Generalized equations for estimating DXA percent fat of diverse young women and men: the TIGER study.

PURPOSE: Popular generalized equations for estimating percent body fat (BF%) developed with cross-sectional data are biased when applied to racially/ethnically diverse populations. We developed accurate anthropometric models to estimate dual-energy x-ray absorptiometry BF% (DXA-BF%) that can be generalized to ethnically diverse young adults in both cross-sectional and longitudinal field settings.

METHODS: This longitudinal study enrolled 705 women and 428 men (aged 17-35 yr) for 30 wk of exercise training (3 d·wk(-1) for 30 min·d(-1) of 65%-85% predicted V' O2max). The distribution of ethnicity was as follows: 37% non-Hispanic white, 29% Hispanic, and 34% African-American. DXA-BF%, skinfold thicknesses, and body mass index (BMI) were collected at baseline and after 15 and 30 wk.

RESULTS: Skinfolds, BMI, and race/ethnicity were significant predictors of DXA-BF% in linear mixed model regression analysis. For comparable anthropometric measures (e.g., BMI), DXA-BF% was lower in African-American women and men but higher in Hispanic women compared with non-Hispanic white. Addition of BMI to the skinfold model improved the SEE for women (3.6% vs 4.0%), whereas BMI did not improve prediction accuracy of men (SEE = 3.1%).

CONCLUSIONS: These equations provide accurate predictions of DXA-BF% for diverse
young women and men in both cross-sectional and longitudinal settings. To our knowledge, these are the first published body composition equations with generalizability to multiple time points, and the SEE estimates are among the lowest published in the literature.