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Time to bring fetal growth assessment into the 21st century

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In obese women, the optimal criteria for detecting fetuses that are not growing well are unclear. Hinkle et al. used data on 228 438 deliveries at ≥23 weeks of gestation in 12 US centres, covering the period 2002–2008, to compare the overlap in the prevalence of infants identified as small for gestational age (SGA) across population, fetal growth, and customised reference systems. They estimated sensitivity, specificity, and positive and negative predictive values for perinatal mortality using each system, and the relative risk of having an SGA fetus in relation to pre-pregnancy body mass index (BMI) category.

For all three classifications SGA prevalence was lowest within the normal BMI range, and highest among underweight women. SGA prevalence by pre-pregnancy BMI showed substantial overlap: in comparison with population and fetal centiles, customised centiles detected the lowest proportion, about 13%, in women with low pre-pregnancy BMI, but the highest proportion in overweight and obese women. Compared with women of normal BMI, women who were underweight had a higher relative risk, and women who were overweight or obese had a lower relative risk, for delivering an SGA infant. The intrauterine reference detected the highest proportion of perinatal mortality cases with SGA infants of obese women at approximately five-fold increased risk.

The use of different reference systems leads to confusion for clinical staff and patients alike. Customisation involves adjusting fetal weight for maternal height, weight, parity, and ethnic group, on the assumption that a small baby born to a small mother is less likely to be abnormally small than a similar sized baby born to a bigger woman. This is in keeping with the finding by Hinkle and colleagues that the prevalence of SGA infants in underweight mothers was lowest when using the customised reference. A small mother may be small because her own growth was constrained, however, and not because she is constitutionally small. If so, she may be pathologically constraining the growth of her own fetus, and hence adjusting for her size would 'normalise' the abnormally small baby, and consequently might be predicted to identify small babies at risk of perinatal death less well than the use of an unadjusted fetal reference. This was also found by Hinkle and colleagues.

At the nub of the matter are several unresolved issues. First is the continuing conflation of the term SGA with 'intrauterine growth-restriction'. One in ten of a normal population will fit the former statistical definition. But what about the bigger baby whose growth falters but who remains above the tenth centile? This baby is arguably in greater need of identification. The widely used Hadlock fetal growth curves were constructed 25 years ago with data from less than 400 'predominantly middle-class white patients' (Hadlock et al. *Radiology* 1991;**181:** 129–33). This indicates that updated fetal charts constructed from measurements using state-of-the-art sonography are long overdue.

The World Health Organization (WHO) postnatal growth charts developed from longitudinal measurements in infancy show healthy babies across diverse countries that include India, Brazil, and the USA to have a similar pattern of growth. This suggests that all human fetuses, if not constrained by maternal factors, might also exhibit a similar growth pattern. Charts based upon measurements from women around the world have been developed (Papageorghiou et al. *Lancet* 2014; **384:**869–79), but until global maternal health has recovered from generations of neglect, and until the fetal growth pattern resulting in optimal life-long health has been identified, it would be wiser to consider these a reference rather than a standard.

Disclosure of interests

Full disclosure of interests available to view online as supporting information. ■