

# **Designation of small-for-gestational age according to 7 fetal growth charts in England's National Health Service: population based cohort study of 3.2 million births**

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## **ABSTRACT**

**OBJECTIVE** Antenatal detection of fetal growth restriction is a key strategy for prevention of stillbirths and other adverse perinatal outcomes. Current guidelines focus on identifying small-for-gestational age babies but do not specify which growth charts to use during pregnancy. We investigated 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 (ICBs) 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- (SGA <10 and <3 centile) and large-for-gestational age (LGA, >90 and >97 centile) weight at birth, according to 7 fetal weight standards: 6 unadjustable for maternal characteristics: Hadlock (USA single-centre data), INTERGROWTH-21<sup>st</sup> (IG21, versions 2017 and 2020; eight-country average), World Health Organisation (WHO; 10-country average); Fetal Medicine Foundation (FMF; two-centre average); GROW Lite (NHS population-average); and GROW (NHS population, customised for each pregnancy according to maternal height, weight, parity and ethnic origin).

**RESULTS:** Data were available for 38 (90%) of the 42 ICBs in England. There was wide overall variation between ICBs in maternal characteristics, including ethnic origin (average proportion English: 65.6%, range 19.8-92.2) and high body mass index (BMI>30: mean 24.8%, range 16.3-29.4). The overall rate of babies identified as SGA (<10<sup>th</sup> centile) varied widely according to the standard used, ranging from 5.5% with IG21-2017 to 18.7% with FMF. LGA (>90<sup>th</sup> centile) rates ranged from 4.9% by Hadlock to 17.7% by IG21-2017. Similarly large variations were seen with <3<sup>rd</sup> and >97<sup>th</sup> centile cut-offs. Across all ICBs, the range of SGA was wider with unadjustable standards and mostly reflected local population characteristics including ethnicity and maternal weight. The customised GROW standard had SGA and LGA rates of 13.4% and 8.4%, respectively, and the narrowest range of SGA rates across ICBs (11.6-15.2%). For births at term ( $\geq$ 37.0 weeks), average SGA rates were lowest for IG21-2017 (4.8%), highest for WHO and FMF (both 17.2%) and 12.3% with GROW.

**CONCLUSION:** One-size-fits-all fetal growth charts do not reflect birthweight average, distribution and variation in our maternity population, and systematically fail to identify fetuses that are SGA or LGA, and therefore potentially at risk due to restricted or accelerated growth. The heterogeneity in the NHS requires a customised standard based on the growth potential of each baby. Evidence based national guidelines are urgently needed to standardise charts used for fetal growth assessment, for personalised and safe clinical care as well as to enable proper audit and benchmarking of performance.

## SUMMARY BOX

### What is already known on this topic

- Fetal growth restriction is the most common risk factor for stillbirth, and antenatal recognition of a small fetus and timely delivery is essential for prevention.
- A key part of surveillance in the third trimester is to undertake, where indicated, ultrasound assessment of fetal weight and determine the weight-for-gestational age centile by means of a chart.
- There are a variety of charts and no current national guidance as to which one to use.

### What this study adds

- One-size-fits all, 'universal' charts vary widely in the proportion of cases they designate small-for-gestational age, depending on the data they are derived from and the characteristics of the pregnancies they are applied to, such as maternal weight and ethnic origin.
- Customised charts better represent local populations as they are adjusted for maternal characteristics and can assess fetal weight during pregnancy according to each baby's individual growth potential, thereby improving detection of fetal growth restriction while reducing false positive assessments.

## INTRODUCTION

Good perinatal care includes the identification of the small for gestational age (SGA) fetus as a potential indicator of fetal growth restriction (FGR). Presence of SGA can be determined by ultrasound estimated fetal weight (EFW) plotted on fetal growth charts, and its antenatal detection can lead to prevention of stillbirth and other adverse outcomes by further investigations and timely delivery <sup>1</sup>.

The National Health Service (NHS) in England implemented in 2017 the 'Saving Babies' Lives' Care Bundle (SBL) <sup>2</sup> which includes guidelines for the detection and management of SGA. A key performance indicator which NHS Trusts are required to report on, and gets published as monthly statistics<sup>3</sup>, relates to the gestational age at which SGA fetuses are delivered: babies <3<sup>rd</sup> centile should be delivered before 38+0 weeks, and babies between 3<sup>rd</sup> to 10<sup>th</sup> centile before 40+0 weeks. However the standard by which the centile is determined is not specified in SBL<sup>2</sup>. The Royal College of Obstetricians and Gynaecologists (RCOG) had recommended use of customised charts (GROW) <sup>4,5</sup> in both their previous guidelines <sup>6,7</sup>. With subsequent publication of other fetal weight standards <sup>8-10</sup>, the guideline authors decided not to endorse any standard in their latest update in 2024<sup>11</sup>. The multiplicity of fetal weight charts in use in the NHS has increased since, and in particular that by the INTERGROWTH 21<sup>st</sup> consortium <sup>8</sup>.

We set out to investigate how the use of different fetal weight standards affects rates of SGA and LGA (large for gestational age) in the maternity populations of Integrated Care Boards of NHS England.

## **METHODS**

### Data source

The study cohort originated from a database of routinely collected pregnancy data anonymised for research, and included 3,201,199 singleton livebirths recorded from January 2015 to September 2025 in 92 of the 119 (77%) NHS Trusts in England. Each Trust was running the Growth Assessment Protocol (GAP), a comprehensive fetal growth surveillance program<sup>12</sup>. The variables included maternal height, weight at first antenatal visit, parity, ethnic origin, as well as gestational age, birthweight and sex of the newborn. The expected date of delivery was based on a dating scan performed routinely in the first trimester of pregnancy. Births before 24+0 weeks and after 42+0 weeks were excluded.

Each NHS Trust was grouped into its respective planning & commissioning organisation, known as Integrated Care Board (ICB)<sup>13</sup>, which contained one or more NHS Trusts within their area. There are 42 ICBs in England, with an average of 13,517 births per year based on 567,708 live births in England in 2024<sup>14</sup>. ICBs with less than 1000 pregnancies recorded during the study period were excluded from the analysis.

### Fetal growth standards for calculating percentiles

Scans for estimated fetal weight (EFW) are only routinely performed in high risk pregnancies; therefore, birthweight was used. The weight-for-gestation centiles were calculated to determine small- (SGA; <3<sup>rd</sup> and <10<sup>th</sup>) and large- for-gestational age (LGA; >90<sup>th</sup> and >97<sup>th</sup>) rates, according to the following standards:

1. Hadlock fetal weight standard based on cross-sectional EFW data in a US college cohort<sup>15</sup> ('Hadlock').
2. INTERGROWTH-21<sup>st</sup> fetal weight standard, based on longitudinal assessment of EFWs from low-risk pregnancies in 8 countries ('IG21-2017')<sup>8</sup>.
3. Updated INTERGROWTH-21<sup>st</sup> fetal weight standard, using the same cohort as IG21 2017 but with Hadlock's<sup>16</sup> rather than INTERGROWTH's own fetal weight formula ('IG21-2020')<sup>17</sup>.
4. World Health Organisation fetal weight standard, based on longitudinal assessment of EFWs from low-risk pregnancies in 10 countries ('WHO')<sup>9</sup>.
5. Fetal Medicine Foundation fetal weight standard, based on selected EFW assessments in two hospitals in London and Kent ('FMF')<sup>10</sup>.
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')<sup>18</sup>.
7. Gestation Related Optimal Weight as in 6., but customised for maternal height, early pregnancy weight, parity and ethnic origin ('GROW')<sup>19</sup>.

GROW Lite is not in actual use but was added to study the effect of a chart based on the same NHS derived dataset as in GROW, but without customisation for maternal variables.

Where a fetal weight standard ended at 40+0 weeks (Hadlock, IG21-2017, WHO), or 41+0 weeks (IG21-2020), we projected the trajectory to 42+0 weeks according to the respective chart's formula.

The WHO and GROW standards include the option to adjust for sex of the fetus. However, for fair comparison and to reflect how the standards would be used antenatally, sex was not adjusted for.

### Statistical analysis

We calculated rates of ethnicity, nulliparity, high body mass index (BMI) and prematurity with average maternal height, weight and BMI for each ICB. Average SGA and LGA rates were calculated by applying equal weighting to each ICB cohort to prevent bias due to different sizes. We determined the SGA (<3<sup>rd</sup> and <10<sup>th</sup> centile) and LGA (>90<sup>th</sup> and >97<sup>th</sup> centile) rates and assessed the effect of variation in ethnic origin (proportion of English mothers), maternal height and weight on outcome variable, SGA (<10<sup>th</sup>) in individual ICBs, using univariate linear regression with 95% confidence interval. Assumptions for linear regression were assessed using Q-Q residual plots for normality and homoscedasticity and no major violations were identified. Analyses were performed using Excel (2025; Microsoft, Redmond, WA) and SAS (v. 9.4; SAS Institute, Cary, NC).

