EXPLANATION OF BONE DENSITY RESULTS

This is only to be used as an educational guide to help you understand the scan report printout.

IT SHOULD ONLY BE USED FOR DIAGNOSIS BY YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER

Definitions

T-Score

- The T-score is a measurement used in bone density tests (DEXA scans) to compare your bone density to that of a healthy, young adult (around age 30) of the same sex. It measures how much your bone mass differs from the ideal, standard peak.

Z-Score

- The Z-score is a number that compares your bone density to other people that are your same age and sex.
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Trabecular Bone

- This is a porous, "sponge-type" bone, the type found in your vertebrae (back bones).

Cortical Bone

- This is the dense, hard, and smooth outer layer of a bone, the type found in your hip.

Bone Density

- Bone mineral density is a measurement of the amount of calcium and other minerals in your bones. Bones containing more minerals are denser and are less likely to fracture (break). Bones containing less minerals are less dense and have a higher fracture risk.
- The bone density measures the quantity (mineral density). In short, it is a measure of the strength of your bones.
- Simple Analogy: Think of your bones like a sponge. High density means the sponge is solid, thick, and strong. Low density means the sponge has large holes, is thin, and brittle.
- The higher your bone density, the stronger your bones are and the less likely they are to break.

Trabecular Bone Score (TBS)

- This is a specialized program in the computer that measures the quality or structure of your bone. It tells you how well-connected and strong the internal architecture is (quality). This measurement is only taken at the lower spine.
- A person can have "normal" bone density but poor-quality, weak, and disconnected internal bone structure. TBS detects this hidden risk.
- A higher number is better (stronger, more connected structure). A lower number means the bone structure is weakened, indicating a higher risk of fractures.

What does a T-score mean?

- The World Health Organization (WHO) has set the guidelines for determining bone health based on T-scores.
- A T-score is the difference between your bone mineral density and 0 (zero), which is the bone density of a healthy young adult. The specialists in our office use the T-score result to determine your bone health.
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If your T-score is:

- -1 or higher, your bone is healthy
- -1 to -2.5, you have osteopenia, loss of bone mineral density that is less severe than osteoporosis, but may lead to osteoporosis
- -2.5 or lower, you might have osteoporosis,
- -2.5 or lower plus a fragility fracture**, you might have severe osteoporosis.

** A fragility fracture is a broken bone caused by low-level trauma, such as a fall from standing height or less, that would not normally break healthy bone.

Any of these diagnoses are to be made by your family physician or nurse practitioner.

RISK FACTORS THAT YOUR FAMILY DOCTOR MAY USE TO AID IN DIAGNOSIS ALONG WITH YOUR BONE DENSITY T-SCORE

- Age and sex assigned at birth
- Menopause or hysterectomy
- Family history of hip fracture and family genetics
- Smoking
- Excessive alcohol consumption
- Inactive Lifestyle
- Diet low in calcium or Vitamin D
- Eating disorders
- Use of certain medications
- Certain medical conditions
- Physical characteristics, a small, thin or slender body frame is a higher risk
- Caucasian or Asian

PLEASE SEE YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER FOR PROPER DIAGNOSIS, TREATMENT OPTIONS AND STEPS THAT YOU CAN TAKE TO HELP PREVENT OSTEOPOROSIS AND FRACTURES.

Protocol And Procedure

Typically, our centre takes measurements of your lower (lumbar spine) and your left hip, and if required, your wrist. The spine will give us a reading of the trabecular bone, the hip will give us a reading of the cortical bone, and the wrist is a mix of both trabecular and cortical bone. The unit is only able to measure these three locations.

The lowest T-score among the total hip, femoral neck (this is a region in your hip), or lumbar spine is generally used for diagnosis, the wrist scan can also be used to aid in diagnosis.

- If you have a left hip replacement, we will scan your right hip. If both are replaced, then we will perform a wrist scan instead.
- If your spine has some abnormalities, we may exclude one or more vertebrae from the analysis and then will also include a wrist scan.
- If you have had surgery in your back, we will not scan it and will include a wrist scan instead.
- WE DO NOT scan areas that are sore, for example, if your right hip hurts more than your left hip. That is not due to osteoporosis and there will be no added benefit to scanning the sore area.

