

Bone density testing in general practice



A guide to Dual Energy X-ray Absorptiometry (DXA)

Scanning of the axial skeleton by dual energy X-ray absorptiometry (DXA) is the gold standard in Australia for the measurement of bone mineral density (BMD). DXA is a diagnostic tool for osteoporosis or osteopenia, enabling doctors to determine the extent of bone loss for clinical decision making. This guide outlines who to refer for DXA and the basics of how to interpret a bone densitometry report. Note the terminology of osteopenia and osteoporosis based on BMD alone is intended for individuals over 50 years of age and menopausal women.

Poor bone health is common in Australia

An estimated 4.7 million Australians over the age of 50 years have osteoporosis or osteopenia, with over 183,000 associated fractures (2022). Early diagnosis and improved management can reduce the current annual cost of \$3.84 billion, with fracture costs accounting for up to 67% of overall costs.

In general practice, early detection can prevent a first fracture. For patients who have already fractured, investigation and initiation of osteoporosis medication is crucial to reduce the very high risk of subsequent fractures.

Who to send for a DXA scan

Patients over 50 with risk factors	MBS item
Family history – parent with hip fracture	No rebate
Early menopause	12312
Hypogonadism	12312
Anticipated glucocorticoids ≥ 4 months ≥ 7.5 mg/day	12312
Coeliac disease/malabsorption disorders	12315
Rheumatoid arthritis	12315
Primary hyperparathyroidism	12315
Hyperthyroidism	12315
Chronic kidney or liver disease	12315
Androgen deprivation therapy	12312
Recurrent falls	No rebate
Breast cancer on aromatase inhibitors	No rebate
Treatment with antiepileptic medications	No rebate
Low body weight	No rebate
HIV and its treatment	No rebate
Major depression/ SSRI treatment	No rebate
Type 1 and type 2 diabetes mellitus	No rebate
Multiple myeloma/monoclonal gammopathy	No rebate
Organ or bone marrow transplant (item 12312 applies if treated with glucocorticoids or if kidney disease present)	No rebate

Patients with a minimal trauma fracture	MBS item
DXA is recommended to establish a baseline BMD for treatment	12306

Suspected vertebral fracture	MBS item
Refer for spinal X-ray when: <ul style="list-style-type: none"> – Height loss of 3cm or more – Thoracic kyphosis – New onset back pain suggestive of fracture 	
If fracture confirmed, therapy indicated, refer for DXA	12306
Vertebral fracture assessment (VFA), also known as Lateral vertebral assessment (LVA) is offered with some DXA scans. VFA may be a useful screen for fractures in people with height loss. MBS rebate not available for VFA.	

Patients with osteoporosis	MBS item
T-score equal to or less than -2.5 eligible for one scan every two years	12306

Patients over 70 years of age	MBS item
For men and women over 70 years, MBS rebate applies (regardless of other risk factors)	12320
Patients with a normal result or mild osteopenia (measured by a T-score down to -1.5) eligible for one scan every 5 years	12320
Patients with moderate to marked osteopenia (as measured by a T-score less than -1.5 and above -2.5) will be eligible for one scan every two years	12322

The DXA report

The level of detail provided in a DXA report varies. To comply with guidelines, all reports should state the make and model of the DXA machine used, BMD (measured in g/cm²), T-score and Z-score. Many DXA reports also provide an Absolute Fracture Risk result.

Medical Imaging Centre – Bone Densitometry Report

Dear Doctor

Re: [Patient]

DOB:

This patient attended on for bone densitometry of AP spine and left hip. Bone mineral density was measured by [DXA machine make and model]. The results are summarised below:

Scan date:

Sex: Female

Age at scan: years

Ethnicity:

L1-L4 or L2-L4 usually measured.

T-score results

- **-2.5 or lower** is osteoporosis and
- T-score **between -1 and -2.5** is osteopenia in over 50s and menopausal women. Refer to recommendation when individual has minimal trauma fracture*

Z-score

- Useful indicator of increased bone loss
- Particular importance in under 50s
- At any age Z-score **-2.0 or lower** is 'below expected range for age' and should trigger investigation to exclude underlying disease cause bone loss

Total proximal femur and femoral neck reported. Bilateral hip scans preferable.

Scan site	Region	BMD	T-score	Z-score	Change vs Baseline (%)	Change vs last (%)
AP spine	L2-L4	0.890	-2.6	-1.1	##%	##%
Left femur	Total	0.822	-1.5	-0.4	##%	##%
	Neck	0.831	-1.5	-0.0	##%	##%

This percentage indicates the change in BMD compared to the first scan performed.

FRAX – Absolute fracture risk assessment tool. Most DXA centres can provide this as part of DXA report.

Recommend treating patients over 50 years with a 10-year result of

- 20% or greater risk of major osteoporotic fracture (MOF) or,
- 3% or greater risk of hip fracture

Absolute Fracture Risk (AFR):

Major Osteoporotic Fracture: 20%

Hip Fracture: 3.5%

Risk Factors: None

Trabecular Bone Score (TBS): L1-L4 is ###

TBS – Trabecular Bone Score. Offered by some centers, to assess bone micro-architecture. TBS result can be used to adjust FRAX result. TBS does not attract an MBS rebate.

Vertebral fracture assessment: VFA demonstrates a deformity of L3, indicating a probable vertebral fracture.

Confirmation with X-ray is recommended.

VFA (vertebral fracture assessment – also known as Lateral vertebral assessment LVA) is offered by some imaging centres. It is a useful screening tool for asymptomatic vertebral fracture. Fractures detected by VFA should be confirmed by plain x-ray. VFA does not attract an MBS rebate.

T-score

Osteopenia	T-score between -1.0 and -2.5	BMD between 1.0 and 2.5 SDs below young adult mean
Osteoporosis	T-score -2.5 or below	BMD 2.5 or more SDs below young adult mean

The T-score compares the patient's bone density to the peak bone density of young adults. It is the number of standard deviations (SDs) of the BMD measurement above or below the mean BMD of young healthy adults of the same sex. According to the World Health Organisation, osteopenia and osteoporosis can be diagnosed in individuals over 50, and in menopausal women, based on the T-scores.

*NOTE:

Individuals over 50 years with a **low trauma hip or vertebral fracture** are considered to have clinical osteoporosis.

Individuals over 50 years with **other low trauma fractures, and a T-score below -1.5**, (BMD in the lower osteopenic or osteoporotic range), are also considered to have clinical osteoporosis.

Z-score

The Z-score is the number of SDs of the BMD above or below the mean BMD of adults of the same age and sex.

Z-score is a useful indicator of increased bone loss and is of particular importance below 50 years. At any age, a **Z-score -2.0 or lower** is 'below the expected range for age' and should trigger investigation to exclude underlying disease causing bone loss. A **Z-score above -2.0** is 'within the expected range for age'.

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National toll-free number for patients 1800 242 141

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