### Patient and public involvement

The study was motivated by a recent increase in parents with lived experience of stillbirth contacting the Perinatal Institute's clinical team with questions about their loss, often labelled 'unexplained' by their health service. A frequent theme was inappropriate assessment of fetal growth and choice of growth charts. The parents of Maia Devlin Corfield, stillborn at 41 weeks with unrecognised growth restriction, conducted a nationwide Freedom of Information Survey <sup>20</sup> which found that, contrary to national guidelines <sup>11</sup>, many NHS Trusts failed to assess the appropriateness of their charts for their population. Such information and sad personal stories spurred the authors on to conduct this study

## **RESULTS**

Of the 42 ICBs in England there was sufficient data for 38 (90%) after 4 were excluded for having less than the preset limit of 1000 births recorded (Tables S1-S4). The number of births in each ICB varied depending on whether none, one or more hospitals in the GAP programme were within their catchment area, and the proportion of time over the study period that they were in the GAP programme and contributed data. Supplementary Table S1 displays a wide variation between ICBs in maternal characteristics, including ethnic origin, maternal height, weight and body mass index, and prematurity rate. These characteristics are summarised and presented as averages with ICB ranges in Table 1. The 'Other' maternal ethnicity category includes South European, Middle Eastern, South East Asian, North African and other groups that are small in number nationally, but well represented in some ICBs, especially in London (Table S1).

Table 2 lists the SGA rates (<10<sup>th</sup> and <3<sup>rd</sup>) for all and for term pregnancies by the seven different fetal growth standards. IG21-2017 had the lowest <10<sup>th</sup> and <3<sup>rd</sup> rates at 5.5% and 1.5%, while FMF had the highest at 18.7% and 10.0%. The six unadjustable standards (Hadlock, IG21-2017, IG21-2020, WHO, FMF and GROW Lite) had a wide range of SGA rates, the highest being FMF (15.6 – 26.0%) while customised GROW had the lowest range (11.6 – 15.2%). Supplementary Tables S2 and S3 show the <10<sup>th</sup> and <3<sup>rd</sup> centile SGA rates for individual ICBs.

Table 3 lists LGA rates (>90<sup>th</sup> and >97<sup>th</sup> centile) in the 38 ICBs. IG21-2017 had the highest average >90<sup>th</sup> and >97<sup>th</sup> rates, respectively, at 17.7% and 7.4%, and Hadlock the lowest >90<sup>th</sup> and >97<sup>th</sup> rates at 4.9% and 1.5%. Again, the ranges between ICBs were widest for the unadjustable standards, with IG21-2017 LGA >90<sup>th</sup> rates ranging from 12.2% to 20.6%. Supplementary Table S4 shows the LGA rates (>90<sup>th</sup> and >97<sup>th</sup>) for each ICB.

In Figure 1, the centile distributions are illustrated by decile bands for each of the standards. Bars in the >90 and <10 centile bands indicate the range of average LGA or SGA rates between ICBs. Figure 2 illustrates the differences between the 10<sup>th</sup> centile trajectories of the charts derived from different populations.

Table 4 shows the degree to which maternal constitutional variables affect the designation of SGA by each fetal weight standard, in terms of ethnic origin (% English), maternal height and maternal weight. Each of these variables are significantly correlated with SGA rates as defined by the unadjusted standards (Hadlock, IG21, WHO, FMF and GROW Lite), which results in the taller and heavier mothers, and those of English ethnicity, being assigned the lowest SGA rates. With customised GROW, which is already adjusted for these variables, SGA rate was either not affected (ethnicity, weight) or with only borderline significance (maternal height: -0.19, CI -0.37 to -0.02).

## **DISCUSSION**

### **Principal findings**

Firstly, we found that most ‘one-size-fits-all’ fetal growth charts in current use in England do not represent the national average birthweight in our population, and vary substantially in screen positive rates for SGA and LGA (Tables 2 & 3). INTERGROWTH charts (2017<sup>8</sup> and 2020<sup>17</sup>) result in a large under-estimation of SGA and over-estimation of LGA rates. WHO charts<sup>9</sup> show the opposite effect, over-estimating SGA and under-estimating LGA rates, while with FMF charts<sup>10</sup>, both SGA and LGA rates are high. Hadlock<sup>15</sup> had acceptable SGA but low LGA rates. There were more realistic rates using GROW Lite<sup>18</sup> and GROW<sup>16</sup> standards, which are based on the UK’s NHS population. Secondly, there was considerable heterogeneity between ICBs, and all unadjustable charts, including GROW Lite, showed wide ranges in SGA and LGA rates due to the varied population. A much narrower screen positive range was obtained with the customised GROW chart, which is adjusted for individual maternal characteristics, thereby improving identification of abnormal growth.

## **Strengths and Limitations**

A strength of the study is the large database of routinely collected information covering 38 (90%) of the 42 ICBs which constitute the NHS areas in England. The remaining 4 ICBs did not have a hospital running the GAP programme in their catchment area, but could compare the characteristics of their own population with similar ones in Table S1 to infer their approximate LGA and SGA rates with different charts. Being a retrospective analysis, assessment of pregnancy outcomes would have been affected by treatment paradox, and we therefore focussed on SGA screen positive rates as these are management triggers recommended by the RCOG <sup>11</sup> and NHS England's national SBL guidelines <sup>2</sup>. A potential limitation could be that we assessed fetal weight charts by birthweight; however this was the only way in which a representative sample of the population could be studied, as scans are not done routinely in the third trimester, but selectively only in pregnancies that may be considered at increased risk. Even if routine scan data were available, ultrasound assessment can have substantial error in estimating fetal weight, especially at the LGA and SGA ends of the distribution, and accuracy is further affected by factors such as maternal body mass index.<sup>21</sup>

## **Comparison with other studies**

Comparative studies of large cohorts in Australia<sup>22</sup> and Europe<sup>23</sup> have highlighted the differences in screen positive rates between charts, questioned the appropriateness of universal standards, and called for the use of national or regional population based charts. Our study however shows that even between relatively small areas within our health service, such as ICBs with an average of less than 15,000 births per year, application of unadjustable growth standards result in substantial variation of SGA and LGA rates.

The discrepancies can be due to the varied methodologies used to develop the standards, but a main reason is the difference in populations from which standards are derived and to which they are applied. INTERGROWTH was based on 1556 pregnancies from 8 countries, including England as well as several low and middle income countries<sup>8</sup>. The authors maintained that because they selected well nourished women and low risk pregnancies, their babies' growth and weight ought to be a valid standard universally. However the IG-21 publications' own tables show substantial differences in average weight between the contributing countries' datasets, as well as between the contributing countries and the overall average <sup>24</sup>. A number of studies have since reported that the INTERGROWTH fetal and neonatal standards do not perform well even in the countries which had contributed the data, including Brazil <sup>25</sup>, China <sup>26,27</sup>, India <sup>28</sup>, Italy <sup>29</sup> and USA<sup>30,31</sup>. Similar observations were reported from Canada<sup>32</sup>, Denmark<sup>33</sup>, Norway<sup>34</sup>, Poland<sup>35</sup>, Lithuania<sup>36</sup>, Spain<sup>37,38</sup>, Hong Kong<sup>39</sup>, Australia <sup>40</sup> and New Zealand<sup>41</sup>, questioning the validity and usefulness of a universal standard. In UK studies, IG21 is inferior in predicting infants requiring neonatal unit admission<sup>42</sup> and misses the majority of pregnancies at risk of stillbirth.<sup>43</sup> Despite such evidence, the

INTERGROWTH formulae are in electronic applications for assessing fetal growth and size, and their uptake has increased since the latest RCOG guideline stopped recommending which chart to use.<sup>11</sup>

The WHO standard is also based on low risk pregnancies and includes data from 1387 women from 10 countries with none from the UK<sup>9</sup>. This chart has a higher 10<sup>th</sup> centile line (Fig 2) and results in high SGA rates (18.1%) in our population (Table 2). The FMF standard<sup>8</sup> is derived from two Trusts in London and Kent, yet the method applied results in high SGA as well as high LGA rates in our UK wide cohort.

GROW Lite uses NHS data with normal pregnancy outcome and shows SGA and LGA rates closer to that expected with 10<sup>th</sup> and 90<sup>th</sup> centile cut-offs. Below 10<sup>th</sup> centile rates are expected to be higher than 10% because factors restricting fetal growth (e.g. placental insufficiency) are more common than factors which accelerate growth (e.g. maternal diabetes). A growth restricting influence is present across the spectrum of fetal weight, hence there is a negative skewness across the distribution, as shown in Fig 1. When cases with potential pathology are excluded, the SGA rate is closer to the 10<sup>th</sup> centile. For example, exclusion of preterm births, which are known to be associated with FGR<sup>44</sup>, results in an SGA (<10<sup>th</sup> centile) rate of 11.2% at term (Table 2).

A further reason for the large differences in SGA and LGA rates, as demonstrated between ICBs in Table S1, relates to maternal constitutional characteristics such as ethnicity, height and weight which influence normal growth<sup>5, 45-48</sup>. Table 4 shows the strength of correlation between these variables and SGA rates. It applies to all unadjustable standards but not to GROW, as that is already customised for these variables. In effect, the variation in SGA rates by the 'one-size-fits-all' standards reflects the differences in maternal constitutional characteristics the ICBs' heterogeneous populations.

