

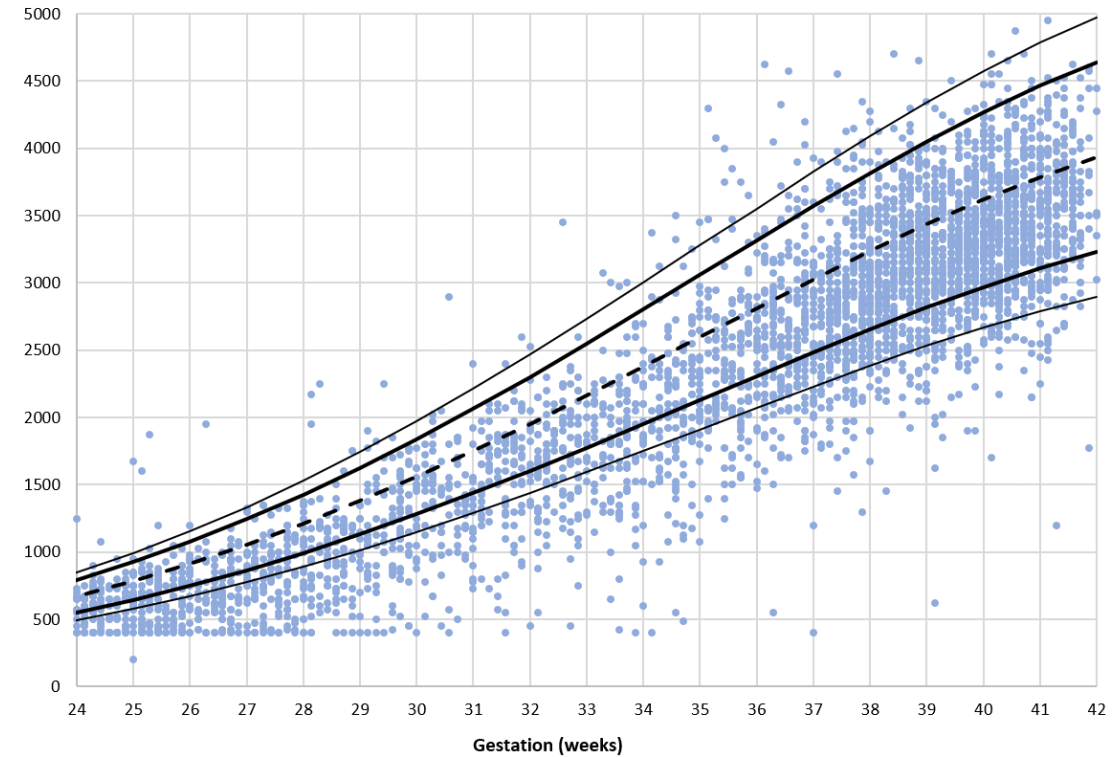


Sonography and Patient Safety:

The role of evidence-based standards for fetal growth assessment.

Presented by : Jason Gardosi

Birthweight (g)



Prof Jason Gardosi MBE



Professor of Maternal and Perinatal Health, Warwick University

Executive Director, Perinatal Institute

MD FRCSED FRCOG

Disclaimer

This presentation is based on research conducted to the best of the presenter's abilities, acknowledging inherent uncertainties and limitations. The findings may be influenced by factors such as data quality, methodology, and interpretation, and do not guarantee real-world accuracy.

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Declaration of interest

The Perinatal Institute is a not-for-profit social enterprise which provides GROW charts and the GAP programme discussed in this presentation



perinatal.org.uk

RESEARCH ARTICLE

Stillbirth rates, service outcomes and costs of implementing NHS England's Saving Babies' Lives care bundle in maternity units in England: A cohort study

Kate Widdows¹, Stephen A. Roberts², Elizabeth M. Camacho ³, Alexander E. P. Heazell ^{1,4*}

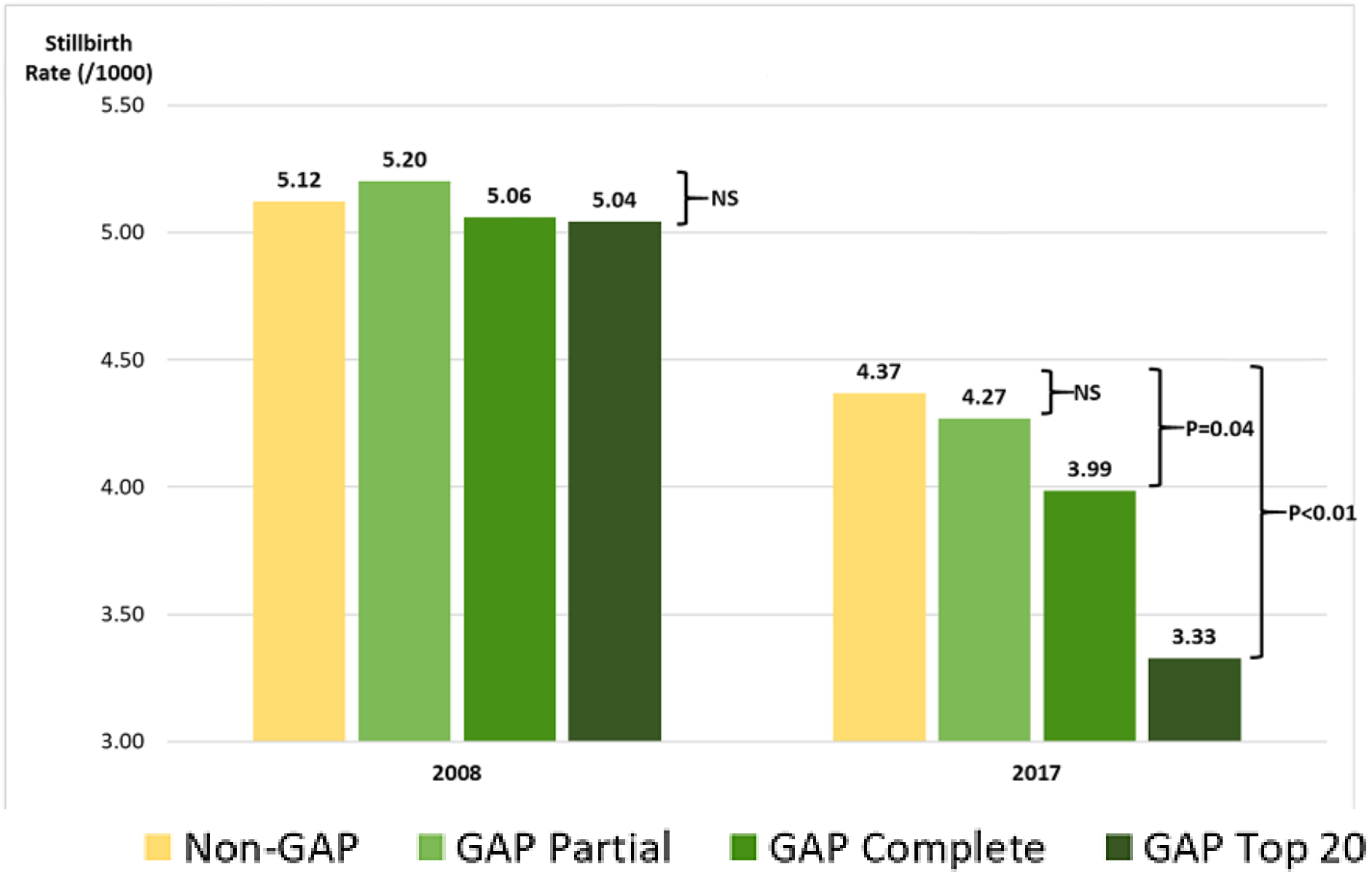
Original Paper |  Open Access |    

Reduction of stillbirths in England from 2008 to 2017 according to uptake of the Growth Assessment Protocol: 10-year population-based cohort study

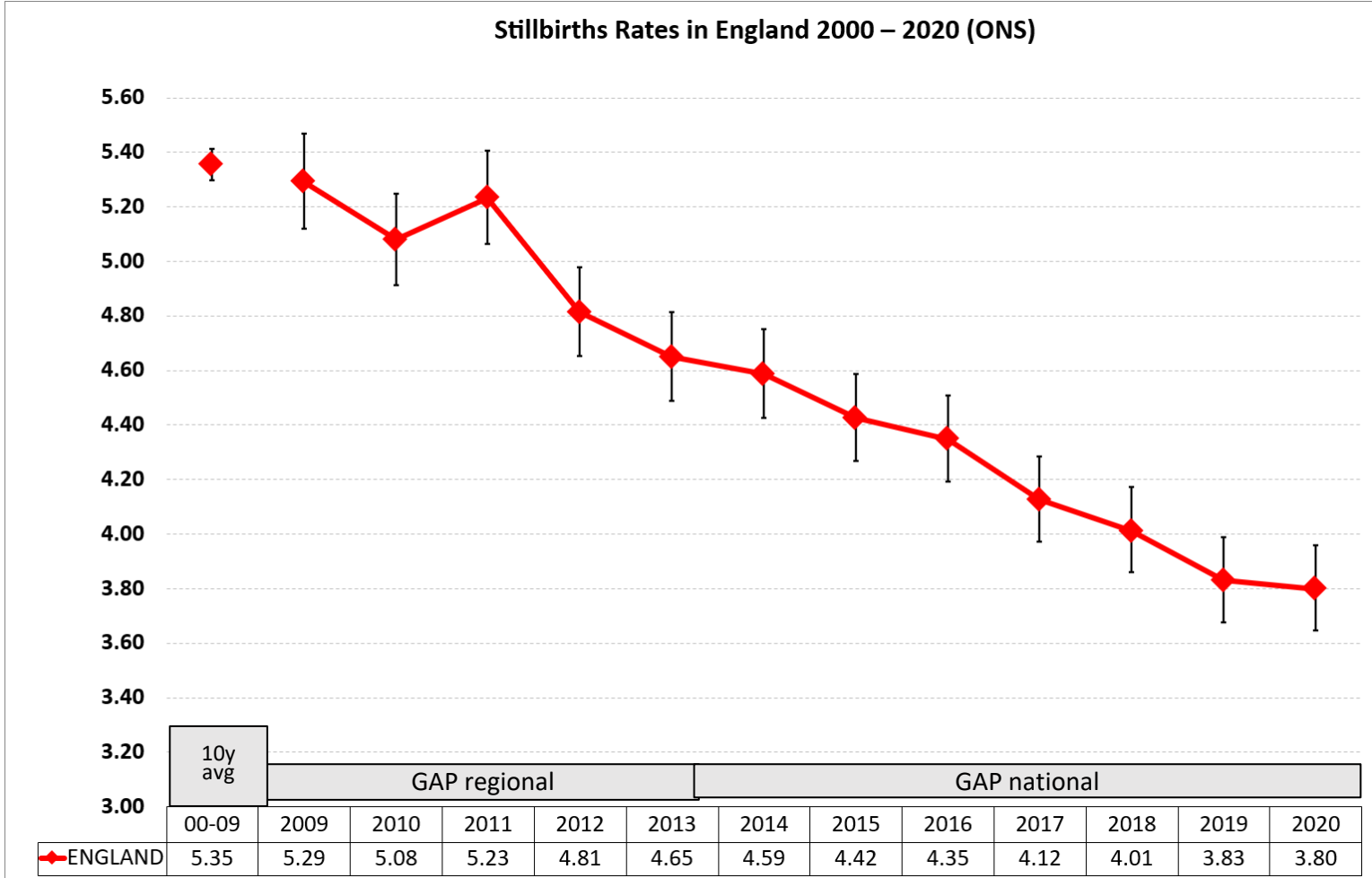
O. Hugh, M. Williams, S. Turner, J. Gardosi 

First published: 27 August 2020 | <https://doi.org/10.1002/uog.22187> | Citations: 4

This research won the ONS Research Excellence Awards 2020 - People's Choice Award, voted on by members of the research community, Office for National Statistics, partner organisations and members of the public.



Stillbirths in England 2000-2020 (ONS)



According to ONS data, stillbirth rates in England have fallen consistently for 9 years to 3.80 /1000.

This represents a 28.4% reduction from the 2000-09 average of 5.35/1000, and equates to 1,005 babies saved per year

Flattening in 2020 ? due to Covid



Royal College of
Obstetricians and
Gynaecologists

Setting standards to improve women's health

Guideline No. 31

November 2002

THE INVESTIGATION AND MANAGEMENT OF THE SMALL-FOR-GESTATIONAL-AGE FETUS

B_D Use of a customised fundal height chart improves accuracy to predict an SGA fetus.

B_D Use customised ultrasound charts.³⁷

Customised birthweight or ultrasound EFW charts that are adjusted for important independent physiological variables, such as maternal weight, maternal height, ethnic group and parity, have better sensitivities for identifying SGA fetuses^{48,49} and identifying morphometric evidence of FGR,⁵⁰ have lower false-positive rates⁵¹ and are predictive of poor perinatal events.^{47,52,53}



Royal College of
Obstetricians &
Gynaecologists

The Investigation and Management of the Small-for-Gestational-Age Fetus

Green-top Guideline No. 31

2nd Edition | February 2013 | Minor revisions – January 2014

SFH should be plotted on a customised chart rather than a population-based chart as this may improve prediction of a SGA neonate.



Use of a customised fetal weight reference may improve prediction of a SGA neonate and adverse perinatal outcome. In women having serial assessment of fetal size, use of a customised fetal weight reference may improve the prediction of normal perinatal outcome.



DOI: 10.1111/1471-0528.17814

RCOG GREEN-TOP GUIDELINES

BJOG An International Journal of
Obstetrics and Gynaecology

Investigation and Care of a Small-for-Gestational-Age Fetus and a Growth Restricted Fetus (Green-top Guideline No. 31)

First published: 13 May 2024 | <https://doi.org/10.1111/1471-0528.17814> | Citations: 11

Which fetal growth charts should be used?

Integral to the assessment of fetal size, determined by EFW, is being able to interpret the measurement relative to a given expected growth standard using a fetal growth chart with reference curves. There are several types of charts available with reference ranges being either descriptive (how a population has grown at a particular time) or prescriptive (how a population should grow). Another important distinction is between universal and customised charts. Prescriptive charts assume that under optimal conditions all fetuses will have the same growth potential and the only difference observed in growth across populations will be due to environmental factors, examples are World Health Organization (WHO) fetal charts (with country specific charts)²¹⁴ and Intergrowth 21st (universal charts).¹⁸² Customised charts have been proposed as an alternative to universal charts and are based on the premise that fetal growth varies across countries and ethnicities and that adjustment should occur at a population level for these factors, e.g. National Institute of Child Health and Human Development (NICHD) charts with separate charts for white, Black, Hispanic and Asian women.²¹⁵ Another approach, often also called customisation is to adjust for other variables (e.g. maternal height, weight, parity and fetal sex as well as ethnicity) at an individual level, e.g. GROW.²¹⁵⁻²¹⁷ The GROW software can incorporate ethnicity, height, weight, parity +/- fetal sex to calculate the predicted optimal weight at 40 weeks for each individual fetus.²¹⁸⁻²¹⁹ The customised growth curve is then determined retrospectively, based on a proportionality growth function derived from the ultrasound based Hadlock standard.²²⁰ However, there are concerns that these are factors at an individual level that are associated with pathological fetal growth and thus customisation at an individual level risks normalising pathology. It should be noted that the GROW software allows selection of variables that are used in the adjustment, and when all variables are removed the charts default to a population standard. This is retrospectively derived from a database of 2.7 million pregnancies characterised as low risk in a UK population.²¹⁸



across populations will be due to environmental factors, examples are World Health Organization (WHO) fetal charts (with country specific charts)²¹⁴ and Intergrowth 21st (universal charts).¹⁸² Customised charts have been proposed as an alternative to universal charts and are based on the premise that fetal growth varies across countries and ethnicities and that adjustment should occur at a population level for these factors, e.g. National Institute of Child Health and Human Development (NICHD) charts with separate charts for white, Black, Hispanic and Asian women.²¹⁵ Another approach, often also called customisation is to adjust for other variables (e.g. maternal height, weight, parity and fetal sex as well as ethnicity) at an individual level, e.g. GROW.²¹⁵⁻²¹⁷ The GROW software can incorporate ethnicity, height, weight, parity +/- fetal sex to calculate the predicted optimal weight at 40 weeks for

Investigation and Care of a Small-for-Gestational-Age Fetus and a Growth Restricted Fetus (Green-top Guideline No. 31)

First published: 13 May 2024 | <https://doi.org/10.1111/1471-0528.17814> | Citations: 11

Maternity providers may wish to evaluate the impact of different reference charts in their local population to ensure that the reference chart is appropriate or how it should be adjusted using local data sets.

- Universal reference charts may need to be adjusted to local or regional populations, either for population characteristics, or the centile that is used to determine further surveillance and investigation for growth concerns.

Maternity providers should ensure that they monitor the number of fetuses considered < 3rd centile to ensure that their growth pathway and growth chart is appropriate.

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Maternity safety reports and alerts

The GAP clinical team have received a number of requests for advice from non-GAP NHS Trusts reviewing their stillbirths. We have also been contacted by bereaved parents, looking for answers. Sadly, many of these deaths appeared to have been potentially avoidable. There was a recurrent theme that fetal growth restriction had not been recognised with the growth chart in use locally.

We arranged a Webinar for clinicians from GAP and non-GAP units to raise awareness. The invite with background is [available here](#).

The webinar, held on 16 April 2025, had over 200 registrations from 70+ Trusts. It was not recorded, so as to encourage free discussion. Following multiple requests for the slides, we made a post-webinar recording.



