National Institute for Health and Clinical Excellence

ANTENATAL CARE (PARTIAL UPDATE) GUIDELINE
Consultation on first draft

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Document	**Section Number**	**Comments**
Full & NICE	**General**	**GENERAL COMMENT** 1. We have a number of grave reservations about the proposed Draft Guideline. The Perinatal Institute has sought to address the shortcomings of the current review and recommendation but we are particularly concerned that there is currently only one round of consultation. As our comments are fairly fundamental, we would like to ask **that another round of consultation be agreed** to ensure that the substantive changes which we believe are necessary can be commented upon once more, before publication of the final Guideline. 2. It would be appropriate to make the evidence base more comprehensive, to account for the fact that prospective studies in antenatal care are often lacking or difficult to obtain because of ➢ general ethical considerations ➢ difficulty in 'blinding' ➢ information obtained antenatally will influence management and outcome ➢ relatively rare outcomes require large studies to prove effectiveness 3. A substantial amount of evidence has been gleaned from careful audit studies and reviews of adverse outcome, such as confidential case reviews undertaken with rigorous methodology and against well defined criteria and standards.
Full & NICE	**9.2** **1.7.2.3**	**DOWN'S SCREENING** 1. We welcome the inclusion and reference to 'new models' of screening that take into account the service limitations of providing nuchal translucency measurements in all cases (page 192). 2. Findings state that selection of cut offs is complex and difficult to practise. The NSC funded pilot in Stafford, West Midlands has demonstrated that implementing a '3 stage Contingency Screening Policy' [1] is no more difficult than implementing any screening policy beginning in the 1st trimester. 94% of the screened population received a result in the 1st trimester. It offers improved levels of safety over the combined test (7.8 cases detected per procedure related loss compared to 6.2 cases). 3. Radiology departments are facing a national staffing crisis [2]. In the NSC Survey of Ultrasound Services [3], 45% of units were noted as having sonographer vacancies. 4. Ultrasound resources in parts of the NHS including the Midlands and North of England are severely limited and will restrict the introduction of a combined screening test within the timeframe of the NSC Model of Best Practice [4]. The new guidance will also impact on ultrasound services with the new requirement

		for fetal echocardiography with four chamber and outflow tract view recommended. 5. Combined screening is not a feasible screening programme within current ultrasound and maternity services. The Contingent Screening Model offers an alternative interim solution to offering women an early test without impacting significantly on already compromised ultrasound, midwifery and diagnostic services. 6. We suggest that the recommendations on combined screening should be made conditional on the availability of adequate ultrasound resources. 7. We also suggest that the guideline include a provision for contingent methods of 1st trimester screening, if they can demonstrate that they can meet the NSC's criteria for detection- and false positive rates. **References** 1. Three Stage Contingency Screening for Down's Syndrome. Results of the Stafford Pilot. The Perinatal Institute: Nov 2006. http://www.pi.nhs.uk/screening/downs/index_downscreeningreport.htm 2 Extending the Provision of Ultrasound Services in the UK. British Medical Ultrasound Society: Sep 2003 http://www.bmus.org/about/ab-strategy.asp 3. Antenatal Ultrasound Screening. Ultrasound Survey of England: 2002. National Screening Committee: April 2005. 4. Model of Best Practice: Nov 2003. Department of Health. http://www.screening.nhs.uk/downs/model_bestpractice.pdf
Full & NICE	**5.5** **1.3.2.4**	**VITAMIN D SUPPLEMENTS** The guidance recommends normal healthy women should not be routinely offered vitamin D supplementation during pregnancy. This conflicts with recommendations from other national groups such as the food standards agency and the Scientific Advisory Committee on Nutrition. **These recommend that all pregnant women should take supplements** http://www.sacn.gov.uk/reports/# http://www.eatwell.gov.uk/agesandstages/pregnancy/whenyrpregnant/ We believe that having different recommendations is unhelpful and confusing for both expectant mothers and their care providers.
Full & NICE	**5.12** **1.3.9.1**	**ALCOHOL IN PREGNANCY** The guidance recommends less than 1 drink (1.5 UK units of alcohol) per day. This would allow for up to 10 units per week. This contradicts the recommendations from the Department of Health which states: *Women who do choose to drink, before and during pregnancy, should drink no more than one to two units of alcohol once or twice a week.* http://www.dh.gov.uk/en/News/DH_074968 The BMA Board of Science in the Fetal alcohol spectrum disorders- a guide for health professionals publication recommend women who are pregnant, or who are considering a pregnancy, should be advised not to consume any alcohol. http://www.nofasuk.org/PDF/BMA%20REPORT%204%20JUNE%202007.pdf We believe that having different recommendations is unhelpful and confusing for both expectant mothers and their care providers.

