OSTEOPOROSIS

Make the FIRST break the LAST
FRACTURE LIAISON SERVICES

This document provides information from Osteoporosis Canada's FLS Covid-19 Task Force to help FLSs deal with delays in BMD testing that may occur during this pandemic.

In this document, you will find:

- A concise review of the literature on FRAX without BMD, including a recommendation for its use.
- A summary of the published adjustments to the online FRAX tool.
- An illustration of FRAX with and without BMD, in this instance illustrating the adjustment that can be made, based on a published adjustment, for a patient with Diabetes Mellitus Type 2 of greater than 10 years duration.

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Using FRAX without BMD during the Covid pandemic: Guidance for Canadian FLSs

As per the 2010 Osteoporosis Canada Guidelines,[1] patients presenting with two or more fragility fractures or a fragility fracture of hip or spine are automatically deemed high risk and therefore do not need a fracture risk determination using FRAX.

For other patients (e.g. fragility fracture of distal radius, proximal humerus or pelvis), BMD is recommended to determine fracture risk. During a pandemic wave, BMD testing may not be readily available. Even when available, some patients may choose not to go out for testing due to their concerns regarding possible Covid exposure.

A subcommittee of the Osteoporosis Canada FLS Covid-19 task force conducted a literature review looking at how FRAX without BMD (FRAX-) compares to FRAX with BMD (FRAX+) and to true fracture rates.

Below is a summary of the results:

- FRAX- correlates very well with FRAX+ and with true fracture rates as observed in the general population over the age of 50.[2]
- All available studies have been conducted in the general population. Little is known specifically in the FLS population of patients with a recent fracture.
- In a large Canadian study[2], adding BMD to FRAX- resulted in re-classification of risk in only 8.5% of those patients who were classified at moderate or high risk with FRAX-:
    - 2.8% moving from moderate to high risk with FRAX+
    - 5.7% moving from high risk to moderate risk with FRAX+

Recommendation: FRAX without BMD can be used to guide treatment recommendations in the same way that FRAX with BMD has been used. BMD testing should be completed when available but should not delay osteoporosis treatment in those who scored at high risk using FRAX without BMD.

If access to BMD remains limited for the medium/longer term, the following patients might be considered for priority BMD testing:

- Patients who have a fracture risk close to 20% using FRAX without BMD
- Younger patients
- Patients who are initiated on osteoporosis treatment post-fracture

1. Papaioannou A, et al. 2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. *CMAJ* 2010;182:1864-1873.
2. Leslie WD, et al. Fracture risk assessment without bone density measurement in routine clinical practice. *Osteoporos Int* 2012;23:75-85

