

## Editorial

# Childhood obesity

Recently released results from the 2011–13 Australian Health Survey<sup>(1)</sup> show that in 2011–2012, 25.3% of children aged 5 to 17 years were overweight (17.7%) or obese (7.6%), with girls (27.1% overweight/obese) doing somewhat worse than boys (23.6% overweight/obese). Although this is a high proportion of children who were overweight or obese, the good news is that it had not increased since 2007–2008. Globally, childhood overweight and obesity increased dramatically between 1990 and 2010<sup>(2)</sup>, hence the interest we see in this topic as expressed in submitted articles.

In the present issue it is reported that childhood overweight/obesity in France, which increased during the 1990s, appears to have stabilised at around 16%<sup>(3)</sup>. While these observations suggest that there may be a levelling off in the prevalence of obesity in some countries, the number of overweight and obese children is still high and likely still increasing globally.

The same study also examined social, economic and lifestyle factors associated with overweight and obesity in children in south-west France<sup>(3)</sup>. In children aged 5–7 years, overweight and obesity were associated with female gender, low or medium household socio-economic status (SES), no or infrequent consumption of breakfast or light afternoon meal, and more sedentary activities. Similarly, for the older group aged 7–11 years, female gender, low or medium household SES, no morning snack and more sedentary activities were important. The self-reported measure of physical activity was not associated with overweight or obesity. Notably, for the 5–7-year-old sample, eating at the school canteen was inversely associated with obesity. In the region where this study was conducted there has been a focus on improving the nutritional quality of school meals, which may be important.

Other studies in this issue have looked at various factors associated with the prevalence of overweight and obesity as well. Data from the Longitudinal Eating and Activity (LEA) study were used to investigate school and family environmental factors at age 10 years in relation to energy balance-related behaviours (EBRB; i.e. breakfast consumption, soft drink consumption and physical activity) at age 16 years in Flemish schoolchildren<sup>(4)</sup>. None of the school environmental factors were associated with EBRB six years later, but eating breakfast with parents predicted more frequent breakfast consumption at age 16 years. Family factors related to soft drink consumption were parental consumption, availability at home, and being able to take soft drinks or have them whenever asked for. Positive parental attitude, more parental encouragement

and parents' rating physical activity as relaxing after school all predicted future physical activity. Neither gender nor SES modified the associations. These findings point to the importance of parents in determining their children's behaviour in adolescence.

Among rural American children with an average age around 10 years, BMI Z-score was inversely associated with intake of whole grains, even after adjusting for physical activity and intakes of vegetables, fruit and dairy products<sup>(5)</sup>. An important limitation of the study is that intake was assessed from a single day screening questionnaire. However, it is likely that even if the reported intake of whole grains was not an accurate measure of usual intake, children reporting more whole grains intake on the reference day did consume more whole grains overall than those reporting less intake.

Analysis of data from the IDEFICS study in eight European countries showed that exclusive breast-feeding for 6 months was associated with less overweight and obesity in childhood (14 726 children aged 2–9 years) even accounting for education, income and other potential confounders<sup>(6)</sup>. This suggests that measures to prevent childhood obesity must begin at birth, or even before, as birth weight was found to predict obesity at age 14 years in 119 070 Chilean children adjusting for gender, age and mother's educational attainment at delivery<sup>(7)</sup>.

SES is known to be associated with obesity but the direction of this association varies. In a birth cohort study conducted in Brazil<sup>(8)</sup>, family income at birth was positively associated with BMI at ages 1, 2, 4, 15, 18 and 23 years for males; while for females the relationship was in the same direction up to age 4 years and then trended in the opposite direction, so that by age 23 years the women with the highest family income had the lowest BMI. Among Greek children aged 10–12 years, older maternal age and having parents with normal BMI were associated with lower likelihood of childhood overweight/obesity. In addition, a less manual paternal occupation was associated with reduced likelihood of overweight/obesity in girls, and residence in urban or semi-urban compared with large urban areas was associated with overweight/obesity in boys<sup>(9)</sup>. Other SES variables measured included mother's and father's educational level, mother's type of occupation, place of residence and annual family income, which were not associated with BMI in the children.