Full & NICE	**12**	**FETAL GROWTH AND WELLBEING** **General Comments** 1. Screening or surveillance? The guideline frequently confuses, and needs to distinguish, between spot- check of size and serial assessment of growth. It has been established for some time that the former are less predictive than the latter. [1] Chang TC, Robson SC, Spencer JA, Gallivan S. Prediction of perinatal morbidity at term in small fetuses: comparison of fetal growth and Doppler ultrasound. *Br J Obstet Gynaecol* 1994;101:422-427. This raises the question whether serial assessment can be regarded as 'screening': it could be also considered to be 'surveillance'. 2. This being a guide for healthy pregnancy, it would be appropriate to state within the section for fetal growth and well-being that there is in fact ***no agreed UK population standard*** to define normal ranges for estimated fetal weight, fetal growth, and birthweight.
Full & NICE	**1.2.7.3** pp 15-17	3. As concerns fundal height, the Draft Guideline currently states as good practice points that 'symphysis-fundal height should be 'measured and plotted', at each antenatal visit from 25 weeks. There is however **no single accepted / agreed fundal height chart in use in the UK.** 4. If there were such a standard, it would be challenged on the basis of evidence that an individually adjustable, 'customised' standard is better in detecting abnormal growth and more accurately reflects normality.
Full & NICE	**12** **1.10.1.2**	5. Specifically, the Draft Guidelines now suggest +/- 3 cm as action points for fundal height. Firstly, even though serial measurements are recommended, no consideration is given to longitudinal assessment of growth and related action points - i.e. changes evident over time such as slow growth or no growth. Action points for longitudinal assessment have been defined (www.pi.nhs.uk/growth) and have been used in the evaluation of fundal height measurements in the controlled study in Nottingham [your ref **#567**]. 6. Defining +/- 3 cm as normal boundaries would furthermore result in a wide up-and-down variation of fundal height across the third trimester gestational age range being considered acceptable. Expressed as coefficient of variation, this 'normal' range, would be relatively even wider in the early weeks of the third trimester, as 3 cm would represent a larger proportion of the mean fundal height expected at these gestations. 7. The NICE proposal would imply a ***? new chart*** which in essence has the 50th centile line running at 45 degrees, making gestational age (weeks) equivalent to fundal height (cms), and action lines running in parallel at 3 cm distance above and below. We are not aware of (m)any units where such a standard is applied today. Furthermore, **we are not aware of any significant study supporting its effectiveness for detecting 'SGA'**. 8. At this point, the most commonly used standard for fundal height, EFW and birthweight measurements is likely to be the customised charts, implemented following RCOG recommendations (Guideline 31, 2002) in about 70 maternity units in England, Wales ad Northern Ireland. In total, these units look after approximately 200,000 pregnancies per annum. A list of these units is available on request. [2] Royal College of Obstetricians and Gynaecologists. The investigation and management of the small-for-gestational age fetus. *RCOG Green Top Guideline* 2002(No.31). 9. The customised growth chart is the term used for an individually adjustable standard called 'Gestation Related Optimum Weight' (GROW), available as free software from www.gestation.net The website is administered by the Perinatal Institute, an NHS organisation.

