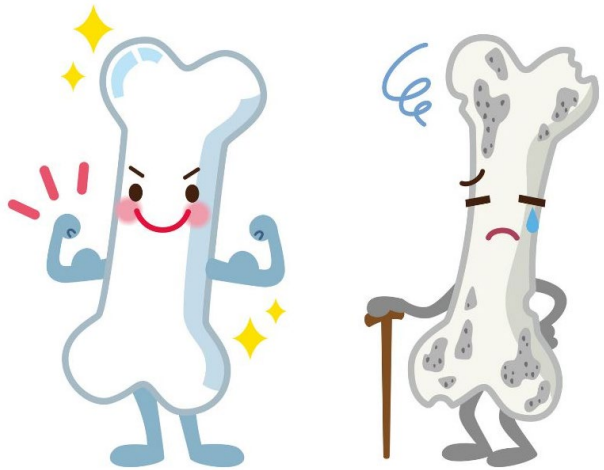
MANAGING OSTEOPOROSIS IN OLDER ADULTS

A Geriatrician's Perspective

Stephanie Kim, MD, MHSc



Conflicts of Interest

- Nothing to declare

Objectives

- Understand the impact of osteoporosis and fractures
- Evaluate the strengths and limitations of current fracture risk assessment tools
- Review osteoporosis treatment options
- Discuss duration of osteoporosis treatment and drug holidays

Impact of Osteoporosis

2 MILLION CANADIANS are affected by osteoporosis

At least **1 IN 3 WOMEN and 1 IN 5 MEN** will suffer from an osteoporotic fracture during their lifetime

OVER 80% OF ALL FRACTURES in people 50+ are caused by osteoporosis

28% OF WOMEN and **37% OF MEN** who suffer a hip fracture will die within one year

ONE IN THREE HIP FRACTURE PATIENTS will re-fracture within one year

Fast Facts | Osteoporosis Canada

Impact of Osteoporosis and Fractures

Quality of Life

- Fractures are painful
- Changes to mobility and independence
  - 44% of people with hip fracture return home
  - 10% go to another hospital
  - 27% go to rehabilitation care
  - 17% go to LTC

Impact on Health care system

- Estimated annual cost to the healthcare system is >$4.6 billion
- Multiple health care resources impacted→ emergency room, acute care, rehabilitation, home care, long-term care
- Osteoporotic hip fractures account for more hospital bed days than stroke, diabetes, or heart attack

Hopkins et al. Osteoporos Int. 2016.(10):3023-32
Fast Facts | Osteoporosis Canada

Fracture leads to Fracture

- Imminent Fracture Risk
  - Recency of fracture matters
  - "Sentinel" fragility fracture associated with risk of subsequent fracture within 2 years

Site of index fracture	Index fractures, n	2nd fractures at any site, n (%)	Median time (IQR) between index and 2nd fracture, days
Any	**115,776**	**20,629 (17.8%)**	**555** (236–955)
Hip	31,613	5,025 (15.9%)	**564** (267–952)
Wrist	17,859	3,160 (17.7%)	**582** (233–1,020)
Clavicle, ribs, or sternum	14,559	2,718 (18.7%)	**524** (219–927)
Humerus	13,237	2,507 (18.9%)	**566** (232–970)
Tibia, fibula, or knee	10,894	1,462 (13.4%)	**640** (297–1,023)
Pelvis	8,328	1,775 (21.3%)	**514** (203–896)
Vertebral	7,721	1,775 (23.0%)	**510** (215–899)
Radius or ulna	4,828	974 (20.2%)	**436** (69–939)
Multisite	3,735	752 (20.1%)	**581** (294–986)
Femur	3,002	481 (16.0%)	**562** (254–962)

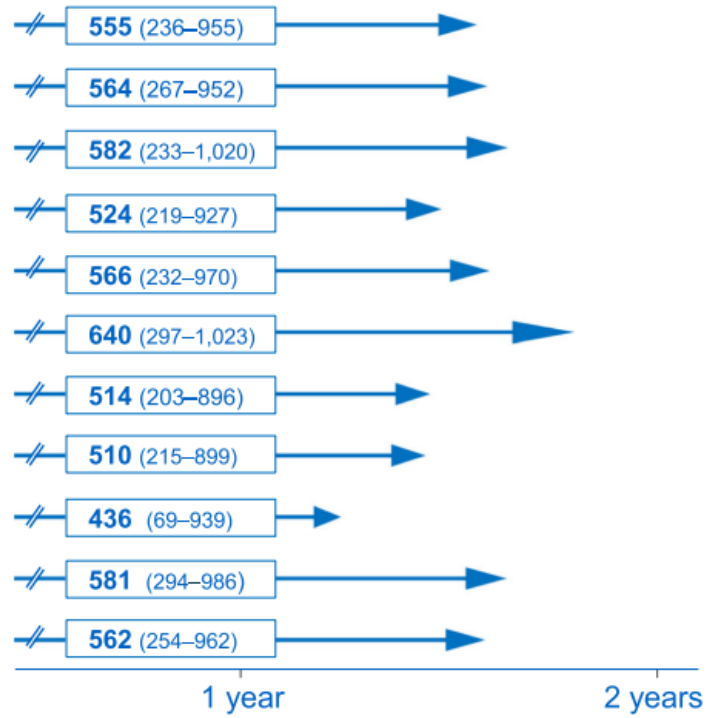


Fig. 1 Median time to second fragility fracture occurring at any site (by index fracture site). Number of index fractures, number and proportion of second fragility fractures at any site, and time to second fracture stratified by site of index fracture. Fracture sites are in descending order of number of index fractures. Abbreviations: IQR, interquartile range

Adachi et al. BMC Musculoskelet Disord. 2021:(1):224

Challenges Managing Osteoporosis in Older Adults

- Limitations applying current fracture risk tools to older adults
- Focus on BMD results
- Non-skeletal risk factors affect bone health
- Comorbidities and competing priorities
- Navigating risk: benefit profiles

ASSESSING FRACTURE RISK

Assessing Fracture Risk: 2010 CAROC tool

10-year Risk Assessment for Women (CAROC Basal Risk)

Age	Low Risk	Moderate Risk	High Risk
50	above -2.5	-2.5 to -3.8	below -3.8
55	above -2.5	-2.5 to -3.8	below -3.8
60	above -2.3	-2.3 to -3.7	below -3.7
65	above -1.9	-1.9 to -3.5	below -3.5
70	above -1.7	-1.7 to -3.2	below -3.2
75	above -1.2	-1.2 to -2.9	below -2.9
80	above -0.5	-0.5 to -2.6	below -2.6
85	above +0.1	+0.1 to -2.2	below -2.2

The T-score for the femoral neck is derived from the National Health and Nutrition Education Survey III (NHANES III) reference database for white women.

10-year Risk Assessment for Men (CAROC Basal Risk)

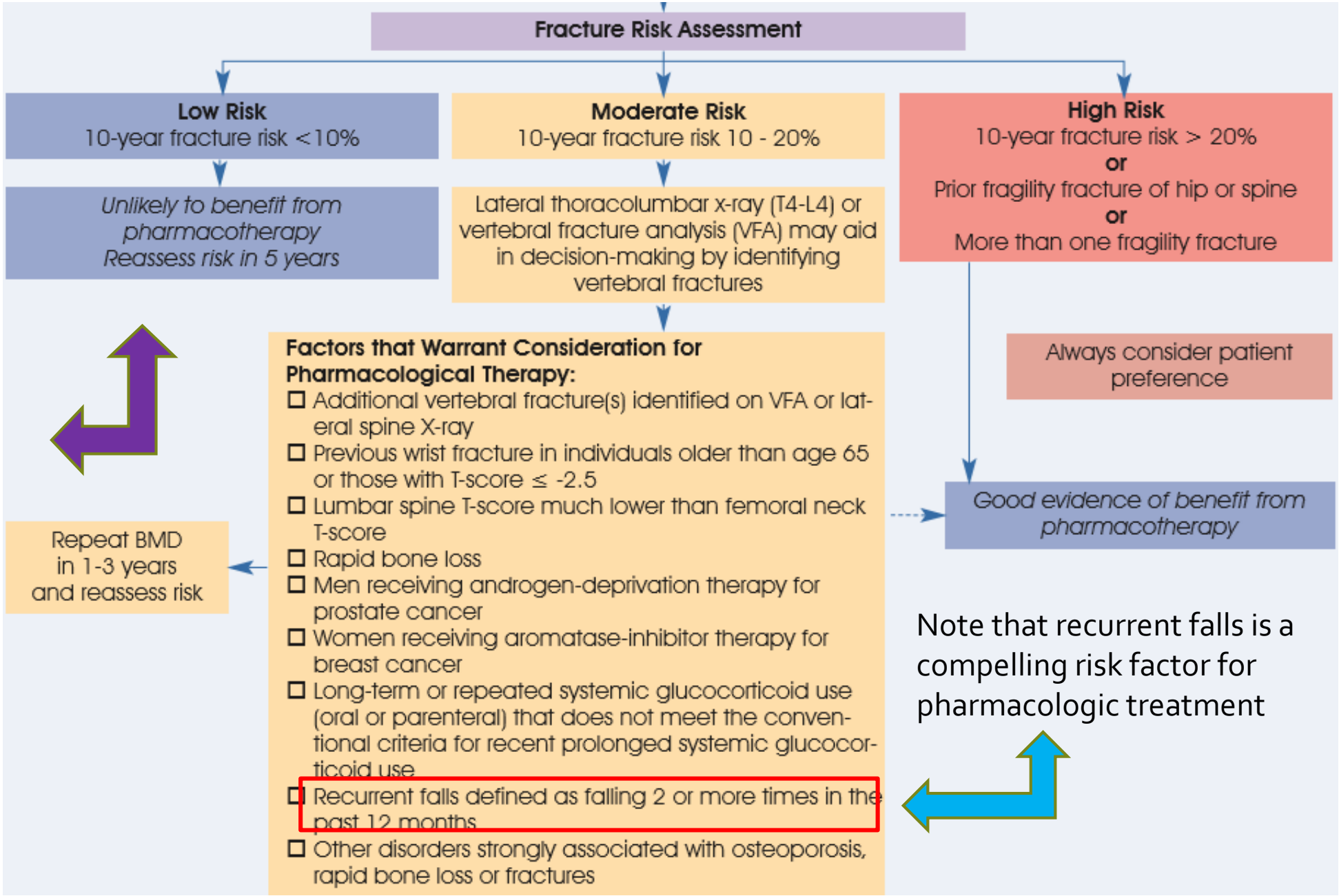
Age	Low Risk	Moderate Risk	High Risk
50	above -2.5	-2.5 to -3.9	below -3.9
55	above -2.5	-2.5 to -3.9	below -3.9
60	above -2.5	-2.5 to -3.7	below -3.7
65	above -2.4	-2.4 to -3.7	below -3.7
70	above -2.3	-2.3 to -3.7	below -3.7
75	above -2.3	-2.3 to -3.8	below -3.8
80	above -2.1	-2.1 to -3.8	below -3.8
85	above -2.0	-2.0 to -3.8	below -3.8

