



GE HealthCare

Bone & Metabolic Health

Pediatric measurement and analysis



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Pediatric measurement and analysis application

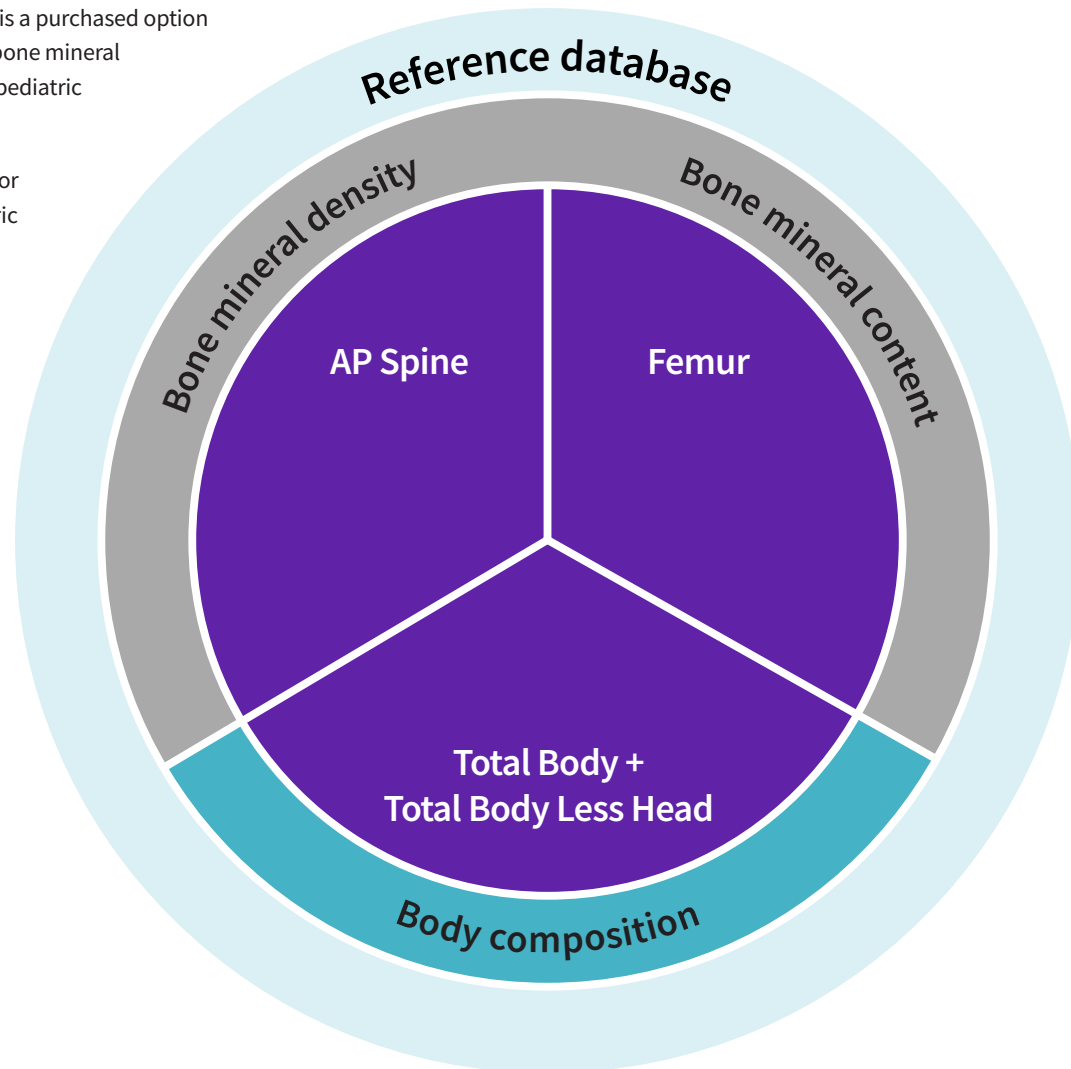
Innovation and dedication

GE HealthCare offers you a powerful set of tools to get valuable clinical information about growth and development in children. The Pediatric clinical application from GE HealthCare measures more than BMD. It analyzes all three tissue types – lean mass, fat mass, and bone – to help you monitor growth and development in children.

Pediatric measurement and analysis is a purchased option that provides bone mineral density, bone mineral content, fat mass, and lean mass for pediatric patients from birth to 20 years old.