Ethnicity has a well established physiological effect on growth, as shown in international studies of low risk pregnancies<sup>49-52</sup>. A 10-country cohort study of 1.25 million term pregnancies showed that SGA rates by the INTERGROWTH standard varied with ethnic origin and maternal size and failed to reflect stillbirth rates<sup>53</sup>. In the UK, an ethnic specific neonatal standard has been proposed for South Asians<sup>54</sup> because their birthweight was consistently lower than the British population-average newborn chart<sup>55</sup> in normal outcome pregnancies, resulting in high SGA rates. In a more recent cohort of nearly 3 million births, South Asian babies were found to have a 47% higher SGA rate when ethnicity was not adjusted for, and these additional 'SGA' pregnancies did not have a higher stillbirth risk than those that were not SGA<sup>56</sup>.

In the current study, SGA rates can be seen to vary widely according to the ethnic mix of the local population. For example in North East London, where South Asians make up the largest ethnic group (40%, Table S1), the SGA rate is highest of all ICBs according to each of the 6 unadjustable standards, reaching 25.4% with WHO and 26.0% with FMF, while the GROW customised centile shows an SGA rate of 13.3% (Table S2).

Artificially inflated SGA rates may lead to unnecessary investigations and interventions and divert clinicians' and health services' attention from other causes of increased perinatal mortality rates, such as health inequalities and social deprivation. Other potential implications for a baby misclassified as small is overfeeding during infancy, which increases the risk of obesity and adult cardiovascular diseases.<sup>54</sup>

Making charts ethnicity specific only, however, would ignore physiological and pathological variation in maternal size within each ethnic group. Analysis in different maternal height and weight groups within normal BMI limits showed that stillbirth rates remained the same for all groups, as did SGA rates with GROW when customised for height and weight. However with GROW not customised, as in GROW Lite, or with unadjustable standards such as Hadlock, INTERGROWTH or WHO, the SGA rates were consistently higher for small mothers and lower for large mothers resulting in false positive and false negative assessments.<sup>57,58</sup> High BMI pregnancies are at increased risk of stillbirth which is associated with higher SGA rates, identified by GROW but masked by each of the unadjustable standards.<sup>58</sup> These effects were also observed when the analysis was repeated for South Asian pregnancies.<sup>58</sup>

While many comparative studies have stillbirth as primary outcome, antenatal growth problems are also associated with neonatal morbidity and mortality. In an analysis of a state-wide cohort in Washington, term birthweight defined as SGA by GROW compared to INTERGROWTH was significantly better associated with stillbirth risk as well as neonatal indicators including low Apgar score, newborn seizures and need for higher level of intensive care.<sup>31</sup>

### **Policy implications**

Comparison of SGA detection rates between hospitals and clinical networks can be misleading if different fetal weight and birthweight charts are used<sup>59</sup>. The inconsistencies are evident in NHS Digital's monthly publication<sup>3</sup> of maternity units' self reported performance indicators. NHS England's Saving Babies' Lives (SBL) guideline<sup>2</sup> stipulates that fetuses identified antenatally with a weight below the 3<sup>rd</sup> centile should be delivered before 38.0 weeks, and those between 3<sup>rd</sup> and 10<sup>th</sup> centile before 40.0 weeks, without specifying which standard to use. This lack of standardisation affects the usefulness of audit and is likely to be a reason for the continued absence of an authoritative, peer reviewed national report on NHS England's performance under its SBL guidelines. More immediately in clinical practice, inappropriate charts can lead to false positive diagnoses and unnecessary interventions, or failure to recognise fetal growth restriction, and thereby represent a systematic risk to patient safety in our maternity services.

### **Conclusion**

Fetal growth restriction is the most frequent precursor of adverse perinatal outcome, and fetal weights below 10<sup>th</sup> and 3<sup>rd</sup> centiles are important trigger points for clinical management including further investigations and decisions regarding timing of delivery. However such cut-off points are

meaningless without defining the SGA fetal weight standard by which they are to be determined, as one-size-fits-all charts are based on different methodologies and derived from different populations. SGA rates can vary substantially within normal ranges of maternal characteristics, and adjustment for such physiological variation provides a personalised chart which predicts the growth potential of each baby, improves identification of risk and reduces false positive alerts. Standardisation is the only means by which the health service can meaningfully audit and benchmark performance of fetal growth assessment at local and national level.

## **Acknowledgement**

We would like to thank Sherena Corfield and Jack Devlin, parents of stillborn daughter Maia, for communicating their sad experience, their tireless campaign to improve patient safety, and their advice and encouragement for conducting this study.

**Funding:** None

## **Competing interests**

All authors have completed the ICMJE uniform disclosure form at [www.icmje.org/disclosure-of-interest/](http://www.icmje.org/disclosure-of-interest/) and declare that they are employees of the Perinatal Institute, a not-for-profit social enterprise that developed the GROW charts used in the study and provide them to NHS Trusts as part of its GAP programme. The authors have had no support from, or financial relationship with, any organisation that might have interest in the submitted work; and no other relationships or activities that could appear to have influenced the submitted work.

## **Authors' contributions**

JG conceived and led the work, helped interpret the data and wrote the first draft. OH and AM conducted and checked the analyses. EB and HE contributed to the interpretation of the data. All authors reviewed and revised the manuscript and approved the final version. JG is guarantor.

## **Ethical approval**

The study received approval by the East Midlands-Derby Research Ethics Committee (REC reference 25/EM/0271, IRAS Project ID 365709).

## **Data sharing**

Data sharing will be available on reasonable request. Codes used in the analysis are included in public repository: <https://github.com/olihugh/ICB-SGA-Designation>

## **Transparency**

The lead author affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

## **Dissemination**

The results of the study will be disseminated via conferences and social media platforms to persons receiving maternity care, their health service providers clinicians and clinical networks in the NHS and internationally, guideline developers as well as Integrated Care Boards and other commissioners and planners of health care.

**Provenance and peer review:** Not commissioned; externally peer reviewed.

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

|                                      |                         | n (%)<br>(or as stated) |               | ICB Range   |
|--------------------------------------|-------------------------|-------------------------|---------------|-------------|
| 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/m <sup>2</sup> ) | 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 2** - Fetal weight standard <10<sup>th</sup> and <3<sup>rd</sup> centile rates for England average and range across Integrated Care Boards, for all and for term only ( $\geq 37$  weeks) births

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

**Table 3** – Fetal weight standard >90<sup>th</sup> and >97<sup>th</sup> centile rates for England average, and range across Integrated Care Boards

|                         | Centile Band |             |         |           |
|-------------------------|--------------|-------------|---------|-----------|
|                         | >90th        |             | >97th   |           |
|                         | Average      | Range       | Average | Range     |
| Hadlock <sup>15</sup>   | 4.9          | 3.0 - 6.0   | 1.5     | 0.9 - 2.0 |
| IG21-2017 <sup>8</sup>  | 17.7         | 12.2 - 20.6 | 7.4     | 4.7 - 8.9 |
| IG21-2020 <sup>17</sup> | 12.3         | 8.3 - 14.6  | 4.2     | 2.6 - 5.3 |
| WHO <sup>9</sup>        | 7.6          | 4.9 - 9.2   | 2.2     | 1.3 - 2.8 |
| FMF <sup>10</sup>       | 16.2         | 11.0 - 18.8 | 7.4     | 4.7 - 8.9 |
| GROW Lite <sup>18</sup> | 9.9          | 6.5 - 11.7  | 3.9     | 2.3 - 4.8 |
| GROW <sup>19</sup>      | 8.4          | 7.3 - 9.3   | 3.1     | 2.6 - 3.7 |

**Table 4 – Regression for the effect of ethnic origin (% English), maternal height and weight on small for gestational age (<10<sup>th</sup>) rates by seven different fetal weight standards (Hadlock<sup>15</sup>, IG21-2017<sup>8</sup>, IG21-2020<sup>17</sup>, WHO<sup>9</sup>, FMF<sup>10</sup>, GROW Lite<sup>18</sup> and GROW<sup>19</sup>)**

| Variable             | Standard  | Effect | 95% confidence interval |       |
|----------------------|-----------|--------|-------------------------|-------|
|                      |           |        | -                       | +     |
| % English (+10%)     | Hadlock   | -0.99  | -1.20                   | -0.78 |
|                      | IG21 2017 | -0.48  | -0.61                   | -0.36 |
|                      | IG21 2020 | -0.68  | -0.84                   | -0.52 |
|                      | WHO       | -1.19  | -1.43                   | -0.95 |
|                      | FMF       | -1.25  | -1.50                   | -0.99 |
|                      | GROW Lite | -0.92  | -1.12                   | -0.72 |
|                      | GROW      | -0.03  | -0.20                   | 0.14  |
| Mean height (+0.5cm) | Hadlock   | -1.22  | -1.36                   | -1.07 |
|                      | IG21 2017 | -0.62  | -0.70                   | -0.54 |
|                      | IG21 2020 | -0.86  | -0.97                   | -0.76 |
|                      | WHO       | -1.44  | -1.61                   | -1.26 |
|                      | FMF       | -1.51  | -1.69                   | -1.33 |
|                      | GROW Lite | -1.13  | -1.27                   | -0.10 |
|                      | GROW      | -0.19  | -0.37                   | -0.02 |
| Mean weight (+1kg)   | Hadlock   | -0.86  | -1.21                   | -0.51 |
|                      | IG21 2017 | -0.40  | -0.59                   | -0.21 |
|                      | IG21 2020 | -0.58  | -0.83                   | -0.32 |
|                      | WHO       | -1.05  | -1.45                   | -0.65 |
|                      | FMF       | -1.08  | -1.51                   | -0.65 |
|                      | GROW Lite | -0.79  | -1.12                   | -0.47 |
|                      | GROW      | 0.14   | -0.05                   | 0.32  |

