Screen positive rates of INTERGROWTH 21st vs GROW fundal height charts in the NHS: retrospective cohort study

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INTERGROWTH vs GROW fundal height charts

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Serial assessment of fundal height is an important screening tool in low risk pregnancies, for the identification of fetuses requiring referral for size and growth assessment by ultrasound biometry and Doppler. As a clinical tool, standardised fundal height (SFH) measurement requires training and a chart suitable for the local population[1]. NHS England recently issued a directive[2] against use of the INTERGROWTH 21st estimated fetal weight charts because of their low antenatal screen positive rate for small-for-gestational age (SGA)[3]. We wanted to investigate whether the INTERGROWTH-21 (IG21) standard for symphysis-fundal height[4], which is based on the same 8-country cohort as their fetal weight standard, has an appropriate screen positive rate when applied to pregnancies in the National Health Service (NHS).

We studied 90,601 consecutive low risk pregnancies from 43 NHS Trusts between 2023 and 2025 that had 3 or more routinely recorded third trimester SFH measurements. The IG21 SFH standard [4] and the GROW SFH standard [5] were applied to compare SGA (<10th centile) screen positive rates as well as calculation of sensitivity (detection rate) of neonatal SGA. Proportions and means were compared and p values calculated using two-proportions Z test and two-sample t-test respectively.

The Table compares the pregnancy characteristics of our NHS based study cohort with the cohort on which the IG21 standard is based[4]. Mothers in the NHS were taller, heavier with higher BMI, had higher parity, and had babies with higher term birthweight. The NHS cohort had an average of 4.6 third-trimester fundal height measurements per pregnancy, with a median of 33+6 weeks (IQR 29+3 to 36+3). The rate of SGA by GROW and IG21 was 8.7% and 5.0% respectively, which represented a 42% lower screen positive rate according to IG21.

In total 6727 (7.4%) neonates in this low risk population receiving serial fundal height measurements were born SGA, and this would have been flagged antenatally by one or more SFH measurements in 1732 (25.7%) pregnancies according to both GROW and IG21 SFH standards. An additional 84 (1.2%) of pregnancies with an SGA neonate would have been identified by the IG21 SFH standard and not by GROW, resulting in an overall IG21 detection rate of 27.0%. However a further 822 (12.2%) pregnancies were SGA by GROW only, resulting in an overall detection rate of 38.0% by GROW and indicating that IG21 would have missed 822 of 2554 (32.2%) of SGA neonates.

In conclusion, the INTERGROWTH SFH standard [4] is derived from pregnancies of smaller mothers and lower term birthweights than in the average NHS population, which is the probable reason for its 42% lower SGA screen-positive rate. As a result, antenatal identification of SGA birthweight and risk of fetal growth restriction is likely to be missed in about a third of pregnancies monitored with IG21 SFH charts in the NHS.

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Conceptualisation: JG, OH. Data analysis and verification: OH. Initial draft: JG.
All authors had access to the data and reviewed, edited and approved the final draft.

Declaration of interest:
All authors are employees of the Perinatal Institute, a not-for-profit social enterprise that has developed and licenses the GROW fetal growth chart referred to in this article.

Ethics Approval

The Perinatal Institute conducts retrospective cohort studies relating to fetal growth, based on fully anonymised data derived from routine recording of the standard GROW maternity dataset. Research using this database (IRAS Project ID 365709) has been approved by Research Ethics Committee (REC reference 25/EM/0271).

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TABLE Comparison of characteristics of study cohort and INTERGROWTH SFH cohort[3]

		Current Cohort	Intergrowth[4]	p value
Pregnancies		90,601	4239	
Maternal age (years)	Mean (SD)	29.9 (4.9)	28.4 (3.9)	<0.01
Maternal height (cm)	Mean (SD)	164.2 (6.7)	162.2 (5.8)	<0.01
Maternal weight (kg)	Mean (SD)	68.2 (12.0)	61.3 (9.1)	<0.01
Body mass index	Mean (SD)	25.3 (4.0)	23.3 (3.0)	<0.01
Ethnicity British	n (%)	57572 (63.5)	606 (14.3)*	<0.01
Nulliparous	n (%)	50855 (56.1)	2907 (68.6)	<0.01
Male infant	n (%)	46068 (50.9)	2106 (49.7)	p=0.14
Term LBW <2500g (≥37 weeks)	n (%)	1106 (1.2)	127 (3.0)	<0.01
Preterm birth (<37+0 weeks)	n (%)	1891 (2.1)	192 (4.5)	<0.01
Birthweight ≥37 weeks (g)	Mean (SD)	3468 (440)	3267 (444)	<0.01

*LBW = low birthweight *Based on ethnicity rate in Villar et al.* https://doi.org/10.1016/S0140-6736(14)60932-6