The T-score for the femoral neck is derived from the National Health and Nutrition Education Survey III (NHANES III) reference database for white women.

NB: Fragility fracture after age 40 or recent prolonged systemic glucocorticoid use increase CAROC basal risk by one category (i.e., from low-risk to moderate or moderate risk to high). Individuals with a fragility fracture of a vertebra or hip and those with more than one fragility fracture are at high risk of an additional fracture.

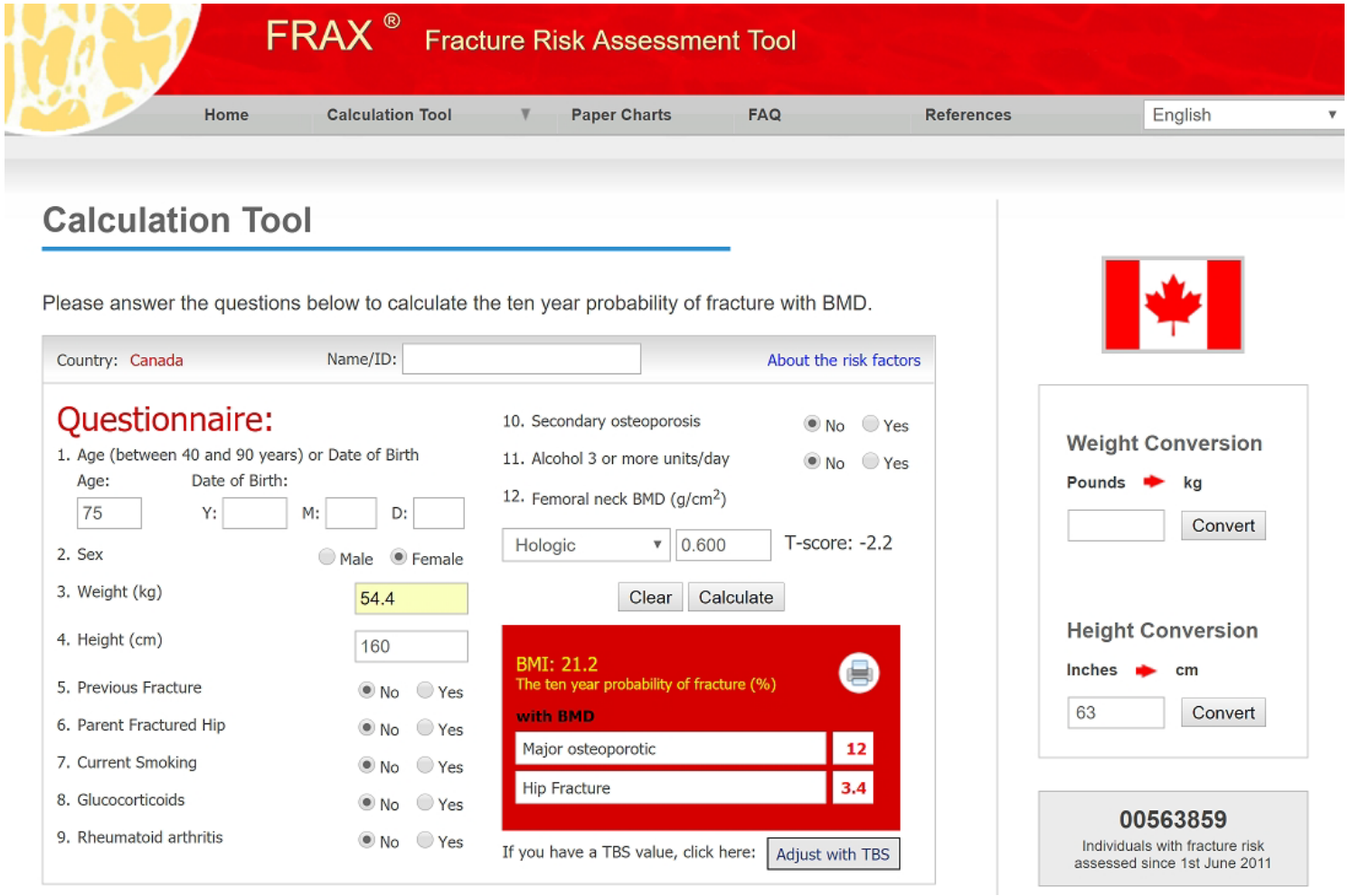
The T-score for the femoral neck is derived from the National Health and Nutrition Education Survey III (NHANES III) reference database for white women.

1. Calcium
2. Vitamin D
3. Exercise
4. Falls Prevention



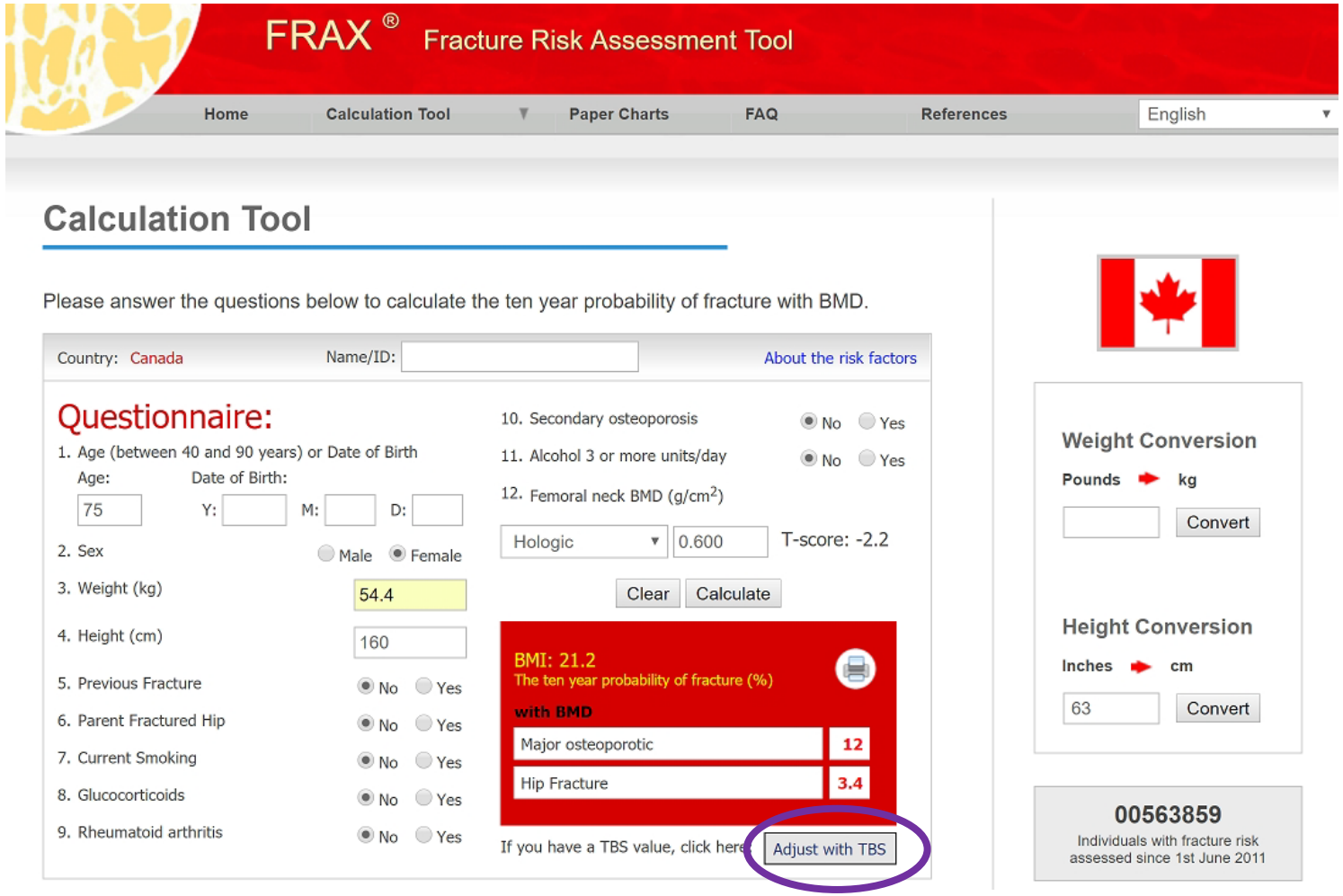
Note that recurrent falls is a compelling risk factor for pharmacologic treatment