Z-Scores, age-matched percentages, or centiles are used to compare pediatric patients to their peers.

Reference data is available for US (Lunar), US (BMDCS), US (NHANES 1999–2004), China, Asia, and European populations for AP Spine, Femur or Total Body measurements for male and females 5-19 years old depending on the reference population.



Accurate assessment, reliable trending

Children grow at unique rates. Our advanced pediatric analysis tools let you compare skeletal and chronological age analyses and BMD results against gender-specific reference populations. Age-specific standard deviations for each patient allow for enhanced diagnostic confidence.^{1,2}

“Children with growth abnormalities often show deficient BMD for chronological age, but this deficit might be a reflection of growth irregularities rather than poor bone mineralization.”³

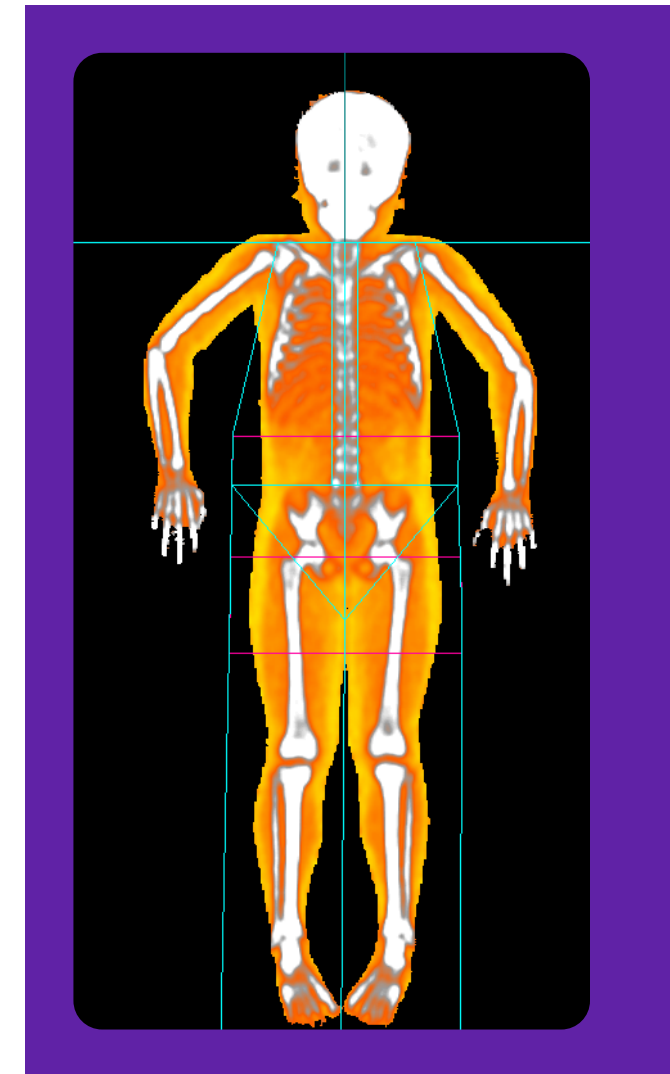
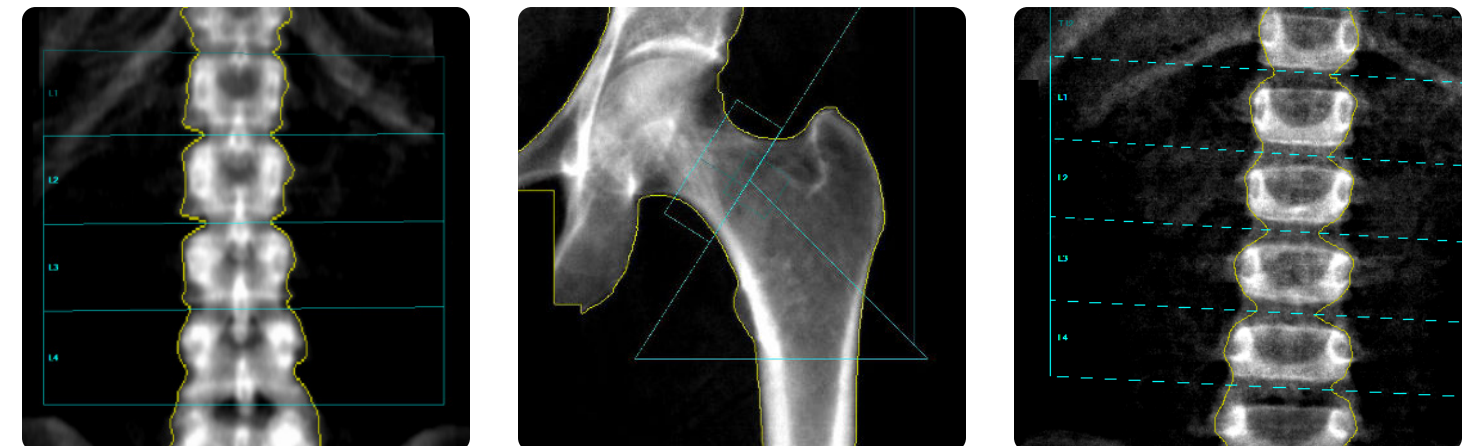
The DXA Pediatric application provides a complete measurement of bone, fat, and lean tissue composition. These measurements enable enhanced assessments of growth and development that include:

- Height for age⁴
- BMC for bone area⁴
- Bone area for height⁴
- Lean body mass for height (muscle development)^{5,6}
- BMC for lean body mass (muscle-bone balance)^{5,6}

Exam results provide excellent diagnostic quality information and a comprehensive trending tool, coupled with full reporting and connectivity options. All DXA equipment from GE HealthCare is also based on the easy-to-use enCORE platform.

Pediatric AP Spine and Femur analysis

Pediatric AP Spine and Femur provide reference data for US (Lunar), US (BMDCS), and European populations.



Pediatric total body analysis

Pediatric Total Body provides reference data for US (Lunar), US (BMDCS), US (NHANES 1999–2004), China, Asia, and European populations.

Total Body Less Head (TBLH)

The BMD of the head dominates the Total Body BMD in children. To omit the head from Total Body results, we also provide the option to perform a Total Body Less Head (TBLH) scan.

Pediatric Growth Indices

Pediatric Growth Indices can be found under the Pediatrics tab on the Analysis screen.

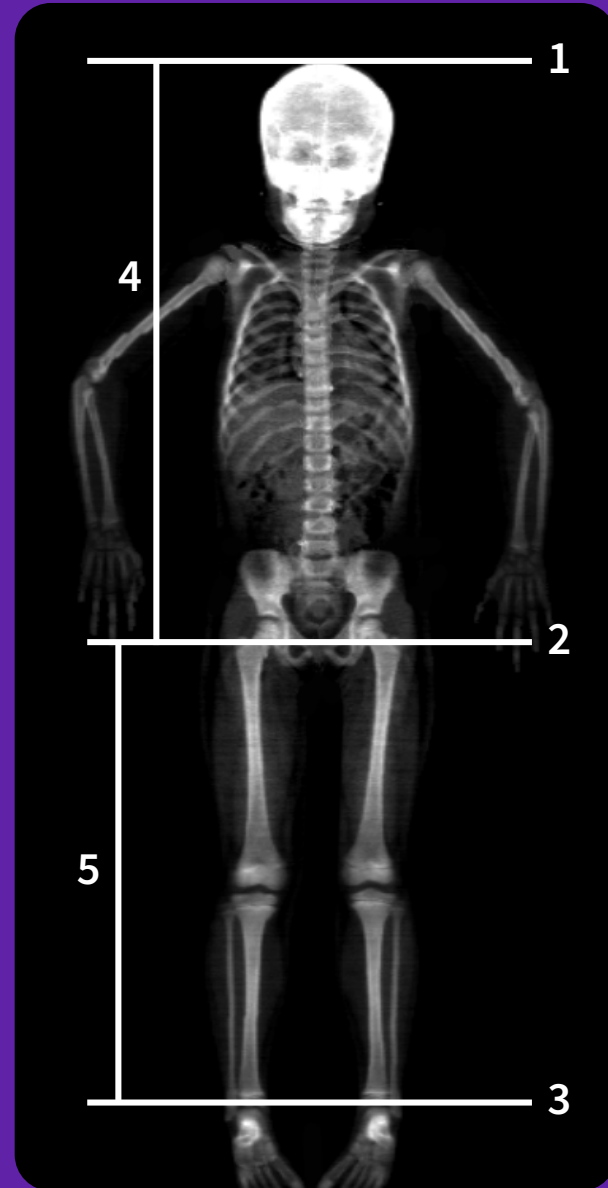
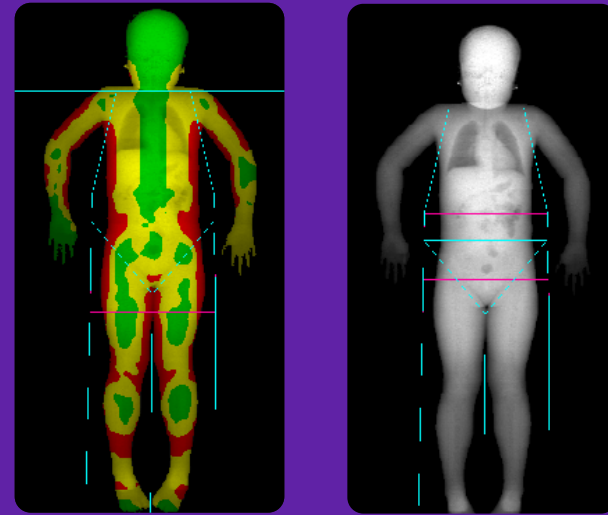
The software provides information on Bone Size and Lean Body Mass Assessment.