The following pages are NOT your results. These are random examples of scans to help you understand your results.

DISCUSS YOUR RESULTS WITH YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER.

Our bone density equipment uses the NHANES database. NHANES stands for National Health and Nutrition Examination Survey. It is a program by the CDC (Centers for Disease Control and Prevention) that checks the health of thousands of Americans annually. They measure the bone density of participants and have created a database on bone mineral density for people from 8 to 85. This database is used worldwide as the international standard reference for calculating bone mineral density (BMD) T-scores. Unfortunately, our equipment only has a Caucasian database. Ethnicity and race play a significant role in bone health, influencing how dense and strong your bones are throughout your life. This can be discussed with your physician or nurse practitioner.

Spine Results

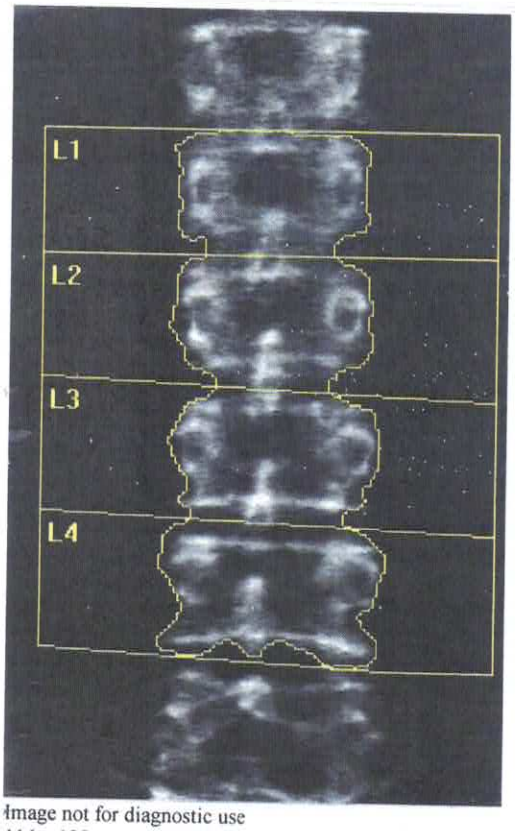


Image not for diagnostic use
116 x 138
DAP: 2.0 cGy*cm²

Please note that the image is not for diagnostic use, meaning we cannot diagnose anything with your spine other than the bone density. It is not to be used as an x-ray.

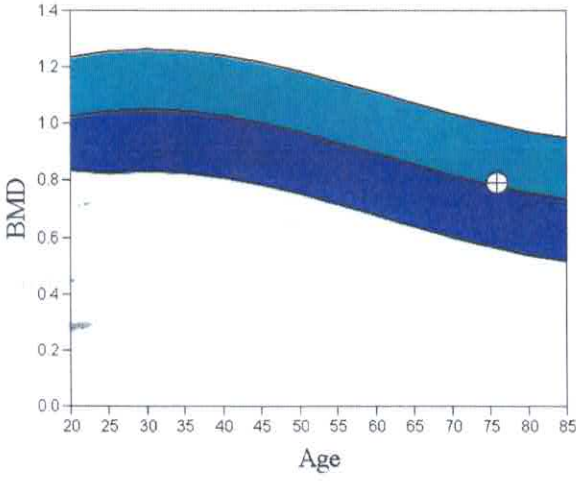
DXA Results Summary:

Region	Area (cm²)	BMC (g)	BMD (g/cm²)	T - score	Z - score
L1	15.39	12.30	0.799	-1.7	0.4
L2	16.50	13.52	0.820	-1.9	0.5
L3	17.24	13.30	0.771	-2.8	-0.3
L4	18.89	14.60	0.773	-2.6	0.0
Total	**68.03**	**53.72**	**0.790**	**-2.3**	**0.1**

