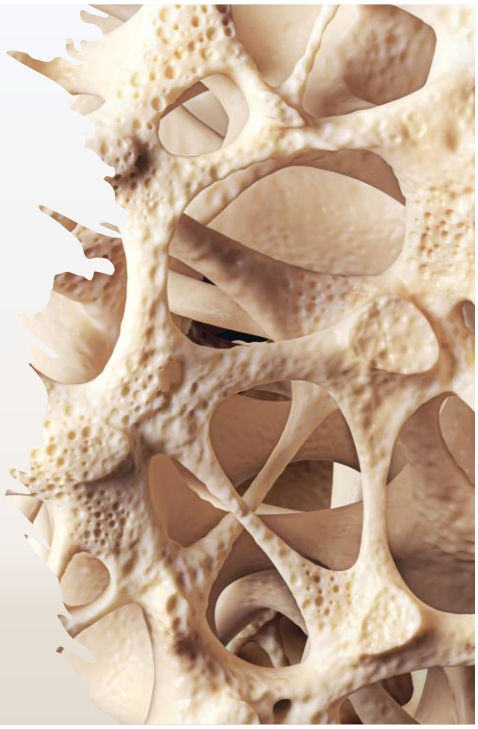
The Canadian Osteoporosis Care-Crisis:

How do we make the shift from public health crisis to a national health priority?



1

Learning Objectives

Upon completion of this module, participants will be better able to:

- Define the factors contributing to the osteoporosis care-gap in Canada
- Explain the impact of the care-gap on the disease state including subsequent fractures and mortality
- Identify common barriers to optimal osteoporosis management in the primary care practice setting
- Apply solutions to help address the osteoporosis care-gap

2

Amongst other clinical priorities in your 50+ patients, where does osteoporosis fit?

1. Very low priority
2. Low priority
3. Neutral
4. High priority
5. Very high priority

3

Current Osteoporosis Burden

In 2015–2016,

2.2 Million

Canadians 40 years and older were living with diagnosed osteoporosis

About 80% were women

The RISK of osteoporosis diagnosis doubles every 5 years, between the ages of 40 and 60

1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021)

4

Public Health Agency of Canada:
2020 Report from the Canadian Chronic Disease Surveillance System[1]

Osteoporosis is a major public health concern in Canada…

With a growing and aging Canadian population, the prevalence of osteoporosis is **predicted to increase.**

The main public health challenge lies in the fractures associated with the disease. Such **fractures are associated with significant morbidity, mortality and costs.**

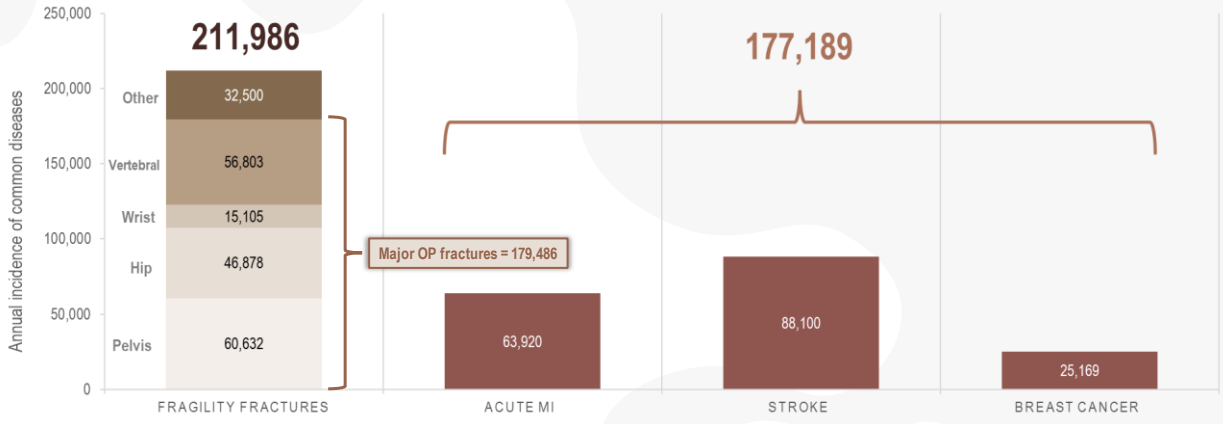
MIND THE GAP

Despite interventions that have been shown to substantially reduce the risk of osteoporotic fractures, **most individuals at high risk of fracture do not undergo appropriate screening or treatment.**

1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021)

5

Fractures from Osteoporosis are more Common than Heart Attack, Stroke and Breast Cancer Combined (2015)



1. Osteoporosis Canada FLS Toolkit; Available at: https://osteoporosis.ca/wp-content/uploads/FLS-TOOLKIT-App-B.pdf (Accessed June 29 2020; 2015 data); 2. Canadian Chronic Disease Surveillance System (CCDSS); Available at: https://health-infobase.canada.ca/ccdss/data-tool/ (Accessed June 29 2020; 2015 crude incidence rate data from Downloadable Detailed Tables); 3. Canadian Cancer Statistics 2015; Available at: https://www.cancer.ca/~/media/cancer.ca/CW/cancer%20information/cancer%20101/Canadian%20cancer%20statistics/Canadian-Cancer-Statistics-2015-EN.pdf?la=en (Accessed June 29 20120; male and female data Figure 1.2). MI=myocardial infarction

6

Estimated Mortality Rate after a Fracture Related to Osteoporosis in Canada

7

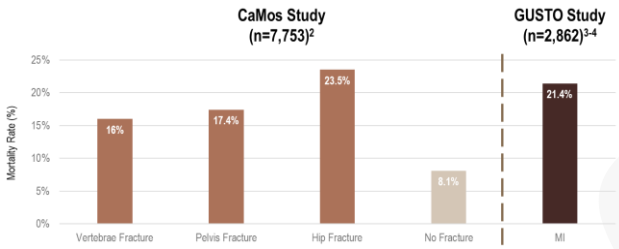
Mortality associated with Fragility Fractures in Canada

Suffering a hip fracture will die within one year[1]

28% women + **37%** men

2-3x more

Men and women sustaining a fragility fracture died in ≤5 years compared to those who did not experience fracture[2]



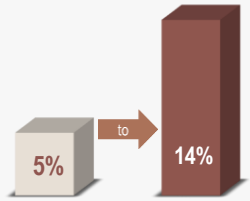
Similar mortality rate following a **hip fracture** compared to an **acute MI** in Canadian men and women

1. Jiang HX, et al. J Bone Miner Res. 2005;20(3):494-500 2. Ioannidis G, et al CMAJ 2009; 185(5):265-271
3. Kaul P, et al. Circulation 2004; 110:1754-1760 4. Bata IR, et al. Can J. Cardiol. 2006; 22(5):399-404

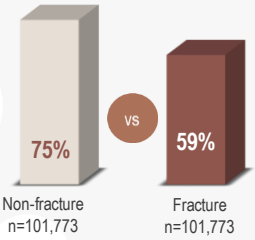
8

Mortality and Survival Over 2-6 Years of Follow-Up After a Fracture in Canadian Adults Aged >65

Mortality risk more than doubled within the **first year** after fracture [a,1]



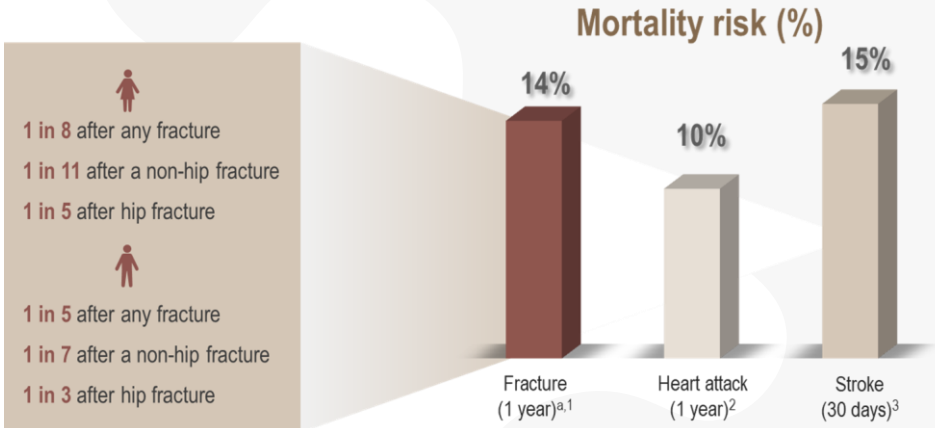
The likelihood of **survival within 5 years** after fracture was **16% less** than without fracture [a,1]



a Population-based retrospective matched-cohorthealthcare database study conducted in Ontario, Canada using the ICES Data Repository included 101,773 women (73%) and men aged >65 (median: 81 years) who experienced a low-trauma fx at an osteoporotic site (ie, excluding skull, face, hands, or feet) in 2011-2015 (butnot 5 years prior) and who were followed-up until 2017; fracture cohort was matched, based on sex, age categories, urban residence and comorbidities, to 101,773 women and men aged >65 who did not experience a fracture in 2012-2014 or 5 years prior. 1. Brown et al. BMC Musculoskelet Disord. 2021;22:105.