Studying pediatric growth through Pediatric Total Body Composition

DXA technology can be a convenient method to obtain height measurements in immobile children with chronic conditions. The Total Body Scan of a pediatric patient can be used to calculate different morphological parameters such as height, sitting height or leg length in children.⁷

The digital analysis of the total body scan can be used to measure body segments, similar to measurements of vertebral height for assessment of vertebral morphometry.⁸

Our Pediatric software along with custom ROI feature enables height measurements to allow size adjustment of DXA bone mineral density in immobile children with chronic conditions.



Benefit of low radiation of DXA technology for children

The dosage from DXA technology is considerably lower than that of X-ray and can be well-suited to not only measure bone mineral density and body composition, but also evaluate spine morphometry. Owing to low radiation and its versatility in measurement and monitoring of bone & body composition, DXA technology has been used instead of radiographs in children with skeletal diseases.

Evaluation of spine morphometry results in children have showed reasonable agreement between Lunar iDXA™ and radiography (ICC for fish-shape, 0.75; for wedge-shape, 0.65; and for compression fractures, 0.70). In addition, bone age determination showed excellent agreement between Lunar iDXA and radiography.⁹

Lunar iDXA scans of the spine in a pediatric population should be used not only to assess bone mineral density, but also to evaluate anatomic structures and vertebral morphometry. Therefore, iDXA can replace some radiographs in children with skeletal diseases.



Robust technology foundation

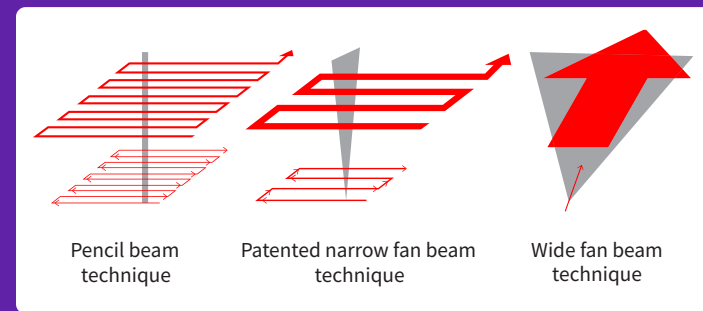
Third generation DXA technology – with over 30 years of innovations since the first bone densitometry FDA clearance in 1980, including:

- Narrow fan beam scan and multi-view image reconstruction minimizes magnification error in comparison to wide-angle fan beam systems¹⁰
- Photon Counting LYSO scintillator crystal detector – that improves image quality and lowers dosage compared to competitive systems^{11,12}
- Exceptional precision

Narrow fan beam scan

Patented narrow fan beam technology that combines the best features of pencil beams (no magnification, low dose) with the short scan time of wide fan beams while reducing magnification error inherent to wide-angle fan beam systems.

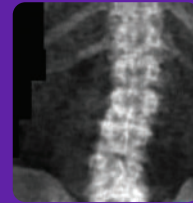
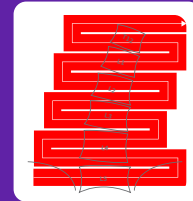
Photon counting detector



Dose-efficient photon counting detector technology that simultaneously counts low and high energy X-rays photons resulting in lower dosage to the patient and faster and efficient scans.