Fig 1 Weights in centile bands according to seven fetal growth standards, with error bars in >90 and <10 centile bands indicating variation between NHS Integrated Care Boards

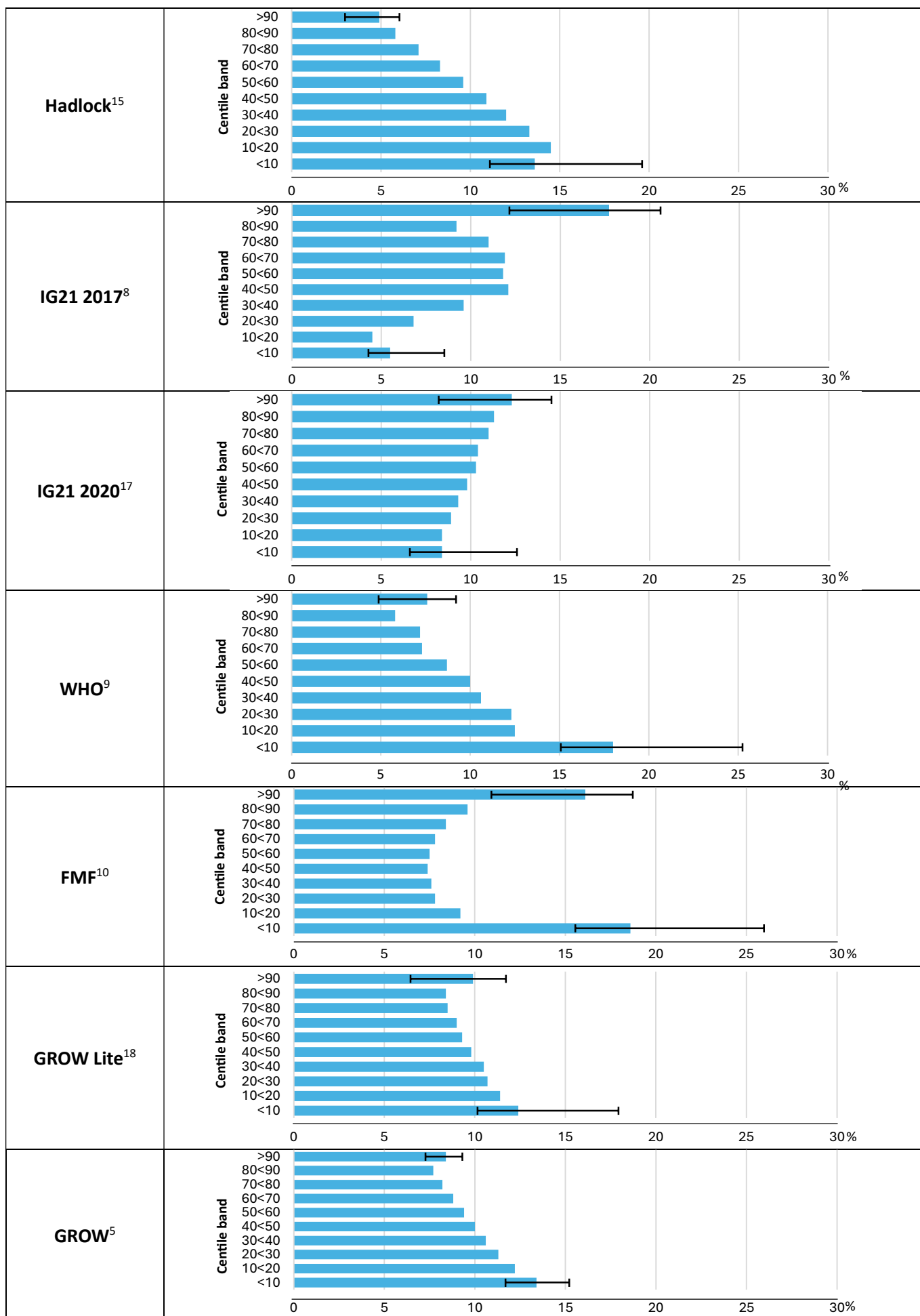
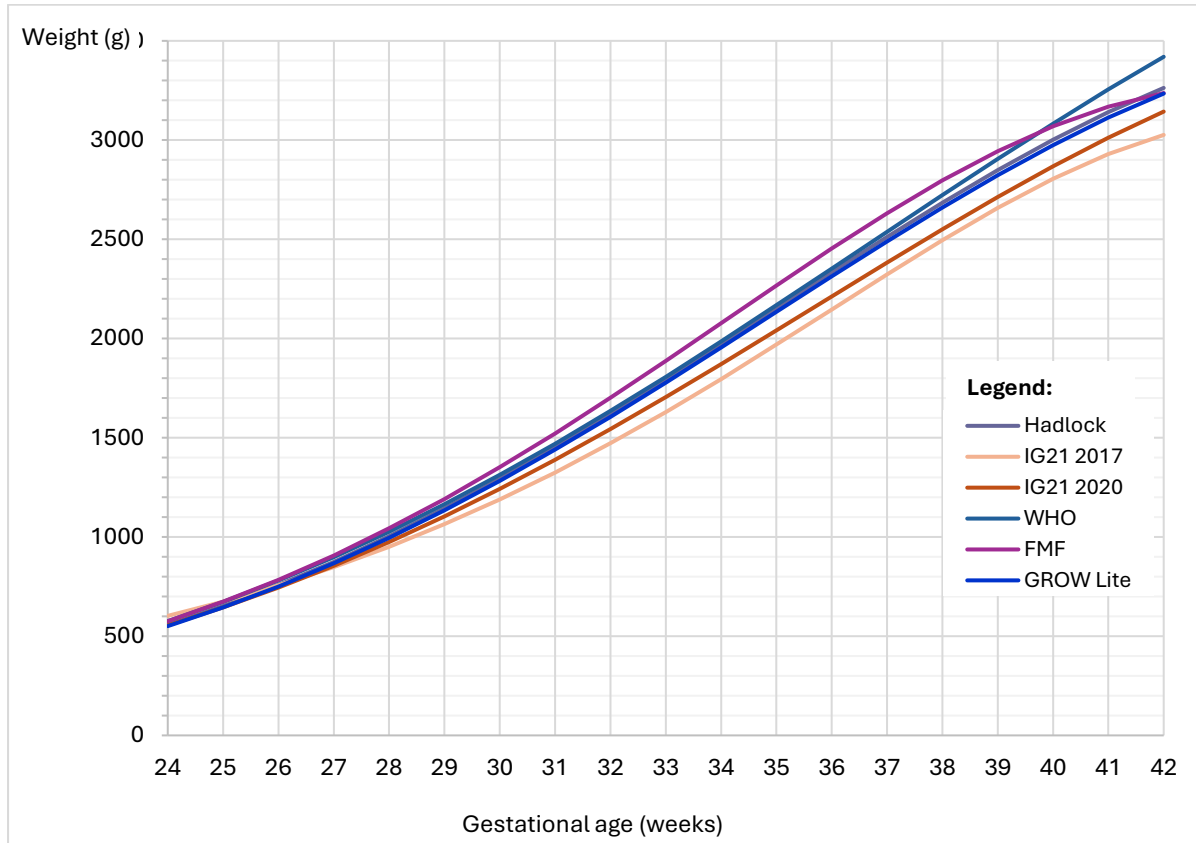


Fig 2 Tenth centile trajectories for the six population-based fetal weight standards (Hadlock<sup>15</sup>, IG21 2017<sup>8</sup>, IG21 2020<sup>17</sup>, WHO<sup>9</sup>, FMF<sup>10</sup> and GROW Lite<sup>18</sup>)



