

# How Useful Is Body Mass Index For Comparison of Body Fatness Across Age, Sex and Ethnic Groups?

**Dympna Gallagher, Marjolein Visser, Dennis Sepulveda, Richard N. Pierson, Tamara Harris, & S.B. Heymsfield.**

St. Luke's-Roosevelt Hospital Center, NY, NY 10025.  
First published in the American J Epidemiol 1996;146:228-39  
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## Practical Implications:

- Results suggest that BMI is age and sex dependent when used as an indicator of body fatness, but that it is ethnicity independent in black and white adults.

## ABSTRACT

**Objective:** This study tested the hypothesis that body mass index (BMI) is representative of body fatness independent of age, sex, and ethnicity.

**Design:** Between 1986 and 1992, the authors studied a total of 202 black and 504 white men and women who resided in or near New York City, were ages 20-94 years, and had BMI's of 18-35 kg/m<sup>2</sup>. Total body fat, expressed as a percentage of body weight (BF%), was assessed using a four-compartment body composition model that does not rely on assumptions known to be age, sex, or ethnicity dependent.

**Results:** Statistically significant age dependencies were observed in the BF%-BMI relations in all four sex and ethnic groups (p values < 0.05-0.01) with older persons showing a higher BF% compared with younger persons with comparable BMIs.

Statistically significant sex effects were also observed in BF%-BMI relations within each ethnic group (p values <0.001) after controlling first for age. For an equivalent BMI, women have significantly greater amounts of total body fat than do men throughout the entire adult life span. Ethnicity did not significantly influence the BF%-BMI relation after controlling first for age and sex even though both black women and men had longer appendicular bone lengths relative to stature (p values <0.001 and 0.02, respectively) compared with white women and men. Body mass index alone accounted for 25% of between-individual differences in body fat percentage for the 706 total subjects; adding age and sex as independent variables to the regression model increased the variance (R<sup>2</sup>) to 67%. These results suggest that BMI is age and sex dependent when used as an indicator of body fatness, but that it is ethnicity independent in black and white adults.

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