Supplemental Digital Content 3 Mean difference in PBF estimated from published equations using anthropometric measures and DXA in NHANES 1999-2004 in adult males and females matched by age range and race-ethnicity with the sample in which the equations were developed*1-3*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Anthropometric(s) used in equation/  Equation evaluated | Males | |  | Females | |
| MD | SE |  | MD | SE |
| *Triceps and subscapular skinfold thickness* |  |  |  |  |  |
| Durnin and Womersley age-specific (5) |  |  |  |  |  |
| 20 - 39 years | -3.4 | 0.2 |  | -4.6 | 0.2 |
| 40 - 59 years | 0.6 | 0.1 |  | -1.8 | 0.2 |
| 60 - 68 years | -0.1 | 0.3 |  | -2.8 | 0.3 |
| 20 - 68 years | -1.2 | 0.1 |  | -3.1 | 0.1 |
| Durnin and Womersley all-age (5) |  |  |  |  |  |
| 20 - 39 years | -2.2 | 0.2 |  | -3.5 | 0.2 |
| 40 - 59 years | -2.9 | 0.2 |  | -4.5 | 0.2 |
| 60 - 68 years | -4.4 | 0.3 |  | -7.1 | 0.3 |
| 20 - 68 years | -2.8 | 0.1 |  | -4.4 | 0.1 |
| Hassager et al. (11) |  |  |  |  |  |
| 20 - 39 years | -6.1 | 0.2 |  | -4.4 | 0.2 |
| 40 - 59 years | -4.9 | 0.1 |  | -4.1 | 0.2 |
| 60 - 72 years | -4.5 | 0.2 |  | -5.7 | 0.2 |
| 20 - 72 years | -5.3 | 0.1 |  | -4.5 | 0.1 |
| Slaughter et al. (30) |  |  |  |  |  |
| 20 - 29 years | -0.9 | 0.3 |  | -4.0 | 0.3 |
| *Height, weight and/or body mass index (BMI)* |  |  |  |  |  |
| Deurenberg et al., 1989 (2) |  |  |  |  |  |
| 60 - 83 years | 2.8 | 0.1 |  | 3.3 | 0.1 |
| Deurenberg et al.1991 (3) |  |  |  |  |  |
| 20 - 39 years | -3.4 | 0.2 |  | -4.6 | 0.1 |
| 40 - 59 years | -0.1 | 0.2 |  | -1.2 | 0.2 |
| 60 - 83 years | 2.4 | 0.1 |  | 1.7 | 0.2 |
| 20 - 83 years | -0.9 | 0.1 |  | -1.8 | 0.1 |
| Deurenberg et al. 1998 *4* | - | - |  | - | - |
| Gallagher et al. 1996 (9)*5* |  |  |  |  |  |
| 20 - 39 years | -5.0 | 0.2 |  | -5.8 | 0.1 |
| 40 - 59 years | -3.5 | 0.2 |  | -4.2 | 0.2 |
| 60 - 84 years | -3.4 | 0.1 |  | -3.4 | 0.2 |
| 20 - 84 years | -4.1 | 0.1 |  | -4.6 | 0.1 |
| Gallagher et al. 2000 full(8)*5* |  |  |  |  |  |
| 20 - 39 years | -4.0 | 0.1 |  | -4.5 | 0.1 |
| 40 - 59 years | -2.7 | 0.2 |  | -3.2 | 0.2 |
| 60 - 84 years | -2.6 | 0.1 |  | -2.3 | 0.1 |
| 20 - 84 years | -3.2 | 0.1 |  | -3.5 | 0.1 |
| Gallagher et al. 2000 simplified(8)*5* |  |  |  |  |  |
| 20 - 39 years | -4.9 | 0.1 |  | -4.1 | 0.1 |
| 40 - 59 years | -3.5 | 0.2 |  | -3.6 | 0.2 |
| 60 - 84 years | -3.3 | 0.1 |  | -3.6 | 0.1 |
| 20 - 84 years | -4.0 | 0.1 |  | -3.8 | 0.1 |
| Gomez-Ambrosi et al. (10) |  |  |  |  |  |
| 20 - 39 years | -2.0 | 0.2 |  | -2.7 | 0.1 |
| 40 - 59 years | -0.3 | 0.2 |  | -0.8 | 0.2 |
| 60 - 80 years | -0.2 | 0.1 |  | -0.2 | 0.1 |
| 20 - 80 years | -1.0 | 0.1 |  | -1.4 | 0.1 |
| Heitmann (12) |  |  |  |  |  |
| 35 - 65 years | -2.7 | 0.2 |  | -5.3 | 0.2 |
| Jackson et al. (16) |  |  |  |  |  |
| 20 - 39 years | -3.5 | 0.2 |  | -6.2 | 0.1 |
| 40 - 65 years | -1.9 | 0.1 |  | -4.1 | 0.2 |
| 20 - 65 years | -2.7 | 0.1 |  | -5.1 | 0.1 |
| Noppa et al. (23) |  |  |  |  |  |
| 44 - 66 years | - | - |  | -8.5 | 0.2 |
| Pasco et al. (25)*5* |  |  |  |  |  |