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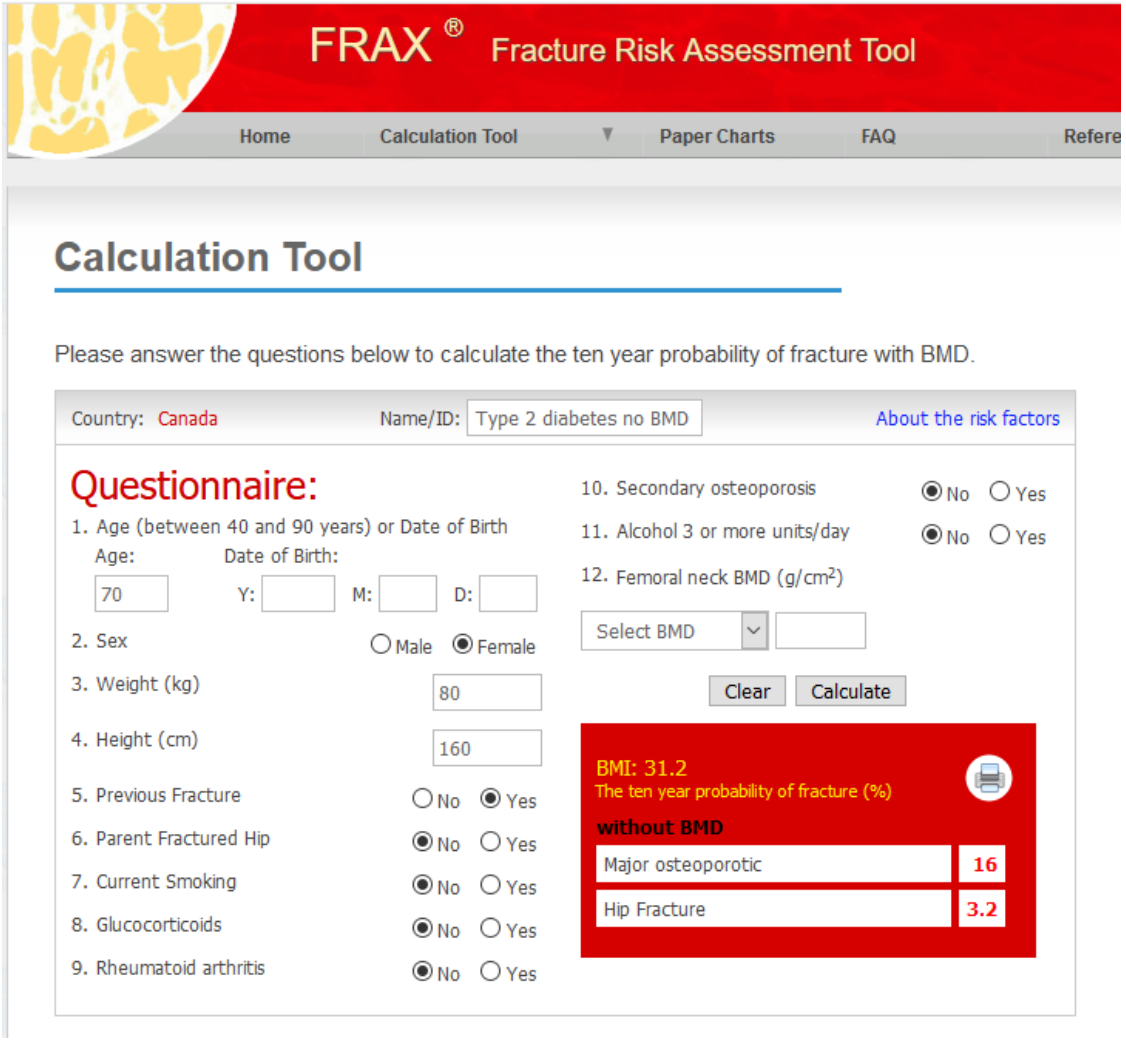
Summary of published adjustments to the online FRAX tool

Legend: BMD: Bone Mineral Density; FN: Femoral Neck; MOF: Major osteoporotic fracture; RA: Rheumatoid arthritis.