00:00 Introduction and summary of cases

10:56 Review of guidelines and evidence

37:00 Comments, Q & A and illustrations

(Total length: 57 minutes)



Use of fetal growth charts in England

[Sherena Corfield](#)  · [Jack A Devlin](#)

[Article Info](#)  [Linked Articles \(2\)](#) 

Fetal growth charts are an important tool to interpret ultrasound measurements and assess risks in pregnancy. Typically, a fetus with an estimated fetal weight (EFW) less than the 10th centile with respect to a growth chart is classified as small-for-gestational age (SGA), whereas a fetus with EFW less than the 3rd centile or less than the 10th with doppler anomalies is considered to have fetal growth restriction (FGR).

- Charts /SGA rates not monitored
- Limits not adjusted despite guidance

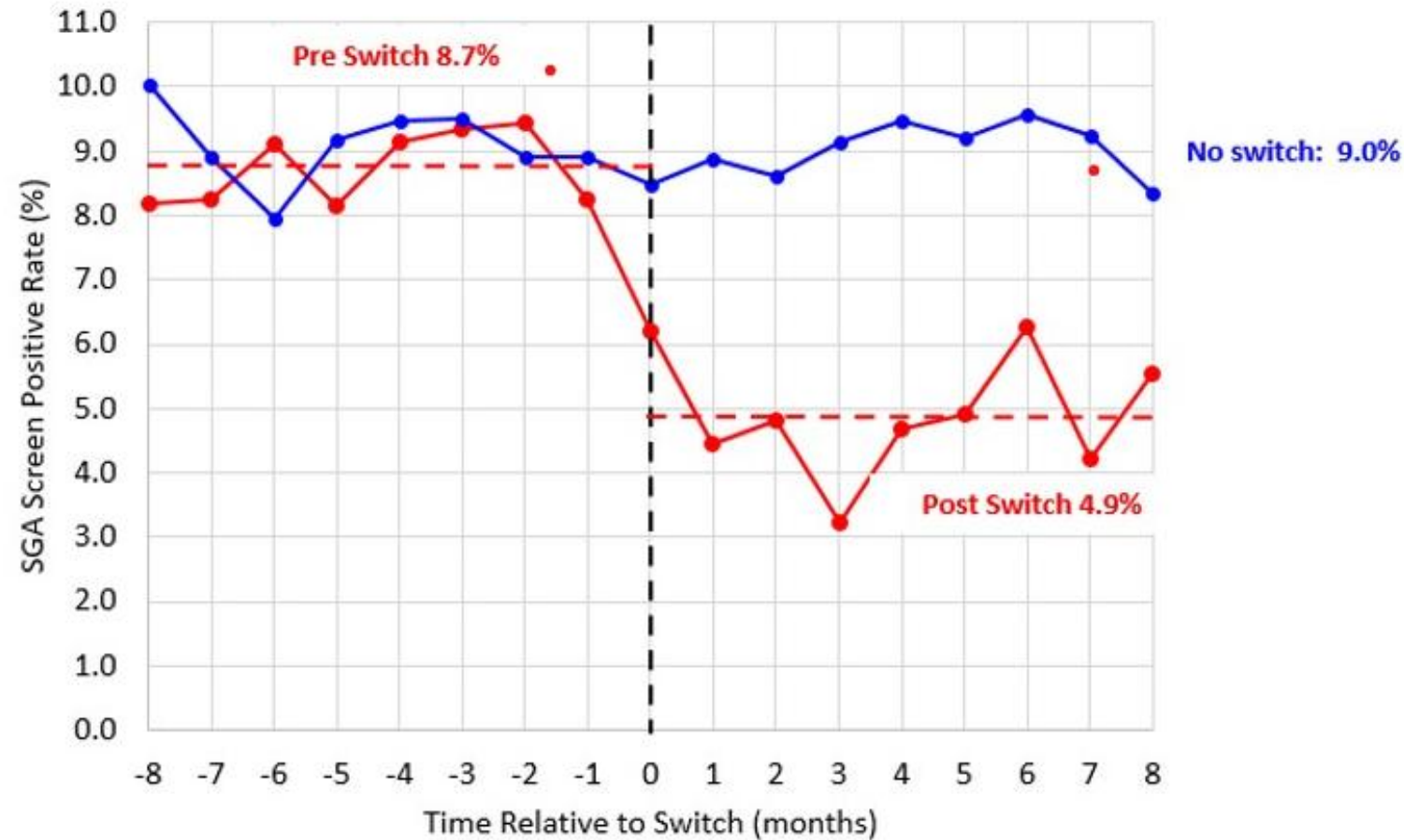
Use of fetal growth charts in England

[Amanda Merricks](#) · [Oliver Hugh](#) · [Jason Gardosi](#) 

[Affiliations & Notes](#)  [Article Info](#)  [Linked Articles \(2\)](#) 

Fetal growth restriction (FGR) is a strong risk for an adverse pregnancy outcome, and small fetuses are at increased risk of FGR. Contrary to previous versions, the authors of the latest (2024) green-top guideline for fetal growth by the Royal College of Obstetricians & Gynaecologists (RCOG)¹ decided not to specify which fetal growth charts should be used. [Gestation Related Optimal Weight \(GROW\)](#) is the most commonly used chart for fetal weight in the UK National Health Service (NHS) and has been the recommended standard in RCOG guidelines since 2003. It is based on large NHS datasets and adjusts or customises fetal and neonatal weight limits for maternal height, early pregnancy weight, parity, and ethnic origin to represent the heterogeneous UK population. INTERGROWTH-21st (IG21)² fetal weight charts are based on an international dataset of eight low-income, middle-income, and high-income countries and have been proposed as a global one-size-fits-all solution, which does not require additional software for customisation to individual pregnancy characteristics. An estimated 18 NHS hospitals switched to IG21 charts since drafts of the new RCOG guideline¹ began circulating in mid-2023.

Figure 1 Screen positive rates for SGA for NHS units before and after their respective switch dates to the INTERGROWTH fetal weight charts¹ (n=7), compared to birthrate-matched units that continued using GROW² fetal weight charts² (n=14).



¹ INTERGROWTH21st Consortium charts <https://intergrowth21.com/tools-resources/fetal-growth>

² Perinatal Institute GROW charts <https://www.perinatal.org.uk/GROW2.0/>

Table 1 Stillbirth risk associated with SGA at last scan, according to GROW *vs* IG21 standards ($n = 117\,027$; stillbirths = 189)

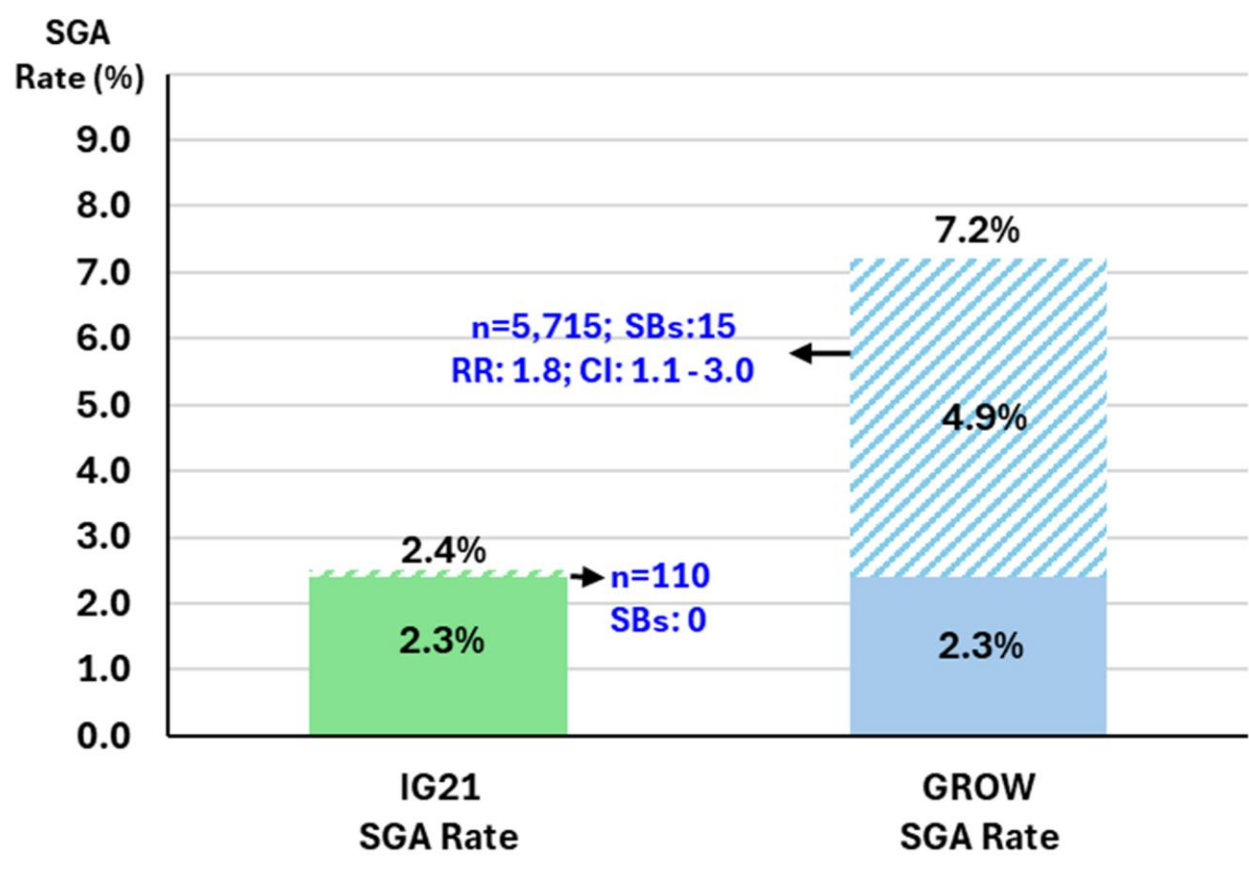
	SGA by GROW	SGA by IG21
Classified as SGA (n (%))	8390 (7.2)	2785 (2.4)
Stillbirths (n (/1000))	30 (3.6)	15 (5.4)

	SGA by GROW only	SGA by GROW and IG21	SGA by IG21 only
Classified as SGA (n (%))	5715 (4.9)	2675 (2.3)	110 (0.1)
Stillbirths (n (/1000))	15 (2.6)	15 (5.6)	0 (0)
Relative risk (95% CI)	1.8 (1.1–3.0)	3.8 (2.3–6.5)	—

GROW, Gestation-Related Optimal Weight;
IG21, INTERGROWTH-21st; SGA, small-for-gestational age.

Small-for-gestational age according to INTERGROWTH-21st fetal weight standard misses most pregnancies at risk of stillbirth identified by GROW

DOI: 10.1002/uog.29214



5715/8390 = additional 68% also at risk

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Update - Dec 2025:

Following meetings with bereaved parents and representatives of RCOG, SBL and the PI, NHS England issued a [Safety Alert](#) advising all NHS Trusts using Intergrowth charts to stop their use by 31 March 2026.

The Perinatal Institute followed this with an [open letter to NHS Trusts](#), with evidence based advice to help Intergrowth using units in their consideration of what charts to use instead.



[Home](#) > [Guidance](#) > [Browse all guidance](#) > [Patient safety alerts](#)
> [Intergrowth estimated fetal growth charts](#)

Intergrowth estimated fetal growth charts

Published: 12/12/2025

NHS England and the Royal College of Obstetricians and Gynaecologists (RCOG) have become aware that there is a potential safety concern regarding the use of intergrowth estimated fetal weight (EFW) charts in maternity services that requires immediate action.

Please see the PDFs below for further details.

[Intergrowth estimated fetal growth charts](#)

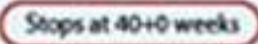
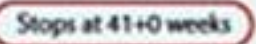
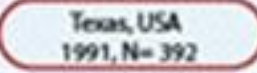
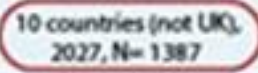
[Intergrowth estimated fetal growth charts - Q&A](#)

[Home](#) > [Guidance](#) > [Browse all guidance](#) > [Patient safety alerts](#)
> [Intergrowth estimated fetal growth charts](#)

Intergrowth estimated fetal growth charts

Published: 12/12/2025

- Trusts that currently use any Intergrowth (2020 or 2017 versions) EFW charts should **stop** and move to using any of the following fetal growth (EFW) charts, which are supported by RCOG guidance:
 - Hadlock formula
 - World Health Organization (WHO)
 - Fetal Medicine Foundation (FMF)
 - Perinatal Institute GROW

Features	HADLOCK	WHO	FMF	GROW
Chart goes to 42.0 weeks gestation	 	 	 	
NHS SBL requirement to use the same methodology AN and PN				
Cohort (size)	 	 	 	 
Derived from NHS data				
Can be used for SFH assessment				

Intergrowth estimated fetal growth charts

Published: 12/12/2025

The change from Intergrowth EFW charts must be completed by 31 March 2026.

Note: this action only applies to Intergrowth EFW charts. Symphysio-fundal height (SFH) charts can continue to be used. RCOG will update its guidance in line with this advice.

For all trusts

Maternity providers should ensure that they continue to monitor the detection and management of fetuses considered to be both <10th and <3rd centile for estimated weight, in line with [Saving Babies Lives Care Bundle \(SBLCB\) v3.2](#) to ensure that the screening pathway is being implemented safely.

Maternity providers should also be aware that some EFW charts (for example, Hadlock and WHO) end at 40 weeks gestation, meaning that the diagnosis and management of fetal growth disorders beyond this gestation needs to be considered on a case-by-case basis.



BRIEF COMMUNICATION

 **Open Access**



INTERGROWTH 21st versus GROW fundal height charts and antenatal detection of small-for-gestational age: A multicenter cohort study

[Emily Butler](#), [Hanna Ellson](#), [Hannah Taylor](#), [Oliver Hugh](#), [Jason Gardosi](#) 

First published: 09 June 2026 | <https://doi.org/10.1002/ijgo.71128> | [VIEW METRICS](#)



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INTERGROWTH 21st versus GROW fundal height charts

TABLE 1 Comparison of a UK study cohort and eight-country Intergrowth⁶ cohort.

	Current cohort	Intergrowth	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
BMI, mean (SD)	25.3 (4.0)	23.3 (3.0)	<0.01
Ethnicity British, <i>n</i> (%)	57 572 (63.5)	606 (14.3) ^a	<0.01
Nulliparous, <i>n</i> (%)	50 855 (56.1)	2907 (68.6)	<0.01
Male infant, <i>n</i> (%)	46 068 (50.9)	2106 (49.7)	0.14
Term LBW <2500 g (≥37 weeks), <i>n</i> (%)	1106 (1.2)	127 (3.0)	<0.01
Preterm birth (<37 ⁺⁰ weeks), <i>n</i> (%)	1891 (2.1)	192 (4.5)	<0.01
Birth weight ≥37 weeks (g), mean (SD)	3468 (440)	3267 (444)	<0.01



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Original Articles

Symphysis-fundus height and pregnancy characteristics in ultrasound-dated pregnancies

[Max Mongelli MD \(FRACOG\)](#) ^a  , [Jason Gardosi MD \(MRCOG\)](#) ^a [Show more](#) ▼



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10.1016/S0029-7844(99)00380-4 ↗

INTERGROWTH 21st versus GROW fundal height charts

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International standards for newborn weight, length, and head circumference by gestational age and sex: the Newborn Cross-Sectional Study of the INTERGROWTH-21st Project



José Villar, Leila Cheikh Ismail, Cesar G Victora, Eric O Ohuma, Enrico Bertino, Doug G Altman, Ann Lambert, Aris T Papageorgiou, Maria Carvalho,

	Brazil (n=1595)	China (n=3551)	India (n=2493)	Italy (n=2358)	Kenya (n=3702)	Oman (n=2821)	UK (n=2939)	USA (n=1027)	Total (n=20 486)
Preterm birth (<37 weeks; %)	143 (9.0%)	212 (6.0%)	250 (10.0%)	83 (3.5%)	154 (4.2%)	145 (5.1%)	100 (3.4%)	49 (4.8%)	1136 (5.5%)
Preterm birth after spontaneous onset of labour (%)	79 (5.0%)	87 (2.5%)	111 (4.5%)	55 (2.3%)	91 (2.5%)	113 (4.0%)	57 (1.9%)	41 (4.0%)	634 (3.1%)
Term* low birthweight (<2500 g; %)	31 (1.9%)	22 (0.6%)	222 (8.9%)	50 (2.1%)	134 (3.6%)	126 (4.5%)	49 (1.7%)	17 (1.7%)	651 (3.2%)
All low birthweight (<2500 g; %)	92 (5.8%)	75 (2.1%)	338 (13.6%)	91 (3.9%)	206 (5.6%)	183 (6.5%)	100 (3.4%)	44 (4.3%)	1129 (5.5%)
Neonatal mortality (%)	4 (0.3%)	0	4 (0.2%)	0	9 (0.2%)	4 (0.1%)	0	1 (0.1%)	22 (0.1%)
Boys (%)	823 (51.6%)	1861 (52.4%)	1287 (51.6%)	1173 (49.7%)	1850 (50.0%)	1471 (52.2%)	1471 (50.1%)	546 (53.2%)	10482 (51.2%)
Exclusive breastfeeding at hospital discharge (%)	1499 (94.0%)	2870 (80.8%)	2455 (98.5%)	1720 (72.9%)	3616 (97.7%)	2736 (97.0%)	2281 (77.6%)	815 (79.4%)	17 992 (87.8%)
Mother admitted to intensive care unit (%)	3 (0.2%)	2 (0.1%)	1	7 (0.3%)	5 (0.1%)	18 (0.6%)	1	1 (0.1%)	38 (0.2%)
Term* birthweight (kg)	3.3 (0.4)	3.4 (0.4)	2.9 (0.4)	3.3 (0.4)	3.3 (0.4)	3.1 (0.4)	3.5 (0.5)	3.4 (0.5)	3.3 (0.5)
Term* birthlength (cm)	49.0 (1.7)	49.7 (1.6)	48.6 (1.8)	49.4 (1.7)	49.1 (1.8)	49.0 (1.8)	49.9 (1.9)	49.9 (2.2)	49.3 (1.8)
Term* birth head circumference (cm)	34.2 (1.2)	33.6 (1.2)	33.1 (1.1)	34.0 (1.2)	34.2 (1.2)	33.6 (1.1)	34.5 (1.3)	34.5 (1.4)	33.9 (1.3)

Only includes pregnancies leading to one livebirth birth and no congenital malformations. All values are means (SD) for continuous variables and absolute numbers (percentages) for categorical variables. PPRM=preterm pre-labour rupture of membranes. NICU=neonatal intensive care unit. * Term indicates all babies born at 37 weeks' gestation or later.

