

Most fetal weight standards miss increased stillbirth risk in obese mothers' pregnancies

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Objective

We investigated the performance of four international fetal weight standards and their ability to identify stillbirth risk associated with smallness for gestational age (SGA) in expectant mothers with increased body mass index (BMI).

Methods

- We analysed routinely collected data from 2.27 million pregnancies
- SGA (<10th centile) was determined according to 4 fetal weight standards:
 - Hadlock¹
 - Intergrowth 21st (IG21)²
 - World Health Organisation (WHO)³
 - Gestation Related Optimal Weight (GROW)⁴ fetal weight standard, customised for maternal height, weight, parity and ethnic origin.

1. <https://doi.org/10.1148/radiology.181.1.1887021>
 2. <https://doi.org/10.1002/uog.17347>
 3. <https://doi.org/10.1371/journal.pmed.1002220>
 4. <https://doi.org/10.1046/j.1469-0705.1995.06030168.x>

Figure 1 - British European

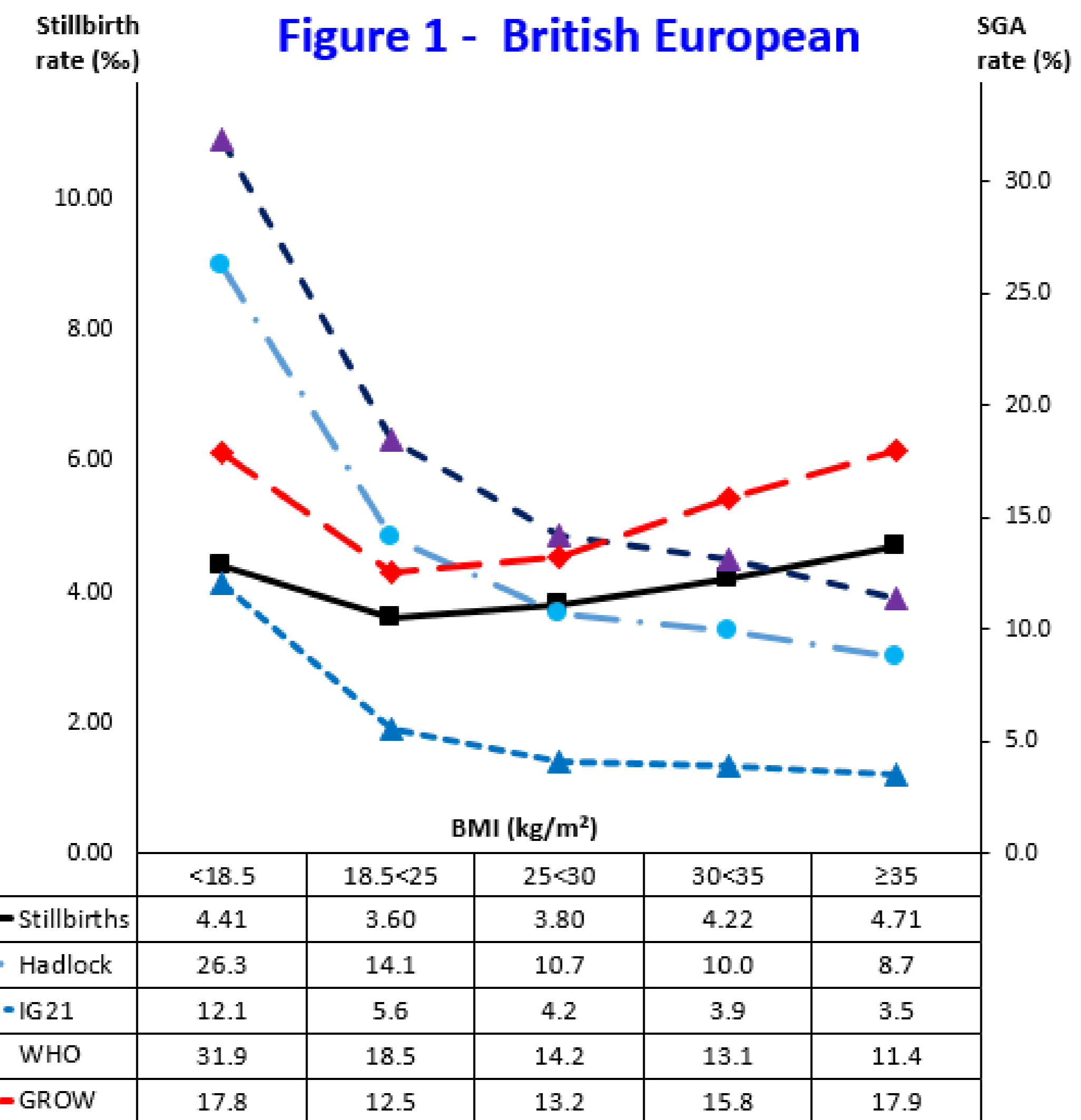
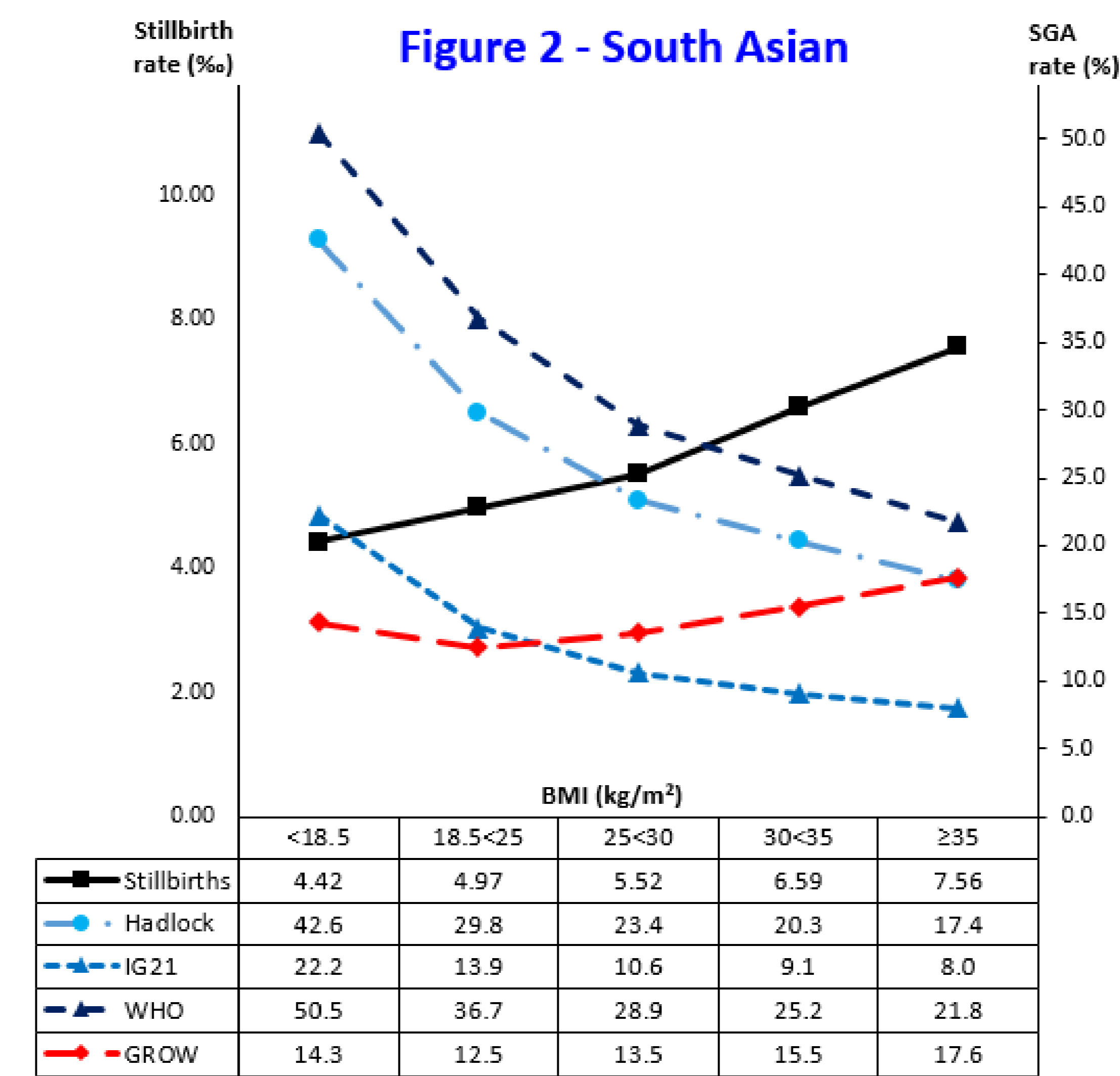