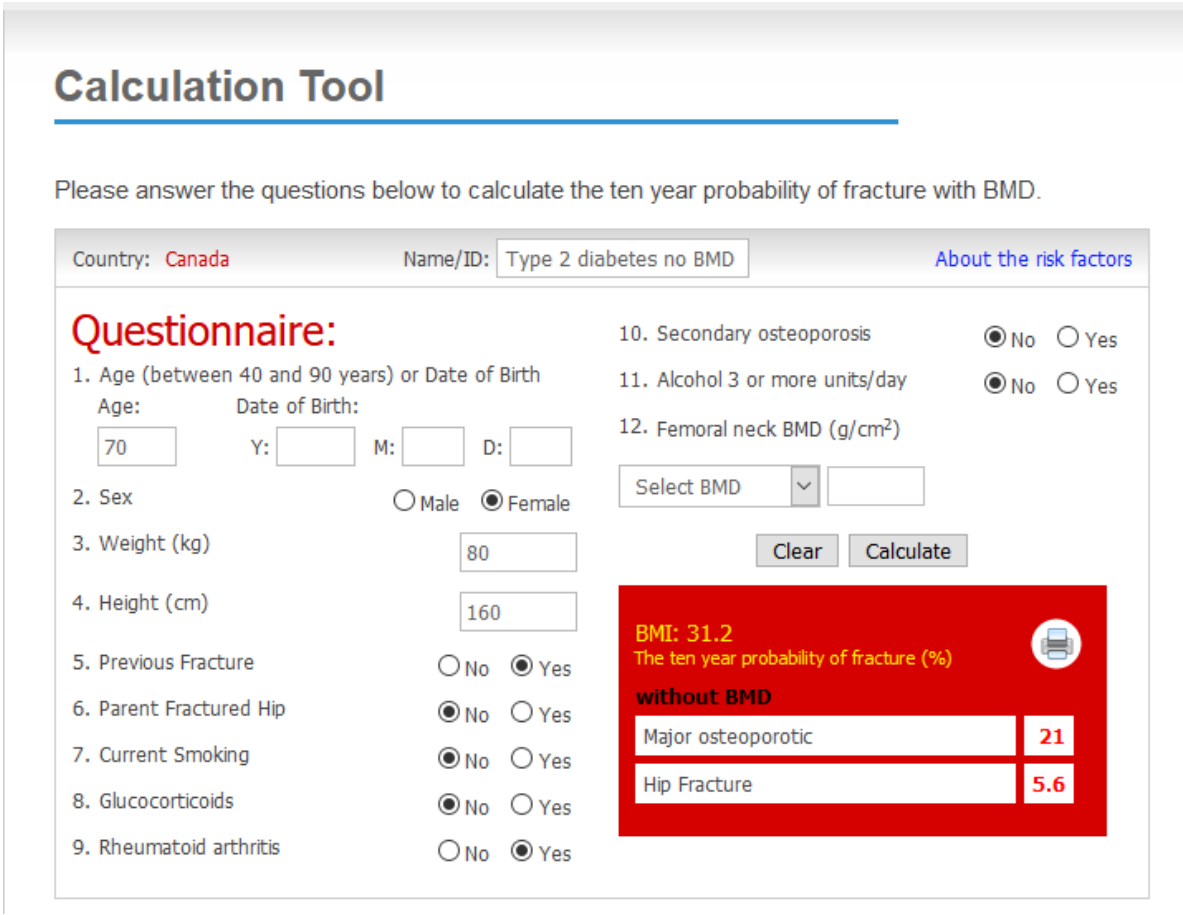
Type of adjustment	Reason for adjustment	FRAX adjustment	Example of how to do adjustment
Diabetes Mellitus (DM) type 2	Underestimation of fracture risk even when BMD used	Reference 1 Click RA box	If patient has both RA and DM, click RA box AND add 10 years to patient's age
Steroids in the past year	Steroid box underestimates fracture risk for those on doses of prednisone greater than 7.5 mg/day.	Reference 2 • 2.5-7.5mg/day, click steroid box • >7.5mg/day, click box steroid box plus add 15%	If patient's Prednisone dose is > 7.5 mg a day, click steroid box. Calculate FRAX. If unadjusted MOF risk is 23%: 15% of 23% = 3.45% Adjusted FRAX is 23 + 3.45 = 26.45, rounded to 26%.
Vertebral BMD significantly lower (i.e. more than 1.0 standard difference) than FN BMD	FN estimates fracture risk	Reference 3 For every 1.0 T-score difference between FN and spine, add 10% of the original FRAX score	If unadjusted MOF risk is 18% • FN T-score= -1.7 • Spine T-score= -3.5 Difference in T-score is 3.5 – 1.7 =1.8, round up to 2. The MOF risk will be increased by 2 X 10% = 20%. In this case 20% of 18% = 3.6%. Adjusted FRAX is 18% + 3.6% = 22.6%, rounded to 23%.
Parental hip fracture	Increased risk of MOF only if parent's age is less than 80 years at the time of the hip fracture.	Reference 4 Click parental hip fracture box ONLY if parent age < 80 at time of fracture.	
Recent fracture	Fracture risk higher if fracture occurred within the past 2 years	This will likely be incorporated directly into the FRAX tool in the future. Has been validated in the Canadian context (ref 6).	There are tables in Appendix of Reference 5. It will be up to each FLS program to decide if they will incorporate before it is embedded directly into the FRAX.

1. Leslie WD, et al. Comparison of methods for improving fracture risk assessment in diabetes: the Manitoba BMD registry. *J Bone Miner Res* 2018;33:1923-1930.
2. Kanis JA, et al. Guidance for the adjustment of FRAX according to the dose of glucocorticoids. *Osteoporos Int* 2011;22:809-816.
3. Leslie WD, et al. Spine-hip discordance and fracture risk assessment: a physician-friendly FRAX enhancement. *Osteoporos Int* 2011;22:839-847.
4. Yang S, et al. Objectively verified parental hip fracture is an independent risk factor for fracture: a linkage analysis of 478,792 parents and 261,705 offspring. *J Bone Miner Res* 2016;31:1753-1759.
5. Kanis JA, et al. Adjusting conventional FRAX estimates of fracture probability according to the recency of sentinel fractures. Osteoporos Int 2020;31:1817-1828.
6. Leslie WD, et al. Adjusting fracture probability for the effects of recent fracture: a registry-based cohort study. Abstract presented at the American Society of Bone and Mineral Research, September 2020

Type 2 diabetes, without BMD and without any adjustments



Type 2 Diabetes, NO BMD, risk adjustment using RA



Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: Canada Name/ID: Type 2 diabetes no BMD About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   Age: 70 Date of Birth: Y: M: D:
2. Sex — Male / Female
3. Weight (kg): 80
4. Height (cm): 160
5. Previous Fracture — No / Yes
6. Parent Fractured Hip — No / Yes
7. Current Smoking — No / Yes
8. Glucocorticoids — No / Yes
9. Rheumatoid arthritis — No / Yes
10. Secondary osteoporosis — No / Yes
11. Alcohol 3 or more units/day — No / Yes
12. Femoral neck BMD (g/cm^2): Select BMD