		10. The GROW - customised standard for fundal height, EFW and birthweight has been developed on the principles that it is a.) appropriately dated, b.) individually adjusted, c.) free from pathology (e.g. smoking, diabetes) and d.) fetal weight based. [3] Gardosi J, Chang A, Kalyan B, Sahota D, Symonds EM. Customised antenatal growth charts. *The Lancet* 1992;339:283-287. [4] Gardosi J, Mongelli M, Wilcox M, Chang A. An adjustable fetal weight standard. *Ultrasound Obstet Gynecol* 1995;6:168-174. 11. In contrast, population based charts include a sizeable proportion of pathological factors due to smoking and prematurity, and fail to adjust for constitutional variation.
Full	**12.6**	**Fetal Growth** 12. The study by Owen et al 2003 [your ref: **933**] was designed to compare two strategies for predicting low neonatal morphometry characteristics – customised estimated fetal weight from the last scan and growth velocity using fetal abdominal area. In calculating fetal growth velocity, a generous time difference between the last and the *third* last scan measurement was allowed – which would make this parameter of doubtful relevance clinically. Furthermore and without explanation, three different cut-off values (Z scores) were selected for growth velocity for each of the outcome measures studied: – 2 for prediction of low skinfold thickness, -1.55 for low ponderal index, and –1.5 for low mid-arm circumference to occipito-frontal circumference ratio. 13. Despite this questionable methodology, the authors (who are published proponents of the growth velocity method) could show no significant difference in positive likelihood ratios between their varied Z score cut-off limits and a customised centile <5th. When relaxing the customised centile cut-off to 10th centile (but still maintaining their chosen, and presumably best cut-offs for abdominal circumference growth), they could still only find a significant difference in one of the three outcome measures (Ponderal Index <25th centile). 14. The performance of this test (low customised EFW) cannot be compared with the results quoted from other biometry studies listed in Section 12.3, as the latter had SGA as outcome. In this study, a more stringent outcome (IUGR defined by neonatal morphometry) was used. We suggest that this study shows in fact **good predictive values of a normal customised EFW centile**. This is even more so the case if a similarly more stringent cut-off (5th customised centile) is used, with a –ve LR of 0.84, which compares favourably with the quoted biometry studies for predicting 'SGA' (Section 12.3). 15. There is **additional evidence** supporting the use of customised fetal growth limits during pregnancy: 16. Fetal weight SGA by customised percentile was examined in a prospective study of serial ultrasound assessment in 215 pregnancies. Various limits were studied; for the 10th customised centile, the results showed ST 68, SP 89, PPV 72 NPV 86. [5] De Jong CLD, Francis A, Van Geijn HP, Gardosi J. Customized fetal weight limits for antenatal detection of fetal growth restriction. *Ultrasound Obstet Gynecol* 2000;15:36-40. 17. Individualised fetal growth limits resulted in a reduction of false positive diagnoses of 'IUGR' in a cohort of pregnancies with normal outcome. [6] Mongelli M, Gardosi J. Reduction of false-positive diagnosis of fetal growth restriction by application of customized fetal growth standards. *Obstet Gynecol* 1996;88:844-848. 18. Fetal growth curves were found to vary according to maternal characteristics used for customising the normal limits, in low as well as high risk populations [7] Mongelli M, Gardosi J. Longitudinal study of fetal growth in subgroups of a low

		risk population. *Ultrasound in Obstetrics & Gynecology* 1995;6:340-344. [8] de Jong CLD, Gardosi J, Baldwin C, Francis A, Dekker GA, van Geijn HP. Fetal weight gain in a serially scanned high-risk population. *Ultrasound Obstet Gynecol* 1998;11:39-43 19. These studies dealt mainly with estimated fetal weight, plotted on customised charts for EFW. It is important to note that individual ultrasound parameters cannot be customised but are population averages only. **They may therefore be inaccurate in demonstrating fetal growth restriction and may be responsible for avoidable adverse outcome.** This has been illustrated in a recently completed confidential enquiry into stillbirths with fetal growth restriction conducted by the Perinatal Institute in Birmingham and the Black Country (www.pi.nhs.uk/pnm/ce)
Full	**12.15**	**BIRTHWEIGHT** 20. In the guideline draft, two studies (your refs: **940, 941**) were summarised, both based on a Swedish cohort, the second one being an extension of the former with more cases. Both studies agreed that there was a strong association between smallness for gestational age, as defined by customised centile <10, and adverse outcome. The second of the studies highlighted an observed increase in OR for adverse outcome in the customised SGA-only group compared to the group which was SGA by both customised and population methods, and suggested that this was an artefact due to the SGA (cust only) group having more preterm babies. 21. These claims have been refuted in recently published correspondence [9] Gardosi J, Clausson B, Francis A. The use of customised versus population-based birthweight standards in predicting perinatal mortality. *BJOG* 2007;114(10):1301-2. Firstly, differences in gestational age are not a confounder for stillbirth as an outcome. Secondly, such differences should not be surprising to anyone familiar with the way customised growth charts are constituted. They predict an optimal weight, which includes a fetal weight based curve derived from a normal population, rather than a birthweight curve. The latter represent an inappropriate standard, as birth weights are negatively skewed in the preterm period due to the association between preterm delivery and growth restriction. In addition, CGCs exclude known pathological factors such as smoking, and adjust only within a normal BMI range of the population. As a result, the SGA by customised centile-only includes more pathological pregnancies in general – including more preterm deliveries as well as more smokers and more obese women, than the other SGA subgroups. In addition, it includes women who are taller and heavier but with a normal BMI, in whom SGA is less likely to be recognised using a population standard. (Ref 9). 22. There is **additional evidence** of the improved ability of customised centiles to identify pathologically abnormal growth status / birthweight, based on studies from The Netherlands, New Zealand, France and Spain: 23. In the study by deJong et al (1998), 31 of 217 babies had SGA birthweights by the standard Dutch population weight standard. Application of customised centiles identified an additional 37 SGA pregnancies which were significantly more likely to have had pre-eclampsia, absent or reduced end diastolic flow, caesarean section for fetal distress, admission to neonatal intensive care, and artificial ventilation [10] de Jong CLD, Gardosi J, Dekker GA, Colenbrander GJ, van Geijn HP. Application of a customised birthweight standard in the assessment of perinatal outcome in a high risk population. *BJOG* 1998;105:531-35.

