

What do we know about current trends in fractures in Long-Term Care and how can we use the new osteoporosis guidelines to prevent fractures?

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OLTCC October 21, 2023

Land Acknowledgement

We acknowledge that the lands on which we are hosting this meeting include the traditional territories of many nations.

The OCFP recognizes that the many injustices experienced by the Indigenous Peoples of what we now call Canada continue to affect their health and well-being. The OCFP respects that Indigenous people have rich cultural and traditional practices that have been known to improve health outcomes.

I invite all of us to reflect on the territories you are calling in from as we commit ourselves to gaining knowledge; forging a new, culturally safe relationship; and contributing to reconciliation.

Faculty / Presenter Disclosure

- Faculty: **Jonathan Adachi**
- Relationships with financial sponsors:
 - Grants/Research Support: **Amgen, Radius**
 - Speakers Bureau/Honoraria: **Amgen, Gilead, Paladin, OCFP, GERAS**
 - Other: **CIHR**

Faculty / Presenter Disclosure

- Faculty: Sid Feldman
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 - Speakers Bureau/Honoraria: OCFP, Ontario Osteoporosis Strategy, Osteoporosis Canada
 - Other: Salary support: Baycrest Centre, UoT DFCM, Baycrest Global Solutions

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Potential for conflict(s) of interest:

– None

Mitigating Potential Bias

- Pharmacological therapy will be presented only as part of clinical recommendations
- Clinical recommendations were determined using the GRADE approach - an evidence-based approach to guideline development
- All pharmacological therapy will be presented in its generic form.

Learning Objectives

1. Know the current trends in fractures and in long-term care.
2. Assess fracture risk using the Fracture Risk Scale (FRS)
3. Use the new osteoporosis guidelines to prevent fractures.

Updated Osteoporosis Guidelines



Published October 10, 2023

Look for them in the

Canadian Medical Association Journal (CMAJ)





What are the current trends in osteoporosis and fractures among older adults living in LTC?



Many LTC residents have osteoporosis

90% have some form of cognitive impairment

86% need extensive help with activities, such as eating, using the washroom

80% have neurological diseases

76% have heart/circulating disease

64% have a diagnosis of dementia

62% have musculoskeletal diseases, such as arthritis and osteoporosis

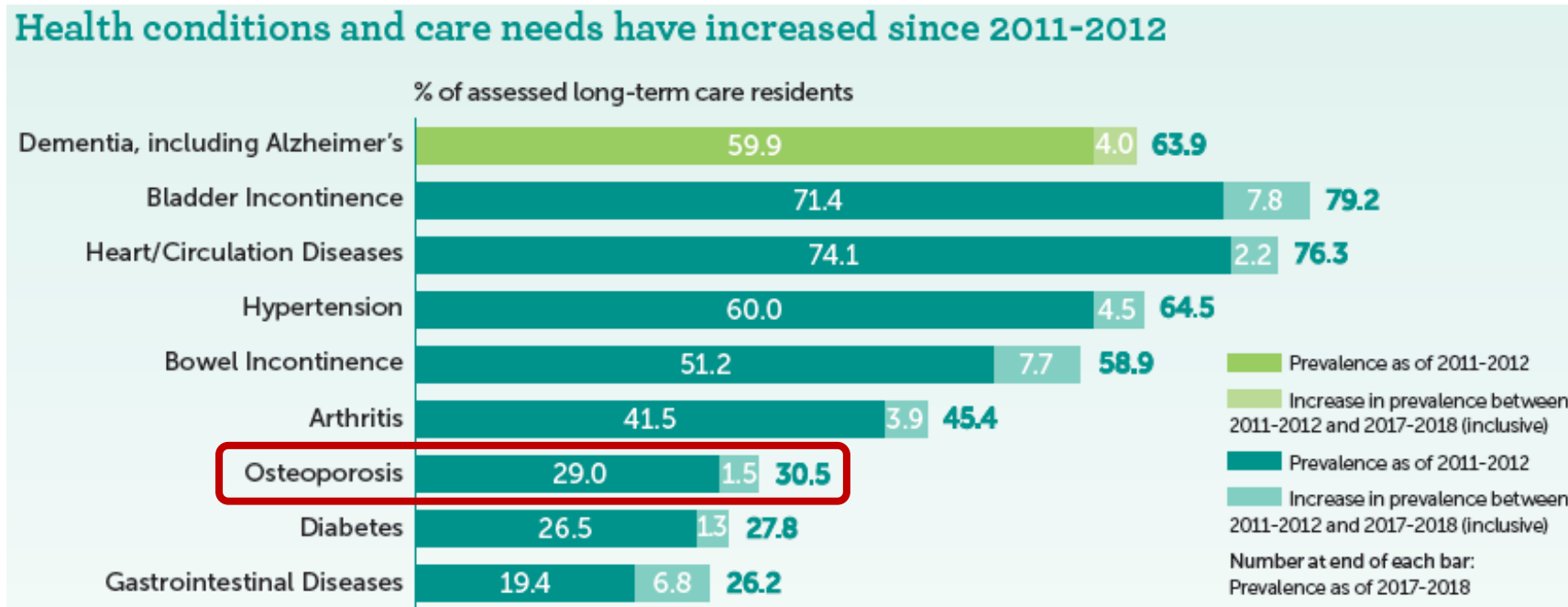
61% take 10 or more prescription medications