Table 1: Maternal baseline characteristics, perinatal events, and newborn baby measures

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- IG21 would have missed 822 of 2554 (32.2%) of SGA neonates



PATIENT SAFETY

‘Catastrophic outcomes’ threat from ‘inappropriate’ maternity tools

By Emily Townsend | 14 July 2026

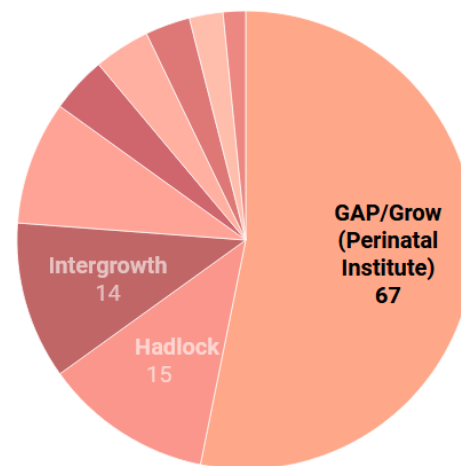


5 Comments

- > Use of differing growth charts to measure babies risks “overlooking” a leading cause of stillbirth
- > *HSJ* research reveals widespread use of differing systems
- > Unclear national standards lead trusts to “mark own homework” and risk “avoidable perinatal death”

about whether some are flawed.

GAP/Grow (Perinatal Institute) Hadlock
Intergrowth WHO charts/standards Fetal
Medicine Foundation K2 systems/local customised
charts + NICE guidance Chitty (1994)
biometry Tommy's decision support tool No
named growth chart/customised



*Total charts/standards used is higher than the number

HSJ found that across 113 trusts with maternity services that provided information, eight different types of growth charts were used, including several with their own localised system (**see chart left and table below**).

Some 14 trusts continue to use in some capacity a system called Intergrowth, despite [NHS England warning in December that it is flawed](#) for estimating fetal weight. A small number of providers persisted in using it for this purpose, and NHSE said it was “now seeking assurance” they had stopped.

<https://www.hsj.co.uk/patient-safety/catastrophic-outcomes-threat-from-inappropriate-maternity-tools/8123790.article>





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² MAMA Academy - The Safer Pregnancy Charity, London, UK

³ Perinatal Institute for Maternal and Child Health, Birmingham, UK

⁴ University of Warwick Medical School, Coventry, UK

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Cite this as: *BMJ* 2026;393:e668919

<http://doi.org/10.1136/bmj-2026-668919>

Published: 23 June 2026

Improving detection and management of restricted fetal growth to prevent perinatal death

Jason Gardosi and colleagues argue that England should adopt a coherent national programme to ensure more consistent identification and management of fetal growth restriction, the most common and avoidable cause of perinatal death

Sherena Corfield,¹ Jack A Devlin,¹ Heidi Eldridge,² Emily Butler,³ Jason Gardosi^{3,4}

The UK's secretary of state for health and social care ordered an investigation into failures in England's maternity service in 2025, raising concerns that unsafe care has led to the "normalisation of deaths of women and babies."¹ An overlooked contributory factor stems

(perinatal episode electronic record, PEER); the subsequent population based study of PEER data found that unrecognised fetal growth restriction was the single largest risk factor for stillbirth, and that its antenatal recognition reduced the risk by half.⁵



¹ Public representative, London, UK

² MAMA Academy - The Safer
Pregnancy Charity, London, UK

Improving detection and management of restricted fetal growth to prevent perinatal death

Box 1: Actions needed to improve patient safety in maternity care

- National programming in antenatal and intrapartum care, coordinated by the Department of Health and Social Care
- Latest outcome based evidence synthesised into regularly updated National Institute for Health and Care Excellence and royal college guidelines
- Standardisation of protocols and digital tools to reduce variation across the NHS, allow personalised high quality care, and reduce adverse outcomes
- National oversight, monitoring, and benchmarking of key indicators such as antenatal detection of fetal growth restriction, with central and network based support for all trusts to audit performance and provide feedback
- Transparency and accountability on progress to parents, clinicians, and other stakeholders

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Maternity safety reports and alerts

Update - June 2026:

On **24th June 2026**, the final report of the Independent Review into maternity services at Nottingham University Hospitals NHS Trust, led by **Donna Ockenden**, has been published.

The report identifies widespread systemic failings in maternity and neonatal care, highlighting opportunities where harm may have been prevented and setting out essential actions to improve safety both locally and nationally. The full report can be found below:

[Final Report of the Independent Review - Ockenden Review](#)

On **30th June 2026**, Baroness Amos published the final report of the **Independent National Maternity and Neonatal Investigation**.

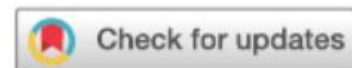
The review concludes that maternity and neonatal services require significant national reform and makes recommendations to improve safety, equity, accountability and the experience of women, babies and families across England. The full report is linked below:

[Final Reports - National Maternity and Neonatal Investigation](#)

Ex Ockenden Report 2026

EA 7: National standard for standardisation and recording of fetal growth risk assessment

1. There must be standardisation of fetal growth risk assessment, management and audit across RCOG (1), SBLCB (2) and NICE (3) guidance, with clear concise recommendations on the choice of pathways and charts to ensure consistency of the approach to the reduction in stillbirth.
2. All practitioners performing ultrasound growth scans should have training to undertake and report examinations to meet the standardised methods used in the recommended charts.



Designation of small for gestational age according to seven fetal growth charts in England's National Health Service: population based cohort study of 3.2 million births

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Additional material is published
online only. To view please visit
the journal online.

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ABSTRACT

OBJECTIVE

To investigate the screen positive rates of standards for fetal weight assessment in current use in England.

DESIGN

Population based cohort study of electronic data recorded as part of routine antenatal care.

SETTING

Integrated care boards of the National Health Service (NHS) in England.

PARTICIPANTS

3 201 199 women with singleton pregnancies delivered between 2015 and 2025.

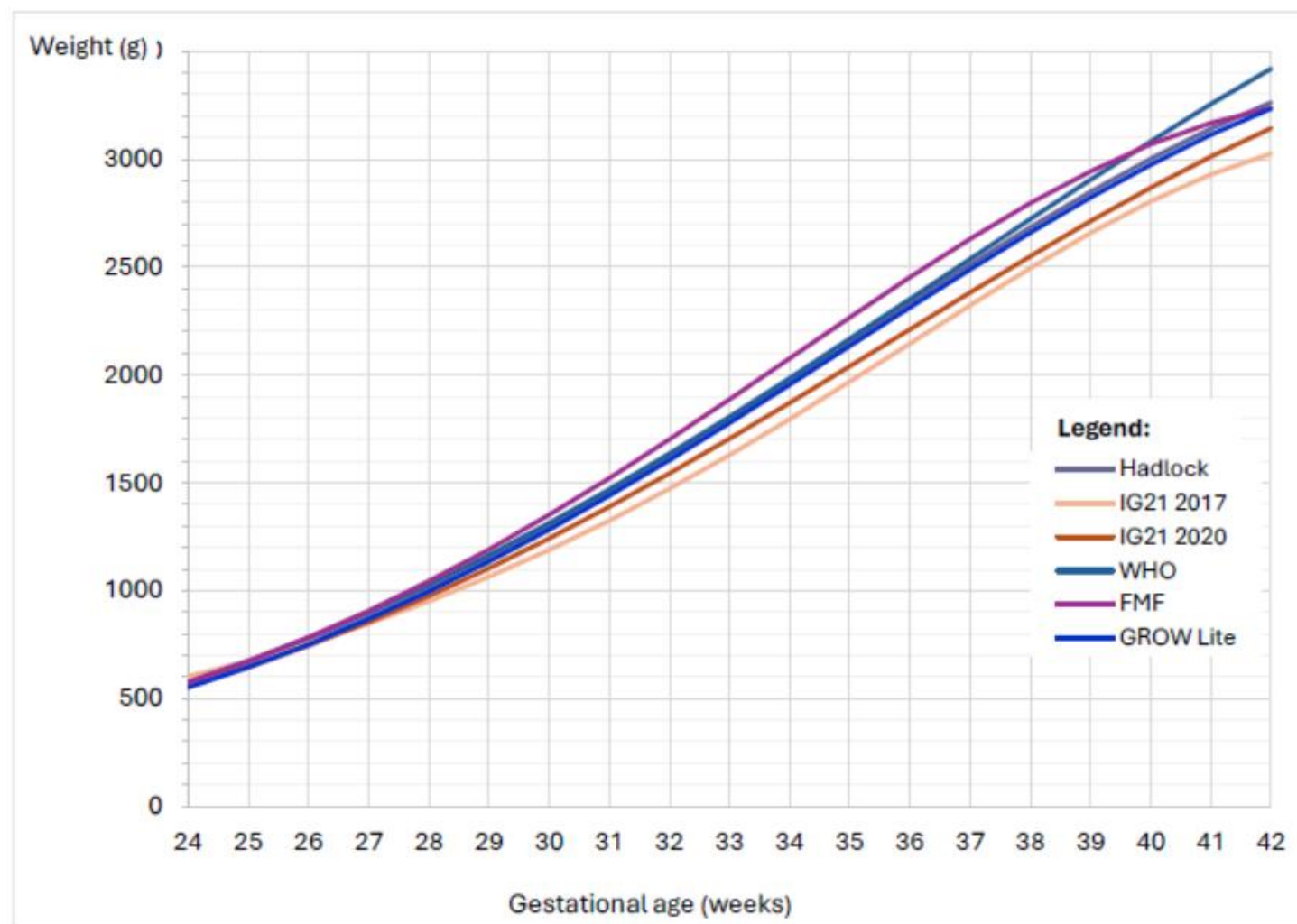
MAIN OUTCOME MEASURES

Rates of small for gestational age (birth weight <3rd and <10th centile) and large for gestational age (birth weight >90th and >97th centile) according to seven fetal weight standards. Six of these standards are

characteristics varied widely among integrated care boards, including ethnic origin (average proportion English: 65.6%, range 19.8-92.2) and high body mass index (≥ 30 : mean 24.8%, range 16.3-29.4). The overall rate of babies identified as being small for gestational age (<10th centile) varied widely according to the standard used, ranging from 5.5% with IG21-2017 to 18.7% with FMF. Large for gestational age (>90th centile) rates ranged from 4.9% for Hadlock to 17.7% for IG21-2017. Similarly, large variations were seen with cut-off points of <3rd centile and >97th centile. Across all integrated care boards, the range of small for gestational age was wider with unadjustable standards and mostly reflected local population characteristics, including ethnicity and maternal weight. The customised GROW standard had small and large for gestational age rates of 13.4% and 8.4%, respectively, and the narrowest range of small for gestational age rates across integrated care boards

1. **Hadlock** fetal weight standard based on cross-sectional EFW data in a US college cohort¹⁵ ('Hadlock').
2. INTERGROWTH-21st fetal weight standard, based on longitudinal assessment of EFWs from low-risk pregnancies in 8 countries ('**IG21-2017**')⁸.
3. Updated INTERGROWTH-21st fetal weight standard, using the same cohort as IG21 2017 but with Hadlock's¹⁶ rather than INTERGROWTH's own fetal weight formula ('**IG21-2020**')¹⁷.
4. World Health Organisation fetal weight standard, based on longitudinal assessment of EFWs from low-risk pregnancies in 10 countries ('**WHO**')⁹.
5. Fetal Medicine Foundation fetal weight standard, based on selected EFW assessments in two hospitals in London and Kent ('**FMF**')¹⁰.
6. Gestation Related Optimal Weight: fetal weight chart derived from average birthweights of UK low risk pregnancies, combined with a proportionality fetal weight curve ('**GROW Lite**')¹⁸.
7. Gestation Related Optimal Weight as in 6., but customised for maternal height, early pregnancy weight, parity and ethnic origin ('**GROW**')^{5,19}.

Fig 2 Tenth centile trajectories for the six population-based fetal weight standards (Hadlock¹⁵, IG21 2017⁸, IG21 2020¹⁷, WHO⁹, FMF¹⁰ and GROW Lite¹⁸)

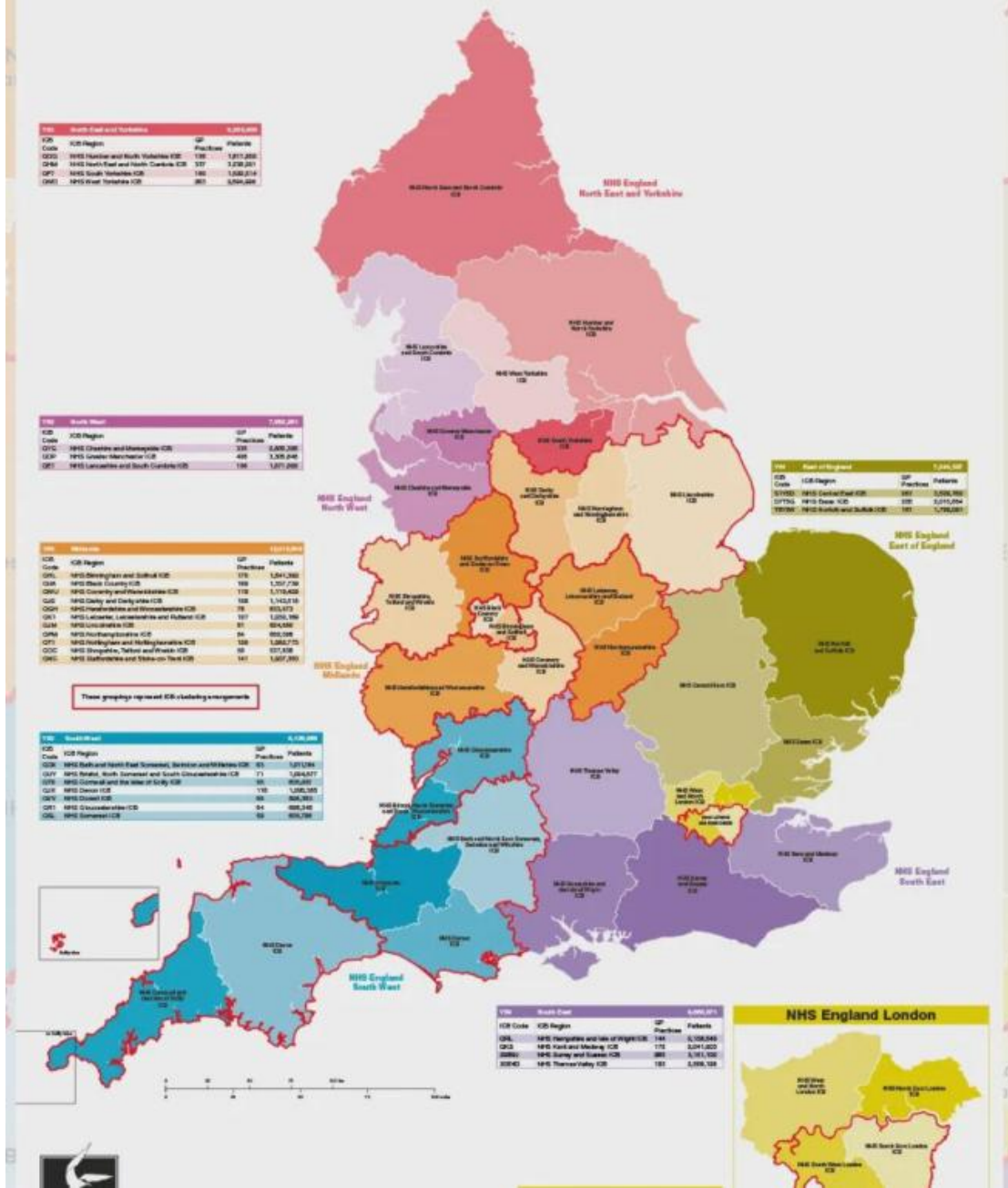


- Expected rate of SGA <10 centile in a super-normal population excluding all known pathologies and at term:
10%
- Pathologies that increase SGA (placenta, BMI, HT, smoking etc):
X% - depending on case mix of cohort
- SGA rate in any Trust $10+X\%$ (X = on average 2-4%)
- LGA: Distribution left shifted, so rate <10 – ca 7-8%
plus X = pathologies (Diabetes, obesity)

- 3,201,199 singleton livebirths Jan 2015 – Sept 2025
- 92 of 119 (77%) of NHS Trusts in England

England Commissioning Map 2026

Integrated Care Boards, GP Practices and Registered Patients



- Integrated Care Boards (ICB) in England: 42
- n>1000 data in 38 ICBs (90%)

