

Bone health screens aim to identify risk factors for bone fragility and to determine which children who may benefit from interventions to reduce the risk of fractures. Bone densitometry by Dual Energy X-ray Absorptiometry (DXA) is sometimes part of a comprehensive screen; the test measures bone mineral content (BMC) & areal bone mineral density (aBMD).

## Do's:

- DXAs should be performed in centers experienced in evaluating pediatric patients
- Pediatric regions of interest are the lumbar spine and total body less head (TBLH); hip scans are not recommended before adolescence. Scans should avoid areas with metal implants.
- aBMD should be reported as Z-scores (standard deviations from the mean for healthy children of similar age, sex, height, and ethnicity) using reference data collected using DXA equipment from the same manufacturer. For Hologic DXAs, a valuable reference database is <https://zscore.research.chop.edu/bmdCalculator.php>
- The minimum interval between serial scans should be 6–12 months.

## Don'ts:

- DXAs should not be performed unless the child can be safely positioned without sedation
- T-scores are not appropriate for patients younger than 20 since they compare the BMD results to healthy adults who have attained peak bone mass.
- The term “osteopenia” should not be used to describe Z-scores between -1 and -2. Z-scores < -2 are referred to as “low BMD for age”.

**Advantages:** DXAs are rapid, precise, widely available and involve low dose radiation exposure (comparable to a round trip flight across the U.S.) Body composition can be measured as well.

**Limitations:** The diagnosis of “osteoporosis” in a pediatric patient cannot be made on the basis of low aBMD alone; a history of low trauma long bone or vertebral fractures is required.

***DXAs should be considered for patients with primary bone disease or those at risk for a secondary bone disease when they may benefit from interventions to decrease their elevated risk of a clinically significant fracture, and the DXA results will influence that management.***

## References:

1. Crabtree NJ, Arabi A, Bachrach LK, Fewtrell M, El-Hajj Fuleihan G, Kecskemethy HH, et al. *Dual-energy X-ray absorptiometry interpretation and reporting in children and adolescents: the revised 2013 ISCD Pediatric Official Positions.* J Clin Densitom. 2014;17(2):225–42.
2. Zemel BS, Leonard MB, Kelly A, Lappe JM, Gilsanz V, Oberfield S, et al. *Height adjustment in assessing dual energy x-ray absorptiometry measurements of bone mass and density in children.* J Clin Endocrinol Metab. 2010;95(3):1265–73.
3. Zemel BS, Kalkwarf HJ, Gilsanz V, Lappe JM, Oberfield S, Shepherd JA, et al. *Revised reference curves for bone mineral content and areal bone mineral density according to age and sex for black and non-black children: results of the bone mineral density in childhood study.* J Clin Endocrinol Metab. 2011;96(10):3160–9.