

BONE MINERAL DENSITOMETRY (BMD) REFERENCE

Definitions

- **Least Significant Change* (LSC):** Amount by which one BMD value must differ from another for the difference to be statistically significant to 95% level of confidence. This corresponds to 2.77 times the precision error for single measurements at each time point for 95% certainty.
- **T-score:** Number of standard deviations above (+) or below (-) mean peak young adult bone density. Used for individuals >50y age.
- **Z-score:** Number of standard deviations above (+) or below (-) the mean density for an individual of same age and sex. Used for individuals <50y age CAROC 2013 revision.

**Mayfair BMD technologist-specific precision error is 0.010 g/cm² with LSC considered to be 0.028 g/cm² for 95% certainty. When there is less bone density, there is less precision.*

Canadian Association of Radiologists and the Osteoporosis Society of Canada (CAROC) Guidelines

RECOMMENDED DIAGNOSTIC CATEGORIES

For women and men =>50y

- NORMAL (T-score greater than or equal to -1.0)
- LOW BONE MASS (T-score -1.1 to -2.4)
- OSTEOPOROSIS (T-score less than or equal to -2.5).

For women and men < 50y and children <18y

- The diagnosis of osteoporosis should not be made on the basis of BMD alone.
- Z-score above or below -2.0 is used to categorize density:
 - WITHIN EXPECTED RANGE FOR AGE (Z-score greater than -2.0)
 - BELOW EXPECTED RANGE FOR AGE (Z-score less than or equal to -2.0).

Z score for individuals under age 50

- A change in Z score compared to prior T score when comparing to past examination may not indicate a significant change in density.
- Instead refer to specific category and density change comments.

FRACTURE RISK GUIDELINES

10-year fracture risk

- Applies only to those =>50y (both male and female).
- LOW (<10%)
- MODERATE (10% to 20%)
- HIGH (>20%) – This predicts fracture risk of the hip, spine, forearm or proximal humerus, based ONLY upon the T-score of the FEMURNECK, taking AGE and SEX into account derived from a white female reference database.
- Individuals with fragility fracture after age 40 or systemic glucocorticoid therapy >7.5 mg/day > 90 days total in past year have at least moderate fracture risk. If both of these factors occur together, the risk is high.

- Individuals with fragility hip or vertebral fracture after age 40 or 2 or more fragility fractures after age 40 have high fracture risk regardless of BMD result.
 - Individuals with lumbar spine T-score lower than -2.5 significantly worse than femur neck T-score have moderate fracture risk.
 - Fracture risk may be lower than calculated if osteoporosis drug therapy is effective.
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REFERENCES

Canadian Association of Radiologists (2013) "CAR Technical Standards for Bone Mineral Densitometry Reporting." www.car.ca. Accessed August 18, 2022.

Canadian Association of Radiologists and Osteoporosis Canada Risk Assessment (2013) "ASSESSMENT OF 10-YEAR FRACTURE RISK – Women and Men." www.osteoporosis.ca. Accessed August 18, 2022.

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Papaioannou, A., et al. (2010) "[2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary.](#)" *Canadian Medical Association Journal*. November 23, 182 (17) 1864-1873.