

## Lies, Damned Lies ... and Bone Density

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Bone mineral density (BMD) is measured in the diagnosis and treatment of osteoporosis. Serial BMD testing is used to monitor for change, either to initiate treatment (when BMD is decreasing) or to confirm a satisfactory treatment response (when BMD is stable or increasing). Although conceptually simple, assessing for BMD change is very difficult since BMD changes occur very slowly and on the same order as test measurement error. The most widely used method for characterizing BMD measurement error and assessing patient change has significant limitations related to inadequate sample size requirements, potential for spectrum bias, and procedural issues. A conceptual framework based upon Bayesian analysis and heteroscedastic regression was developed and addresses these issues. This approach will be discussed and principles illustrated using the Manitoba BMD Database.