Table 1 – Descriptives (N=3,201,199) including ranges for Integrated Care Boards (ICBs)

		n (%)		ICB Range
		(or as stated)		
Maternal ethnicity				
English		2,100,092	(65.6)	19.8 - 92.2
South Asian		386,827	(12.1)	0.6 - 40.0
East European		224,550	(7.0)	2.3 - 17.9
SS African or Caribbean		147,338	(4.6)	0.5 - 12.4
Other		342,392	(10.7)	4.3 - 35.7
Nulliparity		1,374,965	(43.0)	38.8 - 50.4
Maternal height (cm)	Mean (SD)	164	(6.7)	161 - 166
Maternal weight (kg)	Mean (SD)	72.2	(17.4)	67.6 - 75.0
	Median (IQR)	69	(60 - 81)	65 - 71
Body Mass Index (kg/m²)				
	Mean (SD)	26.7	(6.1)	25.3 - 27.5
	Median (IQR)	25.5	(22.4 - 29.9)	24.2 - 26.2
<18.5		90,162	(2.8)	1.7 - 3.8
>30		793,946	(24.8)	16.3 - 29.4
>35		321,874	(10.1)	5.3 - 13.3
Gestation of birth				
< 37 weeks		201,753	(6.3)	4.4 - 7.2

ICB, integrated care board; SS, Sub-Saharan; SD, standard deviation; IQR, interquartile range

Table S2 – Small for Gestational Age (<10th centile) rates for seven fetal growth standards by NHS Integrated Care Board, for all and term (≥37+0 weeks) births only

Integrated Care Board	Total births	Term n	All Pregnancies							Term Births						
			Hadlock ¹⁵	IG21 2017 ⁸	IG21 2020 ¹⁷	WHO ⁹	FMF ¹⁰	GROW Lite ¹⁸	GROW ⁵	Hadlock ¹⁵	IG21 2017 ⁸	IG21 2020 ¹⁷	WHO ⁹	FMF ¹⁰	GROW Lite ¹⁸	GROW ⁵
			%	%	%	%	%	%	%	%	%	%	%	%	%	%
Bath and North East Somerset, Swindon and Wiltshire	18,733	17,645	11.1	4.3	6.6	15.2	15.6	10.0	12.2	10.1	3.6	5.8	14.3	14.1	9.0	11.1
Bedfordshire, Luton & Milton Keynes	94,171	88,142	15.9	6.6	10.0	20.8	21.6	14.4	13.7	14.7	5.7	8.9	19.8	19.9	13.2	12.4
Birmingham and Solihull	94,264	87,478	17.5	7.7	11.4	22.4	23.7	16.0	14.7	16.2	6.7	10.1	21.3	22.0	14.7	13.3
Black Country	119,318	111,296	18.0	7.8	11.6	23.2	24.1	16.4	15.2	16.7	6.9	10.4	22.1	22.4	15.1	13.8
Bristol, North Somerset and South Gloucestershire	23	14														
Buckinghamshire, Oxfordshire and Berkshire West	16,569	15,657	13.0	5.2	8.0	17.2	17.5	11.7	11.6	11.9	4.4	6.9	16.2	16.1	10.6	10.5
Cambridgeshire and Peterborough	62,381	58,573	12.7	5.0	7.8	17.2	17.4	11.4	12.9	11.7	4.4	6.9	16.4	16.0	10.4	11.9
Cheshire & Merseyside	234,602	218,995	11.5	4.5	6.9	15.5	16.2	10.2	12.4	10.4	3.7	6.0	14.5	14.7	9.2	11.3
Cornwall and Isles of Scilly	32,373	30,691	12.8	5.2	7.9	17.1	17.3	11.5	14.0	11.8	4.6	7.2	16.3	16.0	10.6	13.1
Coventry and Warwickshire	56,061	52,700	11.8	4.5	7.0	16.0	16.8	10.6	11.9	10.8	3.8	6.1	15.1	15.3	9.5	10.8
Derby and Derbyshire	32,602	30,412	11.8	4.5	7.1	15.8	16.4	10.5	13.4	10.6	3.8	6.0	14.8	14.8	9.3	12.2
Devon	70,615	66,514	11.4	4.4	6.9	15.4	15.8	10.2	12.5	10.5	3.8	6.1	14.6	14.5	9.3	11.6
Dorset	33,448	31,966	12.1	4.5	7.1	16.8	16.7	10.8	13.1	11.4	4.1	6.5	16.3	15.8	10.2	12.4
Frimley	76,865	72,641	13.3	5.4	8.2	17.9	18.5	12.1	11.7	12.4	4.8	7.4	17.1	17.2	11.2	10.7
Gloucestershire	19	17														
Greater Manchester	277,122	258,038	15.5	6.4	9.7	20.4	21.1	14.0	14.4	14.2	5.5	8.5	19.2	19.3	12.7	13.0
Hampshire and Isle of Wight	83,983	79,147	13.1	5.4	8.1	17.7	17.6	11.8	14.0	12.1	4.7	7.3	16.9	16.4	10.8	13.0
Herefordshire and Worcestershire	53,280	49,604	11.5	4.4	6.9	15.5	16.3	10.3	12.6	10.3	3.6	5.9	14.5	14.6	9.1	11.3
Hertfordshire and West Essex	80,019	74,708	13.5	5.3	8.2	18.0	18.4	12.1	12.7	12.1	4.3	7.0	16.7	16.6	10.7	11.2
Humber and North Yorkshire	136,622	127,061	11.7	4.7	7.3	15.7	16.1	10.5	13.1	10.5	3.9	6.2	14.6	14.5	9.4	11.8
Kent and Medway	108,921	102,796	12.3	4.8	7.5	16.6	17.0	11.1	12.9	11.4	4.3	6.7	15.8	15.7	10.2	12.0
Lancashire and South Cumbria	127,371	118,546	14.7	6.2	9.3	19.2	19.9	13.3	14.3	13.5	5.4	8.3	18.2	18.3	12.2	13.0
Leicester, Leicestershire and Rutland	64,524	60,029	18.1	8.2	11.9	23.1	23.9	16.6	14.5	16.8	7.2	10.7	22.1	22.3	15.3	13.1
Lincolnshire	28,892	27,027	12.3	4.8	7.4	16.4	17.2	11.0	13.8	11.1	4.0	6.4	15.4	15.6	9.8	12.6
Mid and South Essex	38,741	36,930	12.6	4.9	7.8	17.2	16.8	11.4	13.0	11.9	4.5	7.2	16.7	15.8	10.7	12.3
Norfolk & Waveney	80,170	75,070	12.2	4.7	7.3	16.2	16.9	10.9	13.3	11.0	3.9	6.3	15.3	15.4	9.8	12.1
North Central London	135,095	127,409	16.0	6.5	9.9	21.1	21.6	14.5	13.5	15.0	5.9	9.1	20.4	20.3	13.5	12.6
North East and North Cumbria	190,219	178,214	13.0	5.1	7.9	17.2	18.1	11.7	14.4	11.9	4.4	7.0	16.2	16.7	10.6	13.3
North East London	185,835	173,960	19.6	8.5	12.6	25.4	26.0	17.8	13.3	18.5	7.7	11.6	24.5	24.5	16.7	12.2
North West London	84,026	79,834	17.5	7.1	10.9	22.9	23.5	15.8	13.1	16.4	6.3	9.9	22.0	22.2	14.8	12.1
Northamptonshire	61,496	57,437	12.9	5.2	8.0	17.1	17.9	11.6	13.2	11.8	4.5	7.1	16.2	16.5	10.6	12.0
Nottingham and Nottinghamshire	34,533	32,266	13.1	5.5	8.3	17.6	17.8	11.8	14.8	12.0	4.7	7.3	16.6	16.3	10.7	13.7
Shropshire, Telford and Wrekin	28,314	26,519	12.1	4.8	7.4	16.2	16.6	10.9	13.7	11.1	4.0	6.4	15.3	15.2	9.9	12.7
Somerset	41,907	39,106	12.1	4.9	7.5	16.5	16.5	10.9	13.3	11.1	4.2	6.6	15.6	15.1	9.9	12.2
South East London	682	635														
South West London	49,398	46,404	15.4	6.3	9.5	20.4	21.1	13.9	13.4	14.4	5.6	8.6	19.5	19.7	12.9	12.4
South Yorkshire	112,400	105,366	13.9	5.7	8.7	18.5	19.0	12.6	15.1	12.7	4.8	7.7	17.5	17.5	11.4	13.9
Staffordshire & Stoke on Trent	75	62														
Suffolk & North East Essex	79,853	75,109	12.1	4.6	7.4	16.4	16.8	10.9	13.0	11.2	4.0	6.5	15.6	15.5	10.0	12.0
Surrey Heartlands	31,789	29,959	12.8	4.8	7.6	17.4	18.2	11.5	11.8	11.8	4.1	6.6	16.5	16.7	10.5	10.7
Sussex	21,674	20,463	11.6	4.6	7.2	16.0	16.3	10.5	12.8	10.9	4.1	6.5	15.4	15.2	9.8	12.1
West Yorkshire	122,214	115,006	15.7	6.5	9.9	20.8	21.1	14.2	14.9	14.7	5.8	9.0	19.9	19.8	13.2	13.9

Table 2 - Fetal weight standard <10th and <3rd centile rates for England average and range across Integrated Care Boards, for all and for term only (≥ 37 weeks) births

Fetal growth standard	Pregnancies	Centile Band					
		<10th			<3rd		
		Mean	SD	Range	Mean	SD	Range
Hadlock ¹⁵	<i>All</i>	13.6	2.2	11.1 - 19.6	3.6	0.8	2.7 - 5.6
	<i>Term</i>	12.6	2.2	10.1 - 18.5	2.9	0.7	2.1 - 4.7
IG21-2017 ⁸	<i>All</i>	5.5	1.1	4.3 - 8.5	1.5	0.4	1.1 - 2.3
	<i>Term</i>	4.8	1.1	3.6 - 7.7	1.0	0.3	0.7 - 1.7
IG21-2020 ¹⁷	<i>All</i>	8.4	1.6	6.6 - 12.6	2.9	0.6	2.2 - 4.5
	<i>Term</i>	7.5	1.5	5.8 - 11.6	2.2	0.6	1.6 - 3.7
WHO ⁹	<i>All</i>	18.1	2.6	15.2 - 25.4	5.2	1.1	4.1 - 8.0
	<i>Term</i>	17.2	2.6	14.3 - 24.5	4.4	1.0	3.3 - 7.2
FMF ¹⁰	<i>All</i>	18.7	2.8	15.6 - 26.0	10.0	1.8	7.9 - 14.7
	<i>Term</i>	17.2	2.7	14.1 - 24.5	8.7	1.7	6.7 - 13.2
GROW Lite ¹⁸	<i>All</i>	12.3	2.1	10.0 - 17.8	3.9	0.8	2.9 - 6.0
	<i>Term</i>	11.2	2.0	9.0 - 16.7	3.1	0.7	2.2 - 5.1
GROW ¹⁹	<i>All</i>	13.4	0.9	11.6 - 15.2	4.3	0.5	3.5 - 5.3
	<i>Term</i>	12.3	0.9	10.5 - 13.9	3.5	0.4	2.8 - 4.3

SD, standard deviation

Hadlock

IG21 2017

IG21 2020

WHO

FMF

GROW Lite

GROW

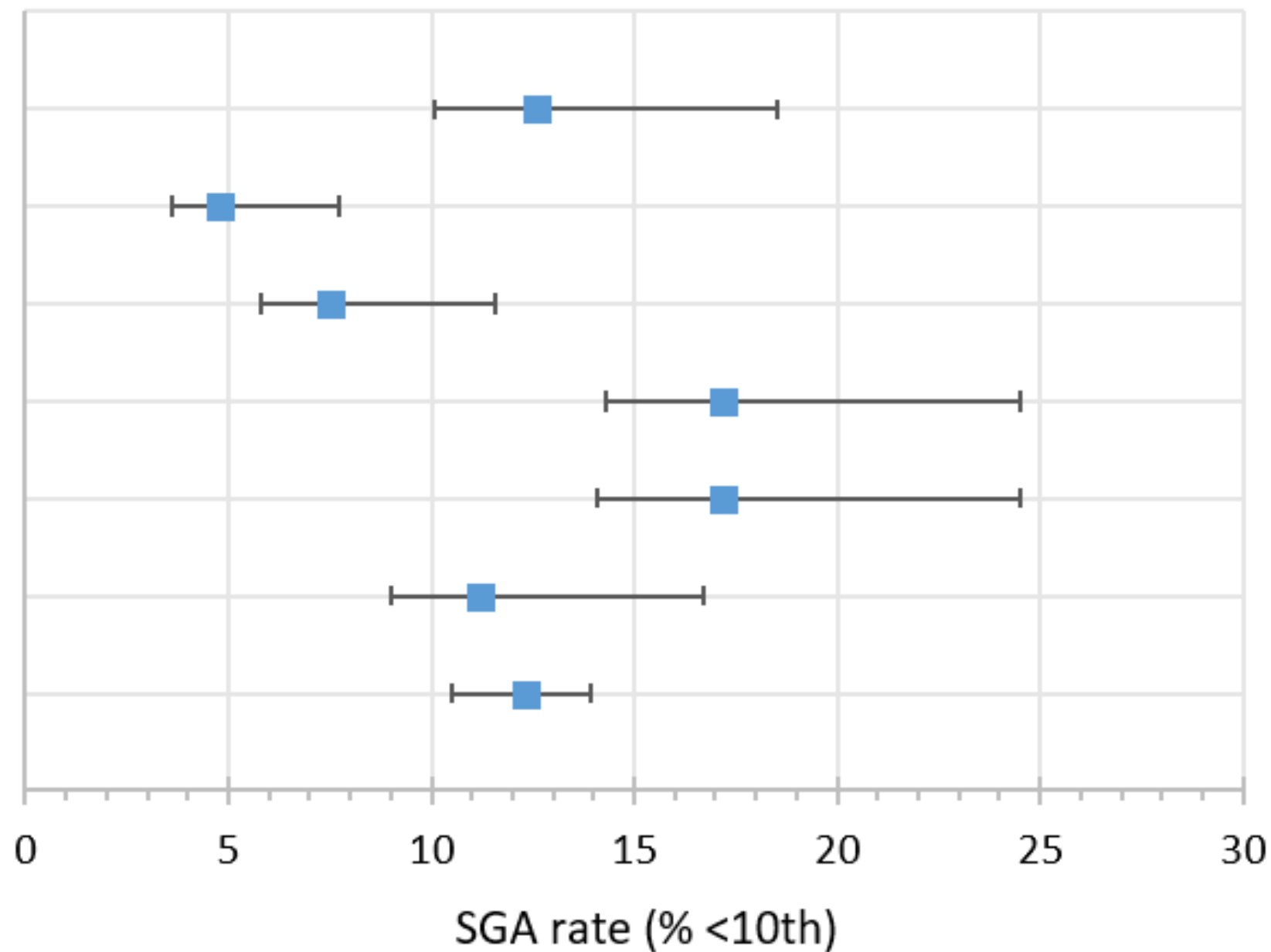


Table 3 – Fetal weight standard >90th and >97th centile rates for England average and range across Integrated Care Boards, for all and for term only (≥37 weeks) births

Fetal weight standard	Pregnancies	Centile Band					
		>90th			>97th		
		Mean	SD	Range	Mean	SD	Range
Hadlock ¹⁵	<i>All</i>	4.9	0.7	3.0 - 6.0	1.5	0.2	0.9 - 2.0
	<i>Term</i>	4.9	0.7	2.8 - 6.0	1.5	0.2	0.8 - 1.9
IG21-2017 ⁸	<i>All</i>	17.7	2.2	12.2 - 20.6	7.4	1.1	4.7 - 8.9
	<i>Term</i>	18.2	2.3	12.1 - 21.2	7.5	1.1	4.6 - 9.1
IG21-2020 ¹⁷	<i>All</i>	12.3	1.5	8.3 - 14.6	4.2	0.6	2.6 - 5.3
	<i>Term</i>	12.3	1.6	7.9 - 14.5	4.0	0.6	2.3 - 5.1
WHO ⁹	<i>All</i>	7.6	1.0	4.9 - 9.2	2.2	0.3	1.3 - 2.8
	<i>Term</i>	7.5	1.0	4.6 - 9.1	2.0	0.3	1.1 - 2.6
FMF ¹⁰	<i>All</i>	16.2	2.0	11.0 - 18.8	7.4	1.1	4.7 - 8.9
	<i>Term</i>	16.5	2.0	10.8 - 19.2	7.5	1.1	4.6 - 9.0
GROW Lite ¹⁸	<i>All</i>	9.9	1.3	6.5 - 11.7	3.9	0.6	2.3 - 4.8
	<i>Term</i>	10.0	1.3	6.3 - 11.8	3.8	0.6	2.2 - 4.8
GROW ¹⁹	<i>All</i>	8.4	0.5	7.3 - 9.3	3.1	0.3	2.6 - 3.7
	<i>Term</i>	8.4	0.5	7.5 - 9.3	3.0	0.3	2.5 - 3.6