9

Mortality Risk After a Fracture in Canadian Adults Aged > 65 and After a CVD Event in Canadian Cohorts With Similar Age Characteristics



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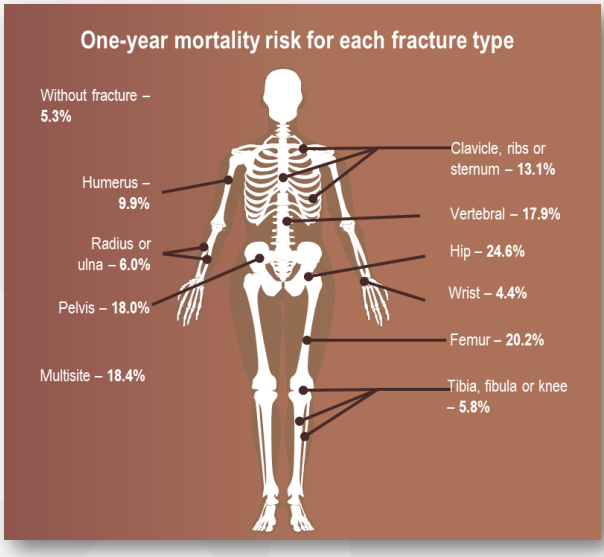
10

One-year Mortality Risks in Adults Aged > 65 by Fracture Site

1 in 4 died within one year after **hip fracture**

1 in 5 died after **femur, pelvis, vertebral or multisite fracture**

Mortality risk after wrist, forearm or lower leg fx was similar to that without fx (1 in 20)



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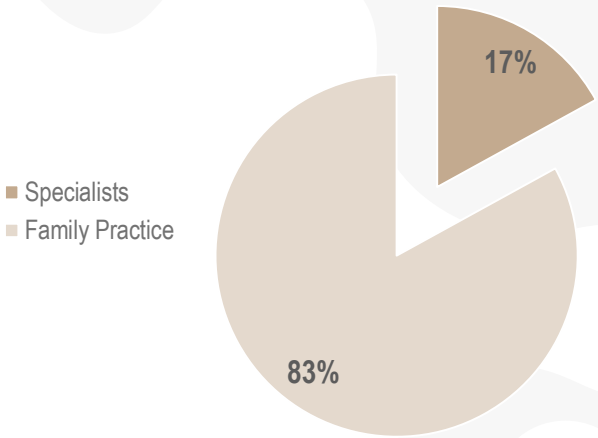
11

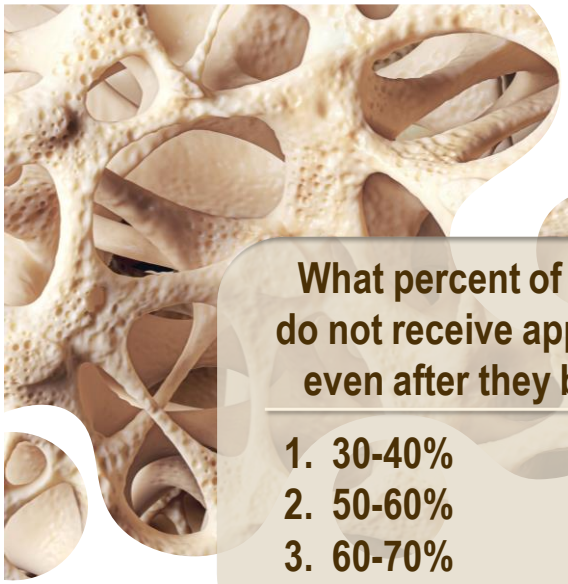
Why is this Important to Family Physicians?

Osteoporosis is managed **primarily** by Family Practice in Canada



Based on Canadian Prescriptions of Osteoporosis Therapies Source: IMSB, Compuscript (Aug 2011)

12



What percent of Canadian adults over the age of 65 do not receive appropriate osteoporosis management even after they break a bone due to osteoporosis?

1. 30-40%
2. 50-60%
3. 60-70%
4. >80%

1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021)

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Current Osteoporosis Burden

The most recent data show a major GAP between best practices and actual care. After sustaining a fracture at sites most attributable to osteoporosis:

MIND THE GAP

Less than **10%** of Canadians 40 years and older had a **BMD test**

Less than **20%** of Canadians 65 years and older received a **prescription** for an anti-osteoporosis medication

Men are less likely to receive any intervention

1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021)

14

Identification and Management of Osteoporotic Fractures is Lacking, Putting Long-Term Health of Patients at Risk

Studies show that an estimated **80–90%** of Canadian adults **DO NOT receive appropriate osteoporosis management**, even after they experience a fracture due to osteoporosis.

In contrast, in Canada, approximately **90%** of patients with **cardiovascular risk factors DO receive appropriate disease management** to prevent a subsequent cardiovascular event.

Papaioannou A, Giangregorio L, Kvern B, Boulos P, Ioannidis G, Adachi JD. The osteoporosis care gap in Canada. BMC Musculoskelet Disord. 2004;5:11.
Bessette L, Ste-Marie LG, Jean S, Davison KS, Beaulieu M, Baranci M, et al. The care gap in diagnosis and treatment of women with a fragility fracture. Osteoporos Int. 2008;19(1):79-86.
Bell A, Hill MD, Herman RJ, Girard M, Cohen E, Canadian RoAfCHRSC. Management of atherothrombotic risk factors in high-risk Canadian outpatients. Can J Cardiol. 2009;25(6):345-51.

15

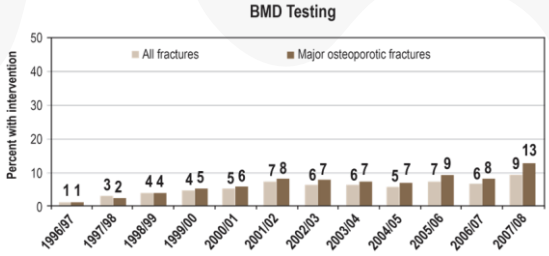
Osteoporosis Management:

Historical Lack of Improvement Over Time in Various Health Jurisdictions across Canada and Other Countries

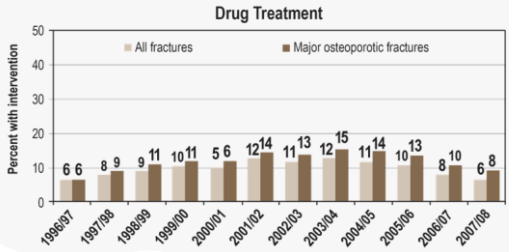
16

A Population-Based Analysis of the Post-Fracture Care-Gap 1996–2008: The Situation is NOT Improving *(Manitoba 1996/1997 to 2007/2008)*