| 20 - 39 years | -3.4 | 0.2 |  | -1.5 | 0.2 |
| 40 - 59 years | -2.9 | 0.2 |  | -1.7 | 0.2 |
| 60 - 84 years | -4.0 | 0.1 |  | -2.7 | 0.2 |
| 20 - 84 years | -3.3 | 0.1 |  | -1.9 | 0.1 |
| Rush et al. (28) |  |  |  |  |  |
| 20 - 27 years | - | - |  | 0.2 | 0.2 |
| Smith et al.(31) |  |  |  |  |  |
| 25 - 37 years | - | - |  | -3.1 | 0.2 |
| Visser et al. (7) *5* |  |  |  |  |  |
| 60 - 84 years | 3.7 | 0.1 |  | 3.0 | 0.2 |
| *Waist circumference (WC) or waist-to-height ratio(WHtR)* |  |  |  |  |  |
| Kagawa et al. (17) |  |  |  |  |  |
| 20 - 39 years | 1.4 | 0.1 |  | 1.0 | 0.2 |
| 40 - 64 years | 0.8 | 0.1 |  | -0.4 | 0.2 |
| 20 - 64 years | 1.1 | 0.1 |  | 0.2 | 0.1 |
| Lean et al. WC (19) |  |  |  |  |  |
| 20 - 39 years | -1.3 | 0.1 |  | -1.7 | 0.2 |
| 40 - 64 years | 2.0 | 0.1 |  | 2.3 | 0.2 |
| 20 - 64 years | 0.5 | 0.1 |  | 0.5 | 0.1 |
| *Multiple anthropometric variables 6* |  |  |  |  |  |
| Chapman et al. (1) *5* |  |  |  |  |  |
| 76 - 84 years | -5.7 | 0.2 |  | -7.0 | 0.3 |
| Lean et al. WC-tricpes (19) |  |  |  |  |  |
| 20 - 39 years | -1.7 | 0.2 |  | -0.8 | 0.2 |
| 40 - 64 years | 3.4 | 0.2 |  | 3.1 | 0.1 |
| 20 - 64 years | 1.1 | 0.2 |  | 1.3 | 0.1 |
| Ramirez-Zea et al. (27) |  |  |  |  |  |
| 20 - 39 years | -3.3 | 0.3 |  | -4.7 | 0.4 |
| 40 - 56 years | -0.7 | 0.3 |  | -4.1 | 0.5 |
| 20 - 56 years | -2.5 | 0.2 |  | -4.5 | 0.3 |
| Svendsen et al. (32) |  |  |  |  |  |
| 75 years | -7.7 | 0.5 |  | -9.9 | 0.9 |
| Wilmore and Behnke body density (35) |  |  |  |  |  |
| 20 - 36 years | -5.2 | 0.1 |  | - | - |
| Wilmore and Behnke lean body mass (35) |  |  |  |  |  |
| 20 - 36 years | -5.3 | 0.1 |  | - | - |

*1*Values were adjusted for sampling strata, primary sampling units and sampling weight. Mean difference was the average of the five mean differences respectively from the five imputation DXA datasets. The SE was calculated from within-imputation and between-imputation variance.

*2* Only non-Hispanic Whites were included in the analyses. The exceptions were equations of Slaughter et al., Jackson et al., Gallagher et al. 1996, Gallagher et al. 2000 full and simplified for which both non-Hispanic Whites and Blacks were included, and the Ramirez-Zea et al. equation for which only Mexican Americans were included.

*3* Abbreviations: DXA for dual-energy X-ray absorptiometry, NHANES for National Health and Nutrition Examination Survey, and PBF for percentage body fat.

*4* The Deurenberg 1998 equation was excluded for analysis because age ranges were unknown.

*5*Analyses were limited to sample aged ≤ 84 years since NHANES coded the age of those aged ≥ 85 as 85 years.

*6* Anthropometrics used in equations were waist circumference and triceps skinfold for Lean et al. WC-triceps equation, BMI and triceps skinfold for Svendsen et al. equation, weight, height and triceps skinfold for Chapman et al. equation, weight and waist circumference for Wilmore and Behnke body density and lean body weight equations, and weight, height and waist circumference for Ramirez-Zea et al. equation.