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## The Relationship of Sitting Height Ratio to Body Mass Index and Fatness in The United States, 1988-1994

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**ABSTRACT** The body mass index (BMI) is the most widely used indicator of body fatness for adults. Higher BMI generally equates with greater levels of fatness. The sitting height ratio (SHR = sitting height/stature) is a relatively simple ratio of body proportions. A larger SHR indicates relatively short leg length for total stature. Previous studies show that the BMI underestimates fatness for traditional peoples with relatively long legs (a low SHR). Conversely, BMI overestimates fatness in traditional peoples suffering from undernutrition with relatively high SHR. A few studies have shown effects of SHR on BMI in small samples from urban/industrial societies. In this paper we assess the influence of SHR and lower leg length on the BMI of the United States population using the National Health and Nutritional Examination Survey of 1988-1994 (NHANES III). This nationally representative sample of 8,639 adults 20-49 years of age includes men and women of white, black, and Mexican-American ethnicity. Using stepwise multiple regression, we find that the BMI is most closely associated with body fatness (sum of four skinfolds) and then significantly influenced by SHR. The leg length component of the SHR has a greater influence on BMI than the sitting height component. Adults with relatively longer legs have lower BMI and body fatness in both sexes and all ethnic groups. The reason for this relationship is not well understood. We offer a hypothesis that early life undernutrition and disease, prenatal and postnatal, inhibits the growth of the legs and promotes a metabolic syndrome leading to greater body fatness.