Assessing Fracture Risk: FRAX



- Calculates 10 year probability of major osteoporotic fracture and hip fracture in those age 40-90
- HIGH risk warranting treatment
  - major osteoporotic fracture risk is >20%
  - Hip fracture risk is >3%

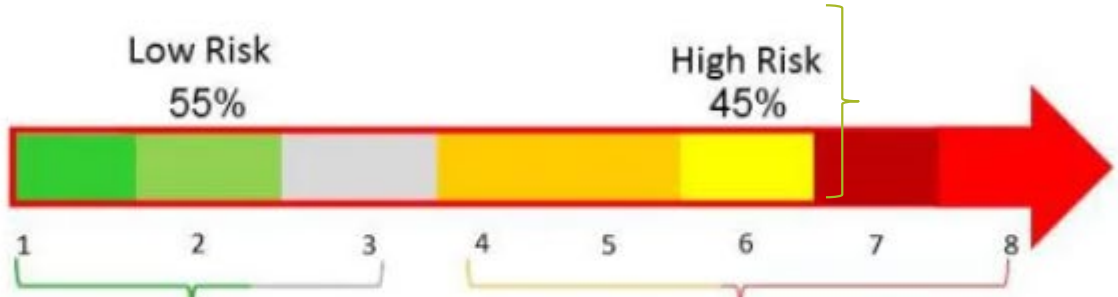
Limitations of FRAX



- May underestimate fracture risk in those with T2DM. Options are to:
  - Use TBS
  - Add 10 years to age
  - Use RA as a risk factor
  - Decrease femoral neck T score by 0.5 SD
- Difficulty ascribing appropriate weight to fracture history
- Does not account for risk of falls
- Underestimation of vertebral fracture

Leslie et al. JBMR. 2018: 11:1923-1930

FRS – Risk Prediction:
Snapshots of Residents at High and Low Risk



Low Risk Resident
Walks in corridor and
BMI > 30
or
Unable to walk in corridor
and
no fall past 30 days

High Risk Resident
Walks in corridor and
BMI 18-30
& one of the following:
- Prior fall
- Prior fracture
- Cognitive impairment
- Tendency to wander
- Age >85

or

High Risk Resident
Unable to walk in corridor
and has a fall past 30 days

High Risk Resident
Walks in corridor and
BMI <18
with or without a fall

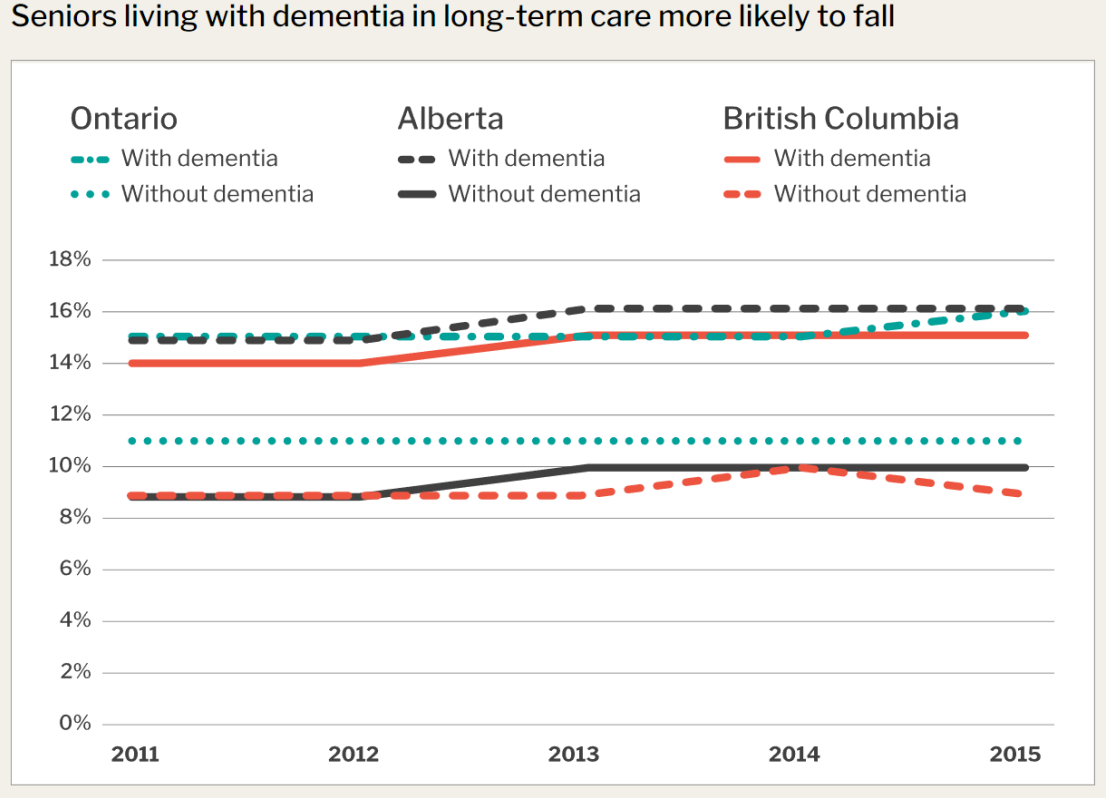
Ioannidis G, et al. BMJ Open, 2017;7.

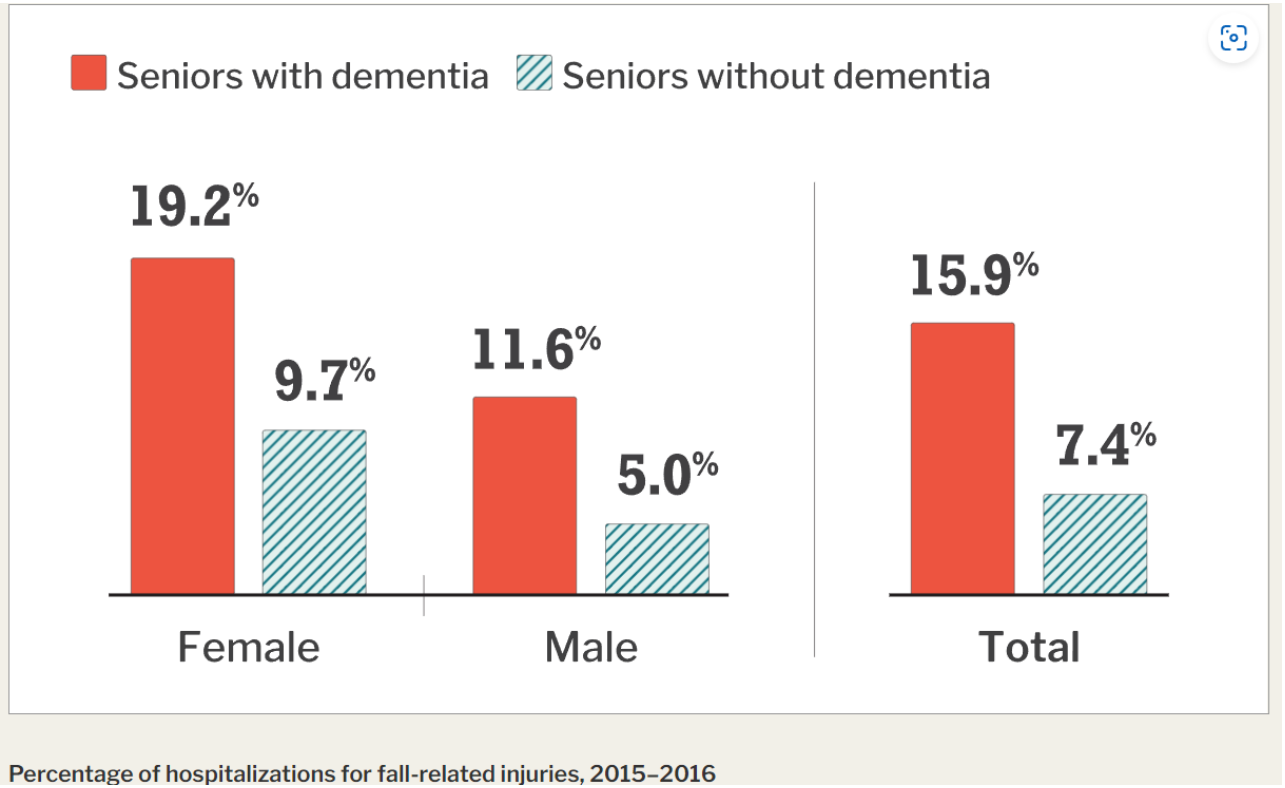
1

No need for BMD

Uses readily available data

Populations at risk in LTC





Hip fracture rates are 1.6 times higher for women in LTC and 2.2 times higher for men in LTC

FRS and hip fractures

Table 2 Incident hip fracture rates by hip fracture risk levels for the combined, derivation and validation datasets

Hip fracture risk levels categories	Combined sample per cent with hip fracture	Derivation sample per cent with hip fracture	Validation sample per cent with hip fracture
Hip fracture risk level 1	0.6	0.67	0.5
Hip fracture risk level 2	1.8	1.88	1.64
Hip fracture risk level 3	2.5	2.64	2.24
Hip fracture risk level 4	3.1	3.2	2.96
Hip fracture risk level 5	5	4.9	5.1
Hip fracture risk level 6	6.8	6.64	7.14
Hip fracture risk level 7	7.8	7.8	7.68
Hip fracture risk level 8	12.6	12.9	11.43