Full	**12.15**	24. McCowan et al (2005) compared customised and New Zealand population centiles in an antenatal SGA cohort (n=374) and a general obstetric population (12,879). She found that customised centiles were more likely to detect babies with perinatal morbidity and mortality than general population centiles. This applied to caesarean section for fetal distress, a variety of perinatal morbidity indices, and abnormal uterine artery Doppler indices which are independent of gestational age. [11] McCowan L, Harding JE, Stewart AW. Customised birthweight centiles predict SGA pregnancies with perinatal morbidity. *Br J Obstet Gynaecol* 2005;112:1026-1033. 25. Ego and colleagues (2006) looked at 56,606 births in 5 tertiary maternity hospitals in France. Once again, customised centiles identified a group of SGA babies which were not small by population centiles. This group had a similar mean gestational age as the group which was designated small by the population standard only, but a fourfold higher risk of stillbirths, while the group small by population centiles- only did not have an increased risk. [12] Ego A, Subtil D, Grange G, Thiebaugeorges O, Senat MV, Vayssiere C, et al. Customized versus population-based birth weight standards for identifying growth restricted infants: a French multicenter study. *Am J Obstet Gynecol.* 2006;194(4):1042-9. 26. A study by Figueras et al (2007) compared Spanish population-based centiles and customised centiles in 13,661 singleton deliveries. Customised assessment identified an additional group which had an increased risk of perinatal mortality and morbidity. Once again, this was in part because most SGA preterm babies are not recognised by population centiles. However, unlike the population SGA group, customised SGA remained an important risk factor for neonatal morbidity even after adjusting for gestational age at delivery. [13] Figueras F, Figueras J, Meier E, Eixarch E, Coll O, Gratacos E, et al. Customised birthweight percentiles accurately predict perinatal morbidity. *Arch Dis Child Fetal Neonatal Ed.* 2007;92(4):277-80. **False positives** 27. The GDG did not comment on another important feature of customisation apparent in the analyses of the Swedish data: that the method identifies a proportion of cases (29% in the Swedish study- your ref # **940**) which are small by population centiles only, and NOT by customised centiles; and **that this group had no increased risk of adverse outcome when** compared to the population which was not SGA by either method. This means that almost a third of cases considered to be small by population charts are in fact not pathological, but have only constitutional smallness. The same principle was observed in each the other studies (McCowan et al 2005; Ego et al, 2006; Figueras et al, 2007). 28. This high false positive rate when using population charts is expected to translate into unnecessary maternal anxiety, investigations, and interventions. One example of the clinical implication was demonstrated in a study from Blackburn (Dua & Schram, 2006): Retrospective application of customised charts in 109 women induced for suspected intrauterine growth restriction found that the majority of cases (58%) induced for IUGR had in fact **babies within the normal range when assessed by CGCs**. Furthermore, had CGCs been used, 54% of growth scans and 53% of antenatal day unit appointments would have been unnecessary. In a multi-ethnic population, Indian and Pakistani women were in fact greatly over-represented. **This suggests that population standards are unable to provide a fair and equitable means to assess fetal size and growth in a heterogeneous population.** [14] Dua A, Schram C. An investigation into the applicability of customised charts for the assessment of fetal growth in antenatal population at Blackburn, Lancashire, UK. *J Obstet Gynaecol* 2006;26(5):411-413.

