

Research Update: Timing of puberty varies in overweight vs. obese boys

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Data from a large and diverse group of U.S. boys offer new evidence that puberty may occur earlier among boys who are overweight and later among those who are obese. The findings are detailed in a recently published study involving the AAP Pediatric Research in Office Settings (PROS) network ([Lee JM, et al. *Pediatrics*. 2016;127:e20150164](#)).

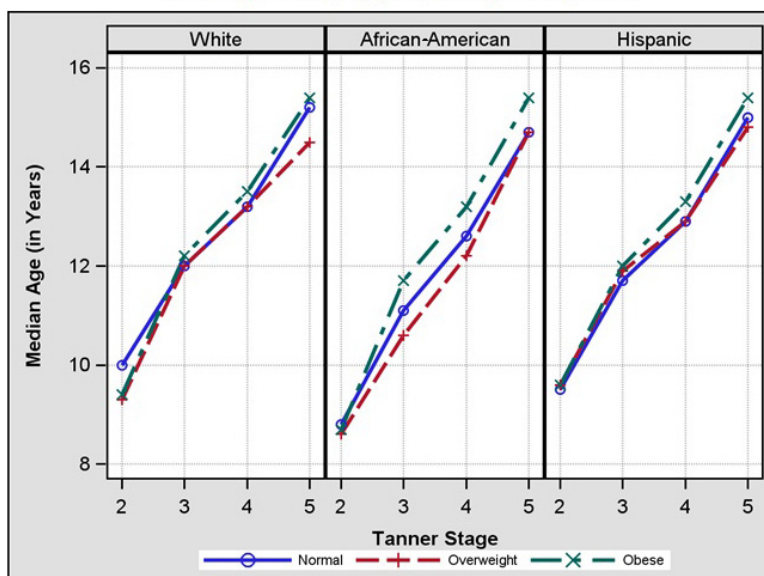
Results of prior studies that have explored relationships between excess weight and timing of puberty in boys have shown mixed results. This may be due partly to different definitions of puberty or smaller sample sizes. In contrast, this large national study involved 212 pediatric clinicians from the PROS network and the Academic Pediatric Association's Continuity Research Network (CORNET).

Researchers used testicular volume and genital stages to study the relationship between obesity and central puberty.

Source: Lee JM, et al. *Pediatrics*. 2016;137:e20150164

Before starting the study, clinicians were trained in Tanner staging and use of a Prader orchidometer to measure testicular volume; received a manual of reference photographs of sexual maturity stages; and passed a qualifying exam. Definitions of Tanner stage and testicular volume were consistent with prior studies. Weight status was classified using the Centers for Disease Control and Prevention growth percentiles in three categories: normal weight (body mass index [BMI] from the 5th-84th percentile), overweight (BMI from the 85th-94th percentile) and obese (BMI over the 94th percentile).

Age of puberty development of U.S. boys, measured as the median age at each Tanner stage, 2 through 5, by race/ethnicity and weight status



Data were collected at well-child visits from 3,872 boys ages 6-16 years (49% white, 26% African-American and 24% Hispanic). Clinicians recorded height and weight (to the nearest 0.5 kilogram) using their usual office procedures and assessed Tanner stages and testicular volume using study procedures and equipment.

Statistical analyses were used to determine population distributions of puberty outcomes across the age spectrum, overall and by each race/ethnic group. Probit regression models were used to predict the probability of having puberty by age for each Tanner stage of genital development: 2 or greater; 3 or greater; 4 or greater; 5 or greater. Simulation analyses were used to identify statistically significant differences across different weight groups.

Overall, results show evidence of earlier puberty for overweight boys compared with normal or obese boys and later puberty for obese boys compared with normal and overweight boys. However, these differences were not consistent across all pubertal stages or all races/ethnicities — distinctions that have not been measurable in prior studies. The study's large sample size also made it possible to compare pubertal outcomes across different and distinct weight categories — something smaller studies have been unable to do (see figure).

These findings add more nuanced insight into the complex relationship between boys' puberty, overweight and obesity. A potentially nonlinear relationship between pubertal timing and body fat in boys highlights the need for further research to evaluate pubertal outcomes across a spectrum of weight categories.

This study involved collaboration among researchers at The University of Michigan; University of Vermont; Alfred I. DuPont Hospital for Children in Wilmington, Del.; CORNET; the National Medical Association NMAPedsNet; Baystate Children's Medical Hospital in Springfield, Mass.; Tufts University School of Medicine in Boston; the University of North Carolina at Chapel Hill; and the Academy.

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Resources

- [Information about PROS](#)
You also may contact Laura Shone, in the AAP Division of Primary Care Research, at 800-433-9016, ext. 7910, or lshone@aap.org.
- [Information and simulated practice with motivational interviewing to address overweight and obesity in primary care](#)
- [Information on childhood obesity and resources for practitioners, at Pediatric ePractice \(PeP\): Childhood Obesity](#)
Full access to PeP is an AAP member benefit.
- [AAP News story "Pediatric Research in Office Settings names new director"](#)

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