Table 3 ORs comparisons for the eight hip fracture risk levels for full, derivation and validation datasets

Hip fracture risk level categories	Combined sample ORs (95% CI)	Derivation sample ORs (95% CI)	Validation sample ORs (95% CI)
Hip fracture risk level 2 vs 1	3.0 (1.9 to 4.6)	2.9 (1.7 to 4.7)	3.3 (1.3 to 8.9)
Hip fracture risk level 3 vs 1	4.2 (2.7 to 6.3)	4.1 (2.5 to 6.5)	4.6 (1.8 to 11.7)
Hip fracture risk level 4 vs 1	5.2 (3.4 to 7.9)	4.9 (3.1 to 7.9)	6.1 (2.4 to 15.6)
Hip fracture risk level 5 vs 1	8.3 (5.5 to 12.6)	7.7 (4.8 to 12.2)	10.8 (4.3 to 26.9)
Hip fracture risk level 6 vs 1	11.6 (7.0 to 19.1)	10.6 (6.0 to 18.7)	15.4 (5.3 to 45)
Hip fracture risk level 7 vs 1	13.4 (8.8 to 20.5)	12.6 (7.9 to 20.2)	16.7 (6.6 to 42.2)
Hip fracture risk level 8 vs 1	23.0 (12.5 to 42.3)	22.1 (11.2 to 43.9)	25.9 (6.6 to 101)

Validated to assess 1-year hip fracture risk in LTC

Not yet validated in other health settings

Ioannidis et al BMJ Open 2017;7

TREATMENT

LIFESTYLE

1. Calcium targeting~1000-1200mg daily
2. Vitamin D 800-1000IU daily
3. Exercise
   a. Weightbearing
   b. Balance
   c. Resistance exercises
4. Falls Prevention

Pharmacologic Treatment Options

Fracture	Risedronate	Alendronate	Zoledronic acid	Denosumab	Raloxifene	HRT	Teriparatide	Romosozumab
Vertebral	√	√	√	√	√	√	√	√
Hip	√	√	√	√	---	√	---	√
Non-vertebral	√	√	√	√	---	√	√	√

Adapted from 2010 Osteoporosis Canada guidelines

Drug	Mechanism of Action	Route	Dose	Duration	Limitations	Contraindications
Bisphosphonate Alendronate Risedronate Zoledronic acid	Anti-resorptive/bone binding	PO IV	35mg weekly 150mg monthly 5mg IV yearly	Depends on fracture risk	GI side effects Inability to sit upright	AFF ONJ Cr clearance <30-35
Denosumab	Anti-resorptive/RANK ligand inhibitor	SC	60mg every 6 months	?	Risk of Hypocalcemia	AFF ONJ
Teriparatide Forteo Osnuvo	Bone formation/PTH analogue	SC	20mcg daily	24 months	Cost Daily injections	Increased risk of osteosarcoma
Romosozumab	Dual action/sclerostin inhibitor	SC	210mcg monthly	12 months	Cost Not approved for men	Black box warning re: CV risk/MACE AFF ONJ

*Note HRT and Raloxifene not included as risks likely outweigh benefits in fracture risk reduction for older adults

Pharmacologic treatment: Which is best?

Anti-resorptive Treatment

- Usually first line due to cost effectiveness and ease
- Ensure correct intake with oral bisphosphonates given poor bioavailability

Bone formation/Dual action

- Greater fracture risk reduction for those with severe osteoporosis
  - VERO TRIAL: TPTD vs. Risedronate
  - ARCH STUDY: Romosozumab + Alendronate vs. Alendronate alone
- Sequence of treatment matters: anabolic treatment optimized when used before anti-resorptives
  - DATA switch study
- Regardless of sequence, course needs to be followed by anti-resorptive treatment to preserve gains

Cost is still a barrier

Table 10: CADTH Cost Comparison Table for the Treatment of Osteoporosis

Treatment	Strength	Form	Price	Recommended dosage	Daily cost ($)	Annual cost ($)
Romosozumab (Evenity)	105 mg/1.17 mL	Single-use pre-filled syringe 1.17 mL	328.3900[a]	210 mg, every month	21.59	7,881
RANK ligand inhibitor						
Denosumab (Prolia)	60 mg/mL	Single-use pre-filled syringe 1 mL	395.7800	60 mg, every 6 months	2.17	792
Bisphosphonates						
Alendronate (Fosamax, generics)	10 mg 70 mg	Tablet	0.4987 2.1014	10 mg daily or 70 mg weekly	0.30	109
Alendronate / cholecalciferol (Fosavance, generics)	70 mg/70 mcg 70 mg/140 mcg	Tablet	2.4348 1.2174	70 mg weekly	0.17	63
Risedronate (Actonel, generics)	35 mg 150 mg	Tablet	1.9787 11.1875	35 mg weekly	0.28	103
Risedronate (Actonel)	35 mg	Delayed release tablet	11.8653	35 mg weekly	1.69	617
Zoledronic acid (Aclasta, generics)	5 mg/100 mL	IV infusion 100 mL	335.4000	5 mg annually	0.92	335
Parathyroid hormone analogue						
Teriparatide (Forteo, generic)	250 mcg/mL	Pre-filled pen 3 mL (37.5 doses) 2.4 mL (30 doses)	800.7934[b]	20 mcg daily[c]	28.60	10,439
Selective estrogen receptor modulator						
Raloxifene HCl (Evista, generics)	60 mg	Tablet	1.0268	60 mg daily	1.03	375

Note: All prices are from the Ontario Drug Benefit Formulary (accessed June 2021), unless otherwise indicated, and do not include dispensing fees.
[a]Sponsor's submitted price: 1 package contains 2 syringes (i.e., 210 mg) — $656.7800.
[b]Price from Delta PA accessed March 2021.[12]
[c]One pen lasts for 28 days.

New LU code for Osnuvo as of September 2022 for AFF or ONJ

TERIPARATIDE
250mcg/mL Inj Sol-3mL Cart Pk

New Search

Reason For Use Code	Clinical Criteria
635	For the treatment of osteoporosis in patients at a high risk of fragility fractures who meet ALL the following criteria: - 65 years of age or older; AND - Has a documented bone mineral density [BMD] T-score of less than or equal to 3; AND - Has a history of prior fragility fracture(s); AND - Has used an anti-resorptive agent for osteoporosis which resulted in osteonecrosis of the jaw and/or an atypical femur fracture. Note: The maximum lifetime exposure to teriparatide for an individual patient is 24 months
	LU Authorization Period: 2 years

Bottom Line…

- All currently approved osteoporosis treatments in Canada are effective at reducing fracture risk

Treatment > No treatment

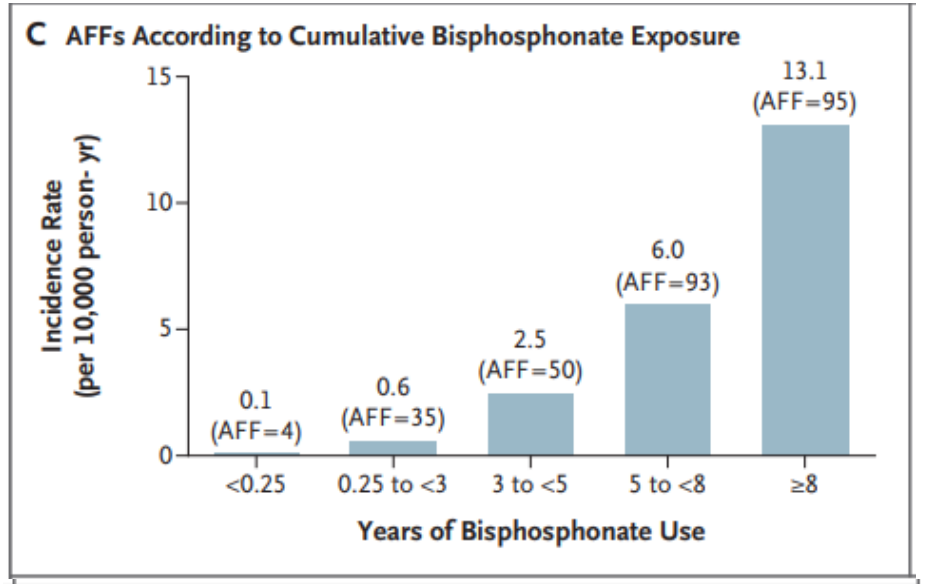
80% of Canadians with fracture history are not prescribed treatment!

