.
Thank you

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