**Table S1** – Description of study population by NHS Integrated Care Board

| Integrated Care Board                                    | Pregnancies | English | South Asian | East European | SSA / Car | Other | Nulliparous | Maternal height | Maternal weight |      | Body Mass Index |        |         |       |       | Birth gestation |
|--|-------------|---------|-------------|---------------|-----------|-------|-------------|-----------------|-----------------|------|-----------------|--------|---------|-------|-------|-----------------|
|  | N           | %       | %           | %             | %         | %     | %           | Mean            | Mean            | p50  | Mean            | Median | % <18.5 | % >30 | % >35 | % <37 weeks     |
| Bath and North East Somerset, Swindon and Wiltshire      | 18733       | 85.0    | 1.5         | 2.5           | 3.1       | 7.8   | 43.1        | 165.2           | 73.0            | 69.0 | 26.7            | 25.4   | 2.5     | 24.7  | 10.1  | 5.8             |
| Bedfordshire, Luton & Milton Keynes                      | 94171       | 47.3    | 21.7        | 11.6          | 7.9       | 11.5  | 42.7        | 163.5           | 71.5            | 68.0 | 26.7            | 25.6   | 2.9     | 24.6  | 9.5   | 6.4             |
| Birmingham and Solihull                                  | 94264       | 44.2    | 31.4        | 5.7           | 8.4       | 10.4  | 38.8        | 162.7           | 72.2            | 69.0 | 27.2            | 26.2   | 2.8     | 27.7  | 10.8  | 7.2             |
| Black Country  | 119318      | 47.3    | 28.3        | 5.5           | 9.7       | 9.2   | 38.9        | 162.6           | 72.3            | 69.0 | 27.3            | 26.2   | 3.3     | 28.3  | 11.6  | 6.7             |
| <b>Bristol, North Somerset and South Gloucestershire</b> | <b>23</b>   |         |             |               |           |       |             |                 |                 |      |                 |        |         |       |       |                 |
| Buckinghamshire, Oxfordshire and Berkshire West          | 16569       | 61.8    | 16.7        | 6.8           | 3.6       | 11.1  | 43.4        | 164.6           | 71.4            | 68.0 | 26.3            | 25.2   | 2.8     | 22.1  | 8.1   | 5.5             |
| Cambridgeshire and Peterborough                          | 62381       | 65.8    | 8.9         | 13.5          | 3.1       | 8.7   | 41.6        | 164.6           | 72.5            | 69.0 | 26.7            | 25.4   | 3.0     | 25.0  | 10.5  | 6.1             |
| Cheshire & Merseyside                                    | 234602      | 83.5    | 2.4         | 3.7           | 1.9       | 8.4   | 43.6        | 164.8           | 73.2            | 70.0 | 26.9            | 25.6   | 2.7     | 25.6  | 10.8  | 6.7             |
| Cornwall and Isles of Scilly                             | 32373       | 92.2    | 0.6         | 2.4           | 0.5       | 4.3   | 42.8        | 164.3           | 73.5            | 70.0 | 27.2            | 25.8   | 1.7     | 27.1  | 11.6  | 5.2             |
| Coventry and Warwickshire                                | 56061       | 71.7    | 8.0         | 7.9           | 3.2       | 9.2   | 44.2        | 165.0           | 72.0            | 69.0 | 26.4            | 25.1   | 2.9     | 22.8  | 9.1   | 6.0             |
| Derby and Derbyshire                                     | 32602       | 84.1    | 4.5         | 5.4           | 1.0       | 5.0   | 43.7        | 165.5           | 74.0            | 70.0 | 27.0            | 25.6   | 2.8     | 26.6  | 11.4  | 6.7             |
| Devon  | 70615       | 88.9    | 1.2         | 3.5           | 0.8       | 5.6   | 43.0        | 165.1           | 73.0            | 69.0 | 26.7            | 25.3   | 2.2     | 24.5  | 10.3  | 5.8             |
| Dorset   | 33448       | 78.5    | 2.0         | 5.8           | 1.0       | 12.7  | 44.3        | 165.1           | 72.8            | 69.0 | 26.7            | 25.3   | 1.9     | 23.6  | 9.7   | 4.4             |
| Frimley  | 76865       | 55.1    | 21.1        | 7.8           | 3.8       | 12.3  | 45.1        | 164.3           | 70.8            | 68.0 | 26.2            | 25.0   | 2.6     | 21.2  | 7.9   | 5.5             |
| <b>Gloucestershire</b>                                   | <b>19</b>   |         |             |               |           |       |             |                 |                 |      |                 |        |         |       |       |                 |
| Greater Manchester                                       | 277122      | 63.4    | 17.0        | 3.7           | 5.2       | 10.6  | 40.2        | 163.9           | 71.7            | 68.0 | 26.6            | 25.5   | 3.1     | 24.3  | 9.6   | 6.9             |
| Hampshire and Isle of Wight                              | 83983       | 80.8    | 3.9         | 4.0           | 2.8       | 8.6   | 44.6        | 164.8           | 73.6            | 70.0 | 27.1            | 25.8   | 2.0     | 26.7  | 11.2  | 5.8             |
| Herefordshire and Worcestershire                         | 53280       | 82.2    | 3.9         | 7.6           | 1.4       | 5.0   | 43.9        | 164.9           | 73.6            | 70.0 | 27.1            | 25.7   | 2.4     | 26.5  | 11.3  | 6.9             |
| Hertfordshire and West Essex                             | 80019       | 63.4    | 10.5        | 9.1           | 4.3       | 12.7  | 44.6        | 164.4           | 71.2            | 68.0 | 26.3            | 25.1   | 2.4     | 21.6  | 8.3   | 6.6             |
| Humber and North Yorkshire                               | 136622      | 84.6    | 1.9         | 5.5           | 1.6       | 6.3   | 43.7        | 165.3           | 73.7            | 70.0 | 26.9            | 25.6   | 2.7     | 26.4  | 11.2  | 7.0             |
| Kent and Medway  | 108921      | 74.8    | 4.4         | 6.2           | 4.6       | 10.0  | 42.9        | 164.9           | 72.9            | 69.0 | 26.8            | 25.5   | 2.6     | 25.1  | 10.3  | 5.6             |
| Lancashire and South Cumbria                             | 127371      | 77.0    | 13.2        | 3.8           | 1.2       | 4.9   | 41.6        | 164.3           | 72.3            | 69.0 | 26.7            | 25.5   | 3.2     | 24.9  | 10.2  | 6.9             |
| Leicester, Leicestershire and Rutland                    | 64524       | 50.0    | 29.1        | 6.5           | 5.4       | 8.9   | 43.9        | 163.0           | 70.7            | 68.0 | 26.6            | 25.4   | 3.8     | 23.9  | 9.1   | 7.0             |
| Lincolnshire   | 28892       | 78.6    | 2.2         | 11.1          | 2.3       | 5.8   | 43.4        | 165.0           | 74.9            | 71.0 | 27.5            | 26.1   | 2.8     | 29.4  | 13.3  | 6.5             |
| Mid and South Essex                                      | 38741       | 75.0    | 4.4         | 5.5           | 4.6       | 10.4  | 41.5        | 164.7           | 72.4            | 69.0 | 26.7            | 25.4   | 2.4     | 24.1  | 9.6   | 4.7             |
| Norfolk & Waveney  | 80170       | 82.5    | 1.8         | 6.2           | 1.6       | 7.9   | 43.3        | 164.9           | 73.1            | 69.0 | 26.8            | 25.4   | 3.0     | 25.5  | 11.1  | 6.4             |
| North Central London                                     | 135095      | 27.1    | 10.0        | 17.9          | 12.4      | 32.5  | 45.5        | 163.5           | 68.9            | 66.0 | 25.8            | 24.7   | 2.8     | 18.7  | 6.4   | 5.7             |
| North East and North Cumbria                             | 190219      | 87.5    | 3.2         | 2.3           | 1.7       | 5.2   | 43.3        | 164.8           | 74.4            | 71.0 | 27.3            | 26.0   | 2.6     | 28.8  | 12.5  | 6.3             |
| North East London  | 185835      | 19.8    | 40.0        | 15.2          | 10.4      | 14.6  | 42.9        | 161.3           | 68.9            | 66.0 | 26.4            | 25.5   | 3.0     | 22.2  | 7.6   | 6.4             |
| North West London  | 84026       | 21.4    | 21.1        | 11.1          | 10.7      | 35.7  | 50.4        | 163.6           | 67.6            | 65.0 | 25.3            | 24.2   | 3.5     | 16.3  | 5.3   | 5.0             |
| Northamptonshire   | 61496       | 62.7    | 6.3         | 14.7          | 6.3       | 9.9   | 43.5        | 164.6           | 72.7            | 69.0 | 26.8            | 25.6   | 3.1     | 25.4  | 10.5  | 6.6             |
| Nottingham and Nottinghamshire                           | 34533       | 82.9    | 1.8         | 9.2           | 1.6       | 4.5   | 44.0        | 165.1           | 74.8            | 71.0 | 27.4            | 26.0   | 3.0     | 28.8  | 13.1  | 6.6             |
| Shropshire, Telford and Wrekin                           | 28314       | 81.7    | 4.5         | 5.4           | 3.0       | 5.4   | 42.0        | 165.2           | 75.0            | 71.0 | 27.4            | 26.1   | 2.4     | 28.9  | 12.4  | 6.3             |
| Somerset   | 41907       | 84.8    | 2.1         | 6.6           | 1.3       | 5.3   | 43.0        | 164.6           | 73.9            | 70.0 | 27.2            | 25.8   | 2.1     | 27.2  | 11.8  | 6.7             |
| <b>South East London</b>                                 | <b>682</b>  |         |             |               |           |       |             |                 |                 |      |                 |        |         |       |       |                 |
| South West London  | 49398       | 45.8    | 15.2        | 7.9           | 12.1      | 19.1  | 44.7        | 164.0           | 71.3            | 68.0 | 26.5            | 25.4   | 2.6     | 22.8  | 8.3   | 6.1             |
| South Yorkshire  | 112400      | 78.7    | 5.3         | 5.9           | 3.0       | 7.1   | 42.4        | 164.5           | 74.2            | 70.2 | 27.4            | 26.1   | 2.8     | 28.9  | 12.8  | 6.3             |
| <b>Staffordshire &amp; Stoke on Trent</b>                | <b>75</b>   |         |             |               |           |       |             |                 |                 |      |                 |        |         |       |       |                 |
| Suffolk & North East Essex                               | 79853       | 79.7    | 2.7         | 5.9           | 2.4       | 9.4   | 42.7        | 164.6           | 73.0            | 69.0 | 26.9            | 25.6   | 2.6     | 25.7  | 10.9  | 5.9             |
| Surrey Heartlands  | 31789       | 64.5    | 9.9         | 6.3           | 4.4       | 14.9  | 45.0        | 164.5           | 70.5            | 67.0 | 26.0            | 24.8   | 2.5     | 20.0  | 7.5   | 5.8             |
| Sussex   | 21674       | 84.3    | 1.8         | 5.8           | 0.8       | 7.3   | 43.7        | 165.0           | 71.7            | 68.0 | 26.3            | 25.0   | 2.5     | 21.8  | 8.9   | 5.6             |
| West Yorkshire   | 122214      | 69.1    | 16.0        | 4.6           | 2.4       | 7.8   | 41.4        | 164.0           | 71.7            | 68.0 | 26.6            | 25.4   | 3.4     | 24.4  | 9.7   | 5.9             |