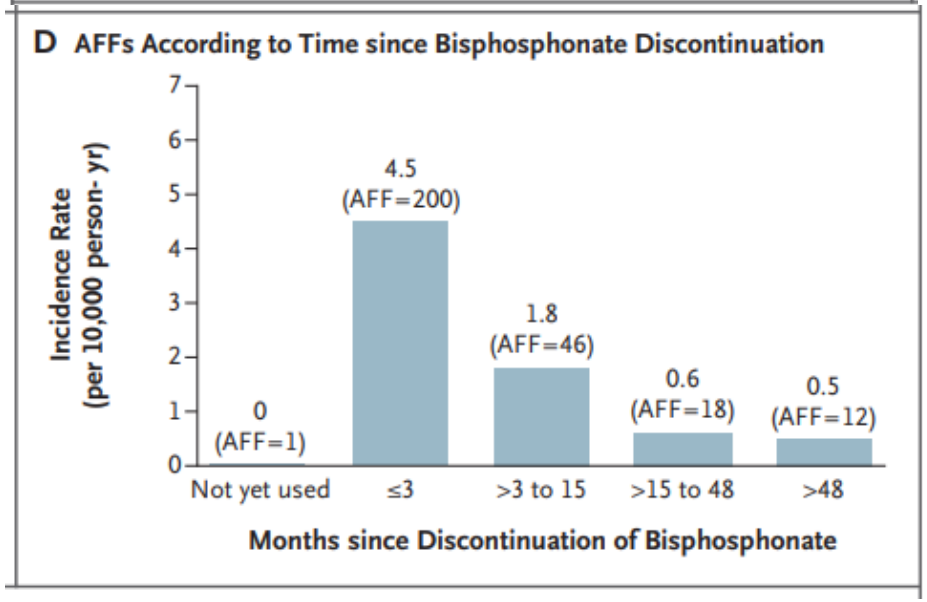
- Individualize treatment to patient factors
  - Cost
  - Motivation
  - Goals and Functional Status

HOW LONG SHOULD WE TREAT: DRUG HOLIDAYS

Drug Holidays: Bisphosphonates

- Rationale
  - Mechanism of bisphosphonates allows for potential residual anti-fracture effects after cessation
  - To mitigate the rare but serious adverse effects of Atypical Femur Fractures and Osteonecrosis of the Jaw which may increase with treatment duration

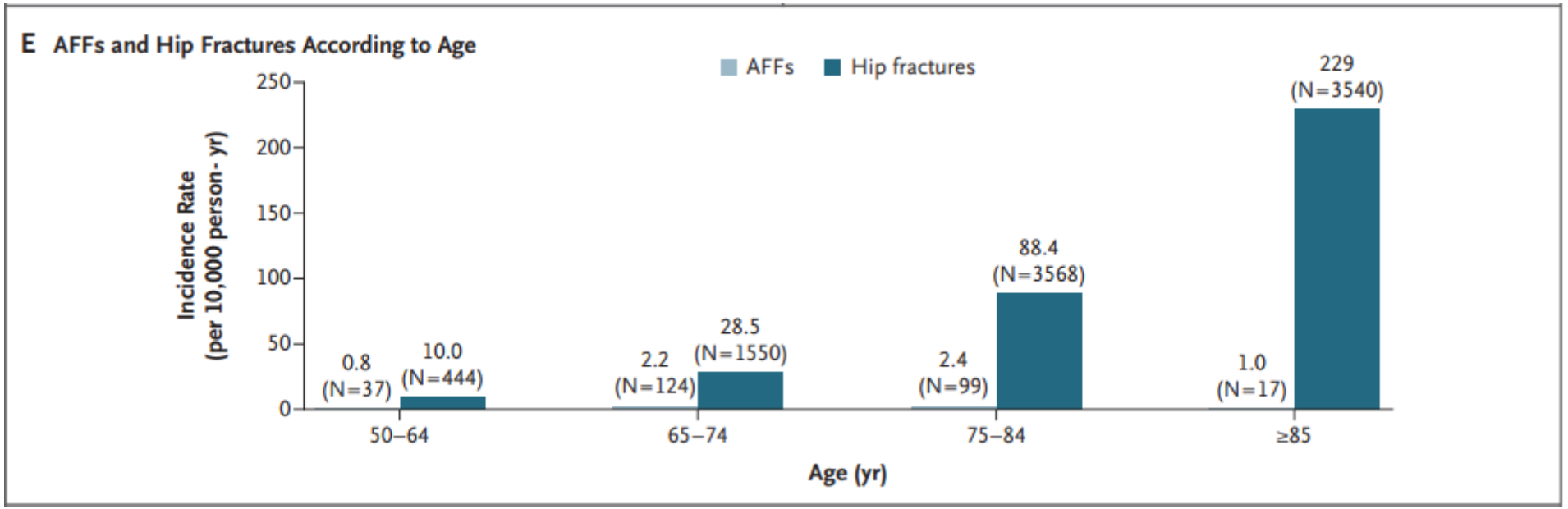




Black et al. N Engl J Med. 2020. 383(8):743-753

Drug Holidays: Bisphosphonates

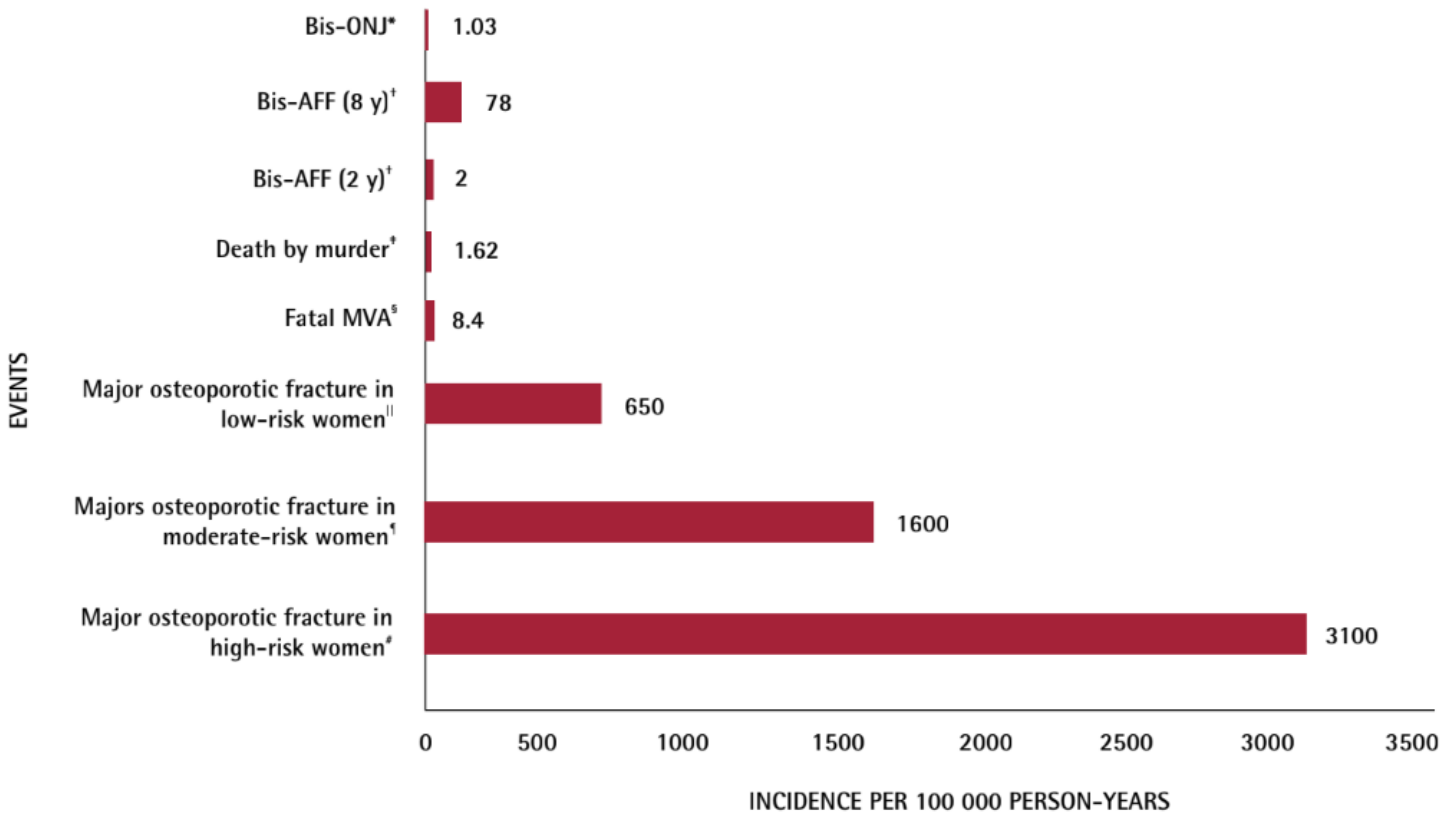
- Nevertheless, we need to think about the risk of adverse effects as well as fracture to decide when drug holidays should be offered



Black et al. N Engl J Med. 2020. 383(8):743-753

Contextualizing Risk

Figure 1. Risks of major osteoporotic fracture and other rare events



Bis-AFF—bisphosphonate-associated atypical subtrochanteric and diaphyseal femur fracture, Bis-ONJ—bisphosphonate-associated osteonecrosis of the jaw, BMD—bone mineral density, FN—femoral neck, FRAX—Fracture Risk Assessment Tool, MVA—motor vehicle accident.

*Data from Khan et al[33] (Canadian data).

†Data from Dell et al[38] (American data).

‡Data from Statistics Canada[77] (Canadian data).

§Data from Transport Canada[78] (Canadian data).

||The 10-year risk of major osteoporotic fracture in a low-risk woman by Canadian FRAX (65-year-old woman, weighing 60 kg with a height of 168 cm; BMD FN T-score -1.2).

¶The 10-year risk of major osteoporotic fracture in a moderate-risk woman by Canadian FRAX (65-year-old woman weighing 60 kg with a height of 168 cm; parent hip fracture history; BMD FN T-score -2.0).

#The10-year risk of major osteoporotic fracture in a high-risk woman by Canadian FRAX (65-year-old woman weighing 60 kg with a height of 168 cm; parent hip fracture history; previous fracture; BMD FN T-score -2.6).