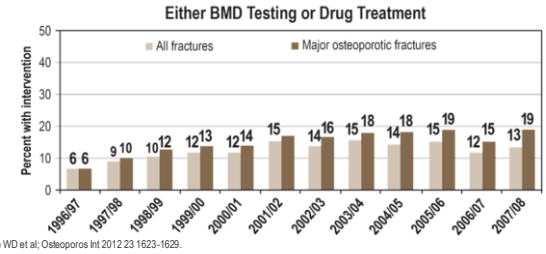
Intervention rates (in percent) in the year after fracture for BMD testing



Intervention rates (in percent) in the year after fracture for drug use



Intervention rates (in percent) in the year after fracture for either intervention

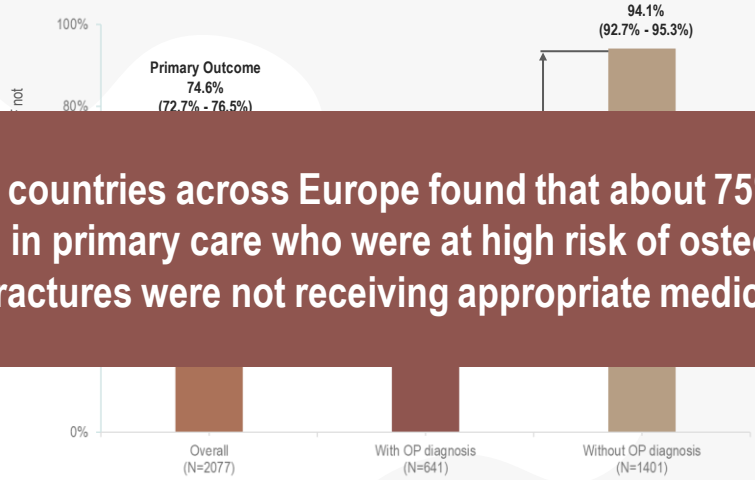


Despite increased attention to gaps in osteoporosis management post-fracture in the last 10 years, the situation has not improved: in 2007/2008, **fewer than 20% of untreated individuals with a low-trauma fracture received intervention.**

Leslie WD et al; Osteoporos Int 2012 23 1623-1629.

17

The Osteoporosis Treatment-Gap in Patients at Risk of Fracture in European Primary Care: A Multi-Country Cross-Sectional Observational Study *(8 European countries 03/2018 to 10/2018)*



This study in 8 countries across Europe found that about 75% of elderly women seen in primary care who were at high risk of osteoporosis-related fractures were not receiving appropriate medication

The treatment gap was 74.6%, varying from 53% in Ireland to 91% in Germany.
Patients with an osteoporosis diagnosis were found to have a lower treatment gap than those without a diagnosis, **with an absolute reduction of fragility fractions of 63%.**

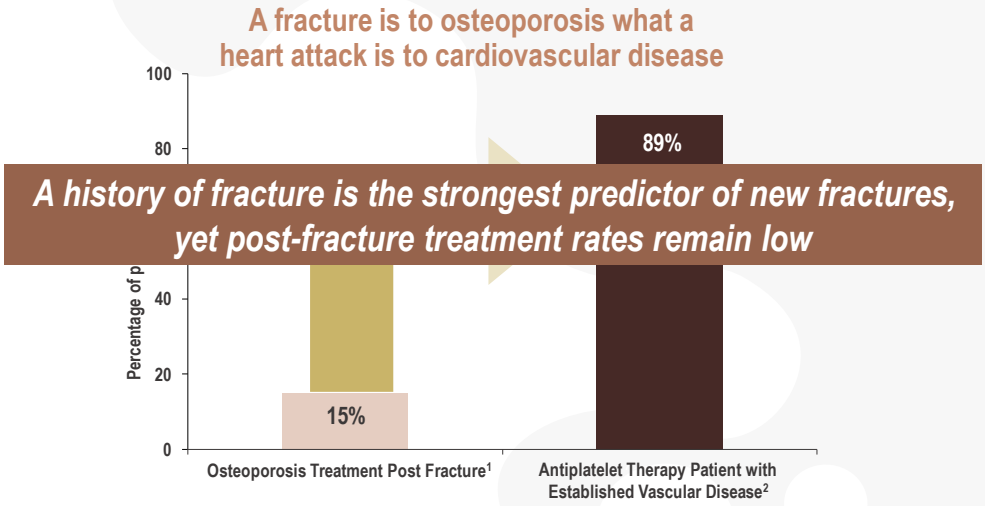
McCloskey E et al; Osteoporos Int 2021 32 251-259.

18

Improvement in Other Chronic Diseases

19

Why do 89% of Canadian Patients with Established Vascular Disease vs 15% Post-Fracture Leave the Hospital on Treatment?



Bessette L et al, Osteoporosis Int. 2008, 19:79-84
Bell A, et al. Can J Cardiol. 2009 Jun;25(6):345-51.

20

Canadian Chronic Disease Surveillance System

21

Age-standardized Rates of Osteoporosis-related Fractures among Canadian Adults Aged 40+[1] (2000-2016)

Age-standardized annual fracture rates among Canadians 40 years and older were highest for forearm, followed by hip, spine, humerus and pelvis, although fracture rates for the hip and spine converged within the last five years, with spine fracture rates exceeding those of hip in 2015–2016

40.0

0.0

	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Forearm	231.8	221.8	226.8	228.4	231.6	222.2	221.1	226.7	223.2	204.1	210.2	210.3	204.9	217.6	211.6	207.9
Hip	174.0	167.7	163.3	164.3	161.6	153.8	152.6	150.9	149.0	145.3	144.9	141.8	141.4	145.3	144.0	132.5
Spine	116.8	116.0	121.9	122.0	122.4	126.8	124.8	124.9	126.8	125.0	129.1	134.4	135.4	144.8	146.2	148.3
Humerus	102.4	99.1	101.7	100.5	102.0	100.8	98.7	99.9	100.2	95.2	96.5	98.3	96.4	100.8	99.8	99.1
Pelvis	61.7	61.7	60.4	62.1	62.2	61.1	61.8	63.9	65.0	63.0	66.6	68.6	69.8	72.3	73.0	74.4

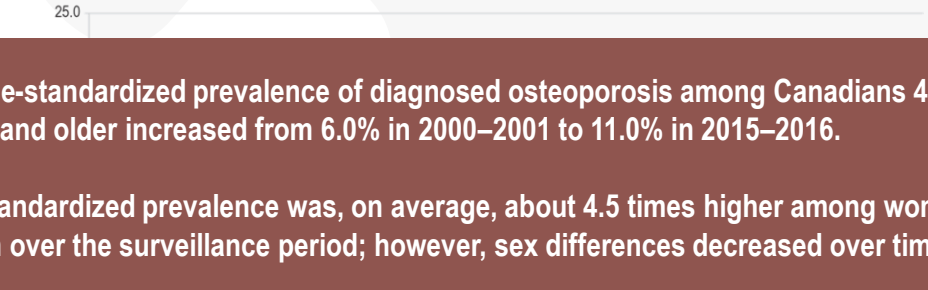
1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021).

22

Age-standardized Incidence of Diagnosed Osteoporosis among Canadian Adults Aged 40+[1](2000-2016)

Overall, the age-standardized prevalence of diagnosed osteoporosis among Canadians 40 years and older increased from 6.0% in 2000–2001 to 11.0% in 2015–2016.

The age-standardized prevalence was, on average, about 4.5 times higher among women than men over the surveillance period; however, sex differences decreased over time.



	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Women	22.0	22.4	22.8	21.6	20.9	20.4	18.6	17.7	16.7	16.0	14.5	13.1	11.9	11.8	11.4	11.5
Men	4.1	4.3	4.5	4.7	4.8	4.9	4.5	4.4	4.3	4.1	3.9	3.8	3.5	3.5	3.6	3.6

1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021).