Full	**12.15**	**FUNDAL HEIGHT** 28. Fundal height measurements vary with maternal characteristics and do no follow any 'cm per week' rule. The average measurement at 40 weeks was 38 cm (Mongelli 1999) [15] Mongelli M, Gardosi J. Symphysis-Fundus Height and Pregnancy Characteristics in Ultrasound-Dated Pregnancies. *Obstetrics & Gynecology* 1999;94:591-4 If the -3 cm rule proposed by GDG were to be followed, there would be many unnecessary referrals for ultrasound. 29. Customised charts for fundal height are individually adjusted for maternal variables. The study referred to in your draft (your ref #: **567**) was accurately summarised in that it showed significantly increased detection of SGA and reduced referrals for unnecessary investigations where the baby was not SGA. The study was not powered to assess obstetric intervention or adverse outcome. Its main objective was to assess diagnostic value, in terms of antenatal detection of SGA, and the resultant number of referrals for investigations. In the light of evidence that the use of biometry and Doppler in high risk pregnancy reduces perinatal mortality, the antenatal detection of SGA is a valid objective and good practice point in itself. The findings in fact showed **increased detection *as well as* reduced referrals**. The latter was considered to be due to fewer false positive assessments of SGA, typically in cases where the mother was constitutionally small and was carrying a baby which was of normal size for her. 30. A longitudinal study in Birmingham (City Hospital NHS Trust) has since confirmed these findings, observing significantly higher detection rates of SGA in combination with significantly reduced referrals and ultrasound scans when customised growth charts were used. However, the importance of ongoing training was emphasised to further improve the antenatal detection of SGA. [16] Wright J, Morse K, Kady S et al. Audit of fundal height measurement plotted on customised growth charts *MIDIRS Midwifery Digest* 2006; 16:341-45
Full	**12.16**	**HEALTH ECONOMICS IMPLICATIONS** 31. Surprisingly, there is no consideration of the health economical implications of customised growth charts in light of the evidence available. For a policy of fundal height measurement supplemented with fetal biometry where indicated, the use of customised charts will result not only in increased detection but reduced costs of investigations. 32. The value of increased detection is not easy to quantify and is obviously not only a benefit in terms of costs, but will result in reduced morbidity and mortality with the application of the appropriate protocols for further investigations. However the **reduction of referrals for further investigation and reduced interventions will translate into savings**. This is supported by evidence from each of these studies: 33. • Mongelli (1996; ref [6]): customised charts reduce false positives • Clausson (2001, your ref # 940): customised standards identify 29% false positive by population standard – these have no increased risk • Further false positives (small by population centile, not at increased risk) identified in studies by McCowan et al (2005; ref [11]) and Ego et al (2006; ref [12]) • Dua 2006 (ref [14]): over 50% of inductions for IUGR could be saved • Gardosi (your ref 567): Customised fundal height charts reduce referrals and admissions for falsely suspected SGA. 34. Customised growth charts are freely available, require little effort to print out at the beginning of each pregnancy and are easily implemented with the appropriate training, available from the Perinatal Institute.

NICE	**1.10**	**Recommendations** 35. In the light of this consistent and overwhelming evidence, we maintain that continued use of 'population charts' is no longer tenable and should be replaced by individually adjusted, 'customised' charts. We suggest that the recommendations should be altered as follows: 1.10.1.1. Fundal height should be measured at each antenatal visit from 25 weeks gestation. 1.10.1.2. The measurement should be plotted on customised growth charts adjusted for maternal height, weight in early pregnancy, parity and ethnic origin. **[NEW]** 1.10.1.3 A fetal growth scan to detect SGA unborn babies should be offered if - the first fundal height measurement is below the 10th centile on the customised chart or - serial measurements have shown a slowing of growth **[NEW]** 1.10.1.4. The results of the ultrasound biometry, expressed as estimated fetal weight, should be plotted on the customised growth chart to assess relative size-for gestation, (or growth if a previous EFW has been plotted). **[NEW]** 1.10.1.5. An EFW below the 10th centile on the customised chart, or slow EFW growth, is an indication to consider further investigations such as the assessment of umbilical artery Doppler flow. **[NEW]** **1.10.1.6 NEW -** as current 1.10.1.**3** **1.10.1.7 NEW** – as in current 1.10.1.4
Algorithm		**Algorithm** - should be amended accordingly
Full	**12.16**	**Full report** – Recommendations (following section 12.16): As above.