SSA / Car: Sub-Saharan African or Caribbean. Shaded rows = excluded due to lack of data

**Table S2 – Small for Gestational Age (<10<sup>th</sup> 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 <sup>15</sup><br>% | IG21 2017 <sup>8</sup><br>% | IG21 2020 <sup>17</sup><br>% | WHO <sup>9</sup><br>% | FMF <sup>10</sup><br>% | GROW Lite <sup>18</sup><br>% | GROW <sup>5</sup><br>% | Hadlock <sup>15</sup><br>% | IG21 2017 <sup>8</sup><br>% | IG21 2020 <sup>17</sup><br>% | WHO <sup>9</sup><br>% | FMF <sup>10</sup><br>% | GROW Lite <sup>18</sup><br>% | GROW <sup>5</sup><br>% |
| 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                   |

Shaded rows are excluded

**Table S3** – Small for Gestational Age (<3<sup>rd</sup> centile) rates for seven fetal growth standards by NHS Integrated Care Board, for all and term (≥37+0 weeks) births only.

| Integrated Care Board                               | Pregnancies |         | All Pregnancies       |                        |                         |                  |                   |                         |                   | Term Births           |                        |                         |                  |                   |                         |                   |
|---|-------------|---------|-----------------------|------------------------|-------------------------|------------------|-------------------|-------------------------|-------------------|-----------------------|------------------------|-------------------------|------------------|-------------------|-------------------------|-------------------|
|   | N           | Term n  | Hadlock <sup>15</sup> | IG21 2017 <sup>8</sup> | IG21 2020 <sup>17</sup> | WHO <sup>9</sup> | FMF <sup>10</sup> | GROW Lite <sup>18</sup> | GROW <sup>5</sup> | Hadlock <sup>15</sup> | IG21 2017 <sup>8</sup> | IG21 2020 <sup>17</sup> | WHO <sup>9</sup> | FMF <sup>10</sup> | GROW Lite <sup>18</sup> | GROW <sup>5</sup> |
|   |             |         | %                     | %                      | %                       | %                | %                 | %                       | %                 | %                     | %                      | %                       | %                | %                 | %                       | %                 |
| Bath and North East Somerset, Swindon and Wiltshire | 18,733      | 17,645  | 2.7                   | 1.1                    | 2.2                     | 4.1              | 7.9               | 2.9                     | 3.8               | 2.1                   | 0.7                    | 1.6                     | 3.4              | 6.7               | 2.2                     | 3.0               |
| Bedfordshire, Luton & Milton Keynes                 | 94,171      | 88,142  | 4.4                   | 1.9                    | 3.6                     | 6.2              | 11.8              | 4.7                     | 4.7               | 3.5                   | 1.3                    | 2.7                     | 5.3              | 10.3              | 3.8                     | 3.7               |
| Birmingham and Solihull                             | 94,264      | 87,478  | 5.1                   | 2.1                    | 4.1                     | 7.2              | 13.5              | 5.5                     | 5.0               | 4.1                   | 1.4                    | 3.2                     | 6.2              | 11.9              | 4.4                     | 4.0               |
| Black Country                                       | 119,318     | 111,296 | 5.3                   | 2.3                    | 4.3                     | 7.4              | 13.5              | 5.6                     | 5.3               | 4.3                   | 1.6                    | 3.4                     | 6.4              | 12.0              | 4.7                     | 4.2               |
| Bristol, North Somerset and South Gloucestershire   | 23          | 14      |                       |                        |                         |                  |                   |                         |                   |                       |                        |                         |                  |                   |                         |                   |
| Buckinghamshire, Oxfordshire and Berkshire West     | 16,569      | 15,657  | 3.3                   | 1.3                    | 2.7                     | 4.8              | 9.5               | 3.6                     | 3.7               | 2.5                   | 0.8                    | 2.0                     | 4.0              | 8.2               | 2.8                     | 3.0               |
| Cambridgeshire and Peterborough                     | 62,381      | 58,573  | 3.3                   | 1.3                    | 2.7                     | 4.7              | 9.2               | 3.5                     | 4.1               | 2.7                   | 1.0                    | 2.1                     | 4.1              | 8.0               | 2.9                     | 3.4               |
| Cheshire & Merseyside                               | 234,602     | 218,995 | 2.9                   | 1.2                    | 2.4                     | 4.2              | 8.4               | 3.1                     | 4.0               | 2.2                   | 0.8                    | 1.7                     | 3.4              | 7.1               | 2.4                     | 3.1               |
| Cornwall and Isles of Scilly                        | 32,373      | 30,691  | 3.5                   | 1.4                    | 2.8                     | 4.9              | 9.2               | 3.7                     | 4.7               | 2.9                   | 1.0                    | 2.3                     | 4.3              | 8.1               | 3.1                     | 4.0               |
| Coventry and Warwickshire                           | 56,061      | 52,700  | 2.9                   | 1.1                    | 2.3                     | 4.1              | 8.6               | 3.1                     | 3.6               | 2.2                   | 0.7                    | 1.7                     | 3.4              | 7.3               | 2.4                     | 2.8               |
| Derby and Derbyshire                                | 32,602      | 30,412  | 3.0                   | 1.2                    | 2.3                     | 4.2              | 8.6               | 3.2                     | 4.2               | 2.2                   | 0.8                    | 1.7                     | 3.5              | 7.2               | 2.4                     | 3.3               |
| Devon   | 70,615      | 66,514  | 2.9                   | 1.1                    | 2.3                     | 4.1              | 8.3               | 3.1                     | 4.0               | 2.3                   | 0.7                    | 1.7                     | 3.4              | 7.2               | 2.4                     | 3.3               |
| Dorset  | 33,448      | 31,966  | 2.9                   | 1.1                    | 2.3                     | 4.3              | 8.4               | 3.1                     | 4.0               | 2.5                   | 0.9                    | 1.9                     | 3.8              | 7.5               | 2.6                     | 3.5               |
| Frimley   | 76,865      | 72,641  | 3.5                   | 1.4                    | 2.8                     | 5.0              | 9.8               | 3.7                     | 3.6               | 2.8                   | 1.0                    | 2.2                     | 4.3              | 8.7               | 3.1                     | 2.9               |
| Gloucestershire                                     | 19          | 17      |                       |                        |                         |                  |                   |                         |                   |                       |                        |                         |                  |                   |                         |                   |
| Greater Manchester                                  | 277,122     | 258,038 | 4.2                   | 1.7                    | 3.4                     | 6.0              | 11.6              | 4.5                     | 4.7               | 3.3                   | 1.1                    | 2.5                     | 5.1              | 10.0              | 3.6                     | 3.7               |
| Hampshire and Isle of Wight                         | 83,983      | 79,147  | 3.5                   | 1.5                    | 2.9                     | 5.1              | 9.4               | 3.8                     | 4.6               | 2.8                   | 1.1                    | 2.2                     | 4.4              | 8.2               | 3.0                     | 3.8               |
| Herefordshire and Worcestershire                    | 53,280      | 49,604  | 2.9                   | 1.2                    | 2.4                     | 4.1              | 8.5               | 3.1                     | 4.0               | 2.2                   | 0.7                    | 1.7                     | 3.3              | 7.1               | 2.3                     | 3.0               |