In terms of assessing childhood obesity, a study in children aged 6–10 years from Colombia compared BMI, waist circumference, weight-to-height ratio, abdominal

skinfold thickness (ASF), subscapular skinfold thickness, triceps skinfold thickness and biceps skinfold thickness as predictors of insulin resistance by the homeostasis model assessment method<sup>(10)</sup>. ASF and BMI Z-scores were independently associated with insulin resistance, with ASF marginally better. The addition of ASF to BMI improved the prediction. The other measures were not retained in step-wise variable selection models. While these results may suggest that ASF is useful to identify prepubertal children at risk of insulin resistance and obesity-associated metabolic disorders, they also confirm the utility of BMI alone for this.

Accurately measuring diet to identify associations between dietary exposures and health outcomes, including obesity, is difficult, but unless dietary measurement error is dealt with appropriately it could potentially lead to incorrect conclusions regarding the associations between different food and beverage groups and obesity. In this issue Börnhorst *et al.*<sup>(11)</sup> describe the use of a propensity score for dietary misreporting, using data from IDEFICS over eight European countries. By including the score in their models, hypothesised associations between intake and obesity were evident where previously associations had not existed or had gone in the opposite direction. Application of this statistical technique in other studies will be of interest.

The studies highlighted in this issue show the importance of tackling childhood obesity even before birth. They also demonstrate the strong association of childhood obesity with family environmental factors, although these associations may reflect the environments in which families live. Figures from some countries give some hope that rates of overweight and obesity are levelling out. But this is unlikely to extend to all countries, and prevalences are still high. Complex associations with family environmental and socio-economic factors suggest the need for greater efforts to curtail the rise in obesity in children now and in the foreseeable future.

Marilyn Tseng  
Editor-in-Chief

Irja Haapala  
Allison Hodge  
Agneta Yngve  
Deputy Editors

## References

1. Australian Bureau of Statistics (2012) 4364.0.55.001 – Australian Health Survey: First Results, 2011–12. <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4364.0.55.001> (accessed November 2012).
2. de Onis M, Blossner M & Borghi E (2010) Global prevalence and trends of overweight and obesity among preschool children. *Am J Clin Nutr* **92**, 1257–1264.
3. Thibault H, Carriere C, Langevin C *et al.* (2013) Prevalence and factors associated with overweight and obesity in French primary-school children. *Public Health Nutr* **16**, 193–201.
4. Verloigne M, Van Lippevelde W, Maes L *et al.* (2013) Family- and school-based predictors of energy balance-related behaviours in children: a 6-year longitudinal study. *Public Health Nutr* **16**, 202–211.
5. Choumenkovitch SF, McKeown NM, Tovar A *et al.* (2013) Whole grain consumption is inversely associated with BMI Z-score in rural school-aged children. *Public Health Nutr* **16**, 212–218.
6. Hunsberger M, Lanfer A, Reeske A *et al.* (2013) Infant feeding practices and prevalence of obesity in eight European countries – the IDEFICS study. *Public Health Nutr* **16**, 219–227.
7. Loaiza S & Atalah E (2013) Birth weight and obesity risk at first grade of high school in a non-concurrent cohort of Chilean children. *Public Health Nutr* **16**, 228–232.
8. Gigante DP, Victora CG, Matijasevich A *et al.* (2013) Association of family income with BMI from childhood to adult life: a birth cohort study. *Public Health Nutr* **16**, 233–239.
9. Farajian P, Panagiotakos DB, Risvas G *et al.* (2013) Socio-economic and demographic determinants of childhood obesity prevalence in Greece: the GRECO (Greek Childhood Obesity) study. *Public Health Nutr* **16**, 240–247.
10. Mueller NT, Pereira MA, Buitrago-Lopez A *et al.* (2013) Adiposity indices in the prediction of insulin resistance in prepubertal Colombian children. *Public Health Nutr* **16**, 248–255.
11. Börnhorst C, Huybrechts I, Hebestreit A *et al.* (2013) Diet–obesity associations in children: approaches to counteract attenuation caused by misreporting. *Public Health Nutr* **16**, 256–266.