SD, standard deviation

Hadlock

IG21 2017

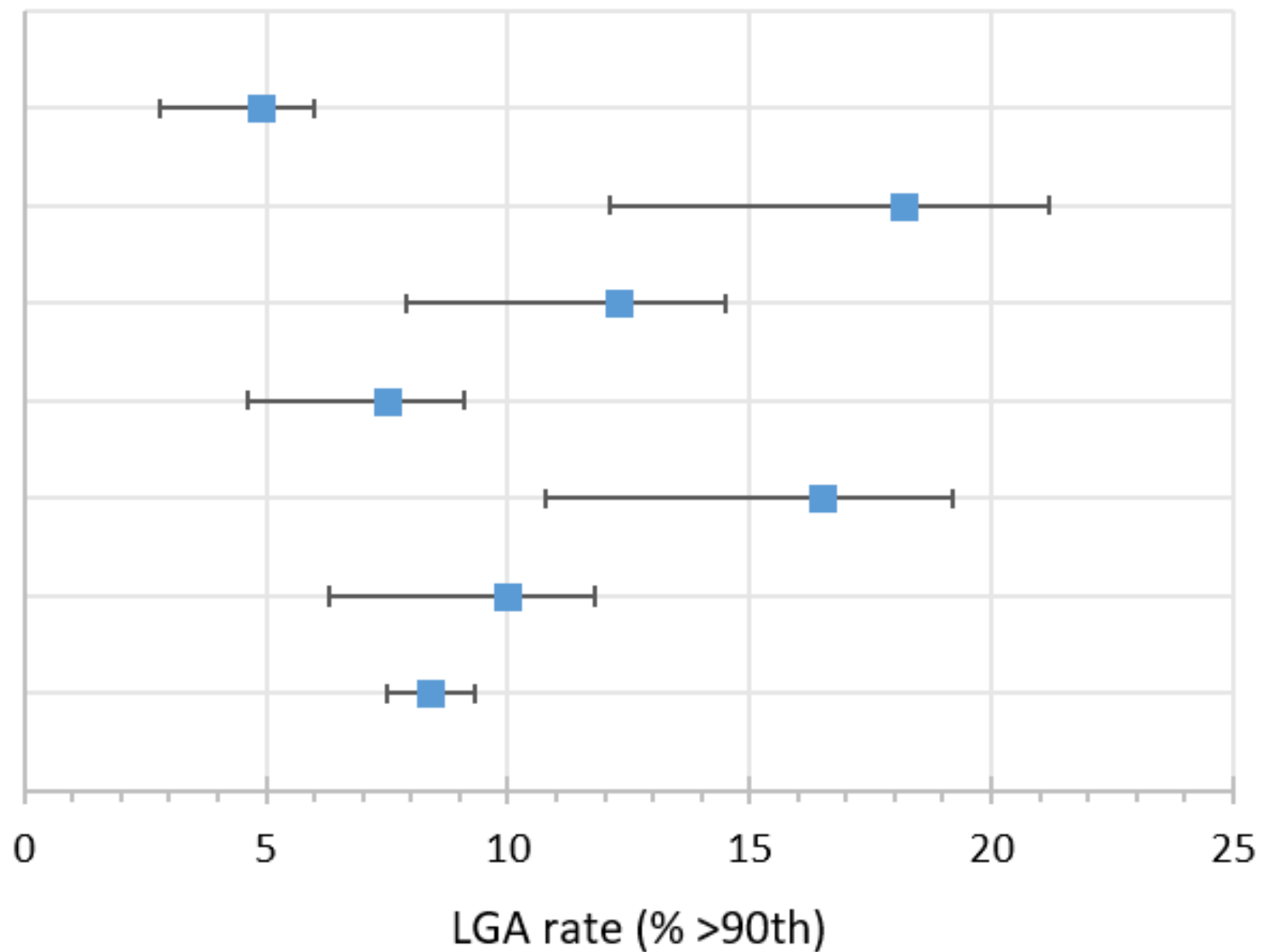
IG21 2020

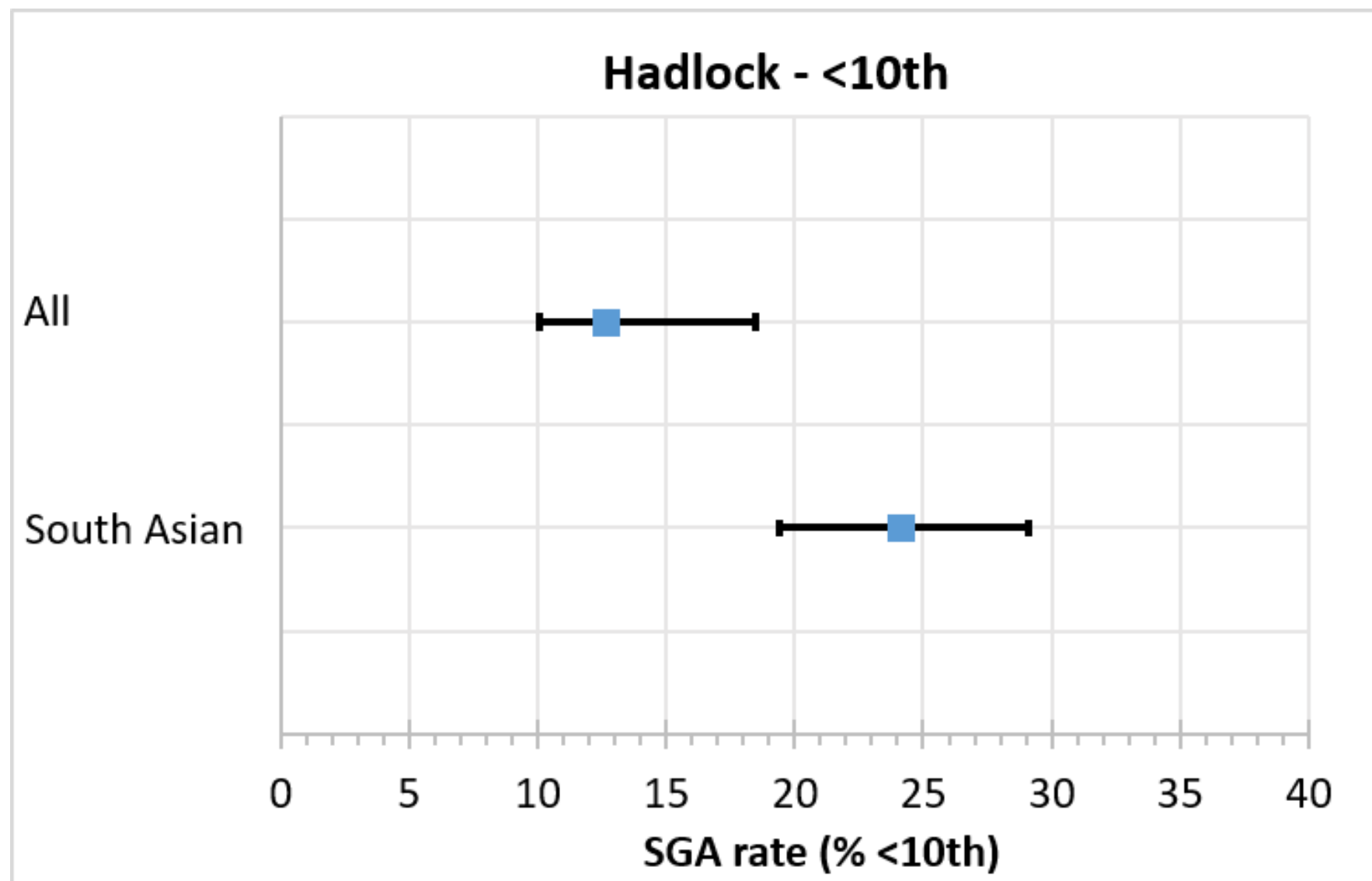
WHO

FMF

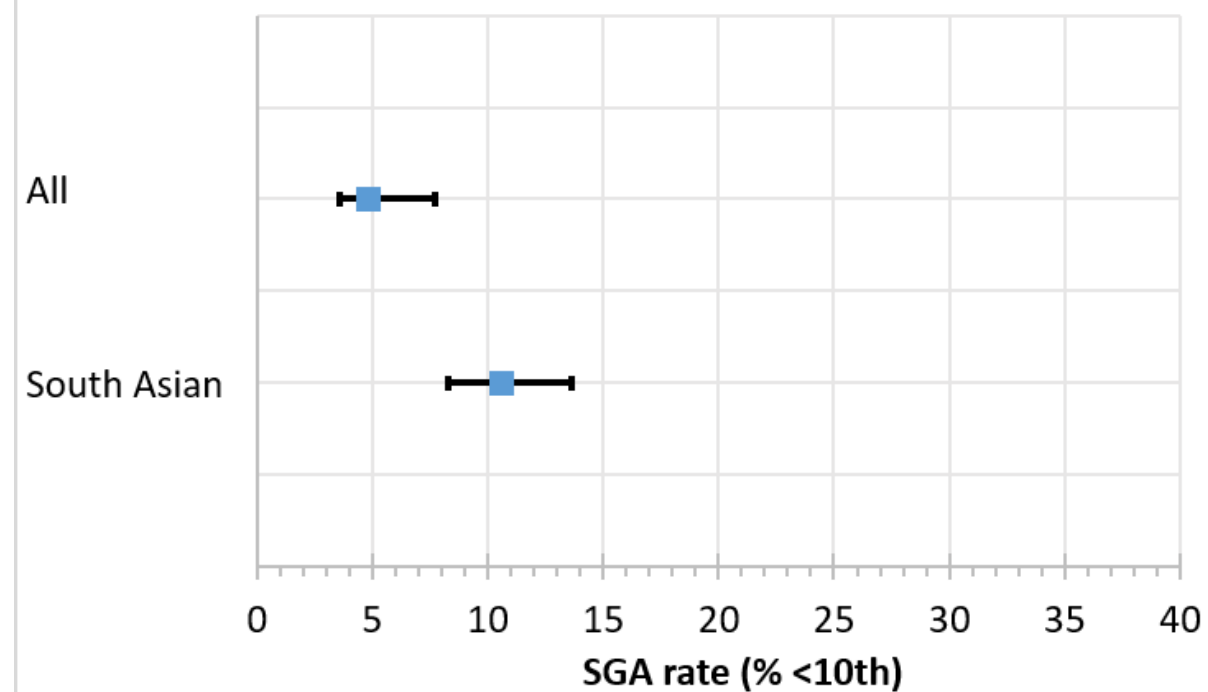
GROW Lite

GROW

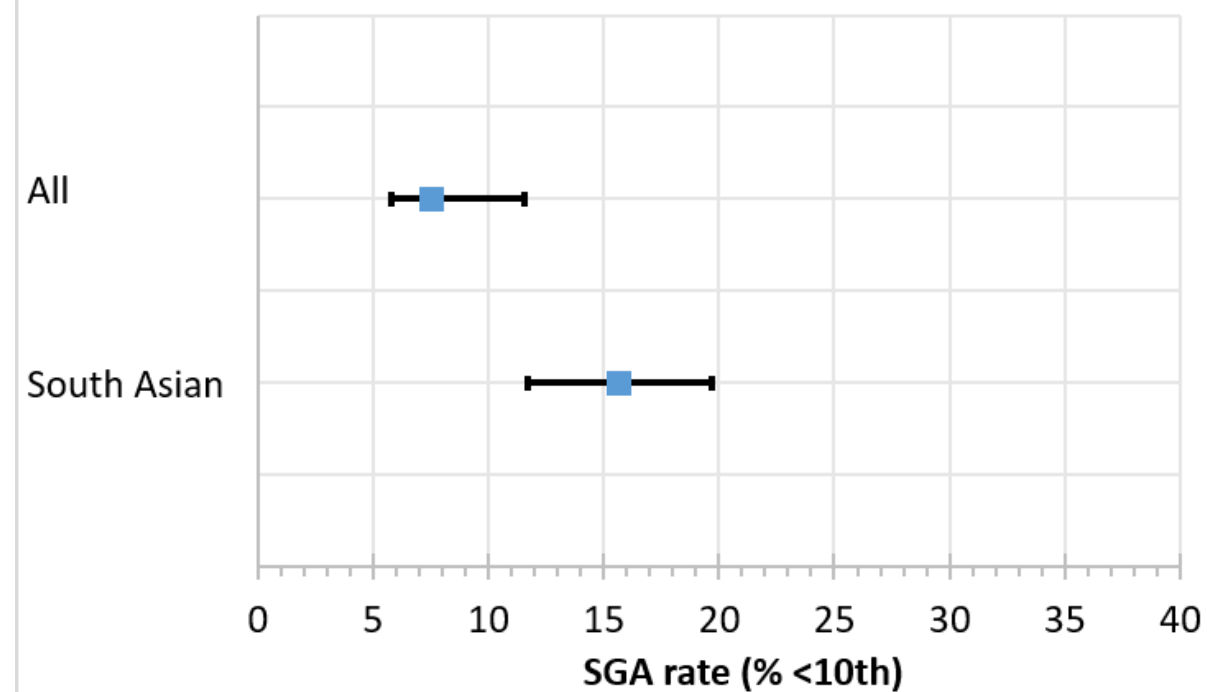




IG21 2017 - <10th



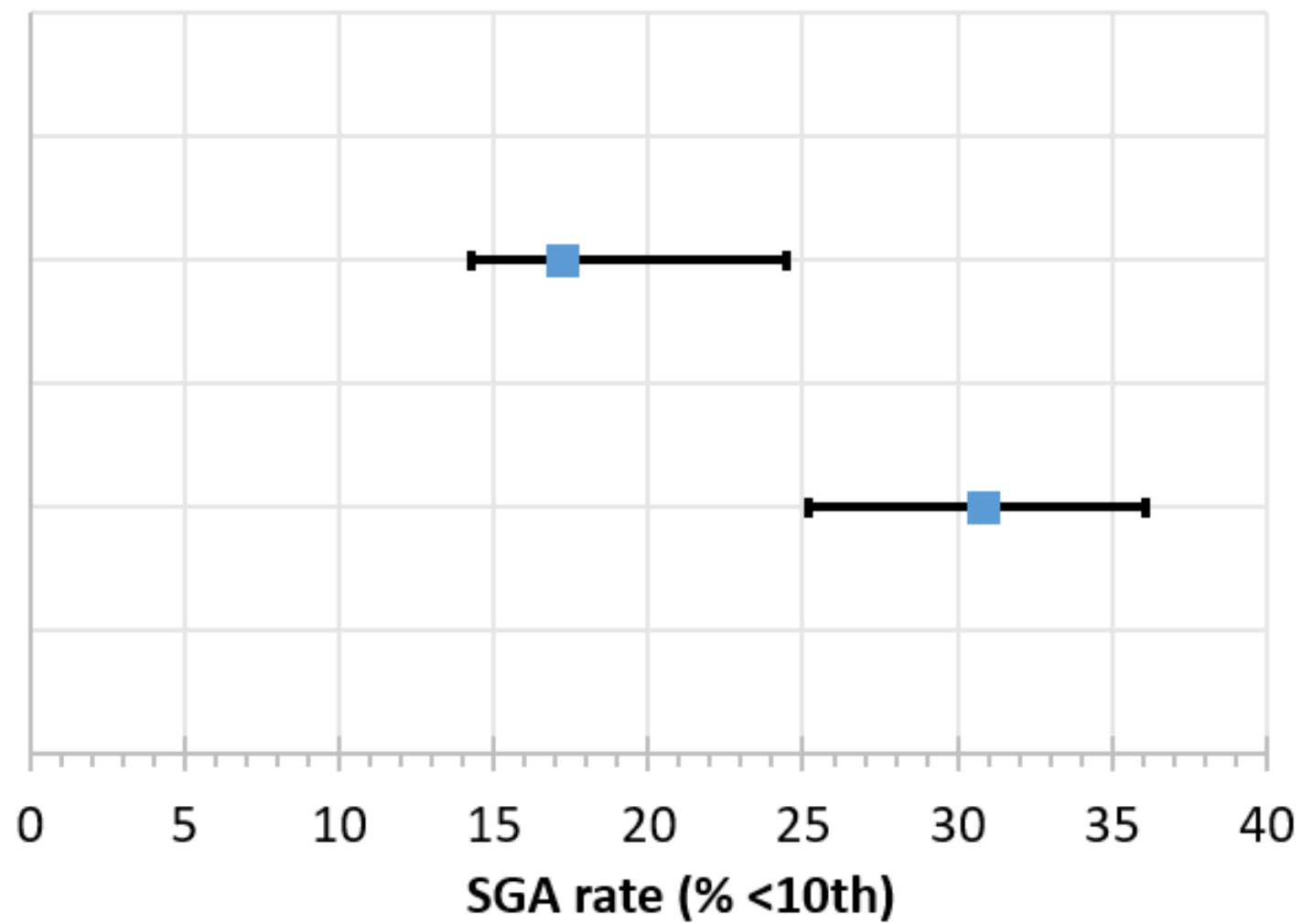
IG21 2020 - <10th



WHO - <10th

All

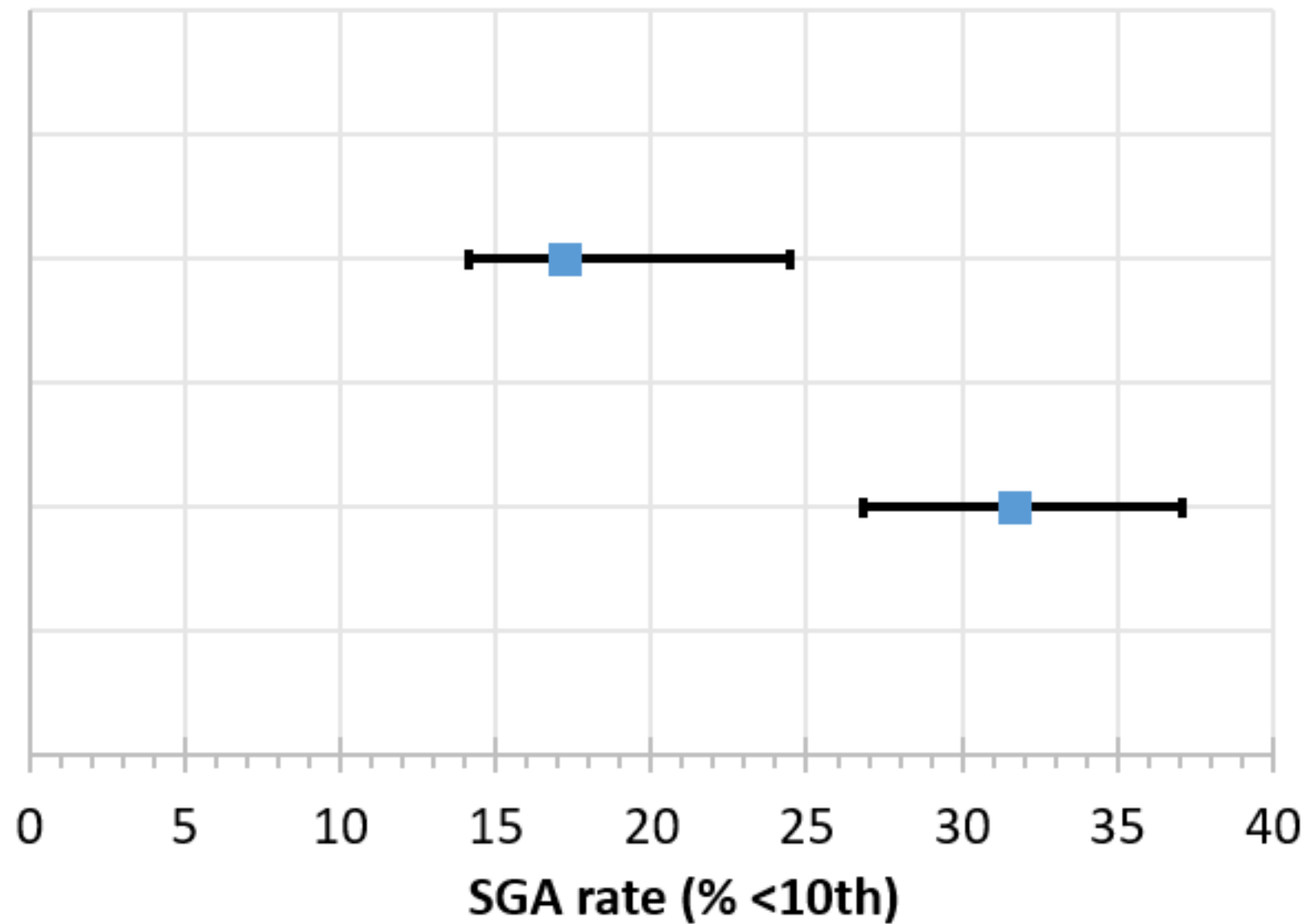
South Asian



FMF - <10th

All

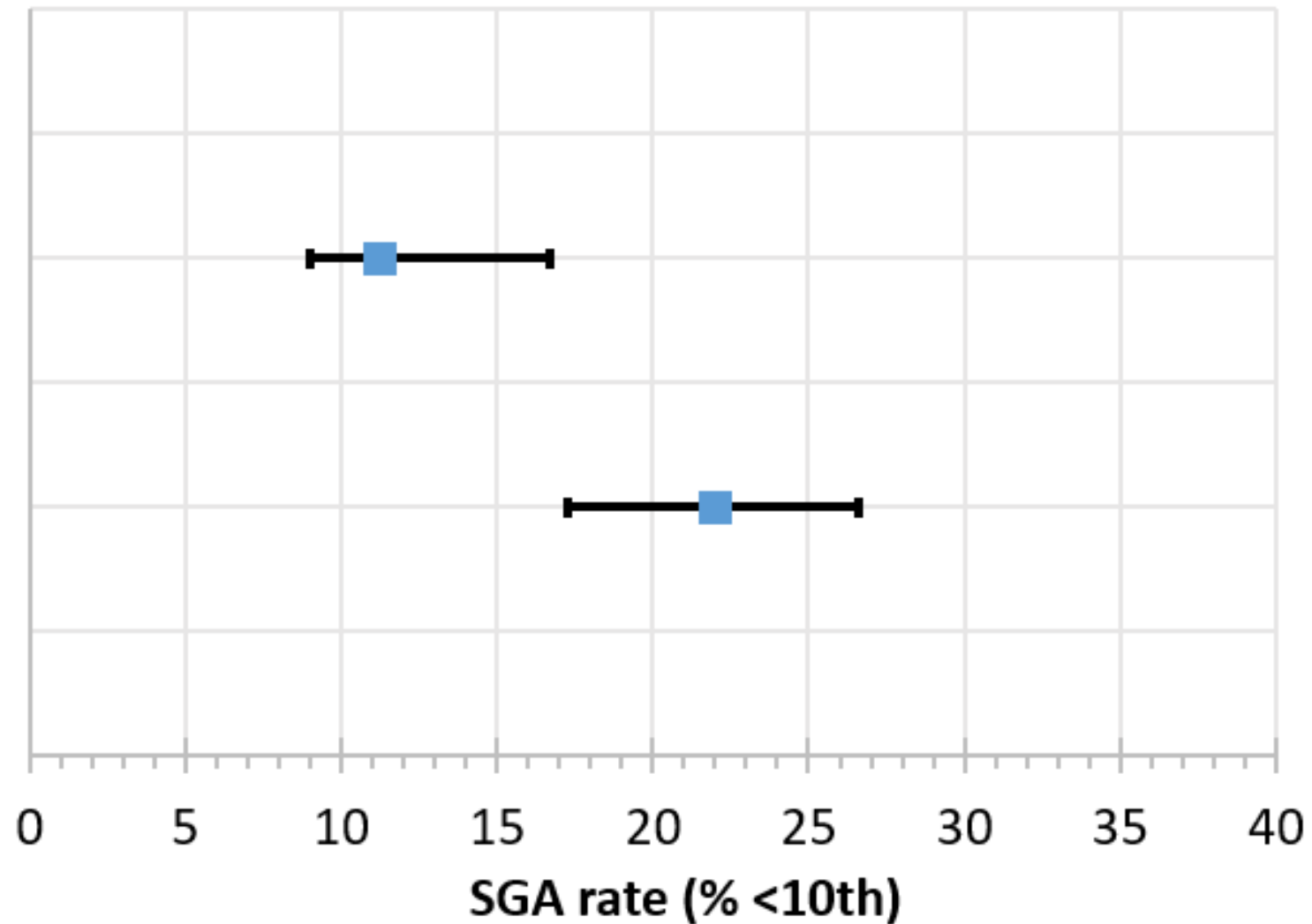
South Asian



GROW Lite - <10th

All