| Hertfordshire and West Essex                        | 80,019      | 74,708  | 3.5                   | 1.4                    | 2.8                     | 5.0              | 9.8               | 3.7                     | 4.0               | 2.6                   | 0.9                    | 2.0                     | 4.0              | 8.2               | 2.8                     | 3.0               |
| Humber and North Yorkshire                          | 136,622     | 127,061 | 3.1                   | 1.3                    | 2.5                     | 4.4              | 8.6               | 3.3                     | 4.3               | 2.3                   | 0.8                    | 1.8                     | 3.6              | 7.2               | 2.5                     | 3.4               |
| Kent and Medway                                     | 108,921     | 102,796 | 3.2                   | 1.2                    | 2.5                     | 4.5              | 8.9               | 3.4                     | 4.1               | 2.6                   | 0.9                    | 2.0                     | 4.0              | 7.8               | 2.8                     | 3.5               |
| Lancashire and South Cumbria                        | 127,371     | 118,546 | 4.2                   | 1.8                    | 3.4                     | 5.8              | 11.0              | 4.5                     | 4.8               | 3.4                   | 1.3                    | 2.6                     | 5.0              | 9.6               | 3.6                     | 3.9               |
| Leicester, Leicestershire and Rutland               | 64,524      | 60,029  | 5.4                   | 2.3                    | 4.4                     | 7.6              | 13.8              | 5.8                     | 5.0               | 4.5                   | 1.7                    | 3.5                     | 6.6              | 12.3              | 4.8                     | 3.9               |
| Lincolnshire  | 28,892      | 27,027  | 3.2                   | 1.3                    | 2.6                     | 4.4              | 9.0               | 3.4                     | 4.6               | 2.4                   | 0.8                    | 1.9                     | 3.6              | 7.6               | 2.6                     | 3.7               |
| Mid and South Essex                                 | 38,741      | 36,930  | 3.2                   | 1.3                    | 2.6                     | 4.7              | 8.9               | 3.4                     | 4.2               | 2.7                   | 1.0                    | 2.2                     | 4.3              | 8.0               | 3.0                     | 3.7               |
| Norfolk & Waveney                                   | 80,170      | 75,070  | 3.1                   | 1.2                    | 2.4                     | 4.4              | 8.9               | 3.3                     | 4.2               | 2.3                   | 0.7                    | 1.7                     | 3.6              | 7.6               | 2.5                     | 3.3               |
| North Central London                                | 135,095     | 127,409 | 4.2                   | 1.6                    | 3.4                     | 6.2              | 11.7              | 4.5                     | 4.3               | 3.5                   | 1.2                    | 2.7                     | 5.5              | 10.5              | 3.8                     | 3.6               |
| North East and North Cumbria                        | 190,219     | 178,214 | 3.4                   | 1.4                    | 2.7                     | 4.7              | 9.7               | 3.6                     | 4.7               | 2.6                   | 0.9                    | 2.0                     | 4.0              | 8.4               | 2.8                     | 3.9               |
| North East London                                   | 185,835     | 173,960 | 5.6                   | 2.3                    | 4.5                     | 8.0              | 14.7              | 6.0                     | 4.3               | 4.7                   | 1.7                    | 3.7                     | 7.2              | 13.2              | 5.1                     | 3.5               |
| North West London                                   | 84,026      | 79,834  | 4.6                   | 1.7                    | 3.6                     | 6.6              | 12.9              | 4.9                     | 4.1               | 3.8                   | 1.2                    | 2.9                     | 5.8              | 11.6              | 4.1                     | 3.4               |
| Northamptonshire                                    | 61,496      | 57,437  | 3.4                   | 1.4                    | 2.7                     | 4.8              | 9.5               | 3.7                     | 4.3               | 2.8                   | 1.0                    | 2.0                     | 4.1              | 8.2               | 3.0                     | 3.5               |
| Nottingham and Nottinghamshire                      | 34,533      | 32,266  | 3.7                   | 1.5                    | 3.0                     | 5.2              | 9.6               | 4.0                     | 5.3               | 2.9                   | 1.1                    | 2.3                     | 4.4              | 8.3               | 3.2                     | 4.3               |
| Shropshire, Telford and Wrekin                      | 28,314      | 26,519  | 3.1                   | 1.3                    | 2.6                     | 4.4              | 8.8               | 3.4                     | 4.5               | 2.4                   | 0.8                    | 1.8                     | 3.6              | 7.6               | 2.6                     | 3.6               |
| Somerset  | 41,907      | 39,106  | 3.2                   | 1.3                    | 2.5                     | 4.6              | 8.8               | 3.4                     | 4.5               | 2.5                   | 0.9                    | 1.9                     | 3.9              | 7.5               | 2.7                     | 3.6               |
| South East London                                   | 682         | 635     |                       |                        |                         |                  |                   |                         |                   |                       |                        |                         |                  |                   |                         |                   |
| South West London                                   | 49,398      | 46,404  | 4.1                   | 1.6                    | 3.4                     | 5.9              | 11.4              | 4.4                     | 4.2               | 3.4                   | 1.2                    | 2.7                     | 5.2              | 10.1              | 3.6                     | 3.4               |
| South Yorkshire                                     | 112,400     | 105,366 | 3.7                   | 1.5                    | 3.0                     | 5.3              | 10.3              | 4.0                     | 5.0               | 2.9                   | 1.0                    | 2.3                     | 4.4              | 8.9               | 3.1                     | 4.0               |
| Staffordshire & Stoke on Trent                      | 75          | 62      |                       |                        |                         |                  |                   |                         |                   |                       |                        |                         |                  |                   |                         |                   |
| Suffolk & North East Essex                          | 79,853      | 75,109  | 3.0                   | 1.2                    | 2.5                     | 4.4              | 8.8               | 3.2                     | 4.1               | 2.4                   | 0.8                    | 1.9                     | 3.7              | 7.7               | 2.6                     | 3.3               |
| Surrey Heartlands                                   | 31,789      | 29,959  | 3.0                   | 1.1                    | 2.3                     | 4.4              | 9.3               | 3.3                     | 3.5               | 2.3                   | 0.7                    | 1.7                     | 3.7              | 8.1               | 2.5                     | 2.8               |
| Sussex  | 21,674      | 20,463  | 3.0                   | 1.2                    | 2.4                     | 4.3              | 8.4               | 3.1                     | 3.9               | 2.4                   | 0.9                    | 1.9                     | 3.8              | 7.5               | 2.6                     | 3.4               |
| West Yorkshire                                      | 122,214     | 115,006 | 4.3                   | 1.8                    | 3.5                     | 6.2              | 11.6              | 4.6                     | 4.9               | 3.6                   | 1.4                    | 2.8                     | 5.4              | 10.4              | 3.9                     | 4.2               |

