

**TITLE:**

The Impact of Subject Demographics on Young adult DXA Z-scores

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The purpose of this study was to directly evaluate the effect of subject demographics on DXA-generated Z-scores in young adults (age 18-51 years) on two of the most widely used technologies. There is no one standard Z-score definition. Methods of Z-score calculation vary within and between DXA technologies. We have previously shown DXA-generated Z-scores and T-scores may differ significantly and substantially in young adults. Preliminary data revealed small changes in subject characteristics can profoundly affect DXA Z-score values. We used our DXA database to identify a spectrum of BMD values (in grams/cm<sup>2</sup>) on two DXA machines: Lunar Prodigy, GE Medical Systems & Hologic Discovery A, Hologic Inc. We chose a white female T-score as our baseline value, with T-scores ranging from -3.0 to 3.0. Subjects' ethnicity, gender, age and weight were then altered to regenerate the Z-score value for each BMD value. Results show subject demographics can profoundly impact DXA Z-score values. Z-scores differed by 3 standard deviations or more, for any given BMD value. The impact of each factor on the Z-score depended on the subject characteristic itself, DXA manufacturer and skeletal site. Subtle changes, such as one year of age, sometimes had a big impact, while other times they did not. Changes in Z-score were similar across the full spectrum of BMD values. Detailed tables summarizing the results will be presented. This study has important implications for standardization of Z-score definition, calculation, and interpretation, as well as the use of DXA-generated Z-scores in clinical practice.