23

Patients Receiving Secondary Prevention Care in Canada[1]

Less than 20% of the people who have a fracture receive an osteoporosis diagnosis, BMD test, or an osteoporosis medication prescription within the following year

In 2014-2015, about 125,500 Canadian aged 40+ (82,000 aged 65+) had an OP-related fracture*

15.4% received OP diagnosis† (aged 40+)

- 9.4% ♂
- 18.4% ♀

7.8% received BMD test‡ (aged 40+)

- 5.1% ♂
- 9.1% ♀

19.6% received OP-related medication prescription§ (aged 65+)

- 13.5% ♂
- 22.1% ♀

* Data from YT were not available for OP-related fractures; † Data from YT and SK were not available for OP diagnosis; ‡ Data from YT, NT, NU, SK and NS were not available for BMD test; § Data from YT, NT, NU, SK and NB were not available for OP-related medication prescription. BMD = bone mineral density; OP = osteoporosis. 1. Public Health Agency of Canada. Osteoporosis and related fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020. https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/osteoporosis-related-fractures-2020/osteoporosis-related-fractures-2020.pdf (Accessed January 27, 2021).

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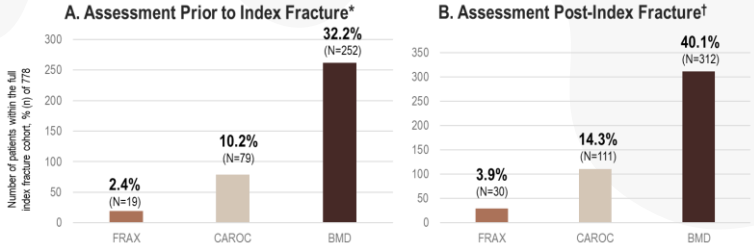
Canadian Care-Gap Data

25

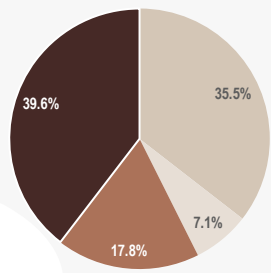
A Retrospective Observational Study of Osteoporosis Management after a Fragility Fracture in Primary Care

Fracture Risk and BMD Assessments Prior To and Post-Index Fracture



*Assessments were not mutually exclusive; n=8 patients had both CAROC and FRAX assessment performed prior to index fracture, while n=71 had only CAROC and n=11 had only FRAX assessment performed. Data represents assessments within five years prior to the index fracture; †Assessments were not mutually exclusive; n=10 patients had both CAROC and FRAX assessment performed post-index fracture, while n=101 had only CAROC and n=20 had only FRAX assessment performed. Data represents assessments post-index fracture until the end of study follow-up. BMD, bone mineral density; CAROC, Canadian Association of Radiologists and Osteoporosis Canada; FRAX, Fracture Risk Assessment Tool.

Osteoporosis Diagnosis Prior to, at or Post-Index Fracture*



*Of the 758 patients with the date of osteoporosis (or lack thereof) available; †Of the 135 patients diagnosed with osteoporosis after their index fracture, 129 were diagnosed before subsequent fracture, one at second fracture and five post-second fracture.

ASBMR ePoster Library. Bell A. 10/01/21; 341420; VPP-624

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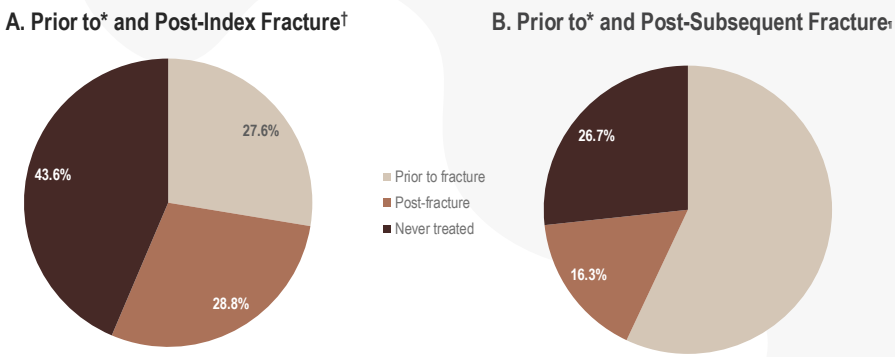
A Retrospective Observational Study of Osteoporosis Management after a Fragility Fracture in Primary Care: *Osteoporosis Treatment Initiation Patterns*



*Included patients who had an osteoporosis treatment recorded within one year prior to their index fracture and continued on the same treatment at the time of their index fracture as well as post-index fracture; †Of the 778 patients in the full index fracture cohort; ‡In the 339 patients who remained untreated after their index fracture, seven discontinued treatment within one year prior to their index fracture and never re-started treatment (same or different) after index fracture; §In the 224 patients who started osteoporosis treatment post-index fracture, 12 discontinued treatment within one year prior to their index fracture and re-started a different treatment after index fracture; ¶Of the 86 patients with at least one subsequent fracture reported during study follow-up.

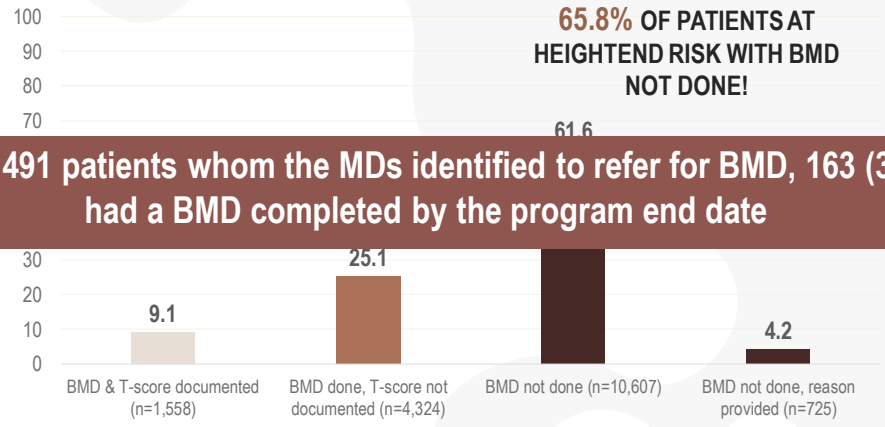
ASBMR ePoster Library. Bell A. 10/01/21; 341420; VPP-624

27

Use of an Electronic Medical Record Dashboard to Identify Gaps in Osteoporosis Care: *ADVANTAGE-OP EMR Program*

ADVANTAGE-OP EMR

Status of BMD screening among patients identified potentially at risk for fractures (N = 17,214)



Of the 491 patients whom the MDs identified to refer for BMD, 163 (33%) had a BMD completed by the program end date

. Papaioannou A, et al Archives of Osteoporosis (2021) 16:76 https://doi.org/10.1007/s11657-021-00919-4

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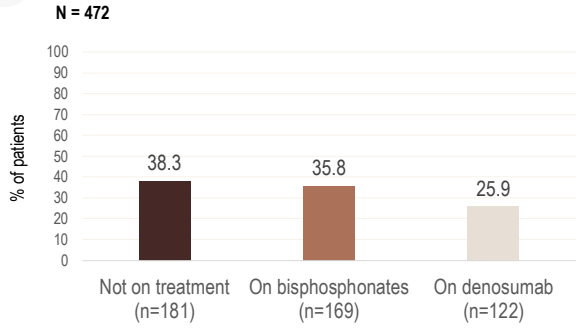
Use of an Electronic Medical Record Dashboard to Identify Gaps in Osteoporosis Care: *ADVANTAGE-OP EMR Program*

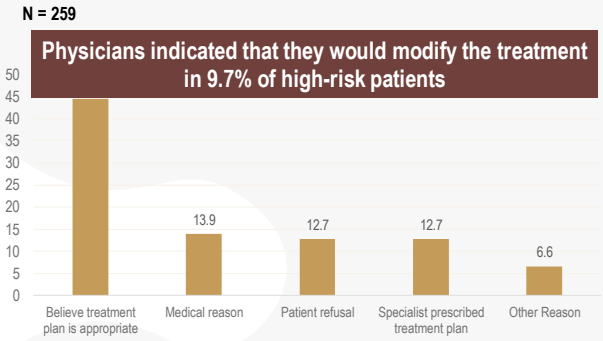
ADVANTAGE-OP EMR

dAshboarD initiatiVe for quAlity improvemeNT in the mAnaGement of patiEnts with OsteoPorosis