Shaded rows are excluded

**Table S4 - Large for Gestational Age (>90<sup>th</sup> and >97<sup>th</sup> centile) rates for seven fetal growth standards by NHS Integrated Care Board**

| Integrated Care Board                                    | Pregnancies<br>N | >90th centile              |                             |                              |                       |                        |                              |                        | >97th centile              |                             |                              |                       |                        |                              |                        |
|--|------------------|----------------------------|-----------------------------|------------------------------|-----------------------|------------------------|------------------------------|------------------------|----------------------------|-----------------------------|------------------------------|-----------------------|------------------------|------------------------------|------------------------|
|  |                  | Hadlock <sup>15</sup><br>% | IG21 2017 <sup>8</sup><br>% | IG21 2020 <sup>17</sup><br>% | WHO <sup>9</sup><br>% | FMF <sup>10</sup><br>% | GROW Lite <sup>18</sup><br>% | GROW <sup>5</sup><br>% | Hadlock <sup>15</sup><br>% | IG21 2017 <sup>8</sup><br>% | IG21 2020 <sup>17</sup><br>% | WHO <sup>9</sup><br>% | FMF <sup>10</sup><br>% | GROW Lite <sup>18</sup><br>% | GROW <sup>5</sup><br>% |
| Bath and North East Somerset, Swindon and Wiltshire      | 18,733           | 5.5                        | 20.2                        | 13.6                         | 8.3                   | 18.2                   | 11.1                         | 8.5                    | 1.6                        | 8.7                         | 4.6                          | 2.3                   | 8.4                    | 4.3                          | 2.8                    |
| Bedfordshire, Luton & Milton Keynes                      | 94,171           | 4.2                        | 15.4                        | 10.8                         | 6.5                   | 14.1                   | 8.6                          | 8.6                    | 1.3                        | 6.3                         | 3.6                          | 1.9                   | 6.4                    | 3.3                          | 3.2                    |
| Birmingham and Solihull                                  | 94,264           | 4.4                        | 14.7                        | 10.9                         | 6.8                   | 13.6                   | 8.7                          | 9.3                    | 1.5                        | 5.9                         | 3.9                          | 2.1                   | 6.3                    | 3.5                          | 3.7                    |
| Black Country  | 119,318          | 4.0                        | 14.2                        | 10.1                         | 6.3                   | 13.0                   | 8.0                          | 8.6                    | 1.3                        | 5.8                         | 3.5                          | 1.9                   | 6.0                    | 3.2                          | 3.3                    |
| <b>Bristol, North Somerset and South Gloucestershire</b> | <b>23</b>        |                            |                             |                              |                       |                        |                              |                        |                            |                             |                              |                       |                        |                              |                        |
| Buckinghamshire, Oxfordshire and Berkshire West          | 16,569           | 4.9                        | 18.0                        | 12.9                         | 7.9                   | 16.7                   | 10.4                         | 8.8                    | 1.4                        | 7.2                         | 4.3                          | 2.1                   | 7.6                    | 3.8                          | 3.3                    |
| Cambridgeshire and Peterborough                          | 62,381           | 5.6                        | 19.5                        | 13.4                         | 8.4                   | 17.7                   | 11.0                         | 9.1                    | 1.9                        | 8.6                         | 4.9                          | 2.6                   | 8.4                    | 4.6                          | 3.6                    |
| Cheshire & Merseyside                                    | 234,602          | 6.0                        | 20.2                        | 14.6                         | 9.2                   | 18.5                   | 11.7                         | 9.1                    | 2.0                        | 8.6                         | 5.3                          | 2.8                   | 8.9                    | 4.8                          | 3.5                    |
| Cornwall and Isles of Scilly                             | 32,373           | 5.1                        | 19.3                        | 12.7                         | 7.8                   | 17.4                   | 10.3                         | 7.7                    | 1.6                        | 8.1                         | 4.2                          | 2.2                   | 7.9                    | 4.1                          | 2.6                    |
| Coventry and Warwickshire                                | 56,061           | 5.1                        | 18.5                        | 13.0                         | 7.9                   | 16.9                   | 10.4                         | 8.6                    | 1.5                        | 7.6                         | 4.4                          | 2.2                   | 7.7                    | 4.0                          | 3.1                    |
| Derby and Derbyshire                                     | 32,602           | 5.1                        | 18.8                        | 13.0                         | 7.8                   | 17.2                   | 10.4                         | 7.8                    | 1.6                        | 7.6                         | 4.3                          | 2.2                   | 7.8                    | 4.0                          | 2.7                    |
| Devon  | 70,615           | 5.5                        | 20.3                        | 14.0                         | 8.6                   | 18.5                   | 11.3                         | 8.3                    | 1.7                        | 8.5                         | 4.8                          | 2.4                   | 8.6                    | 4.4                          | 2.9                    |
| Dorset   | 33,448           | 5.2                        | 19.4                        | 13.0                         | 7.8                   | 17.3                   | 10.5                         | 8.0                    | 1.6                        | 8.1                         | 4.4                          | 2.2                   | 8.0                    | 4.2                          | 2.9                    |
| Frimley  | 76,865           | 4.7                        | 16.9                        | 12.1                         | 7.4                   | 15.5                   | 9.6                          | 9.3                    | 1.5                        | 6.8                         | 4.0                          | 2.1                   | 7.0                    | 3.7                          | 3.4                    |
| <b>Gloucestershire</b>                                   | <b>19</b>        |                            |                             |                              |                       |                        |                              |                        |                            |                             |                              |                       |                        |                              |                        |
| Greater Manchester                                       | 277,122          | 4.4                        | 15.8                        | 11.1                         | 6.8                   | 14.4                   | 8.8                          | 8.0                    | 1.4                        | 6.5                         | 3.7                          | 1.9                   | 6.6                    | 3.4                          | 2.9                    |
| Hampshire and Isle of Wight                              | 83,983           | 5.2                        | 18.8                        | 12.7                         | 7.8                   | 16.9                   | 10.2                         | 8.0                    | 1.7                        | 8.0                         | 4.4                          | 2.3                   | 7.9                    | 4.1                          | 3.0                    |
| Herefordshire and Worcestershire                         | 53,280           | 5.5                        | 19.4                        | 13.9                         | 8.5                   | 17.7                   | 11.1                         | 8.4                    | 1.7                        | 8.2                         | 4.8                          | 2.5                   | 8.3                    | 4.4                          | 3.1                    |
| Hertfordshire and West Essex                             | 80,019           | 4.9                        | 17.9                        | 12.2                         | 7.5                   | 16.1                   | 9.9                          | 8.6                    | 1.5                        | 7.5                         | 4.1                          | 2.1                   | 7.5                    | 3.8                          | 3.2                    |
| Humber and North Yorkshire                               | 136,622          | 5.9                        | 20.6                        | 14.4                         | 9.0                   | 18.8                   | 11.7                         | 8.8                    | 1.9                        | 8.8                         | 5.1                          | 2.6                   | 8.9                    | 4.7                          | 3.2                    |
| Kent and Medway  | 108,921          | 5.3                        | 18.9                        | 13.1                         | 8.1                   | 17.2                   | 10.6                         | 8.4                    | 1.7                        | 8.0                         | 4.5                          | 2.3                   | 8.0                    | 4.2                          | 3.1                    |
| Lancashire and South Cumbria                             | 127,371          | 4.9                        | 17.5                        | 12.2                         | 7.5                   | 15.9                   | 9.8                          | 8.1                    | 1.6                        | 7.2                         | 4.2                          | 2.2                   | 7.3                    | 3.9                          | 3.0                    |
| Leicester, Leicestershire and Rutland                    | 64,524           | 4.2                        | 15.0                        | 10.4                         | 6.3                   | 13.7                   | 8.3                          | 8.6                    | 1.3                        | 6.3                         | 3.6                          | 1.9                   | 6.3                    | 3.3                          | 3.4                    |
| Lincolnshire   | 28,892           | 5.2                        | 18.2                        | 13.1                         | 8.2                   | 16.7                   | 10.5                         | 7.8                    | 1.7                        | 7.4                         | 4.5                          | 2.4                   | 7.7                    | 4.1                          | 2.8                    |
| Mid and South Essex                                      | 38,741           | 4.9                        | 19.1                        | 12.3                         | 7.5                   | 17.0                   | 10.2                         | 8.1                    | 1.5                        | 8.0                         | 4.1                          | 2.1                   | 7.8                    | 3.9                          | 2.9                    |
| Norfolk & Waveney  | 80,170           | 5.6                        | 19.4                        | 13.8                         | 8.5                   | 17.7                   | 11.0                         | 8.5                    | 1.7                        | 8.1                         | 4.9                          | 2.5                   | 8.3                    | 4.4                          | 3.1                    |
| North Central London                                     | 135,095          | 3.4                        | 13.9                        | 9.4                          | 5.5                   | 12.5                   | 7.3                          | 8.3                    | 1.0                        | 5.3                         | 2.9                          | 1.5                   | 5.4                    | 2.7                          | 3.1                    |
| North East and North Cumbria                             | 190,219          | 5.0                        | 17.7                        | 12.7                         | 7.8                   | 16.3                   | 10.1                         | 7.3                    | 1.6                        | 7.2                         | 4.3                          | 2.2                   | 7.4                    | 3.9                          | 2.6                    |
| North East London  | 185,835          | 3.0                        | 12.2                        | 8.3                          | 4.9                   | 11.0                   | 6.5                          | 9.0                    | 0.9                        | 4.6                         | 2.6                          | 1.3                   | 4.7                    | 2.3                          | 3.4                    |
| North West London  | 84,026           | 3.3                        | 13.4                        | 9.0                          | 5.3                   | 12.1                   | 7.1                          | 9.1                    | 1.0                        | 5.1                         | 2.8                          | 1.4                   | 5.2                    | 2.6                          | 3.5                    |
| Northamptonshire   | 61,496           | 5.3                        | 18.4                        | 13.1                         | 8.3                   | 16.9                   | 10.6                         | 9.0                    | 1.7                        | 7.7                         | 4.6                          | 2.4                   | 7.8                    | 4.2                          | 3.4                    |
| Nottingham and Nottinghamshire                           | 34,533           | 5.5                        | 19.3                        | 13.4                         | 8.3                   | 17.7                   | 10.9                         | 8.1                    | 1.8                        | 8.4                         | 4.7                          | 2.5                   | 8.4                    | 4.3                          | 2.9                    |
| Shropshire, Telford and Wrekin                           | 28,314           | 5.4                        | 18.9                        | 13.6                         | 8.4                   | 17.3                   | 10.9                         | 8.0                    | 1.8                        | 7.7                         | 4.8                          | 2.5                   | 8.0                    | 4.3                          | 3.0                    |
| Somerset   | 41,907           | 5.9                        | 20.4                        | 14.1                         | 8.9                   | 18.4                   | 11.5                         | 8.8                    | 1.8                        | 8.9                         | 5.1                          | 2.6                   | 8.9                    | 4.7                          | 3.2                    |
| <b>South East London</b>                                 | <b>682</b>       |                            |                             |                              |                       |                        |                              |                        |                            |                             |                              |                       |                        |                              |                        |
| South West London  | 49,398           | 3.9                        | 14.8                        | 10.6                         | 6.3                   | 13.6                   | 8.3                          | 8.2                    | 1.1                        | 5.7                         | 3.4                          | 1.7                   | 5.9                    | 3.0                          | 3.0                    |
| South Yorkshire  | 112,400          | 5.0                        | 17.7                        | 12.4                         | 7.6                   | 16.2                   | 10.1                         | 7.8                    | 1.5                        | 7.5                         | 4.3                          | 2.2                   | 7.5                    | 3.9                          | 2.8                    |
| <b>Staffordshire &amp; Stoke on Trent</b>                | <b>75</b>        |                            |                             |                              |                       |                        |                              |                        |                            |                             |                              |                       |                        |                              |                        |
| Suffolk & North East Essex                               | 79,853           | 5.0                        | 18.8                        | 13.0                         | 8.0                   | 17.1                   | 10.4                         | 8.2                    | 1.6                        | 7.6                         | 4.3                          | 2.3                   | 7.8                    | 4.0                          | 2.9                    |
| Surrey Heartlands  | 31,789           | 4.5                        | 17.2                        | 11.9                         | 7.3                   | 15.8                   | 9.5                          | 8.3                    | 1.3                        | 7.0                         | 3.9                          | 1.9                   | 7.1                    | 3.5                          | 3.1                    |
| Sussex   | 21,674           | 5.4                        | 19.2                        | 13.3                         | 8.3                   | 17.4                   | 10.8                         | 8.4                    | 1.5                        | 8.1                         | 4.6                          | 2.2                   | 8.2                    | 4.2                          | 3.0                    |
| West Yorkshire   | 122,214          | 4.5                        | 16.5                        | 11.2                         | 6.8                   | 14.9                   | 9.0                          | 7.9                    | 1.4                        | 6.9                         | 3.8                          | 1.9                   | 6.8                    | 3.6                          | 2.9                    |

*Shaded rows are excluded*