Total BMD CV 1.0%
WHO Classification: Osteopenia
Fracture Risk: Increased

your result

Total



THIS GRAPH IS BEST USED FOR COMPARING YOUR FUTURE RESULTS TO YOUR FIRST SCAN

this graph represents your Z-score which compares you to other people that are your same age and sex

the centre line is within the normal range for your age

the light blue area above the centre line means that your bone density is higher than average for your age

the dark blue area below the centre line means that your bone density is lower than average for your age

*****VERY IMPORTANT TO NOTE THAT JUST BECAUSE YOU ARE IN NORMAL RANGE FOR YOUR AGE, DOES NOT MEAN THAT YOU HAVE NORMAL BONE DENSITY. <u>DISCUSS THIS WITH YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER</u>**

Hip Results

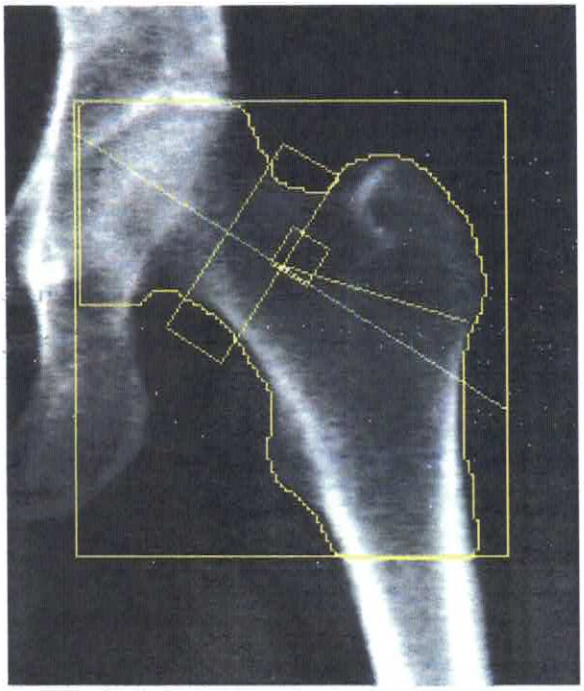


Image not for diagnostic use
96 x 101
NECK: 49 x 15
DAP: 1.5 cGy*cm²

Please note that the image is not for diagnostic use, meaning we cannot diagnose anything with your hip other than the bone density. It is not to be used as an x-ray.

DXA Results Summary:

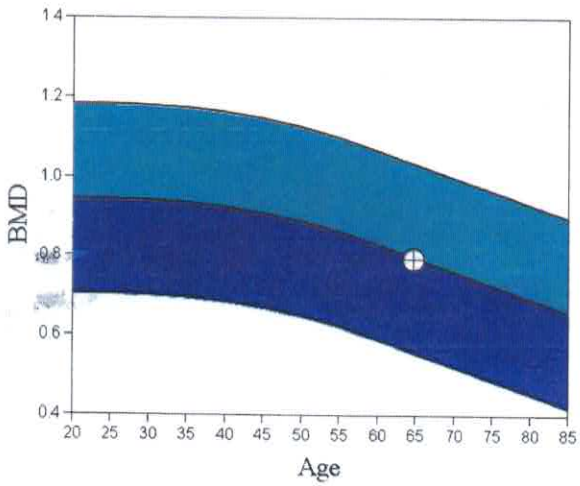
your result

Region	Area (cm²)	BMC (g)	BMD (g/cm²)	T - score	Z - score
Neck	5.46	3.25	0.595	-2.3	-0.8
Troch	11.82	7.05	0.596	-1.1	0.0
Inter	26.29	24.21	0.921	-1.2	-0.2
Total	**43.57**	**34.51**	**0.792**	**-1.2**	**0.0**
Ward's	1.10	0.44	0.395	-2.9	-0.7

Total BMD CV 1.0%
WHO Classification: Osteopenia

your result

Total



this graph represents your Z-score which compares you to other people that are your same age and sex

the centre line is within the normal range for your age

the light blue area above the centre line means that your bone density is higher than average for your age

the dark blue area below the centre line means that your bone density is lower than average for your age