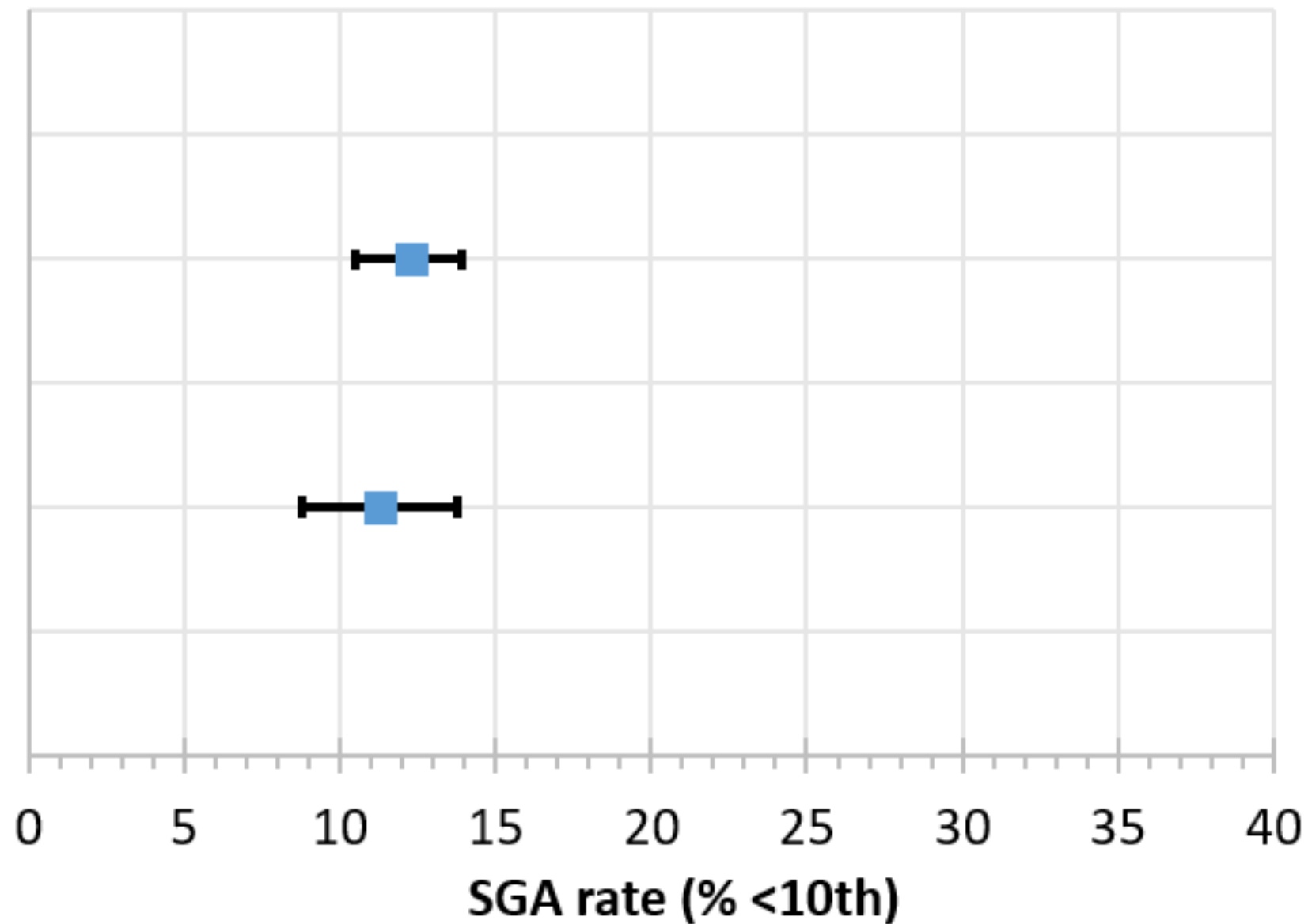
South Asian



GROW - <10th

All

South Asian



Fetal growth surveillance – Current guidelines, practices and challenges

Mandy Williams, Sue Turner, Emily Butler and Jason Gardosi

Ultrasound

0(0) 1–11

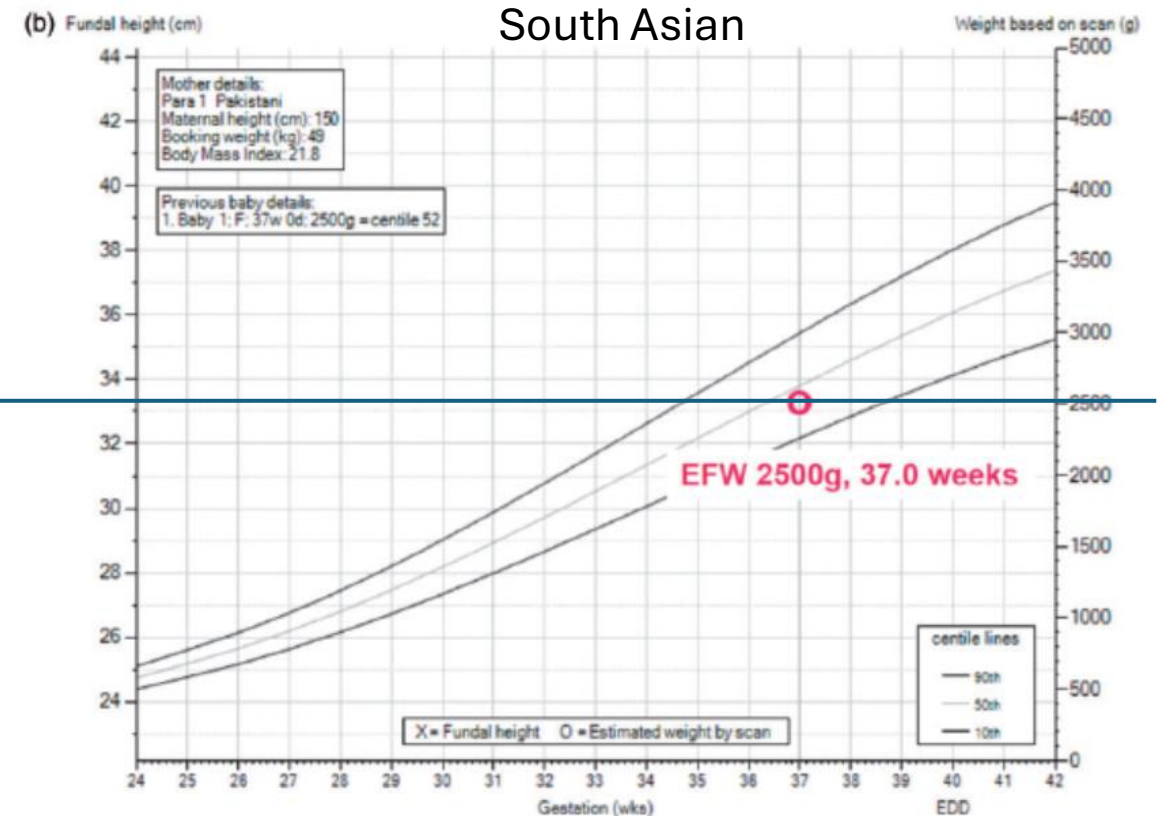
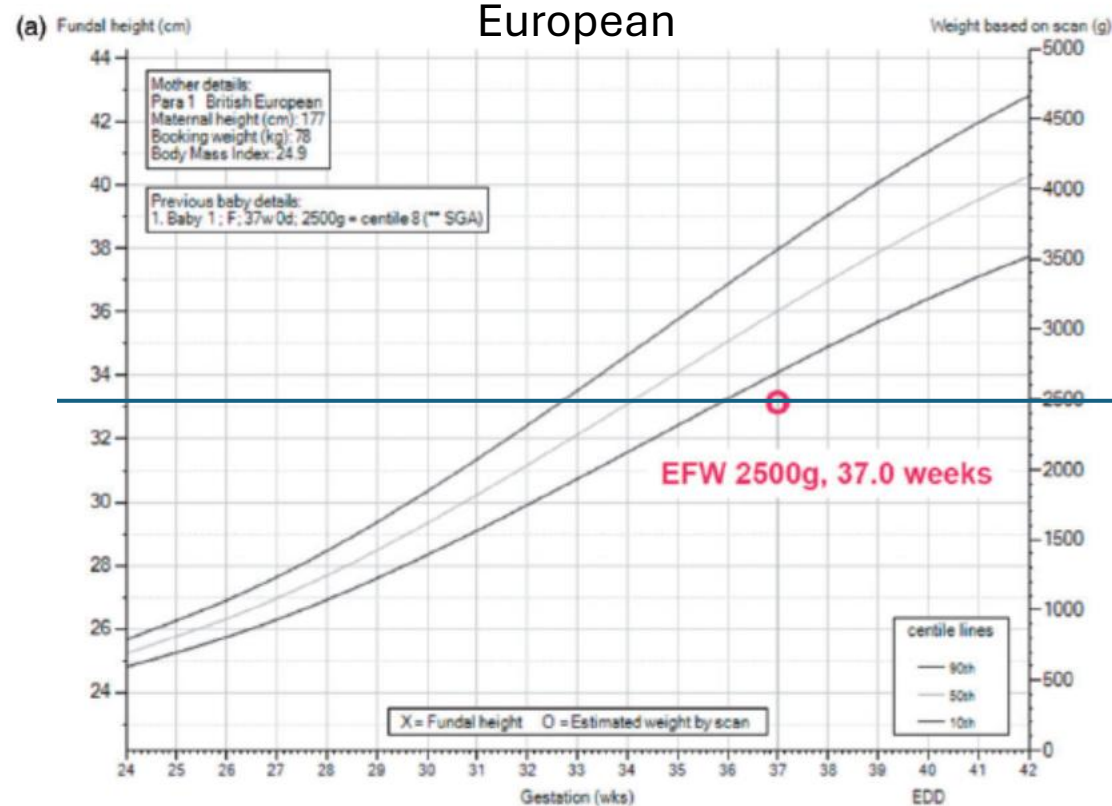
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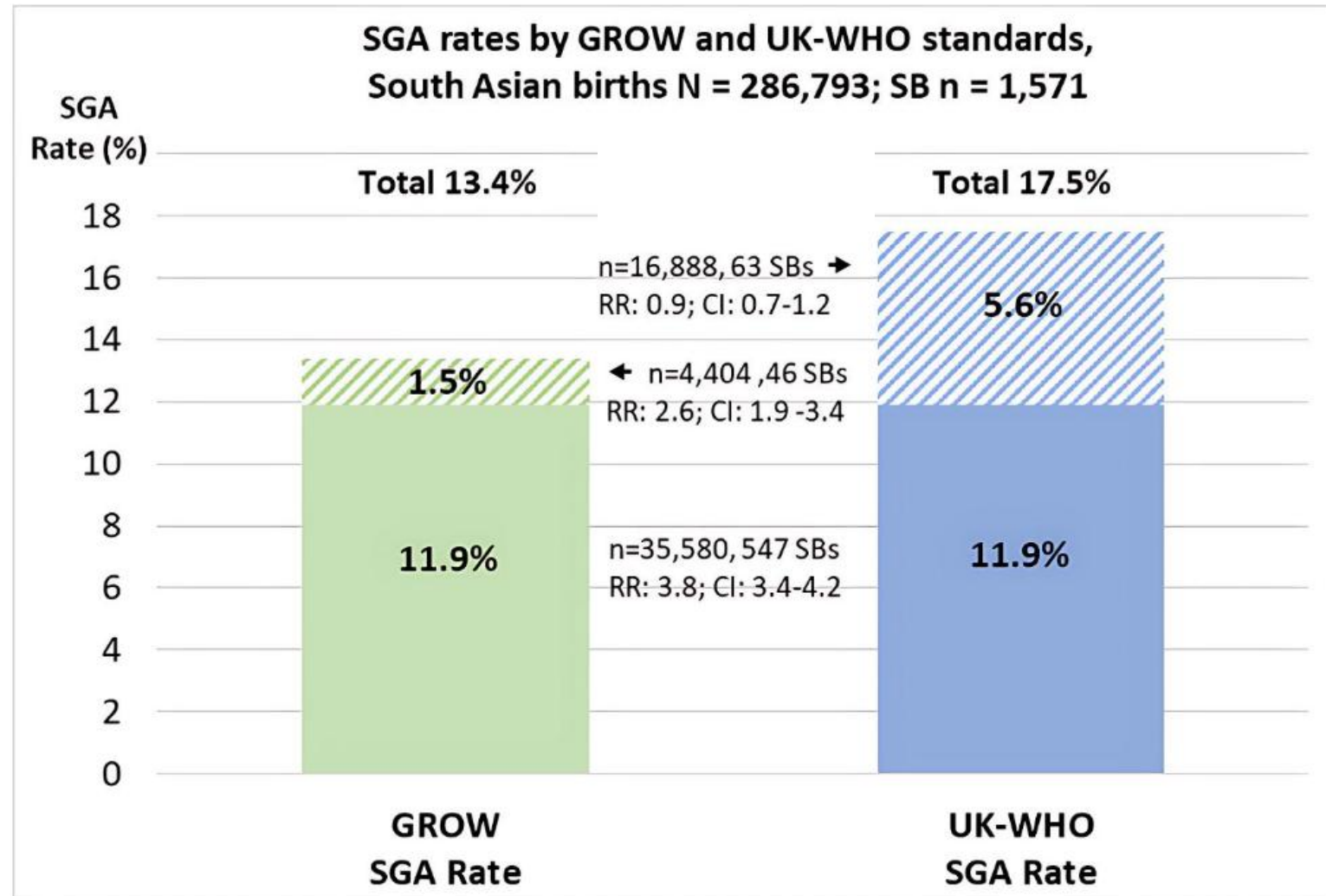
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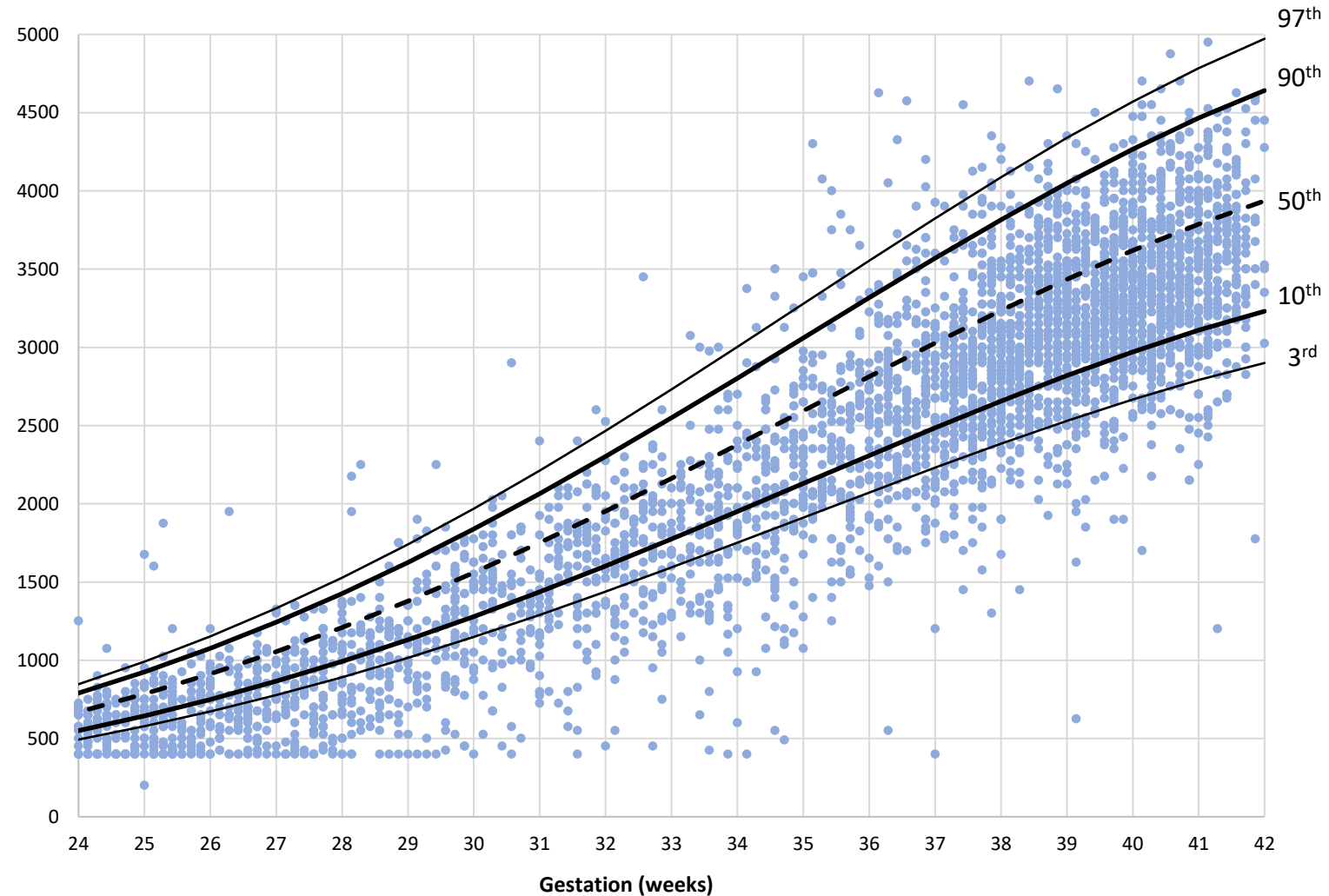