Medication Review in High-Risk Patients



Reasons provided for non-treatment in high-risk patients



. Papaioannou A, et al Archives of Osteoporosis (2021) 16:76 https://doi.org/10.1007/s11657-021-00919-4

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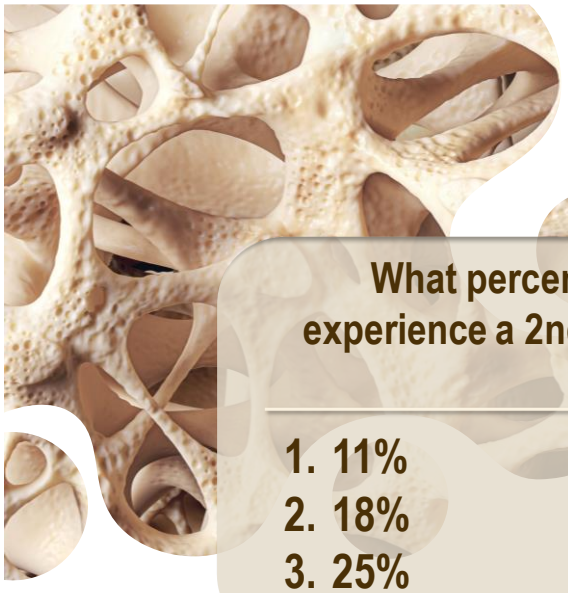
Secondary Fracture Prevention Care-Gap

30



What percent of Canadian adults aged >65 experience a 2nd fracture over 2-6 years after their index fracture?

1. 11%
2. 18%
3. 25%

a Population-based retrospective cohort healthcare database study conducted in Ontario, Canada using the ICES Data Repository included 115,776 women (72%) and men aged >65 (median: 81 years) who experienced a low-trauma fx at an osteoporotic site (ie, excluding skull, face, hands, or feet) in 2011-2015 (but not 5 years prior) and who were followed-up until 2017.
1. Adachi et al. BMC Musculoskelet Disord. 2021;22:224.

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Subsequent Fracture After an Index Fracture

Subsequent fracture after an index fracture in 115,776 Canadian adults aged >65 [a,1]

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 (20.4%)	**436** (69-939)
Multisite	3,735	752 (20.1%)	**581**(294-986)
Femur	3,002	481 (16.0%)	**562**(254-962)

18% experienced a 2nd fracture over 2-6 years after their index fracture **on average within 2 years**

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1. Adachi et al. BMC Musculoskelet Disord. 2021;22:224.

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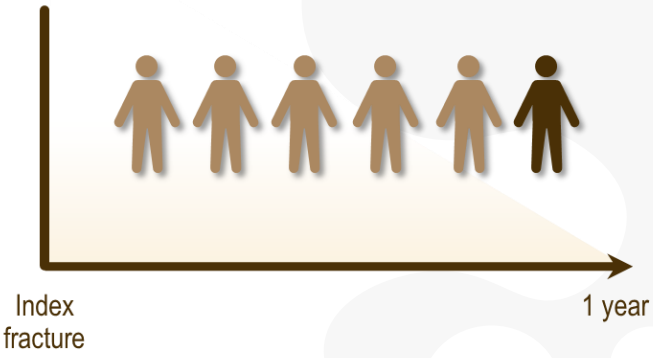
Proportion of Canadian Adults Aged >65 Undergoing BMD Assessment Within One Year After a Fracture

5 in 6 did not have a BMD assessment within 1 year after their fracture



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1. Adachi et al. BMC Musculoskelet Disord. 2021;22:224.

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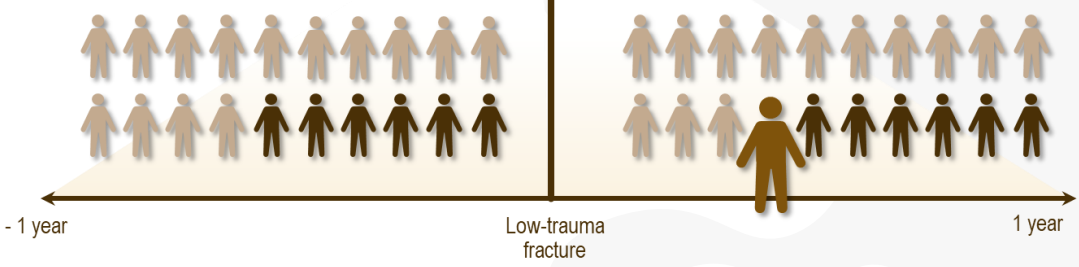
Proportion of Canadian Adults Aged >65 on Anti-Osteoporosis Therapy One Year Prior and Post an Index Fracture

14 in 20 were **not on therapy** [b] 1 year prior to the fracture

Only 1 more in 20 individuals was **prescribed therapy** [b] after the fracture



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b Including bisphosphonates, denosumab, hormone replacement therapy, teriparatide or raloxifene.
1. Adachi et al. BMC Musculoskelet Disord. 2021;22:224.

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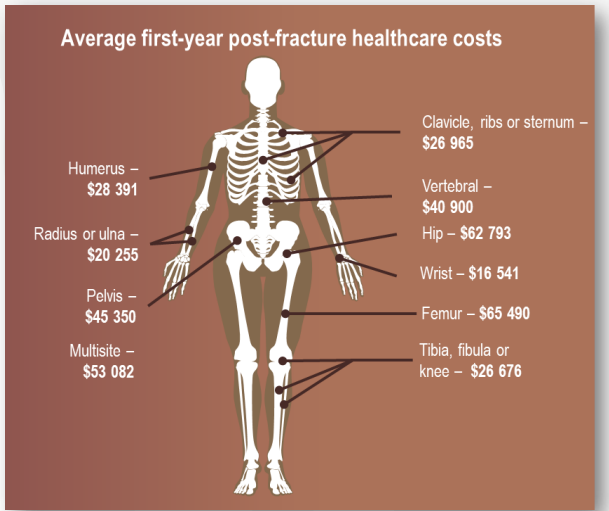
Current Healthcare Costs Associated with Fractures Related to Osteoporosis in Canada

35

First-Year Healthcare Costs after a Fracture in 101,773 Canadian Adults Aged > 65

$39 089

Average total direct healthcare cost per individual in 2017 CAD in the **first year** following any fracture



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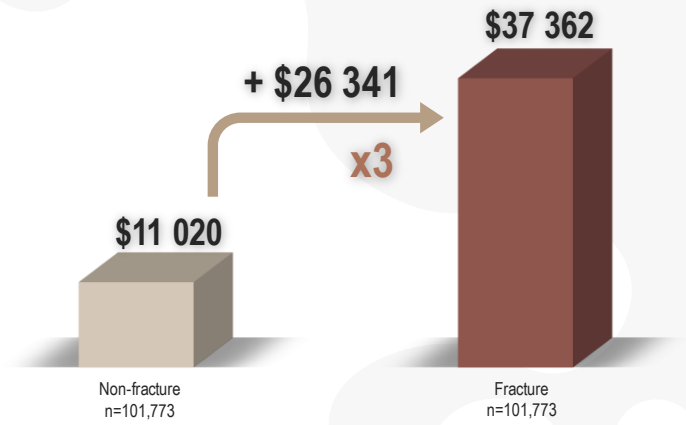
36

Excess First-Year Healthcare Costs after a Fracture in Canadian Adults Aged > 65

Average excess first-year direct healthcare cost per individual



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Excess First-Year Healthcare Costs after a Fracture in Canadian Adults Aged > 65

Average excess direct healthcare costs attributed to osteoporotic fractures within the first year

$26 341

X

Average number of incident fractures per year in Ontario

27 489

=

$724 million in Ontario

$1.9 billion when extrapolated to Canada

a Population-based retrospective matched-cohorthealthcare database study conducted in Ontario, Canada using the ICES Data Repository included 101,773 women (73%) and men aged >65 (median: 81 years) who experienced a low-trauma fx at an osteoporotic site (ie, excluding skull, face, hands, or feet) in 2011-2015 (butnot 5 years prior) and who were followed-up until 2017; fracture cohort was matched, based on sex, age categories, urban residence and comorbidities, to 101,773 women and men aged >65 who did not experience a fracture in 2012-2014 or 5 years prior. 1. Tarride et al. Osteoporos Int. 2021 https://doi.org/10.1007/s00198-021-05877-8.

