Impact of replacing ethnicity specific fetal biometry charts by the INTERGROWTH-21st standards chart
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Objective
To assess the suitability of INTERGROWTH-21st biometry standards in comparison to locally adopted standards.

Methods
This was a retrospective study of fetal biometry measurements performed on East Asian women having a singleton pregnancy, who had underwent a 2nd or 3rd trimester fetal anomaly scan or growth scan between January 2009 and June 2014. Only the initial biometry measurements were used if the pregnancy had more than one scan. Standardized residuals (z-score) for fetal Abdominal Circumference (AC), Head Circumference (HC), Femur Length (FL) and outer to inner Biparetal Diameter (BPD) according to gestational age, were determined using the INTERGROWTH-21st and local reference standards. Z-scores of ±1.282, ±1.645 and ±1.881, the international growth standards, were used to determine the proportion of biometry measurements below and above the 3rd/97th, 5th/95th and 10th/90th percentiles respectively. The proportion of fetuses with at least one or more biometry measurements below the 3rd percentile was determined. Pairwise analysis and McNemar test were used to assess the z-score differences and concordance between the INTERGROWTH-21st and our local biometry standard.

Results
A Database search revealed that 12,123 sets of fetal biometry scans were performed in 10,527 singleton pregnancies. 1,589 (13.1%) sets of biometry measurements were excluded as they were repeated. 9,741 (92.5%) were Chinese East Asians; 6148 (58.4%) were nulliparous; 7,043 (66.9%) were 1st trimester ultrasound dated and perinatal outcome was documented in 10,293 (97.7%). Fetal biometry were performed between 18 to 22 completed weeks in 7858 (74.6%) pregnancies. Wilcoxon signed rank test, with Bonferroni correction, indicated that INTERGROWTH-21st biometry z-scores were significantly lower than those obtained using the local reference for AC, HC and FL (p<0.0001 for all). The proportion of biometry measurements below the 3rd, 5th and 10th centile using the INTERGROWTH-21st standard were 6.7%, 9.9 and 17.8% for AC, 5.3%, 8.0% and 14.5% for HC and 7.0%, 10.9% and 19.2% for FL, respectively. McNemar test indicated a significant discordance between the fetuses identified as being above or below each of the international growth standards (p<0.01 for all) between the INTERGROWTH-21st and the local standard. 1,224 (15.5%) of 18 to 22 weeks scans had AC, HC or FL below the 3rd centile of the INTERGROWTH-21st standard.

Conclusion
The differences between INTERGROWTH-21st and our locally constructed biometry charts was sufficiently large that it would lead to a significant number of fetuses at risk of misdiagnosis of fetal smallness, particularly when using HC and FL.