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Self-report corrections for BMI: Comment on Keith et al International J. Obesity

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We, the authors of two publications, one in *BMC Public Health* and the other in the *International Journal of Obesity*, write to correct points in each of these two articles.[1, 2] Keith et al. discussed the 2009 article by Stommel and Schoenborn in BMC Public Health as follows:

> BMI_{SR} [self-reported body mass index] should not be considered a reliable source of information for estimating BMI_M [measured BMI] with a regression model. This calls into question the validity of methods using self-reported heights and weights and other study variables, such as the methods proposed by Stommel and Schoenborn[2] based on recent NHANES [National Health and Nutrition Examination Survey] data, to generate corrected BMI scores conditioned on BMI_{SR}. When we applied their method[1] to NHANES III, although the corrected BMI scores did improve classification over uncorrected BMI_{SR} among the severely obese (increased sensitivity from 68 to 84%), they seriously exacerbated the misclassification problems among the underweight, normal weight, overweight and obese (sensitivity decreased from 58, 91, 80 and 62 to 3, 30, 31 and 47%, respectively). Compared to BMI_M, the corrected BMI scores also increased the bias in estimating MR beyond that which we showed from using BMI_{SR}.

The above claim was based on results obtained by applying the equation published in table 3 of the Stommel and Schoenborn article.[2] It was subsequently determined that the published information was insufficient for the stated purpose for the following reasons: (1) the intercept term had been omitted from the published table; (2) the regression coefficients had been rounded to the third decimal; and (3) a binary variable for missing income information had been omitted. In addition, Keith et al. applied the equation by applying the regression coefficients for self-reported (s-r) height and its squared term to data scaled in *meters*

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instead of *centimeters* as in the original equation. In Table 1 below, we reproduce the correct complete equation. Using this complete equation to calculate corrected BMI scores improved the classification sensitivities from those published by Keith et al (3, 30, 31, 47%) to 50, 89, 82, and 72%, among the underweight, normal weight, overweight, and obese of NHANES III, respectively.

The authors of the two articles have concluded that the statement in the discussion section by Keith et al.[1] - indicating that use of the correction equation of Stommel and Schoenborn[2] did not reduce the bias introduced into the BMI-mortality association by use of self-reported data - was premature. In addition, Stommel & Schoenborn would like to suggest that the tendency to over-report height and under-report weight is subject to change over time, and therefore equations based on 2001–2006 data may not be entirely applicable to data from 1988–1994. The authors of both articles advise that future research more thoroughly evaluate the question of whether corrections to self-reported heights and weights can substantially reduce biases in BMI mortality associations introduced by use of self-reported heights and weights.

References

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2. Keith SW, Fontaine KR, Pajewski NM, Mehta T, Allison DB. Use of self-reported height and weight biases the body mass index-mortality association. Int J Obes (Lond). 2011; 35(3):401–408. [PubMed: 20680015]

Table 1

Corrected regression coefficients for calculating corrected BMI scores based on self-reported height, weight, and other variables.

Variable	Coefficient
Intercept	−3.494664
Height-SR [cm]	0.268621
(Height-SR)^2 [cm^2]	−0.0016514
Weight-SR [kg]	0.4764528
(Weight-SR)^2 [kg^2]	−0.000653
Gender (1 = f, 0 = m)	1.261229
Age (years)	−0.0322061
Age^2	0.0004285
Pregnant (1 = y, 0 = n)	2.036989
Race/Ethnicity	
_Mexican American	0.2661421
_African American	0.0644164
_Other Minorities	0.3347232
Marital Status	
_Widowed	−0.1469671
_Divorced/Separated	0.0200985
_Never Married	0.1839346
_Living with Partner	0.1280038
Household Income	
_≥$20,000	−0.1326763
Missing Household Income	−0.0921509