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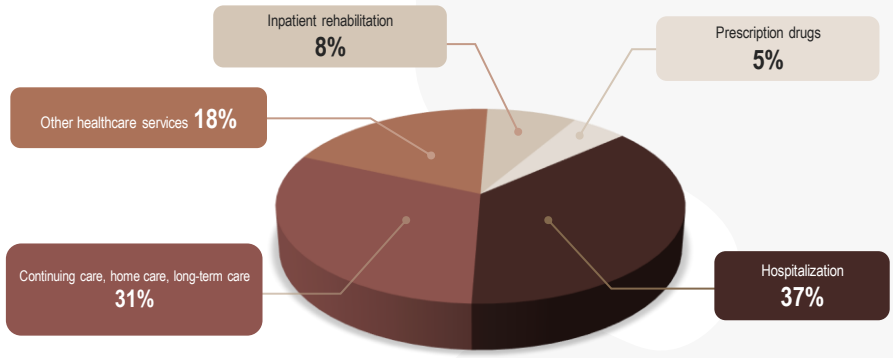
Healthcare Costs in the First Year after a Fracture in Canadian Adults Aged > 65, by Healthcare Resource Use Category

Similar trends in proportions of healthcare costs were observed for most fracture types



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Barriers to Osteoporosis Management in Primary Care Practice

40

What are Some of the Most Common Barriers to Osteoporosis Management in your Practice?

DISCUSSION

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Primary Care Clinician Barriers (1)

- Failure to recognize impact of fracture on patient and society (seen as a low priority disease)
- Failure to find an efficient way of tracking and searching for preventative health maneuvers
- Failure to recognize fracture risk in the presence of BMD > -2.5 (failure to do fracture risk assessment)
- Failure to recognize prior fragility fracture as the greatest risk for future fractures
- Failure to recognize imminent fracture risk and urgency of treatment following fragility fracture
- Failure to differentiate fragility fracture from high energy fracture
- Failure to recognize benefit of more potent therapies over oral bisphosphonate

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Primary Care Clinician Barriers (2)

Failure to monitor patient adherence of oral bisphosphonates

Failure to recognize and appreciate presence and severity of side effects associated with oral bisphosphonate

Failure to identify the risk of family history of osteoporosis

Failure to consider male osteoporosis

Confusion on the use of calcium supplementation

Lack of awareness of secondary causes of osteoporosis such as prednisone use, inflammatory arthritis or dm in fracture risk

Lack of remuneration (for example 80% of women over 50 having mammograms is recognized and financially rewarded) BMD and/or risk assessment is not seen as being as important.

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Primary Care Clinician Barriers (3)

"Bystander effect", the inhibiting influence of the presence of others on a person's willingness to help someone in need. This leads to "diffusion of responsibility" among health care providers. Diffusion of responsibility refers to the fact that as the number of bystanders increases, the personal responsibility that an individual bystander feels decreases

Lack of ownership of osteoporosis: Which health care provider (family physician? specialist? which specialty?) ought to take the lead in managing osteoporosis after a fragility fracture?

Lack of clarity of respective roles can result in clinical inertia, potentially incorrect assumptions about why a given medicine perceived as falling under a specific specialty's purview was not started, and/or confusion if multiple providers weigh in or institute treatment on an overlapping condition, like osteoporosis.

When a patient has seen a "bone doctor" (orthopedic surgeon) in hospital or fracture clinic, and sometime a geriatric or internal medicine specialist, and is discharged without initiating any pharmacologic treatment why would their primary care physician feel that she or he needs to initiate this treatment?

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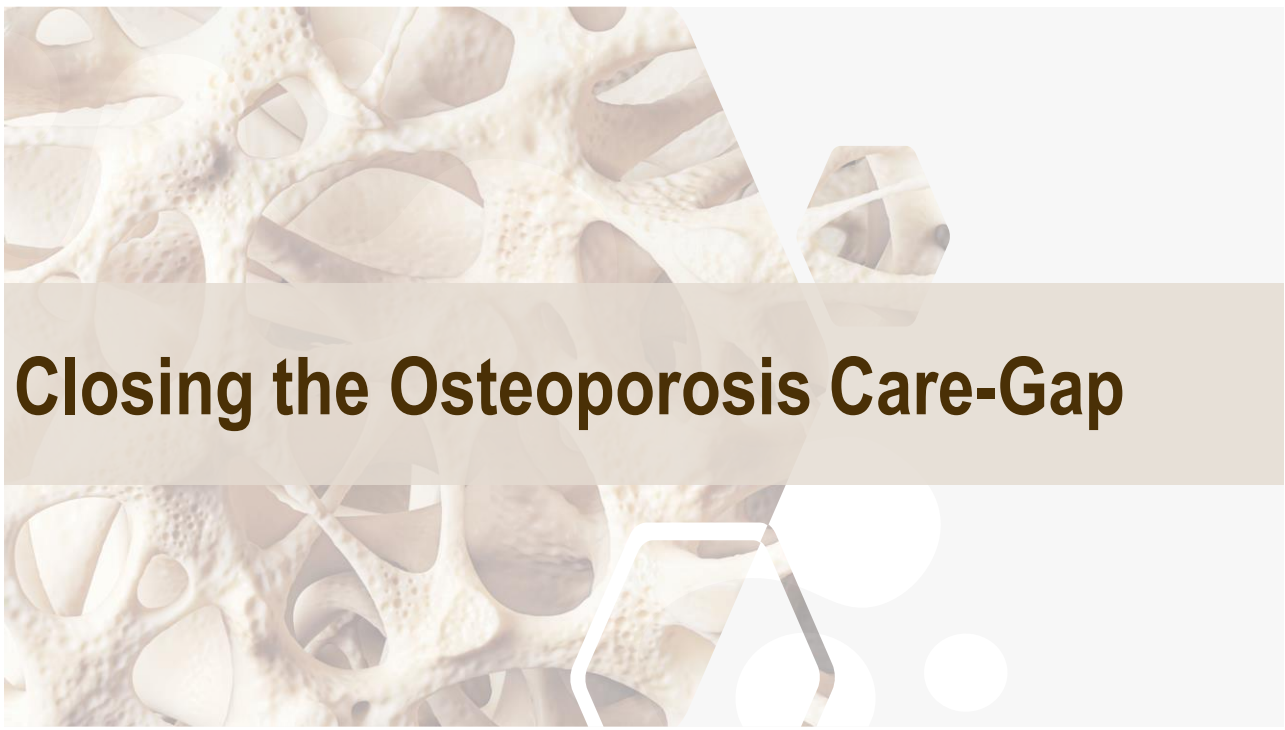
Patient Barriers

- Not having the same level of awareness of osteoporosis screening as compared to breast cancer or pap screening
- Lack of awareness to start on supplementation early on in age
- Asymptomatic nature of disease breeds skepticism of value of treatment
- Failure to recognize impact of fracture on quality of life
- Perception that it is very old women who suffer, not younger ones and not men. So, patients do not think this applies to them
- Failure of adherence to bisphosphonates and failure to understand the importance of adherence in any treatment
- GI side effects of bisphosphonates and calcium supplementation
- Cost and limited coverage of advanced therapy (denosumab)

45



Closing the Osteoporosis Care-Gap

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Basic Prevention of Bone Loss and Fractures

- **Adequate calcium and vitamin D intake** ➞
- **Weight-bearing exercises**
- **Smoking cessation**
- **Limiting alcohol and caffeine consumption**
- **Fall prevention**

Calcium*:

1200 mg/day women ≥ 51 y and men ≥ 71 y

Calcium is best dietary sourced. Usual Canadian intake ~ 600 mg / day making typical supplementation of 600 mg / day appropriate.