Clear Calculate

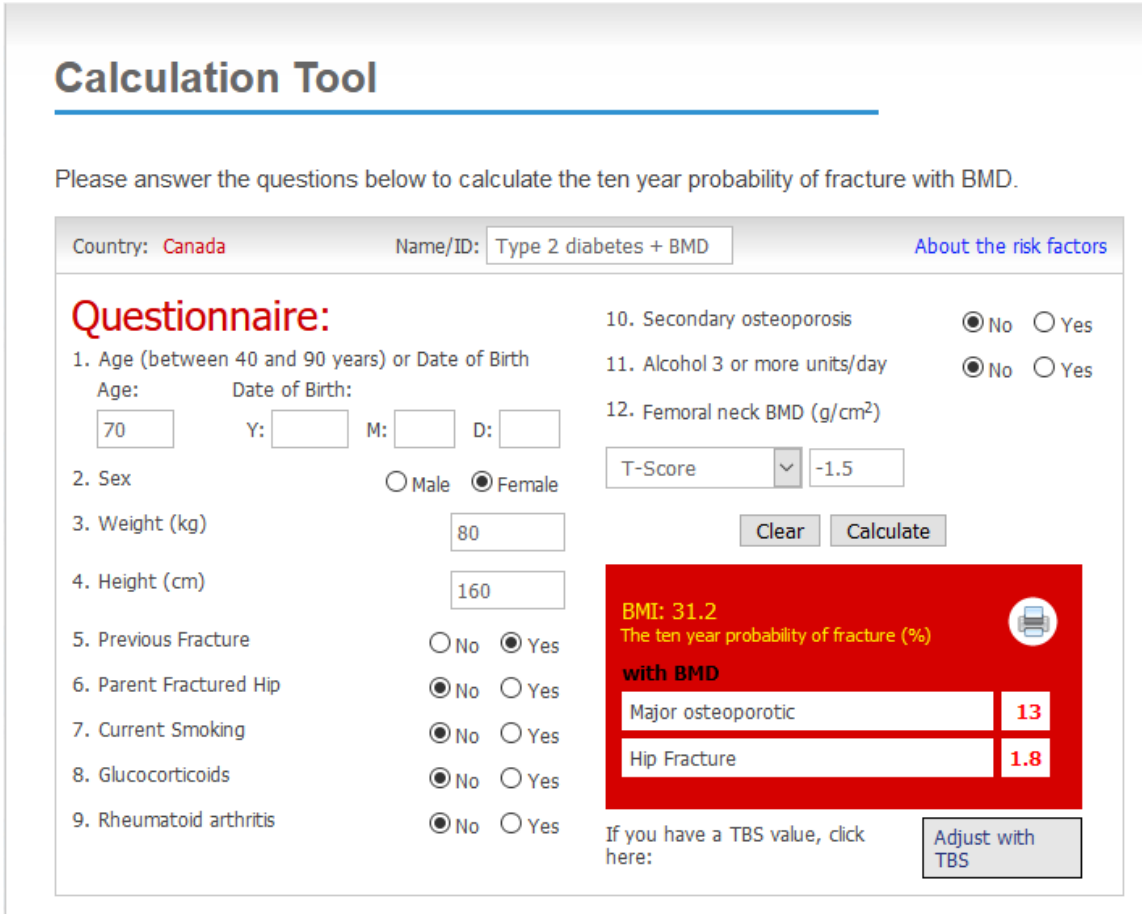
BMI: 31.2

The ten year probability of fracture (%)

without BMD

Major osteoporotic	21
Hip Fracture	5.6

Type 2 diabetes, with BMD no risk adjustment



Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: Canada Name/ID: Type 2 diabetes + BMD About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   Age: 70 Date of Birth: Y: M: D:
2. Sex — Male / Female
3. Weight (kg): 80
4. Height (cm): 160
5. Previous Fracture — No / Yes
6. Parent Fractured Hip — No / Yes
7. Current Smoking — No / Yes
8. Glucocorticoids — No / Yes
9. Rheumatoid arthritis — No / Yes
10. Secondary osteoporosis — No / Yes
11. Alcohol 3 or more units/day — No / Yes
12. Femoral neck BMD (g/cm²)
    T-Score: -1.5