THIS GRAPH IS BEST USED FOR COMPARING YOUR FUTURE RESULTS TO YOUR FIRST SCAN

*****VERY IMPORTANT TO NOTE THAT JUST BECAUSE YOU ARE IN NORMAL RANGE FOR YOUR AGE, DOES NOT MEAN THAT YOU HAVE NORMAL BONE DENSITY. DISCUSS THIS WITH YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER**

Forearm Results

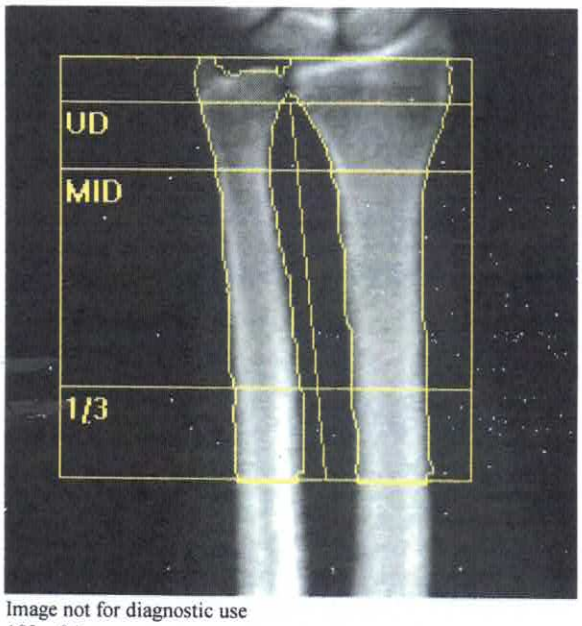


Image not for diagnostic use
182 x 94
DAP: 0.5 cGy*cm²

Please note that the image is not for diagnostic use, meaning we cannot diagnose anything with your arm other than the bone density. It is not to be used as an x-ray.

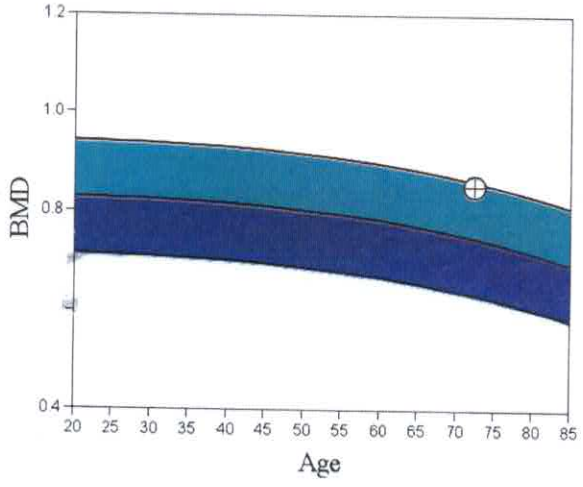
DXA Results Summary:

Radius + Ulna	Area (cm²)	BMC (g)	BMD (g/cm²)	T - score	Z - score
UD	6.00	3.20	0.533	0.4	1.6
MID	13.63	9.87	0.724	0.5	1.6
1/3	**6.11**	**5.20**	**0.851**	**0.4**	**1.8**
Total	25.75	18.28	0.710	0.6	1.8

Total BMD CV 1.0%
WHO Classification: Normal
Fracture Risk: Not Increased

your result

1/3 (Radius + Ulna)



this graph represents your Z-score which compares you to other people that are your same age and sex

the centre line is within the normal range for your age

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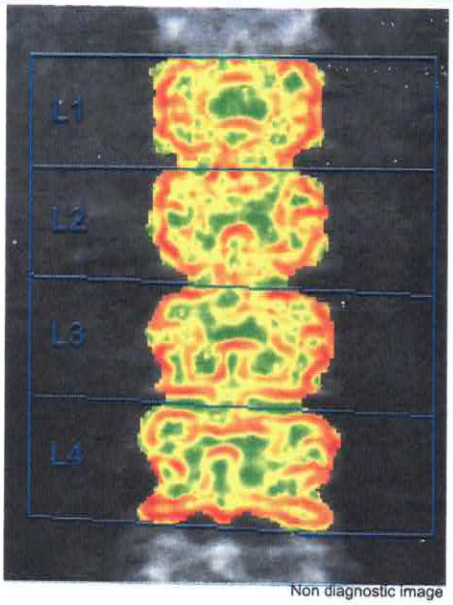
the dark blue area below the centre line means that your bone density is lower than average for your age

