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# A prospective analysis of plasma 25-hydroxyvitamin D concentrations in white and black prepubertal females in the southeastern United States<sup>1,2,3</sup>

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**Background:** Little is known regarding changes in vitamin D status among children living in the southern United States and whether these changes are race-dependent.

**Objectives:** The aims were to prospectively assess plasma 25-hydroxyvitamin D [25(OH)D] concentrations in prepubertal black and white girls ( $n = 83$ ) living in northeast Georgia and to determine whether 25(OH)D concentrations change with increasing age.

**Design:** Plasma samples were obtained annually over a time frame of 1–7 y, and 25(OH)D concentrations were assessed by using radioimmunoassay. Percentage body fat (%BF) and fat-free soft tissue (FFST) mass were measured by using dual-energy X-ray absorptiometry. Linear mixed-effects models were used with height, weight, body mass index percentile, %BF, FFST, pubertal stage, dietary intake, physical activity, and socioeconomic status as covariates.

**Results:** Plasma 25(OH)D values  $<80$  nmol/L were observed in 75% of the participants. Plasma 25(OH)D values (analyzed on the natural logarithm scale) decreased with increasing age ( $P = 0.02$ ), independent of race. Plasma 25(OH)D values were higher in whites than in blacks ( $P < 0.0001$ ), and the amount of this difference depended on season ( $P < 0.001$  for all seasons). A significant negative association between FFST and 25(OH)D, beyond the effects of age, race, and season ( $P = 0.007$ ), was observed. The effects of age, race, and season on 25(OH)D remained significant when dietary calcium, vitamin D, and physical activity were used as covariates; however, after adjustment for FFST, only the effects of race and season remained.

**Conclusions:** White girls living in the southeastern United States have higher 25(OH)D concentrations than do black girls, and the magnitude of this difference depends on the season. Decreases in 25(OH)D with age are associated with increases in FFST. Whether FFST requires additional vitamin D during growth remains to be determined.

**Key Words:** Plasma 25-hydroxyvitamin D • prepubertal females • Georgia • race • season • body composition

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