

# Standardising assessment of birthweight in the UK

Jason Gardosi - May 2019



The professions involved in perinatal care use different standards to assess birthweight, and this can lead to misdiagnosis and confusion for clinicians and parents.

Neonatologists tend to use the traditional WHO charts adapted to a UK 1990 reference standard, i.e. soon 30 year old, which is also used in the national 'Red Book' for measurement of the infant [1,2].

A version specifying the 2<sup>nd</sup> centile was used in the more recent BAPM Framework document on hypoglycaemia at term [3] - although the quoted reference in the document (No. 4) refers to another BAPM Framework document (NEWTT) [4], in which the origin of this term birthweight standard is only listed in reference No. 28 as: '*Cole, T. 2014. Personal Communication*'.

We also hear in our regular GAP training workshops that 2.5kg is still used in many neonatal units as the level below which further investigation for hypoglycaemia is considered to be indicated. Less surprisingly, many public health reports also still use a 2.5kg cut off to designate a 'small baby'.

On the obstetric and midwifery side, the concept of weight-for-gestation is well entrenched, together with the awareness that pregnancies need to be well dated for a reliable population based standard [5]. However the applicability of a single standard in the NHS's heterogeneous, multi-ethnic maternity population has been long questioned in the general [5, 6] and obstetric [7] as well as neonatal [8] literature, and a customised standard (GROW - Gestation Related Optimal Weight) for fetal as well as birthweight has been developed which is adjusted according to maternal characteristics including height, weight, parity and ethnic origin [6,7]. GROW is recommended by RCOG guidelines [9] and is now in place or about to be implemented in 83% of all NHS maternity units in the UK [10]. It is a central part of the Growth Assessment Protocol (GAP) which has improved antenatal recognition of babies at risk of FGR and which in turn is responsible for the recent year-on-year reduction in stillbirth rates to their lowest ever levels [11,12]. The customised GROW standard is also used in many research projects as well as reports (e.g. National Pregnancy in Diabetes Audit) and is used as the standard in the currently running, NIHR/HTA funded Big Baby Trial of shoulder dystocia in macrosomic pregnancies.

After delivery, the GROW software derives a customised birthweight centile adjusted for the same maternal characteristics as well as newborn sex. This information is important for immediate postnatal management as well as subsequent pregnancies, as a history of a small for gestational age (SGA) baby is a significant risk factor for SGA or stillbirth in future pregnancies. SGA is also a risk factor for the immediate neonatal period, e.g. for hypoglycaemia, but most neonatologists still use the UK-WHO standard for this assessment. Thus, many mothers and midwives are left with conflicting assessments of their baby's weight which - not surprisingly - leads to confusion and concern.

Comparisons between customised GROW and various uncustomised, population based standards including the more recently introduced Intergrowth 21<sup>st</sup> [13] have shown consistently that SGA based on customised assessment is better associated with perinatal mortality and morbidity, reduces false positives, and identifies a significant number of additional pregnancies or babies at risk [14-19].

Direct comparison with WHO-UK90 has demonstrated that the customised GROW standard identifies a third more cases that are at risk of perinatal mortality [20]. Standardised case reviews of perinatal deaths has furthermore shown that a number of infants with unexplained death in infancy (SIDS) were missed i.e. not recognised as at-risk due to being SGA at birth by the WHO UK90 standard, while SGA

would have been identified by the GROW standard [21]. A direct comparison of standards for screening for hypoglycaemia, presented at BAPM 2017, showed that customised GROW centiles using any cut-off were able to detect more term infants at risk of admission than the conventionally used UK-WHO centiles [22].

Whereas the GROW 10<sup>th</sup> centile is usually used for antenatal / prospective assessment, for newborn screening a 3<sup>rd</sup> centile cut-off may be used, balancing sensitivity of detection with neonatal workload. A group in Liverpool compared GROW and WHO-UK90, and recommended the use of the 3<sup>rd</sup> GROW centile in the assessment of SGA as hypoglycaemia risk [23].

**In conclusion**, accurate assessment of birthweight has important implications for the parents and all professions providing maternity and perinatal care. Birthweight assessment should be standardised along the evidence based, more precise method already adopted in most maternity units in the UK.

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NB the last 4 references (20-23) are peer reviewed abstracts and reproduced in Appendices 1-4.









PP.62

**GROW instead of WHO birthweight charts for neonatal small-for-gestational-age hypoglycaemia management**

**Holdsworth, R<sup>1</sup>; Rigby, J<sup>2</sup>; Fitzpatrick, C<sup>2</sup>; Dewhurst, C<sup>2</sup>; Yoxall, W<sup>2</sup>; Agarwal, U<sup>2</sup>; Roberts, D<sup>2</sup>; Alfirevic, Z<sup>3</sup>**

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**Introduction** The customised growth chart is gaining impetus as a method for detecting prenatal small-for-gestational-age (SGA) nationally. GROW overestimates SGA when the 10th centile is used as a limit. However, it also identifies a third more cases at significantly increased risk of low Apgar scores and perinatal mortality. Neonatologists have expressed concern that using GROW centiles for neonates will result in more babies requiring SGA hypoglycaemia management because of this overestimation. Currently World Health Organization (WHO) standard charts are used for screening in most Neonatal Units. We set out to determine the potential impact of using GROW for neonatal birthweight on our Neonatology workload.

## Appendix 4

**Methods** A total of 659 GROW birthweight centiles were prospectively compared with the standard UK-WHO charts.

**Results** Admission to neonatal intensive care unit for hypoglycaemia management-only one infant in the overall cohort by GROW. Less than 10th centile by GROW-1/105; less than 10th centile by WHO-0/65; less than third centile by GROW-1/27; and less than third centile by WHO-0/21. Use of GROW resulted in a tiny increase in the number of neonates requiring screening (1%) but had increased sensitivity for identifying the neonates requiring management for hypoglycaemia.

**Recommendation** Our recommendations are (i) that less than third centile GROW is used for neonatal SGA hypoglycaemia screening and (ii) that units that are already using GROW for antenatal SGA detection can swap over to GROW for neonates without a significant impact on neonatal admissions. We have already done this at the Liverpool Women's NHS Foundation Trust.