THIS GRAPH IS BEST USED FOR COMPARING YOUR FUTURE RESULTS TO YOUR FIRST SCAN

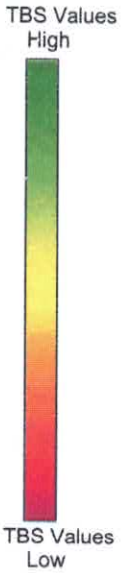
*****VERY IMPORTANT TO NOTE THAT JUST BECAUSE YOU ARE IN NORMAL RANGE FOR YOUR AGE, DOES NOT MEAN THAT YOU HAVE NORMAL BONE DENSITY. DISCUSS THIS WITH YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER**

TBS (Trabecular Bone Score) Results

TBS Mapping



Non diagnostic image



Please note that the image is not for diagnostic use, meaning we cannot diagnose anything with your spine other than the TBS. It is not to be used as an x-ray.

Colour-Coded Image

This is a visual representation of your lower spine

What it means:

Green: High TBS values (better bone architecture)

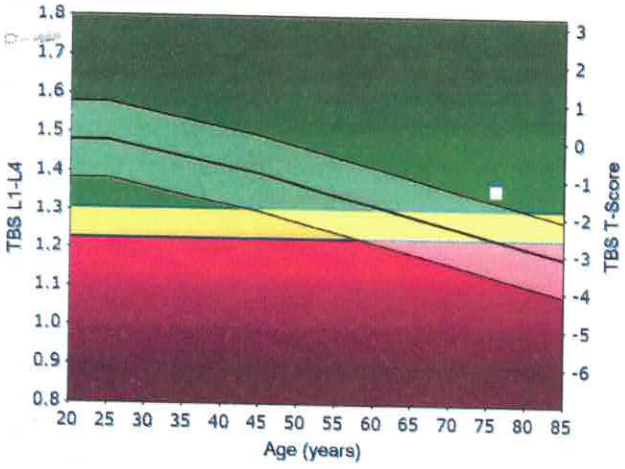
Yellow: Medium TBS value

Red: Low TBS value (fragile bone architecture)

TBS reference graph

Reference population: USA (NHANES / Medimaps) - White

TBS L1-L4: 1.360



This reference graph compares you to the normal population to see if you are at high risk of fracture based on the microarchitecture of your bone.

Green Zone: low risk of fracture suggesting normal bone microarchitecture

Yellow Zone: medium risk of fracture suggesting partially degraded bone microarchitecture

Red Zone: high risk of fracture suggesting degraded bone microarchitecture

Region	TBS	TBS T-Score	TBS Z-Score	BMD
L1	1.333	---	---	0.799
L2	1.358	---	---	0.820
L3	1.392	---	---	0.771
L4	1.357	---	---	0.773
L1-L4	1.360	-1.2	1.3	0.790
L1-L3	1.361	-1.5	1.3	0.796
L1-L2	1.346	-1.6	1.3	0.810
L2-L3	1.375	-1.5	1.3	0.795
L2-L4	1.369	-1.2	1.3	0.787
L3-L4	1.375	-0.9	1.4	0.772

This detailed spine result provides an individual TBS score of each vertebra along with different combinations of vertebrae. **This may be useful for your physician or nurse practitioner.**

Comparison of Follow Up Scans (Spine, Hip, Wrist)

- The blue and white graph represents your Z-score which compares you to other people that are your same age and sex
- The centre line is within normal limits for your age
- The light blue area above the centre line means that your bone density is higher than average for your age
- The dark blue area below the centre line means that your bone density is lower than average for your age

