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Densitometry 101: The Essentials for the Clinician

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Categories of Potential Errors

- Pre-testing
  - Deciding when to test
  - Selecting the right technology
- Testing
  - Quality control
  - Acquisition
  - Analysis
- Post-testing
  - Interpretation
  - Reporting

Quality Control: Instrument Calibration

- Methods
  - Phantom scans
  - Plot and review calibration data
  - Corrective action
- Consequences
  - Diagnostic classification
  - Assessment of fracture risk
  - Treatment decisions

Quality Control: Precision Assessment

- Two or more scans on series of patients to determine reproducibility of BMD measurements
- Necessary to determine whether an apparent BMD change is real
- If insignificant BMD changes are reported
  - Harmful or expensive treatment decisions
  - Unnecessary or expensive referral or testing

Sources of Error

Scan Acquisition

- Incorrect demographics
- Improper patient positioning
- Artifacts not removed
- Wrong scan mode
- Invalid skeletal site
- Fat panniculus issues

Scan Analysis

- Analyzing structurally abnormal bones
- Poor identification of bone edges
- Mislabeling of vertebral bodies
- Poor placement of ROI

Interpretation Errors

- Misapplication of guidelines or standards
  - WHO diagnostic criteria
  - FRAX absolute fracture risk estimates
  - Societyor payer intervention thresholds
  - ISCD Official Positions

- Invalid comparison of serial DXA studies