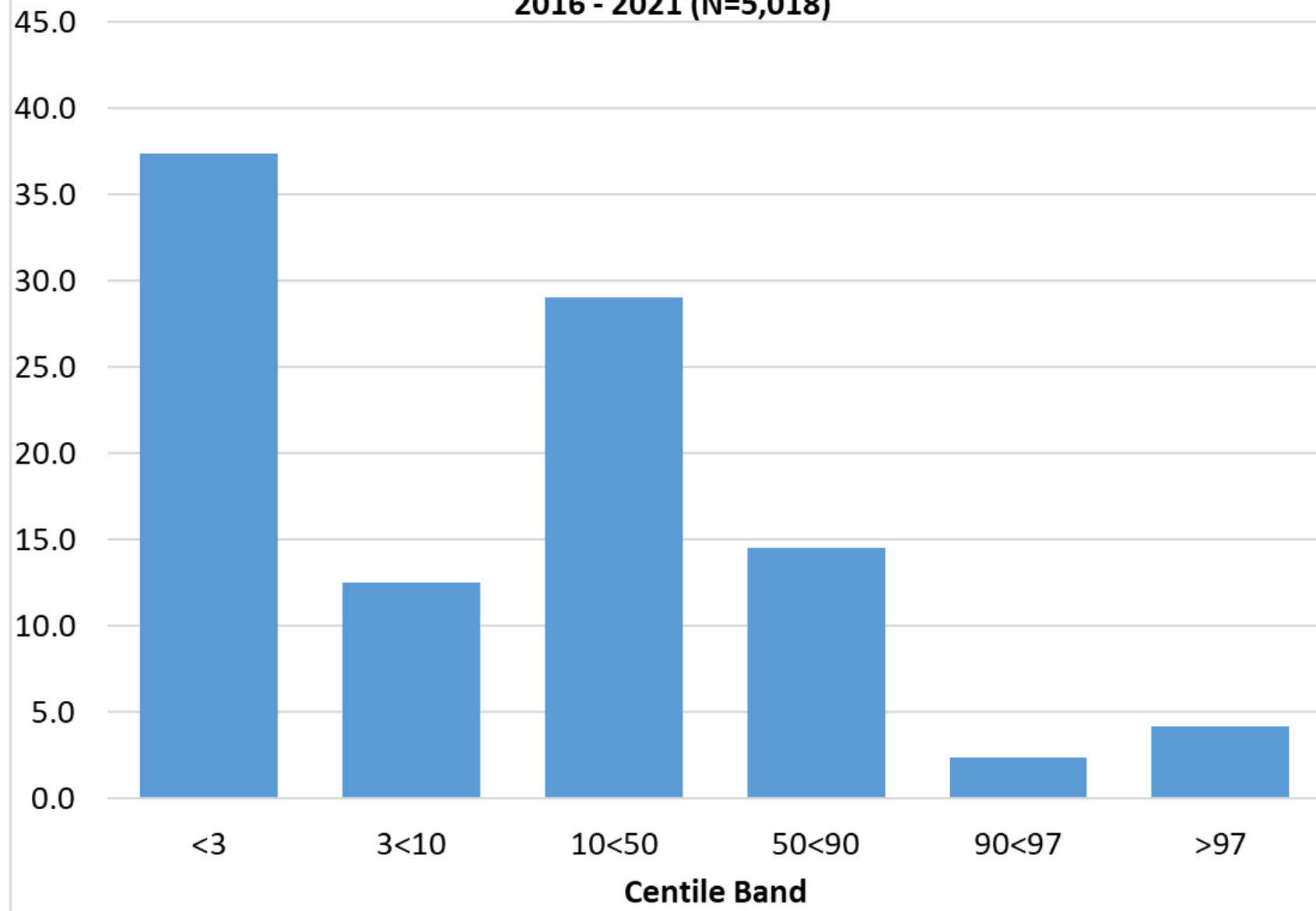
Stillbirth weights 2016-21 on population average fetal weight chart

Plotted with a 2 day adjustment of GA for the average delay between death and delivery

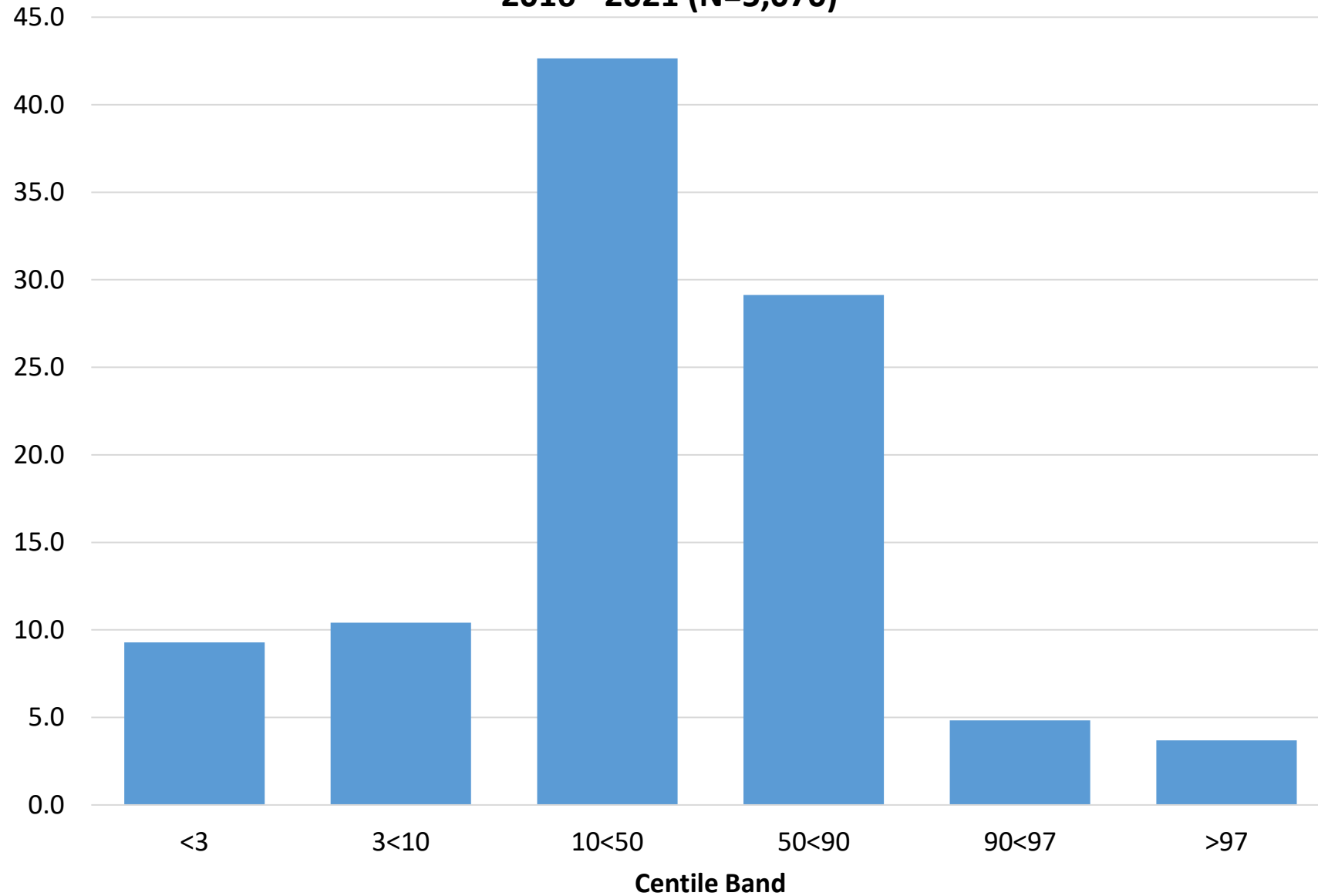
Birthweight (g)



**Proportion of preterm (<37 weeks) stillbirths by GROW centile band,
2016 - 2021 (N=5,018)**



**Proportion of term (≥ 37 weeks) stillbirths by GROW centile band,
2016 - 2021 (N=5,070)**



Ultrasound Obstet Gynecol 2022; 60: 86–95

Published online 8 June 2022 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/uog.24860.

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Fetal weight projection model to define growth velocity and validation against pregnancy outcome in a cohort of serially scanned pregnancies

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Perinatal Institute, Birmingham, UK

Ultrasound Obstet Gynecol 2023; 62: 805–812

Published online 6 November 2023 in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/uog.26248.

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Outcome-based comparative analysis of five fetal growth velocity models to define slow growth

J. GARDOSI^{ID} and O. HUGH^{ID}

Perinatal Institute, Birmingham, UK

Original Research

ajog.org

OBSTETRICS

Fetal size vs growth: comparative analysis of 3 models of growth velocity based on third trimester estimated fetal weights for identifying stillbirth risk



Oliver Hugh, MSc; Joyce Cowan, DHSc; Emily Butler, BSc (Hons); Jason Gardosi, MD, FRCOG

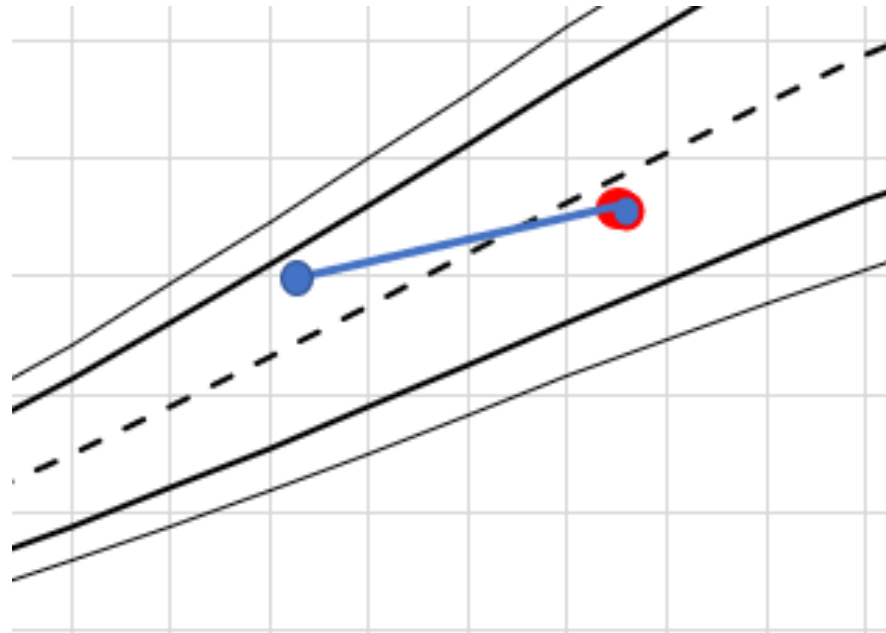
Evaluation against stillbirth risk

N=102,081; SBs=243

Assessing **last two scans** (at average gestations 33+1 and 36+4 weeks)

Comparing **Slow Growth** with **SGA** (last scan).