Brown et al. Can Fam Physician. 2014: (4):324-33

Drug Holidays: Bisphosphonates

Low fracture risk (<10%)

- No need for pharmacologic treatment

Moderate fracture risk (10-20%)

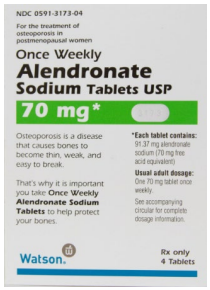
- Differing skeletal residency among bisphosphonates
  - *Zoledronic acid* > *Alendronate* > *Risedronate*
- After 5 years of oral bisphosphonate or 3 years Zoledronic acid assuming good adherence
- Reassess in 2-3 years

Consensus

Drug Holidays: Bisphosphonates

High fracture risk (>20%)

Lack of consensus re: drug holiday for high risk



FLEX RCT

Treatment with Alendronate 5 years vs. 10 years

10 year group had ongoing suppression of bone turnover, stable BMD, lower incidence of clinical vertebral fracture 2.4% with ALN, 5.3% with PBO (RR = 0.45, 95% CI 0.24 to 0.85)

Adverse events similar

HORIZON RCT

Treatment of Zoledronic acid from 3 to 6 years

6 year group had improved BMD compared with 3 year group and significantly lower incidence of vertebral fracture (OR = 0.51, 95% CI 0.26 to 0.95)

Transient increase in serum creatinine with 6 year group but no effect on renal function

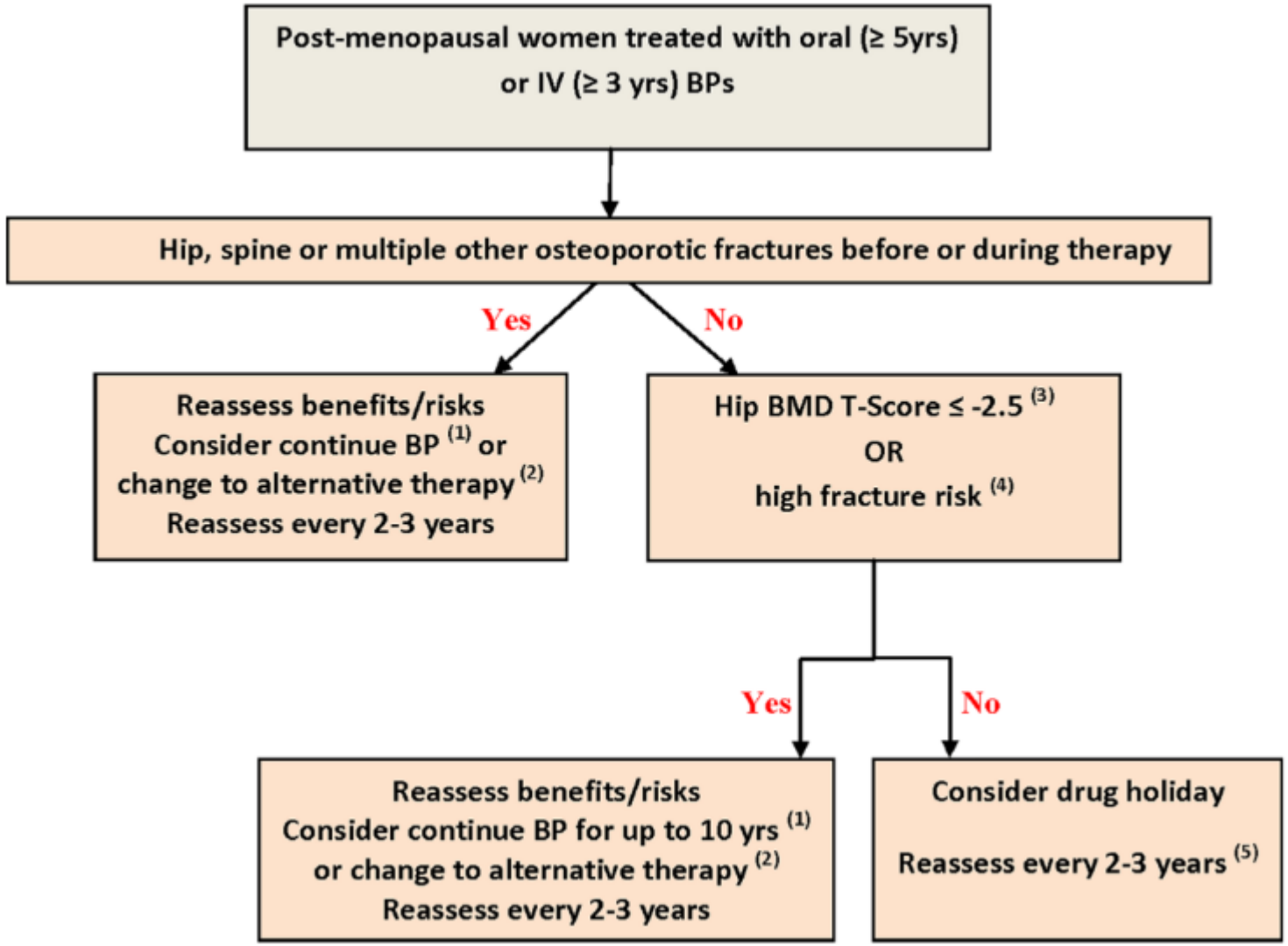
Drug Holidays: Bisphosphonates

High fracture risk (>20%)

- Consider short drug holiday after 5-10 years of treatment
- Reassess 1-2 years

High fracture risk (>20%)

- Switch to bone formation agent
  - TPTD x 24 months
  - Romosozumab x 12 months



Adler et al. J Bone Miner Res. 2016: (1):16-35

Drug Holidays and Denosumab

- Unlike bisphosphonates, we cannot apply the traditional concept of a drug holiday to Denosumab

- Discontinuing Denosumab needs careful consideration

Denosumab: Stopping treatment

BMD declines after treatment

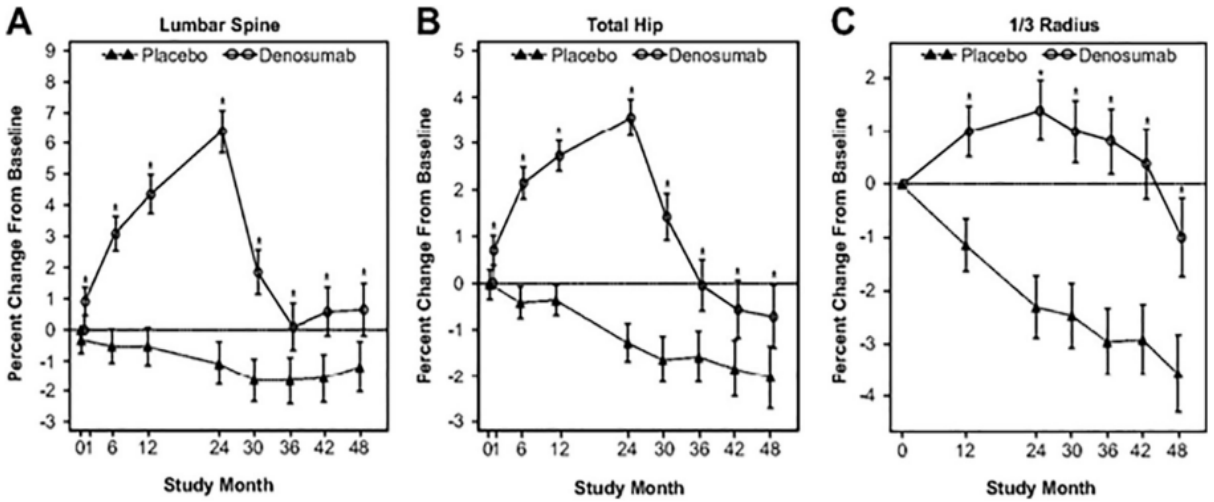


Fig. 2. Effects of stopping denosumab on bone mineral density.

Rebound in bone turnover

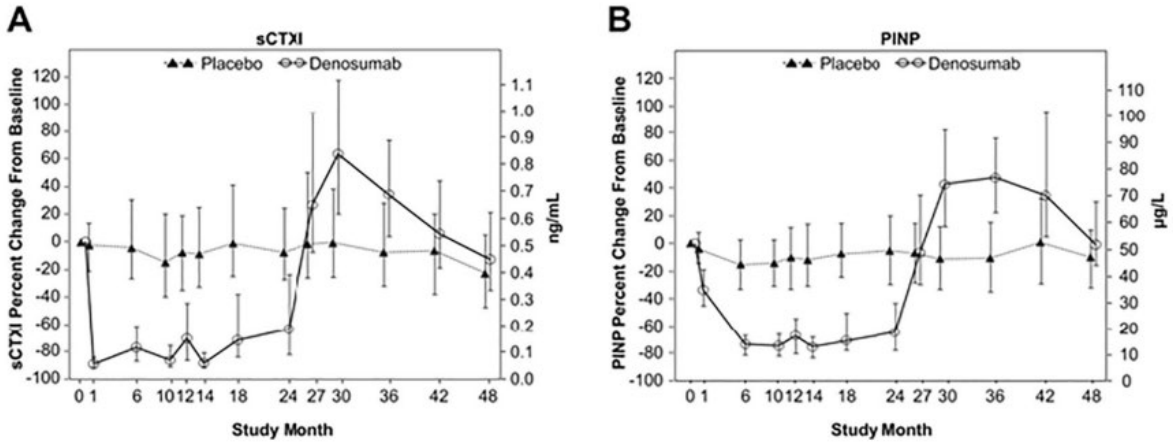


Fig. 3. Effects of stopping denosumab on bone turnover.

