**EASD Conference Abstract**

Title: Associations between markers of childhood body composition and type 2 diabetes in adulthood

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Background and aims: Childhood obesity is a major global public health issue. Childhood BMI, the most widely used marker of obesity, is associated with type 2 diabetes (T2D) in adulthood, but there is limited information on how more direct measures of childhood body composition, including fat mass (FM) and fat free mass (FFM), are associated with T2D risk. We assess the associations between three height-standardised childhood body composition indices (BMI, fat mass index [FMI] and fat free mass [FFMI]) and T2D in adulthood, using recently developed prediction equations to estimate FM and FFM from height, weight, sex and age.

Materials and methods: Analyses were based on data from a cohort of Danish schoolchildren, born 1930-85, with available height and weight measurements at 7y, 10y or 13y. FM and FFM were estimated (using equations derived in a separate study of 2375 children with deuterium dilution measurements) and standardised for height at each age. T2D diagnoses in adulthood were ascertained by linkage to national registers. Sex-specific Cox regression models were fitted within birth cohort groups and the hazard ratios for the associations between each of the childhood indices and T2D were ascertained and pooled via random-effects meta-analyses. Models were fitted separately at BMI values above and below the mean and by age at diagnosis.

Results: Analyses were based on a minimum of 131181 males (13156 T2D cases) and 130334 females (8697 T2D cases). Based on proportional hazards assumption tests, analyses were restricted to those at early T2D risk (before 42y in males & 47y in females). Amongst those with above-average childhood BMI, all three indices had positive associations with early T2D diagnoses, which were stronger amongst females than males (Table 1). The associations between FFMI and T2D in both sexes were systematically stronger than those of FMI and BMI, which showed similar strengths of associations. The strengths of the associations were greater at ages 10y and 13y compared with 7y (Table 1). Among those with below-average childhood BMIs, associations were weaker, but most remained positive.

Conclusion: In this cohort of children born up to 1985, the childhood body composition markers, particularly FFMI, were positively associated with T2D in adulthood. There was a suggestion that the FFMI component of BMI is more strongly associated with T2D risk than the FMI component. However, further evidence is needed in more contemporary cohorts more affected by the recent rise in obesity prevalence, for whom the FM to FFM balance is likely to be different.

Table 1: Sex-specific hazard ratios (95% confidence intervals) for the associations between childhood body composition markers and early type 2 risk in adulthood