	Slow growth	SGA
Cases in category n (%)	11964 (11.7)	9641 (9.4)
Stillbirths, n (/1000)	53 (4.4)	45 (4.7)
	Slow growth only	Slow growth and SGA
Cases in category n (%)	7921 (7.8)	4043 (4.0)
		SGA only
		5598 (5.5)



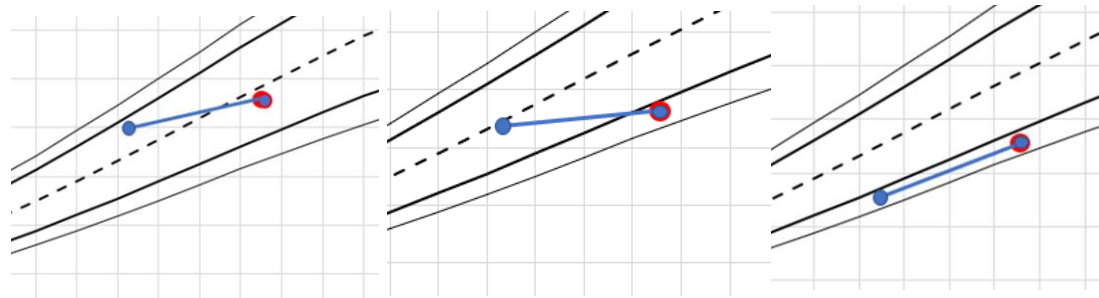
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	Slow growth only	Slow growth and SGA	SGA only
Cases in category n (%)	7921 (7.8)	4043 (4.0)	5598 (5.5)
Stillbirths, n (/1000)	32 (4.0)	21 (5.2)	24 (4.3)
Relative Risk 95% CI	2.07 (1.40-3.05)	2.65 (1.67-4.20)	2.20 (1.42-3.40)
Population Attributable Fraction, %	10.5	9.0	8.8



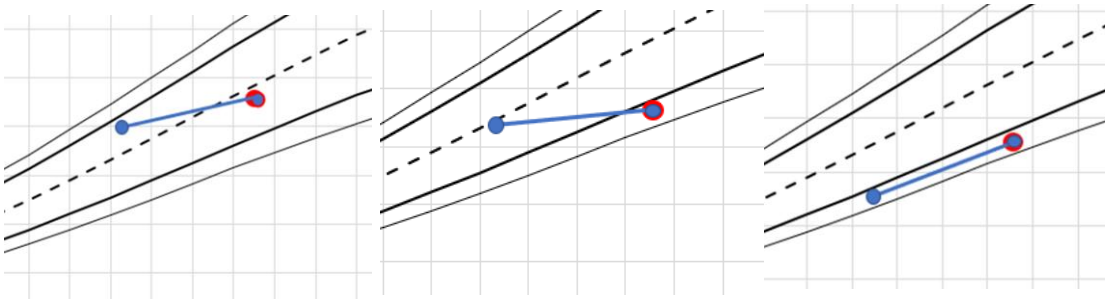
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Relative Risk (95% CI)		2.20 (1.42-3.40)
Population Attributable Fraction, %		8.8



$7921/11964 = 66.2\%$ of slow growth cases were not SGA at last scan

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Outcome-based comparative analysis of five fetal growth velocity models to define slow growth

J. Gardosi  O. Hugh

First published: 16 May 2023 | <https://doi.org/10.1002/uog.26248>

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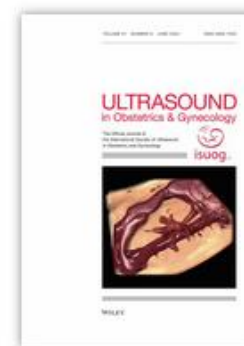


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164,718 pregnancies with 480,592 third trimester scans



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O. Hugh, J. Gardosi

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Outcome-based comparative analysis of five fetal growth velocity models to define slow growth

J. Gardosi✉, O. Hugh

First published: 16 May 2023 | <https://doi.org/10.1002/uog.26248>

1. fixed velocity limit of 20g per day (FVL_{20})¹
2. fixed 50 centile drop (FCD_{50})² over an unspecified scan interval
3. fixed 30 centile drop (FCD_{30})³ over an unspecified scan interval
4. growth trajectory slower than the 3rd centile line (GCL_3)⁴ on a customised chart, over the interval of sequential scans
5. second EFW below the projected optimal weight range (POWR)⁵, adjusted for the interval between scans.

OBSTETRICS

Fetal size vs growth: comparative analysis of 3 models of growth velocity based on third trimester estimated fetal weights for identifying stillbirth risk



Oliver Hugh, MSc; Joyce Cowan, DHSc; Emily Butler, BSc (Hons); Jason Gardosi, MD, FRCOG

Calculation of growth velocity

The following 3 methods in clinical use for calculating growth velocity and designating slow growth between consecutive scan-EFW measurements were applied for comparative analysis:

1. A 50-centile (2 quartiles) drop according to a Delphi consensus recommendation,¹⁴ with cutoff not varied according to scan interval (fixed 50 centile drop, FCD50).
2. A 30-centile drop between scans at 28 and 36 weeks of gestation that were associated with placental insufficiency related outcomes,⁹ with cutoff not varied according to scan interval (fixed 30-centile drop, FCD30).
3. An EFW measurement below the optimal weight range around the expected weight, projected from the previous EFW assuming normal growth²⁴; deviation was calculated as a percent difference between actual (A) and expected (E) EFW, using the formula:



Sample Sample, 11/05/1988,
NHS No. missing, G10000137,
165cm, 78kg, BMI 28.6



EDD: 01/11/22
Agreed
Gest: 35+0



Parity:
1



Risk Factors: See alert flower
Findings: Slow growth
Plan of care: Expand to view



Scan 20/09/2022
Since last scan:

34+0
21 days

Indication:

Planned serial scans

Presentation:

Cephalic

Lie:

Longitudinal

EFW:

2300g, 36.3 centile

Growth since 31+0:

Normal

Growth since 28+0:

Slow

Liquor volume:

Not measured

Further findings:

N/A

Comments:

N/A

Doppler:

UtA:

—

UA:

EDF normal, PI/RI normal

MCA/CPR:

—

Risk factors:

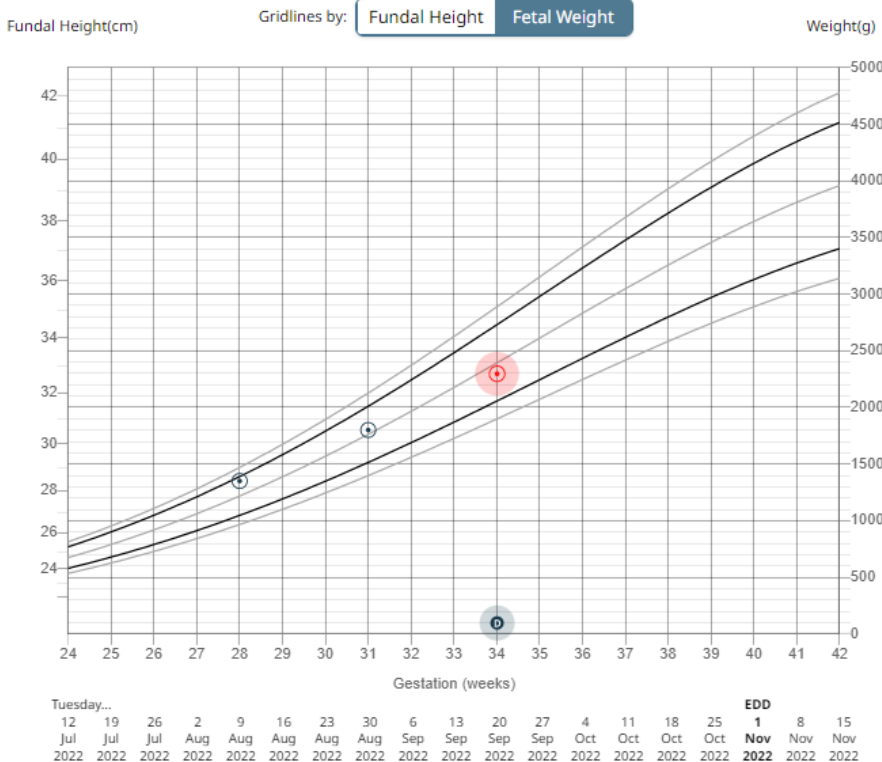
- P/H SGA / FGR baby
- Significant bleed

Plan of care:

- Serial EFW scans
- Obstetric review

Next appointment:

N/A



✕ Add SFH

⊕ Add Scan

Print Chart

Reduction of stillbirths with digital support for assessment of fetal growth velocity

Hanna Ellson, Emily Butler, Hannah Taylor, Jemma Mytton, Oliver Hugh, Jason Gardosi
Perinatal Institute, Birmingham, UK

Objectives

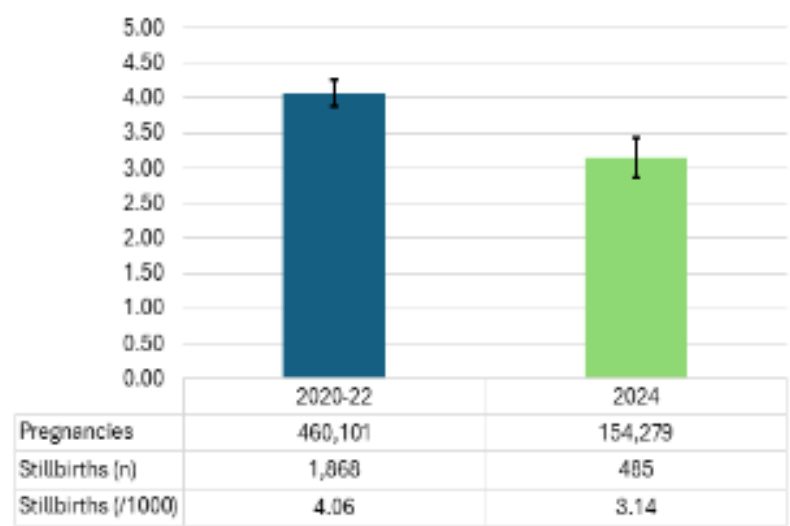
- The new electronic customised growth charts (GROW 2.0) includes auto-plotting, calculation of growth velocity, and prompts for clinical risk assessment and review.
- We wanted to assess the effect of implementation on stillbirth rates.

Methods

- We analysed routinely recorded 2024 data from the first 44 NHS Trusts that implemented GROW 2.0, and compared it with data from the same 44 units between 2020-2022, when only printed charts were in use.
- Previously, growth velocity based on serial ultrasound estimated fetal weight (EFW) was assessed only visually



GROW 2.0 growth velocity assessment (POWER)¹ prompts clinical review if it detects slow growth.



Stillbirth rates **Pre** and **Post** implementation of GROW 2.0 in 44 NHS Trusts

Results

- In 2020-22 (baseline), there were 460,101 births with 1,868 stillbirths (4.06 / 1000)
- In 2024, following implementation of GROW 2.0, there were 154,279 births including 485 stillbirths (3.14 / 1000)
- This represented a 23% reduction (RR: 0.77, CI 0.70 – 0.86)
- GROW 2.0 identified 17.0% of pregnancies with slow growth, most of which (71%) were not SGA, were delivered about a week earlier, and had a stillbirth rate of 1.61 - half the rate in the overall GROW 2.0 cohort.
- The greatest effect was on stillbirth rates **at term**, which reduced from 1.86 to 1.04 (RR 0.56, CI 0.47-0.66).

Conclusion

- Electronic growth chart functionality with auto-plotting, assessment of growth velocity and prompts for review support clinical awareness and decision making
- Recognition of slow growth is an important contributing factor to stillbirth prevention.

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1. GROW 2.0 Electronic fetal growth chart. Perinatal Institute 2023 <https://www.perinatal.org.uk/GROW2.0/>
2. Hugh O, Gardosi J. Fetal weight projection model to define growth velocity and validation against pregnancy outcome in a cohort of serially scanned pregnancies. Ultrasound Obstet Gynecol 2022;60(1):86–95. <https://doi.org/10.1002/uog.24860>

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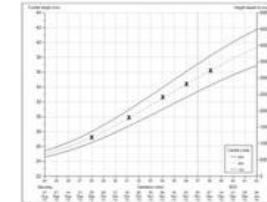
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Publications

Designation of small for gestational age according to seven fetal growth charts in England's National Health Service: population based cohort study of 3.2 million births BMJ. 2026;394:e433307. <https://doi.org/10.1136/bmj-2026-433307>



Improving detection and management of restricted fetal growth to prevent perinatal death BMJ. 2026;393:e668919. <https://doi.org/10.1136/bmj-2026-668919>



INTERGROWTH 21st versus GROW fundal height charts and antenatal detection of small-for-gestational age: A multicenter cohort study Int J Gynecol Obstet. 2026. <https://doi.org/10.1002/ijgo.71128>



Use of fetal growth charts in England Lancet Obstet Gynaecol Women's Health. 2026; 2(5):e364-e365. [https://doi.org/10.1016/S3050-5038\(25\)00223-7](https://doi.org/10.1016/S3050-5038(25)00223-7)



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Small-for-gestational age according to INTERGROWTH-21st fetal weight standard misses most pregnancies at risk of stillbirth identified by GROW. Ultrasound Obstet Gynecol. 2025 <https://doi.org/10.1002/uog.29214>



Abstracts presented at BMFMS 2025 https://perinatal.org.uk/bmfms_2025_abstracts



Accuracy of antenatal ultrasound in predicting large-for-gestational-age babies: population-based cohort study. Am J Obstet Gynecol. 2024;S0002-9378(24):00578-7. <https://doi.org/10.1016/j.ajog.2024.04.052>



Abstracts presented at BMFMS 2024 https://perinatal.org.uk/bmfms_2024_abstracts



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Outcome-based comparative analysis of five fetal growth velocity models to define slow growth Ultrasound Obstet Gynecol. 2023;62(6):805-12. <https://doi.org/10.1002/uog.26248>



Abstracts presented at RCOG 2023

https://www.perinatal.org.uk/rcog_congress_2023_abstracts



Evaluating the Growth Assessment Protocol for stillbirth prevention: progress and challenges

J Perinatal Med. 2022;50(6): 737-47. <https://doi.org/10.1515/jpm-2022-0209>



Reduction of stillbirths in England from 2008 to 2017 according to uptake of the Growth Assessment Protocol: 10-year population-based cohort study Ultrasound Obstet Gynecol. 2021;57:401-8. <https://doi.org/10.1002/uog.22187>



Understanding and Preventing Stillbirth: A Global Task

Special Issue of Journal of Perinatal Medicine, 2022. <https://www.degruyterbrill.com/journal/key/jpme/50/6/html>



Prospective risk of stillbirth according to fetal size at term

J Perinatal Med. 2022;50(6): 748-52. <https://doi.org/10.1515/jpm-2022-0200>



A fetal weight projection model to define growth velocity, and validation against pregnancy outcome in a cohort of serially scanned pregnancies Ultrasound Obstet Gynecol. 2022;60(1):86-95. <https://doi.org/10.1002/uog.24860>



Customized GROW vs INTERGROWTH-21st birthweight standards to identify small for gestational age associated perinatal outcomes at term Am J Obstet Gynecol MFM. 2022;4(2):100545. <https://doi.org/10.1016/j.ajogmf.2021.100545>



Customized growth charts: rationale, validation and clinical benefits

Am J Obstet Gynecol. 2018;218(25):S609-18. <https://doi.org/10.1016/j.ajog.2017.12.011>



Fetal growth surveillance – Current guidelines, practices and challenges

Ultrasound. 2018;26(2):69-79. <https://doi.org/10.1177/1742271X18760657>



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Am J Obstet Gynecol. 2018;218(25):S692-9. <https://doi.org/10.1016/j.ajog.2017.12.013>



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Public Health 2014; 128:698-702. <http://dx.doi.org/10.1016/j.puhe.2014.06.022>



Association between reduced stillbirth rates in England and regional uptake of accreditation training in customised fetal growth assessment BMJ Open 2013;3:e003942 <https://doi.org/10.1136/bmjopen-2013-003942>



The Growth Assessment Protocol: a national programme to improve patient safety in maternity care

MIDIRS, 2013; 23:516-23. http://www.perinatal.org.uk/fetalgrowth/gap/Resources/GAP_article_MIDIRS_Dec_2013.pdf



Tackling Stillbirth: simple and cheap techniques could save hundreds of babies a year

The Times Leading Article 18.12.2013



Fetal growth screening by fundal height measurement

Best Practice & Research Clin Obstet Gynaecol <https://doi.org/10.1016/j.bpobgyn.2009.09.004>



Fetal Growth

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Speakers

Abstracts

Venue

Social Programme

Registration



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Birmingham, UK

Monday 12 and Tuesday 13 October

Welcome reception: Sunday 6 - 7pm

We are pleased to announce that the Fetal Growth conference is coming back to Birmingham, where it all started. The time is right – there are a lot of new developments to keep up with, relating to research and clinical aspects of screening, surveillance, risk assessment, management and guidelines relating to fetal growth.

The in-person meeting will follow our successful format of single-stream, interactive presentations, with ample time for discussion and opportunity to debate the latest evidence. The program will include a set of [hot topics](#) and other areas of interest, with an array of outstanding national and international [speakers](#) and presentation of best abstracts. See also details of our excellent [venue](#) and [social programme](#) to balance the academic endeavours...Finally, make sure you [register](#) and avail yourself of the Early Bird discount.

We look forward to welcoming you to Fetal Growth 2026!



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Fetal Growth

Birmingham 2026

Conference Topics

Faculty

Scientific Programme

Abstracts

Venue

Exhibits

Social Programme

Registration

Previous Meetings

Detailed conference programme to follow.

Topics for presentation and discussion will include:

- Artificial Intelligence: promising applications in obstetrics
- Safe and unsafe standards for antenatal growth surveillance
- The routine third trimester scan: useful or misleading?
- Fetal growth velocity: detecting FGR that is not (yet) SGA
- Twin pregnancy: time to move to twin specific growth charts?
- Doppler and angiogenic factors in surveillance and assessment
- Management of early and late onset placental insufficiency
- Big babies: improving detection and options to offer for delivery
- Standards and guidelines: consistent or contradictory?
- Consensus vs Evidence: if conflicting, which is best?

Registration Form

Please note: This is an in-person-only event

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