Reduction of BMD: 6.6% lumbar spine, 5.3% total hip within first 12 months

E. Tsourdi et al. / Bone 105 (2017) 11–17

Denosumab and Vertebral Fractures

- Rate of vertebral fractures lower with Denosumab treatment vs. placebo during treatment 1.2 [0.9–1.6] versus 7.0 [5.2–8.7] per 100 participant-years
- After discontinuing Denosumab, the rate of vertebral fractures increased to 7.1 (5.2–9.0) per 100 participant-years similar to placebo and 8.5 [5.5–11.5] per 100 participant-years.
- There was a slightly higher rate of multiple vertebral fractures after discontinuing Denosumab 4.2 [2.8–5.7] versus placebo 3.2 [1.4–5.1] per 100 participant-years
- History of vertebral fracture was the greatest predictor of having multiple vertebral fractures after discontinuing Denosumab

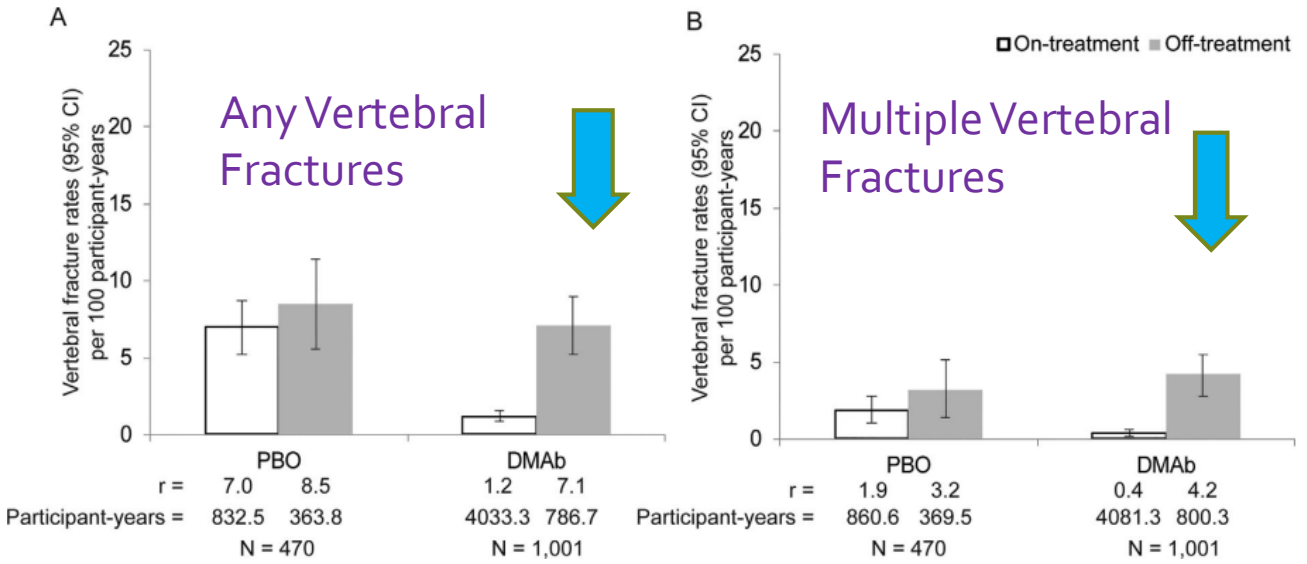


Fig. 2. Exposure-adjusted rates of (*A*) any and (*B*) multiple vertebral fractures in participants who received placebo or denosumab in the FREEDOM study and denosumab in the Extension before (white bar) and after (gray bar) discontinuing treatment. DMAb = denosumab; PBO = placebo; r = rate per 100 participant-years.

Table 4. Significant Predictors of Off-treatment Multiple Vertebral Fractures Based on a Multivariate Logistic Regression Model

	1471 Participants included[a]	772 participants included[b]
Significant covariates	Odds ratio (95% CI)	Odds ratio (95% CI)
Prior VFx[c] (yes versus no)	3.9 (2.1–7.2)	3.6 (1.8–7.1)
Off-treatment duration (per year)	1.6 (1.3–1.9)	1.4 (1.1–1.7)
Off-treatment annualized total hip BMD loss[d] (per 1%)	Not included	1.2 (1.1–1.3)

Cummings et al. J Bone Miner Res. 2018. (2):190-198

How long can we use Denosumab?

10 years of denosumab treatment in postmenopausal women with osteoporosis: results from the phase 3 randomised FREEDOM trial and open-label extension

Henry G Bone, Rachel B Wagman, Maria L Brandi, Jacques P Brown, Roland Chapurlat, Steven R Cummings, Edward Czerwiński, Astrid Fahrleitner-Pammer, David L Kendler, Kurt Lippuner, Jean-Yves Reginster, Christian Roux, Jorge Malouf, Michelle N Bradley, Nadia S Daizadeh, Andrea Wang, Paula Dakin, Nicola Pannacciulli, David W Dempster, Socrates Papapoulos

Bone et al. Lancet Diabetes Endocrinol. 2017. (7):513-523.

Primary outcomes: safety monitoring, adverse events

	Placebo			Combined denosumab groups									
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of participants	3883	3687	3454	6085	5787	5452	4099	3890	3582	3261	1743	1585	1451
All adverse events	189·5	156·3	132·8	165·3	137·8	124·6	129·9	110·9	110·0	108·4	107·6	109·5	95·9
Infections	38·6	33·9	31·7	35·1	30·3	29·5	29·1	26·0	27·2	26·5	27·0	27·0	23·0
Malignancies	1·8	1·6	1·5	1·9	1·5	2·2	2·3	2·4	2·2	2·7	1·7	2·6	1·6
Eczema	0·8	0·5	0·6	1·4	1·1	1·0	1·1	1·2	0·9	0·7	0·8	0·9	1·3
Hypocalcaemia	<0·1	0	<0·1	<0·1	<0·1	0	<0·1	0·1	0	<0·1	<0·1	0	0·1
Pancreatitis	<0·1	<0·1	0	<0·1	<0·1	<0·1	0	<0·1	0·1	<0·1	0·1	<0·1	0
Serious adverse events	11·7	11·9	10·8	12·0	11·5	12·3	11·5	12·9	12·6	14·4	11·5	13·1	12·3
Infections	1·1	1·4	1·4	1·5	1·6	1·4	1·4	1·3	1·9	2·3	1·2	1·5	2·6
Cellulitis or erysipelas	0	0	<0·1	<0·1	<0·1	0·2	<0·1	<0·1	0·1	<0·1	0·2	<0·1	0·1
Fatal adverse events	0·8	0·8	1·0	0·7	0·6	0·7	0·5	0·8	0·9	1·5	0·7	1·0	0·9
Osteonecrosis of the jaw	0	0	0	0	<0·1	0	<0·1	0	0·2	<0·1	0	<0·1	<0·1
Atypical femoral fracture	0	0	0	0	0	<0·1	0	0	0	<0·1	0	0	0

Analyses were based on the original randomised treatment groups in FREEDOM. Data include all participants who received at least one dose of investigational product in FREEDOM or the extension. Placebo data are for all participants who received at least one dose of placebo during FREEDOM. Denosumab data are for all participants who received at least one dose of denosumab during FREEDOM or the extension. Data are shown for each year of exposure; thus a long-term participant could have up to 10 years of exposure and a crossover participant could have up to 7 years of exposure to denosumab. All adverse and serious adverse events were coded using Medical Dictionary for Regulatory Activities version 13.0.

Table 2: **Yearly exposure-adjusted participant incidence of adverse events per 100 participant-years of follow-up for placebo and for the combined FREEDOM, long-term, and crossover denosumab participants, up to 10 years**

Bone et al. Lancet Diabetes Endocrinol. 2017. (7):513-523.

