Methods: Serial height and weight measurements from birth to age 9.5 years for 557 children who took part in the Generation 1 cohort study were used, along with girls' menstrual history at age 12-13 years. Shape invariant random effects models were fit to log(weight+1) for all available participants' data (282 girls, 260 boys), and AIC used to identify the best-fitting model. In time-to-event models subsequently fit to the girls' data to estimate effects of the growth parameters on menarcheal age, a censoring age of 12 years was used to define early puberty.

Results: A model with 4df and fixed and random effects for size and tempo and a fixed effect for velocity was preferred. Some 19% of girls began menstruating before age 12 years. Size and tempo were each associated with an increased hazard of earlier menarche; a 0.1 unit gain in size was associated with a hazard ratio of 1.75 (95%CI 1.32–2.33), and a 0.1 unit gain in tempo with a hazard ratio of 7.84 (95%CI 3.41–18.05).

Conclusions: Using all participants' data gave more precise growth parameter estimates.

Key messages: Understanding mechanisms that drive increased size and tempo of childhood growth may help to elucidate the links between obesity and girls' risk of early puberty.

Abstract #: 690
Growth in childhood and age at menarche: Insights from individual trajectory modelling

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Background: The relationship between patterns of weight gain across childhood and the onset of puberty remains unclear. We aimed to derive growth parameters (size, tempo, and velocity) from models of weight across childhood and to estimate their effects on age at menarche.