Vitamin D:

1000-1200* IU/day adults ≥ 50 y to maintain optimal level of 30-50 ng/ml

*4000 IU safe upper limit for general population

Camacho PM, et al, Endocrine Practice. 2020;5:1-37
Tu KN, et al, P&T. 2018; 43:92-104

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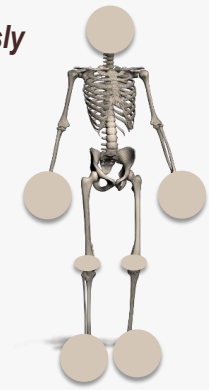
What Is a Fragility Fracture?

- **Fragility fractures are the most serious manifestation of osteoporosis.**
- ***Fragility fractures (which exclude craniofacial, hand, ankle, and foot fractures) represent 80% of all fractures that occur in postmenopausal women aged 50 years and older.***

DEFINITION OF A FRAGILITY FRACTURE:* A fracture that occurs ***spontaneously*** or following a ***minor trauma*** such as:

- Fall from a standing height (i.e. on the ice)
- Fall from a sitting position
- Fall from a supine position (bed or reclining deck chair < 1 metre high)
- Fall after having missed 1 to 3 steps in a staircase
- After a movement outside of the typical plane of motion or coughing

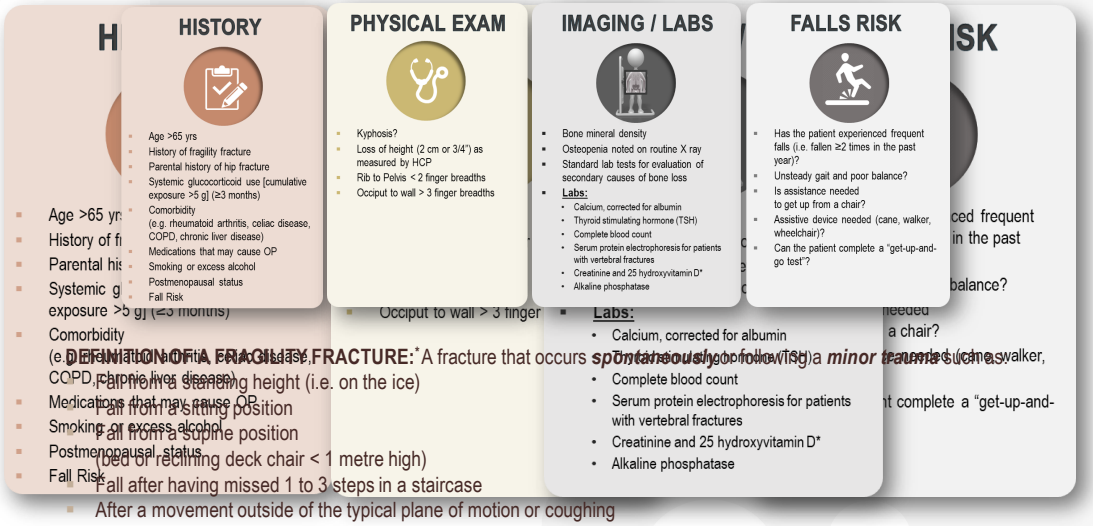
With the exception of:
Skull and face
Cervical spine
Hands, patella and feet



Bessette L, et al. Contemp Clin Trials. 2008;**29**:194-210.
Brown JP, et al. J Bone Miner Res. 2007;**23** (suppl 1):M350.

48

Checklist for Fracture and OP Risk Factors



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1. Adachi et al. BMC Musculoskelet Disord. 2021;22:224.

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CAROC 2010: 10-year Fracture Risk based on Femoral Neck T-score and Age, Sex

Hip or Vertebral Fracture
≥ 2 Fragility fractures

WOMEN			
10-year Risk			
AGE	LOW (< 10 %)	MODERATE (10 % to 20 %)	HIGH (≥ 20 %)
50	> -2.5	1 Fragility fracture OR Glucocorticoids	< -3.8
55	> -2.5		< -3.8
60	> -2.3	-2.3 to -3.7	< -3.7
65	> -1.9	-1.9 to -3.5	< -3.5
70	> -1.7	-1.7 to -3.2	< -3.2
75	> -1.2	-1.2 to -2.9	< -2.9
80	> -0.5	-0.5 to -2.6	< -2.6
85	> + 0.1	+ 0.1 to -2.2	< -2.2

Papaioannou A, et al. CMAJ 2010;182(17):1864-73.

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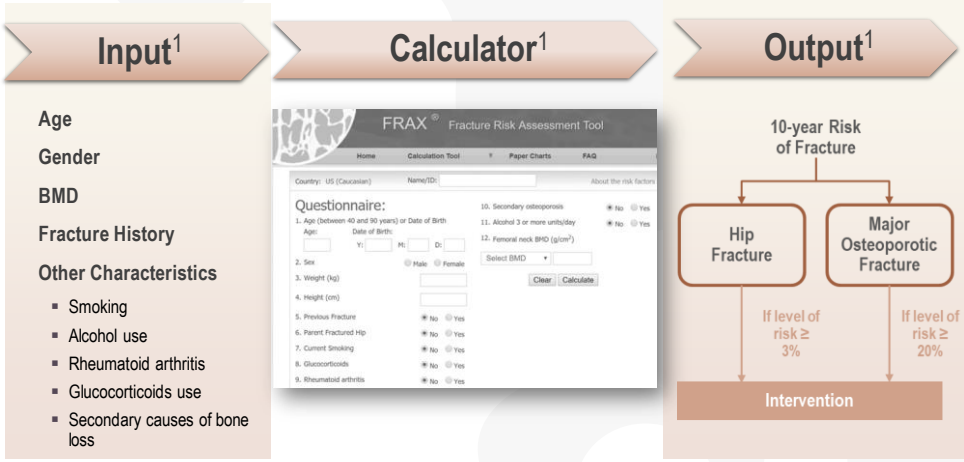
10-Year Fracture Risk Can Be Quantified Using FRAX® or Other Risk-Assessment Tools

Canadian calculator available at www.sheffield.ac.uk/FRAX/tool.aspx?country=19

- **FRAX® provides a conservative estimate of 10-year fracture risk but does not necessarily identify patients with shorter-term risk who require urgent intervention (pharmacological) to prevent subsequent fractures[1-3]**



FRAX® is a registered trademark of Professor J.A. Kanis. University of Sheffield.
BMD = bone mineral density; FRAX = fracture risk assessment tool.
1. FRAX. https://www.shef.ac.uk/FRAX/. Accessed March 15, 2018. 2. Kanis JA, et al. Osteoporos Int. 2011;22:2395-2411. 3. Silverman SL, et al. Curr Osteoporos Rep. 2010;8:192-197

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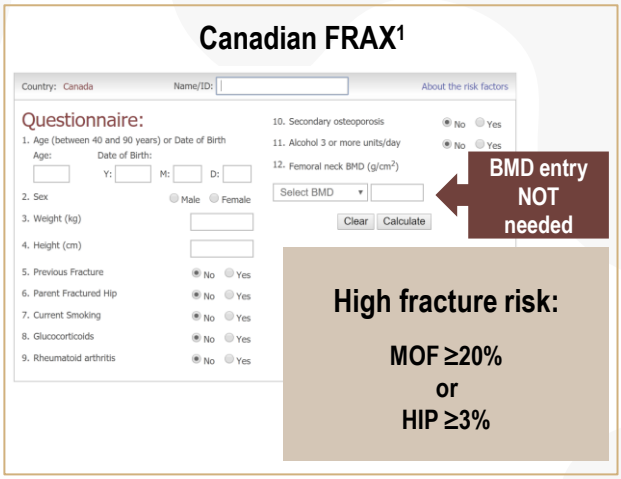
FRAX Risk Calculation without a BMD Entry