Secondary Outcomes

BMD

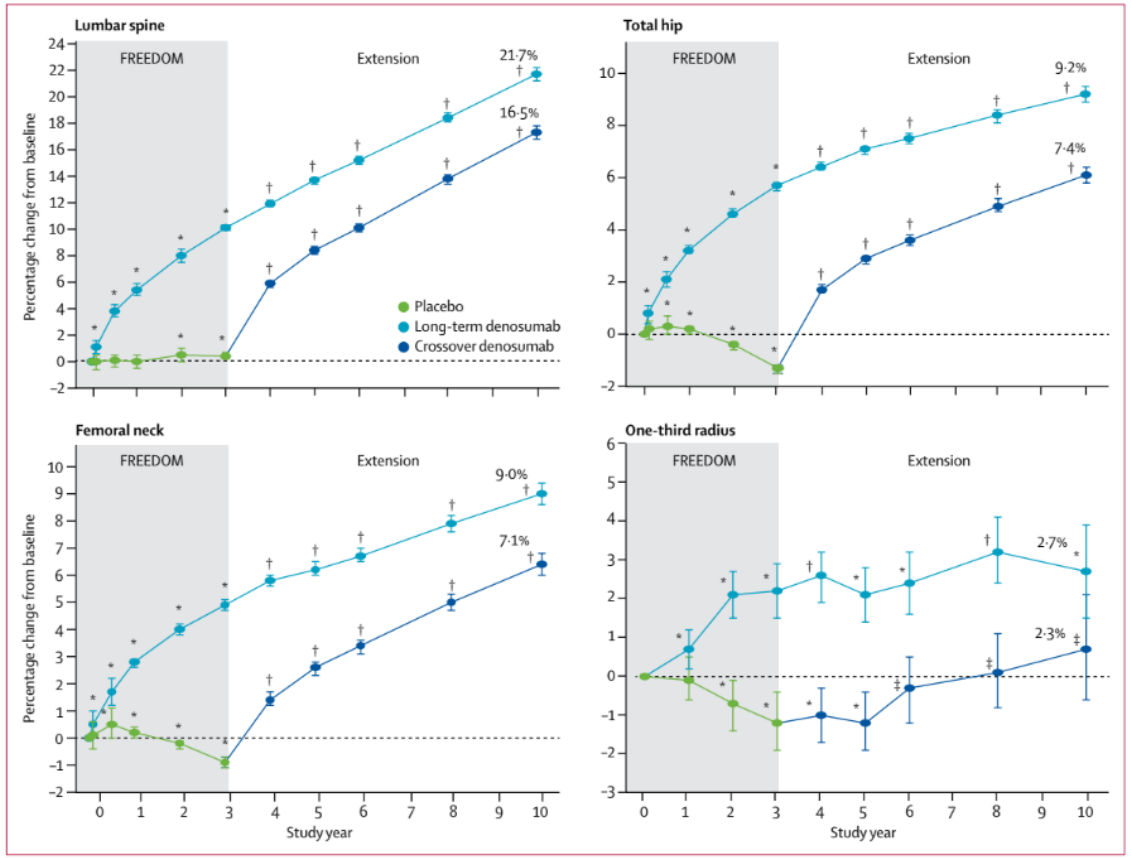


Figure 4: **BMD during FREEDOM and the FREEDOM extension**
Percentage changes from FREEDOM baseline in BMD are shown for the lumbar spine, total hip, femoral neck, and one-third radius. Final number listed at year 10 represents BMD percentage change while on denosumab treatment (from FREEDOM baseline for the long-term group and from extension baseline for the crossover group). Data are least-squares means (95% CI). BMD=bone mineral density. *p<0·05 compared with FREEDOM baseline. †p<0·05 compared with FREEDOM and extension baselines. ‡p<0·05 compared with extension baseline.

Bone Turnover Markers

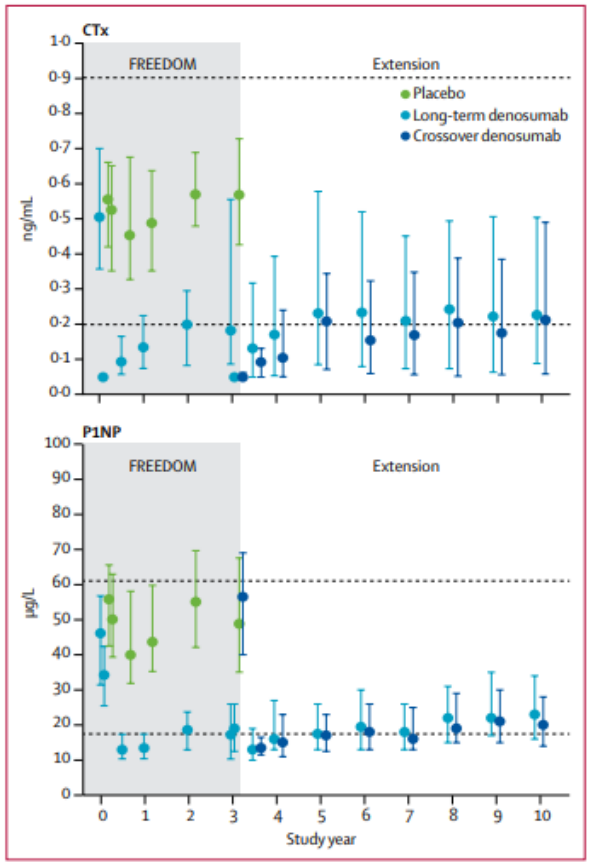
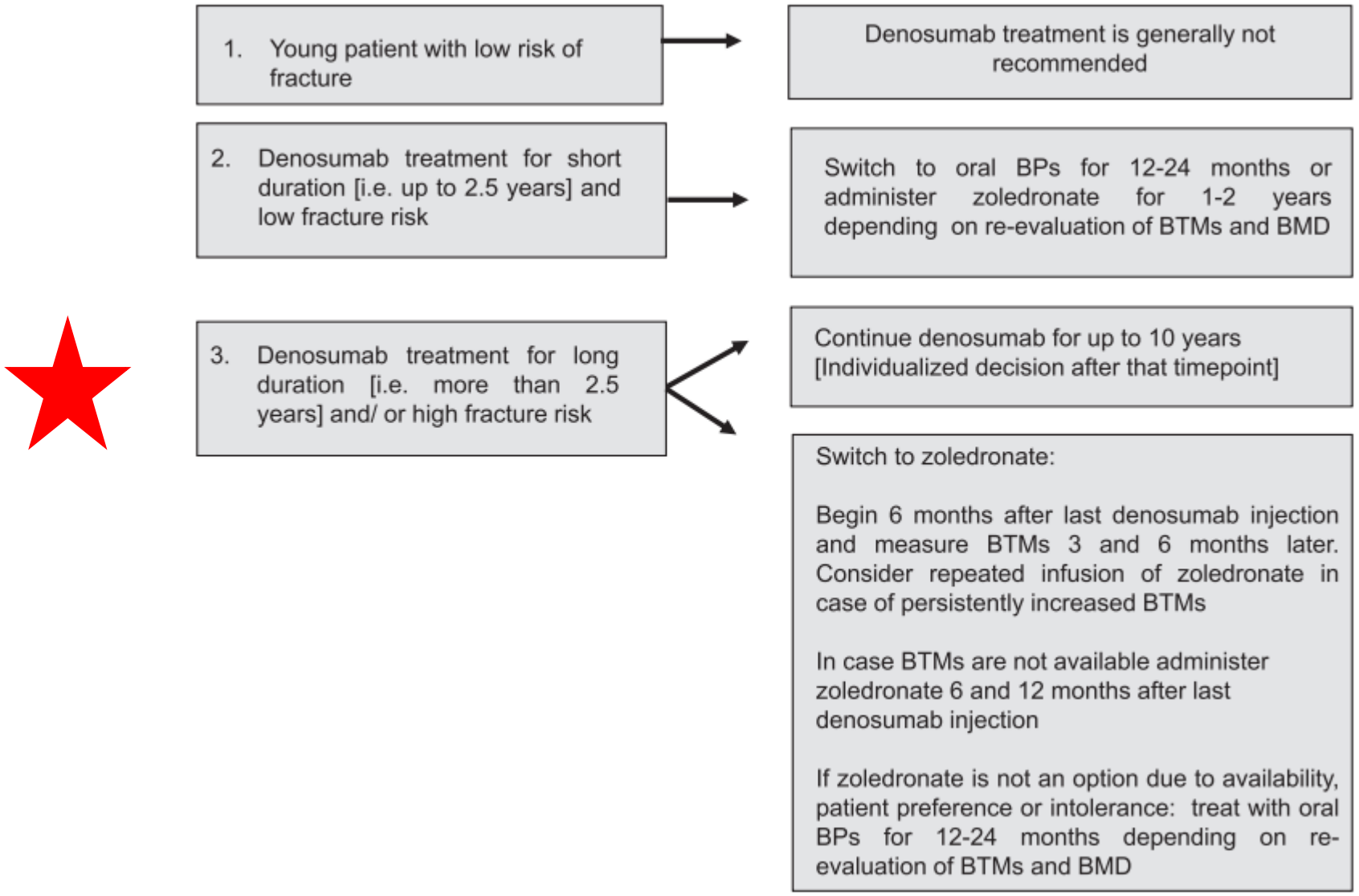


Figure 3: **Serum bone turnover markers during FREEDOM and the FREEDOM extension**
Serum concentrations of predose C-telopeptide of type I collagen (CTx) and procollagen type 1 N-terminal propeptide (P1NP) are shown. Dashed lines represent the premenopausal reference ranges: 0·20–0·90 ng/mL for CTx and 17·4–61·6 µg/L for P1NP. Data are median (IQR).

Bone et al. Lancet Diabetes Endocrinol. 2017. (7):513-523.

Current recommendations



Optimal sequence still needs to be determined

Tsourdi et al. *The Journal of Clinical Endocrinology & Metabolism.* 2021: 106: 264–281

Denosumab treatment in older adults: What is the bottom line?

- Limited data, but for high risk older adults, likely beneficial to continue treatment until further results are available because of rapid reversal of anti-resorptive effect with cessation
- In those on treatment, important to not delay next dose by > 7 months

Joint Guidance on Osteoporosis Management in the Era of COVID-19 from the ASBMR, AACE, Endocrine Society, ECTS & NOF

ASBMR®
The American Society for Bone and Mineral Research

Denosumab (Prolia®)

For patients in whom continued treatment with denosumab is not feasible within 7 months of prior denosumab injection, strongly consider transition to oral bisphosphonate if possible (such as weekly alendronate). For patients with underlying gastrointestinal disorders, such as gastroesophageal reflux disease (GERD), achalasia or active peptic ulcer disease, consider monthly ibandronate or weekly/monthly risedronate. For patients with chronic renal insufficiency [estimated glomerular filtration rate (eGFR) levels < 30-35 mL/min], consider an off-label regimen of lower dose oral bisphosphonate (e.g. alendronate 35 mg weekly, or alendronate 70 mg every 2 weeks).

Take Home Points

- Fracture prevention is important to promote the health and wellbeing of older adults
- Fracture risk assessment tools are easy to use but there are some limitations when assessing fracture risk in older adults
- The FRS is a validated tool in the LTC setting
- Older adults with high +/- moderate fracture risk should receive pharmacologic treatment
  - recent/imminent fracture is important to consider
- Decisions around drug holidays in high risk patients need to be individualized
- Uncertainty still exists around discontinuation of Denosumab

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Questions?