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**How does ethnic adjustment of childhood BMI change obesity prevalence in inner London boroughs with high ethnic diversity: analysis using National Child Measurement Programme data for 2015-2017**

**Background**

Methods for ethnic adjustment of BMI are available but not currently used in the National Child Measurement Programme (NCMP). We evaluated the effect of ethnic-specific BMI adjustments on the prevalence of obesity and severe obesity, using cut-offs to identify children potentially needing clinical intervention, in three inner London Boroughs with high obesity prevalence and ethnic diversity.

**Methods**

We analysed de-personalised NCMP data for 21,126 (10,348 girls) five year-olds (5,463, 9,065 and 6,598 respectively in City & Hackney, Newham and Tower Hamlets) and 19,024 (9,361 girls) 11 year-olds (4,865, 8,274 and 5,885) for the school years 2015-16 and 2016-17. We estimated, for each borough, the prevalence of obesity (BMI centile ≥98th) and severe obesity (defined as ≥120% of the 95th centile) based on unadjusted and ethnic-adjusted BMI using ethnic-specific BMI adjustments for South Asian and Black ethnicity children, developed by Hudda *et al*. These add ~1.1kg/m2 to, and deduct between 0.12 and 5.52kg/m2 from, the BMI of South Asian and Black ethnicity children respectively. We report the net change in numbers identified for possible clinical intervention over both school years and for both ages combined.

**Results**

Proportions of five and eleven year-olds of South Asian ethnicity were highest in Tower Hamlets (58.5%; 67.4% respectively) and Newham (39.1%; 30.3%), and lowest in City & Hackney (9.7%; 6.4%). Equivalent proportions of children of Black ethnicity were highest in City & Hackney (29.6%; 22.0%) and Newham (16.5%; 13.6%), and lowest in Tower Hamlets (8.3%; 9.4%). Ethnic-specific BMI adjustments increased the respective prevalences of obesity and severe obesity in Tower Hamlets from 6.7% and 1.7% to 8.1% and 2.5% at age five, and from 11.2% and 6.9% to 11.9% and 8.6% at age 11, a net increase of 133 obese and 154 severely obese children. Equivalent prevalences in City & Hackney fell after ethnic adjustment, from 6.7% and 1.8% to 5.2% and 1.4% at age five, and from 10.7% and 8.8% to 9.4% and 7.7% at age 11, a net decrease of 145 obese and 74 severely obese children. Prevalence estimates before and after ethnic adjustment in Newham were broadly similar, resulting in three fewer obese and 28 more severely obese children.

**Conclusion**

Adoption of ethnic-adjusted BMI in ethnically diverse areas alters local estimates of childhood obesity, avoids misclassification of children of South Asian and Black ethnicity, and is essential to support clinical service planning and commissioning. Ethnic-specific BMI adjustments for children of mixed ethnicity are needed.