- FRAX without BMD was validated and showed ~80% chance of predicting those who will have a hip fracture[2]
- **2010 Osteoporosis Canada guidelines:[3]**
  - Compared to CAROC, "[FRAX] is based upon a more complete set of clinical risk factors and can be used even without results for BMD"
  - "Fracture discrimination using [FRAX] with BMD is better than [FRAX] without BMD"
  - "[FRAX] is more accurate for patients with one or more of the additional risk factors" on top of BMD and age

1. FRAX® Fracture Risk Assessment Tool. https://www.sheffield.ac.uk/FRAX/tool.aspx?country=19 (Accessed May 27, 2020); 2. Hoff M, et al. Osteoporos Int. 2017;28:2935-2944.. 3. Papaioannou A, et al. *CMAJ*. 2010;182(17)1864–187. BMD=bone mineral density; MOF=major osteoporotic fracture

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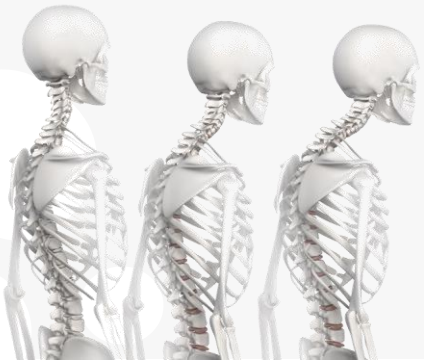
Clinical Pearls: Screening

Question: *Since the last visit …*

- Have you broken any bones?
- Have you fallen?
- Have you had prolonged or unusual back pain?
- Have you received oral or intravenous steroids?

Look

- Is there kyphosis?
- Ability to perform the "**Get Up and Go**" test



Measure

- The patient's height

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Clinical Pearls: Patient Assessment

1. Have they fallen?
2. Has their BMD decreased (>3%) since their last BMD?
3. Have they lost height? (>2 cm height since last visit or > 6 cm historically)
4. Have they broken any bones?
5. Are there any other risk factor multipliers to consider
   - If yes, they are at increased fracture risk and should be further assessed, possibly by a lateral x-ray

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Clinical Pearls: Who to Treat

Treat ALL patients at HIGH-RISK for fracture:

- Prior hip or vertebral fracture
- Multiple fractures (2 or more)
- 10-year absolute fracture risk > 20% for MOF* or hip fracture risk > 3%

Patients at MODERATE-RISK for fracture:

- Consider additional risk factors
- Discuss fracture risk and treatment options with patients

* MOF: major osteoporotic fracture

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Clinical Pearls: Patient Management

1. **Individuals at HIGH-RISK for fracture should continue osteoporosis therapy without a drug holiday**

2. **Discuss benefits vs. risk of therapy with patients**

3. **When monitoring patients on therapy, consider:**
   - Long term efficacy
   - Safety & tolerability
   - Adherence
   - Patient preference

Papaioannou A et al, CMAJ 2010; 182: 1864-1873

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Is Fracture Liaison Service (FLS) a Solution?

FLS is a world-class, cost-effective model of post-fracture care, which ensures that all fracture patients over 50 years of age are assessed and treated appropriately for their underlying osteoporosis.

FLS are:

1. System of post-fracture care
2. Proven to be highly effective in reducing repeat fractures
3. Proven to be highly cost-effective
4. Eliminating the post-fracture osteoporosis care-gap throughout the world

https://fls.osteoporosis.ca/the-osteoporosis-care-gap/

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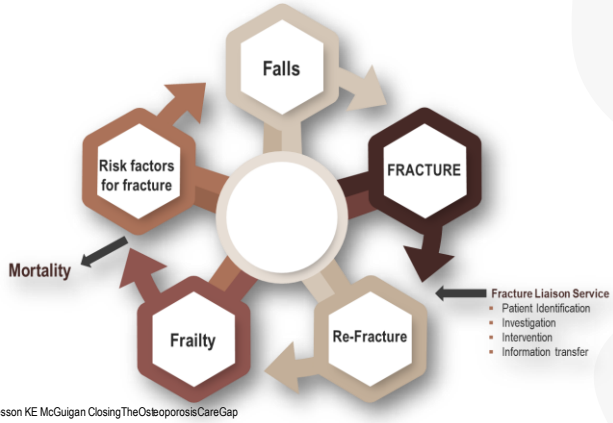
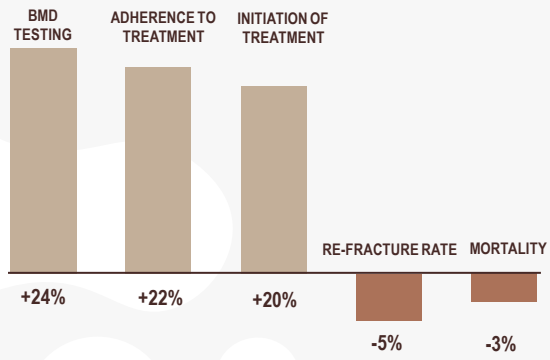
Closing the Osteoporosis Care-Gap - Fracture Liaison Service

PRACTICE POINTS THINK ABOUT ACCESSING YOUR LOCAL FLS IF AVAILABLE

- Systematic and systems integrating secondary fracture prevention programs such as FLS or ortho-geriatric services improve post-fracture care
- Dedicated personnel that is specifically assigned is essential to cover the complex interaction between stakeholders from orthopedics to primary care
- In the oldest, estimates of frailty may provide important information for osteoporosis, fracture risk assessment and individualized interventions



Åkesson KE McGuigan ClosingTheOsteoporosisCareGap



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Clinically Effective and Cost-Effective Systems of Post-Fracture Care

The main objectives of a FLS include:

- Identification: All men and women over 50 years of age who present with fragility fractures will be assessed for risk factors for osteoporosis and future fractures.
- Investigation: As per 2010 Osteoporosis Canada Guidelines, those at risk will undergo BMD testing
- Initiation: Where appropriate, osteoporosis treatment will be initiated by the FLS.

These objectives are often referred to as the 3 "i's"

Osteoporosis Canada urges all jurisdictions to implement FLS.

FLS Working Group Toolkit - https://osteoporosis.ca/wp-content/uploads/FLS-TOOLKIT.pdf

Model	Description	Proportion receiving Proportion receiving BMD testing*	Proportion receiving BMD testing* osteoporosis treatment
Status Quo	Manitoba statistics for major osteoporotic fractures (2007/2008)	13%	8%
Type D (Zero i model)	Only provides osteoporosis education to the fracture patient. Primary care provider (PCP) is not alerted or educated.	No study on BMD testing	8%
Type C (1 i model)	1. Identification The PCP is alerted that a fracture has occurred and further assessment is needed. Leaves the investigation and initiation of treatment to the PCP.	43%	23%
Type B (2 i model)	1. Identification 2. Investigation Leaves the initiation of treatment for fragility fracture patients to the PCP.	60%	41%
Type A (3 i model)	1. Identification 2. Investigation 3. Initiation of osteoporosis treatment where appropriate.	79%	46%

* Although BMD testing is an important aspect of post-fracture care, in and of itself it cannot impact the rate of repeat fractures. Osteoporosis medication is necessary in order to reduce the rate of repeat fractures.

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In Summary (1)

- **The magnitude of care-gap in osteoporosis is among the highest for any chronic diseases with an historical lack of improvement over the last 30 years in various health jurisdictions across Canada and other countries.**
- **Due to the significant morbidity, mortality, and cost associated with low-trauma fractures, the Public Health Agency of Canada has recently highlighted osteoporosis and related fractures as a major public health concern.**
- **Guidance for osteoporosis assessment, pharmacological treatment and management is available and has been broadly disseminated since 2010.**

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In Summary (2)

- **Patient and physician barriers preventing osteoporosis management have been identified and could easily be successfully resolved.**
- **Secondary fracture prevention through fracture liaison services is clinically effective and cost-effective when widely implemented as recommended by Osteoporosis Canada.**
- **Knowledge of the current status and trends build the evidence base required to further drive public health action to address this emerging chronic health issue.**

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