SmartScan™ technology minimizes unnecessary exposure to the patient

SmartScan is an exclusive feature of our DXA bone densitometers, which is enabled by transverse scanning with a narrow fan beam. Bone regions are identified after each transverse sweep and used to estimate where to begin exposing the patient to X-rays on the subsequent sweep. SmartScan simultaneously reduces the scan time and dose to pediatric patients.



K-edge filter

A stable X-ray source with “K-edge filter” that absorbs the X-rays in the middle energy range and protects the patient against unnecessary exposure.

Multi-View Image Reconstruction (MVIR)

Using narrow fan beam technology to perform multiple, spaced and transverse sweeps across the site of interest resulting in accurate determination of bone-height above the tabletop, minimization of magnification errors, and thereby providing higher precision and accuracy.

Low scattered radiation

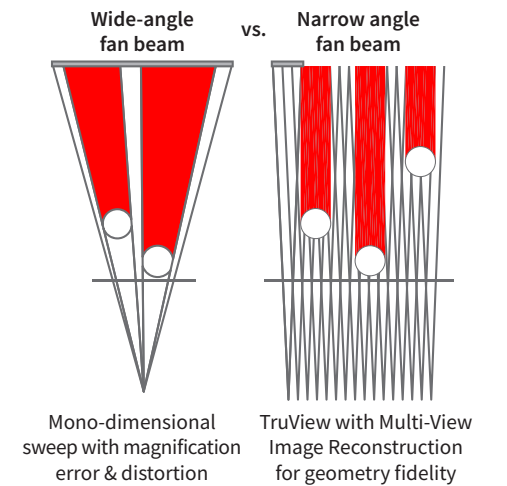
Due to narrow fan beam technology, low scatter radiation in comparison to wide angle fan beam systems.

Technology that minimizes dosage and magnification errors

DXA Densitometers from GE HealthCare bring you the latest diagnostic innovations in bone densitometry. They are precise, accurate and fast with low patient dose, all made possible by the narrow fan beam, MVIR and photon counting detector technology. Our narrow-angle fan-beam technology ensures precise measurement of bone, lean tissue, fat mass and area, without the magnification error inherent in other densitometers using wide-angle fan-beam technology.

Our technology means:

- High precision, crucial to ensuring diagnostic confidence in both today’s exam and repeated measurements^{13,14}
- High-resolution image quality, enabling crisp bone edge detection even in the smallest children



Lower magnification error and better bone edge detection

Magnification error in fan-beam densitometers varies with distance from the X-ray source to the bone measured and might obscure bone mineral changes in the growing skeleton.¹⁵ The geometry of the fan beam produces a magnification error in areal bone measures that decreases with distance from the X-ray source.¹⁶

The Lunar DXA pediatric application is a complete package providing a solid clinical solution including AP spine, proximal femur, total body and BMD exams, as well as pediatric body composition assessments.

Find out how these powerful tools can help you deliver high-quality pediatric care. Contact your GE HealthCare representative today.

“Growth and illnesses in children do not always follow a standard path. Analyzing a child’s body status with skeletal and lean mass parameters enhances our ability to confidently assess bone and lean tissue.”

Hans Fors, MD, GP-GRC
Sahlgrenska Academy of Göteborg University,
Göteborg (SE)

Relative intrinsic performance comparison of DXA beam types

	Pencil beam	Narrow fan	Wide fan
Scan time	Long	Short	Short
Bone height measured	No	Yes	No
Magnification effects	No	No	Yes
Off-center distortions	No	No	Yes
SmartScan	Yes	Yes	No
Scattered radiation	Lowest	Low	High



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About GE HealthCare

GE HealthCare is a leading global medical technology, pharmaceutical diagnostics, and digital solutions innovator, dedicated to providing integrated solutions, services, and data analytics to make hospitals more efficient, clinicians more effective, therapies more precise, and patients healthier and happier. Serving patients and providers for more than 100 years, GE HealthCare is advancing personalized, connected, and compassionate care, while simplifying the patient's journey across the care pathway. Together our Imaging, Ultrasound, Patient Care Solutions, and Pharmaceutical Diagnostics businesses help improve patient care from prevention and screening, to diagnosis, treatment, therapy, and monitoring. We are an \$18 billion business with 51,000 employees working to create a world where healthcare has no limits.

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