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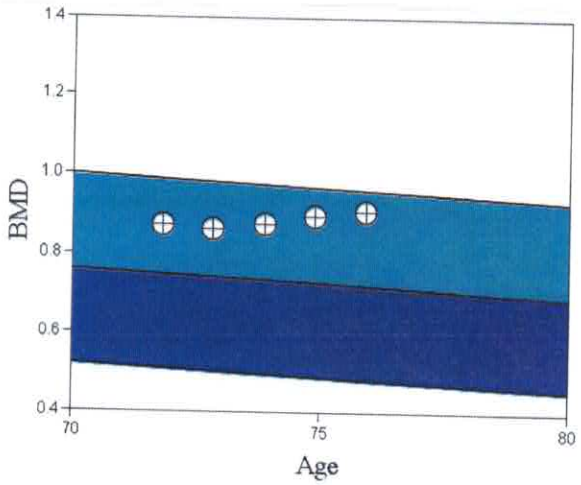
The white dots on this graph represent your Z-score readings over time with the first dot (on the left) representing your baseline (first) scan, and the last dot (on the right) representing your current scan. The amount of white dots on the graph depends on how many scans you have had over the course of time.



The graph below includes your scan dates with the most recent date being at the top. It also includes your age and the actual BMD value. Your family physician or nurse practitioner will most likely review the BMD change. The "vs Baseline" is the percentage of change from your very first scan to your current scan. The "vs Previous" is the percentage of change between each yearly scan.

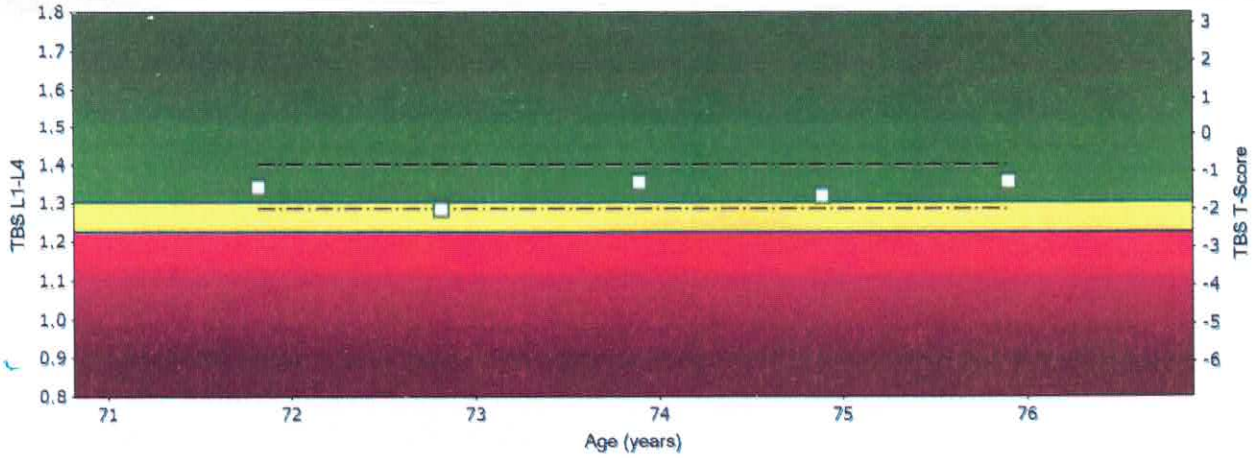
DXA Results Summary:

Scan Date	Age	BMD (g/cm^2)	T - score	BMD Change vs Baseline	BMD Change vs Previous
17.03.2026	75	0.907	-0.3	3.9%*	1.3%
13.03.2025	74	0.895	-0.4	2.5%	2.2%
13.03.2024	73	0.876	-0.5	0.3%	1.5%
15.02.2023	72	0.862	-0.7	-1.2%	-1.2%
16.02.2022	71	0.873	-0.6		

Comparison of Follow Up Scans (TBS)

- This reference graph compares you to the normal population to see if you are at high risk of fracture based on the microarchitecture of your bone.
- Green Zone: low risk of fracture suggesting normal bone microarchitecture
- Yellow Zone: medium risk of fracture suggesting partially degraded bone Microarchitecture
- Red Zone: high risk of fracture suggesting degraded bone microarchitecture

The white dots on this graph represent your T-score readings over time with the first dot (on the left) representing your baseline (first) scan, and the last dot (on the right) representing your current scan. The amount of white dots on the graph depends on how many scans you have had over the course of time.