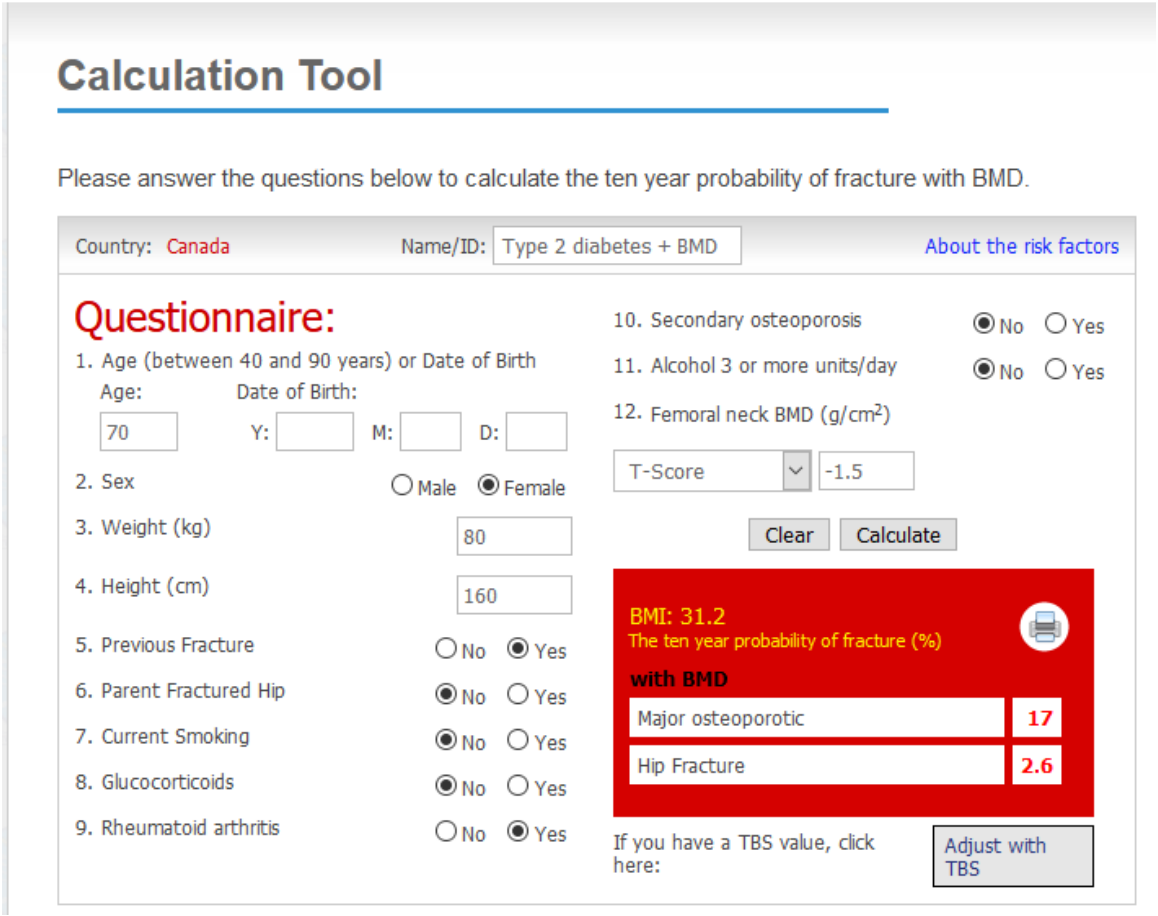
Clear Calculate

BMI: 31.2
The ten year probability of fracture (%)
with BMD

Major osteoporotic	13
Hip Fracture	1.8

If you have a TBS value, click here: Adjust with TBS

Type 2 Diabetes, with BMD, risk adjustment using RA



Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: Canada Name/ID: Type 2 diabetes + BMD About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   Age: 70 Date of Birth: Y: M: D:
2. Sex — Male / Female
3. Weight (kg): 80
4. Height (cm): 160
5. Previous Fracture — No / Yes
6. Parent Fractured Hip — No / Yes
7. Current Smoking — No / Yes
8. Glucocorticoids — No / Yes
9. Rheumatoid arthritis — No / Yes
10. Secondary osteoporosis — No / Yes
11. Alcohol 3 or more units/day — No / Yes
12. Femoral neck BMD (g/cm^2)
    T-Score: -1.5

Clear Calculate

BMI: 31.2
The ten year probability of fracture (%)
with BMD

Major osteoporotic	17
Hip Fracture	2.6

If you have a TBS value, click here: Adjust with TBS