Figure 2 - South Asian



Methods (cont'd)

- SGA rate at birth and stillbirth risk were determined in 5 BMI categories for our two largest ethnic groups: British European (BE) and South Asian (SA).
- Differences in trend between stillbirth risk and SGA rate across BMI groups were assessed by Z test for trend.

Results

- South Asians had a higher rate of stillbirth than British-Europeans (5.5 vs 3.9/1000, P<0.01).
- SGA rates of normal BMI mothers were 12.5% in both BE and SA cohorts using GROW, but varied widely by population-average standards, ranging from 5.6 to 36.6% (Figures 1 & 2).

Results (cont'd.)

- According to GROW, SGA rates mirrored stillbirth rates across the BMI categories with no difference in trends in the BE (p=0.80) as well as the SA cohort (p=0.71).
- SGA rates according to each of the population-average standards declined from lowest to highest BMI contrary to the increasing stillbirth rates, resulting in significantly different trends (p<0.01) for both ethnic cohorts.

Conclusions

- Maternal obesity during pregnancy is associated with increased stillbirth risk and a higher rate of SGA, which becomes only apparent when the fetal weight standard is customised.
- Increased stillbirth rate in high BMI pregnancies is likely to be due to higher rates of fetal growth restriction as well as difficulties in antenatal recognition of the FGR fetus due to maternal obesity.
- Population-average fetal weight standards hide this association and appear to suggest that high BMI is protective of SGA, thereby providing false reassurance.