The graph below includes your scan dates with the most recent date being at the bottom. It also includes your age and the actual TBS and BMD value. Your family physician or nurse practitioner will most likely review the changes. The "TBS var/previous" and the "TBS var/year" is the percentage of change between each yearly scan.

Follow-up results

Exam date	Age	TBS L1-L4	BMD	TBS var./baseline	TBS var./previous	TBS var./year
02/16/2022	71	1.345	0.751	N.A.	N.A.	N.A.
02/15/2023	72	1.288	0.729	-4.2%	-4.2 %	-4.2 %
03/13/2024	73	1.359	0.791	1.1%	5.5 % *	5.1 % *
03/13/2025	74	1.324	0.775	-1.5%	-2.6 %	-2.6 %
03/17/2026	75	1.360	0.790	1.1%	2.7 %	2.7 %

ALL ASSESSMENTS OF CHANGE, WHETHER POSITIVE OR NEGATIVE SHOULD BE DISCUSSED WITH YOUR FAMILY PHYSICIAN OR NURSE PRACTITIONER.

THIS EDUCATIONAL GUIDE IS ONLY TO BE USED FOR UNDERSTANDING YOUR RESULTS.

IT IS NOT A DIAGNOSIS BY OUR CENTRE.

Things to Know About BMD Changes

- There are going to be minor changes, anywhere from 1% to 3% that are due to patient positioning and machine calibration. These small changes are not clinically significant, meaning they are too small to matter.
- No change/increase in bone mineral density (BMD) while on medication—often referred to as **stable bone density**—is generally considered a positive sign that an osteoporosis treatment is working. You may not see your numbers increasing noticeably; however, stable bone density can mean that the medication is stopping the bone loss AND decreasing your fracture risk. **Please discuss with your physician or nurse practitioner.**

Weight Loss and BMD

- Losing weight, especially a significant amount (~10% or more), usually leads to a decrease in bone mineral density. Moderate weight loss involving weight/resistance training or walking may have less of an effect on the decrease in BMD.
- It is important to note that weight loss *does* cause true bone loss due to reduced body weight having to be supported by the bones. However, in some cases, the equipment can overestimate the loss.
- Bone density scans work by passing X-ray beams through both bone and soft tissue. The computer must estimate how much of the radiation was absorbed by soft tissue and subtract it to measure the bone. When a patient loses a significant amount of weight, the thickness and composition of the soft tissue changes. If the machine's software does not properly account for this reduction in fat/lean mass, it can incorrectly calculate a lower bone density, resulting in an "artificial" decrease. **Please discuss with your physician or nurse practitioner.**

TBS and Weight/Body Structure

- Extreme obesity can make a TBS scan less accurate. High body fat makes it harder for the technology to get a clear picture of the bone's internal, trabecular structure.
- The test is most accurate for people with a Body Mass Index (BMI) between 15 and 37. A BMI below 15 may also provide a false TBS score. Your family physician or nurse practitioner can help you calculate your BMI.
- In some studies, a higher BMI (particularly in men) was associated with a lower, or more "degraded," TBS, despite high bone density, suggesting that higher body weight might make the bone structure reading less accurate. **Please discuss with your physician or nurse practitioner.**
- Changes in your lumbar spine such as severe osteoarthritis, dense vascular calcification, or spinal fusion can degrade the image and make TBS unreliable. If multiple vertebrae must be excluded from the DXA analysis, the resulting TBS may not accurately reflect bone quality.
- If the original BMD scan has poor quality, such as severe artifacts or patient movement, the TBS calculation (which uses the same image) may be inaccurate.