

Reproducibility of DXA absorptiometry: a model for bone loss estimates.

[Fuleihan GE](#), [Testa MA](#), [Angell JE](#), [Porrino N](#), [Leboff MS](#).

Endocrine-Hypertension Division, Brigham and Women's Hospital, Boston, Massachusetts, USA.

The enhanced precision of dual-energy X-ray absorptiometry (DXA) allows the detection of very small changes in bone mineral density (BMD). True clinical changes in BMD in patients must be evaluated with the appropriate error of variance. We evaluated the responsiveness of our measures to true bone loss using a statistical variance components model that characterizes the variability associated with error introduced by the machine, operator, and subjects. Our techniques were applied to data from a prospective study of BMD measurements on spine phantoms and on pre- and postmenopausal women performed on the same day or up to 4 weeks apart with DXA (QDR 1000W, Hologic). Our model determined that most of the error in measurements was introduced by operators' and subjects' variability rather than machine performance. The false-positive rates for true bone change are significantly reduced when the appropriate CV% is used to estimate the significance of bone loss over time. Our study underscores the need to use the appropriate precision error to evaluate the clinical significance of changes in bone mass in individual subjects over time.

Publication Types:

- [Multicenter Study](#)
- [Research Support, Non-U.S. Gov't](#)
- [Research Support, U.S. Gov't, P.H.S.](#)

PMID: 7484275 [PubMed - indexed for MEDLINE]