40% need monitoring for an acute medical condition

21% have experienced a stroke

This is Long-Term Care 2019. *Ontario Long-Term Care Association*. www.oltca.com
Data generated by the Canadian Institute for Health Information (CIHI)

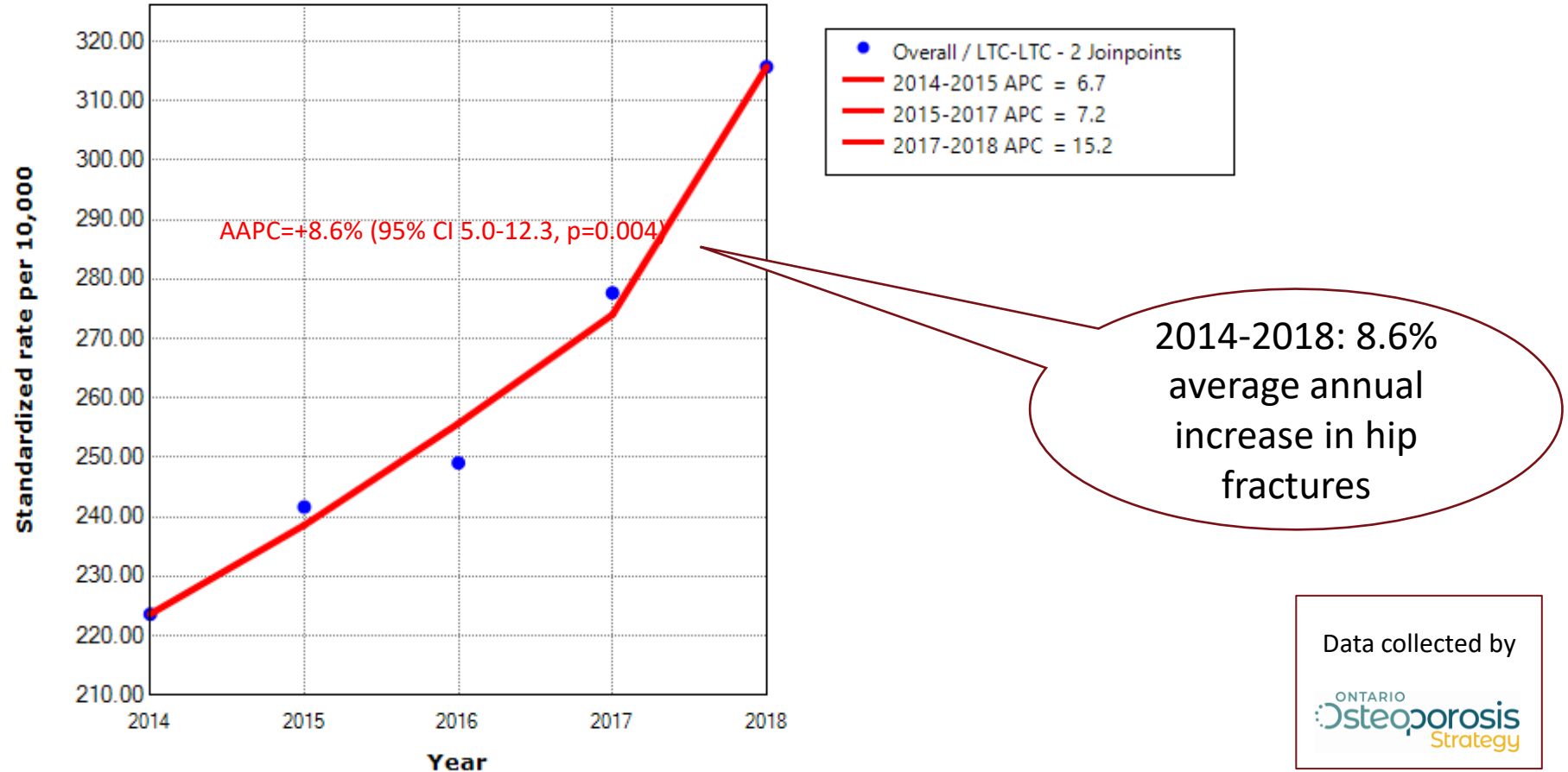
The prevalence of osteoporosis in LTC is increasing



This is Long-Term Care 2019. *Ontario Long-Term Care Association*. www.oltca.com
Data generated by the Canadian Institute for Health Information (CIHI)

Hip fracture rate in LTC 2014-2018

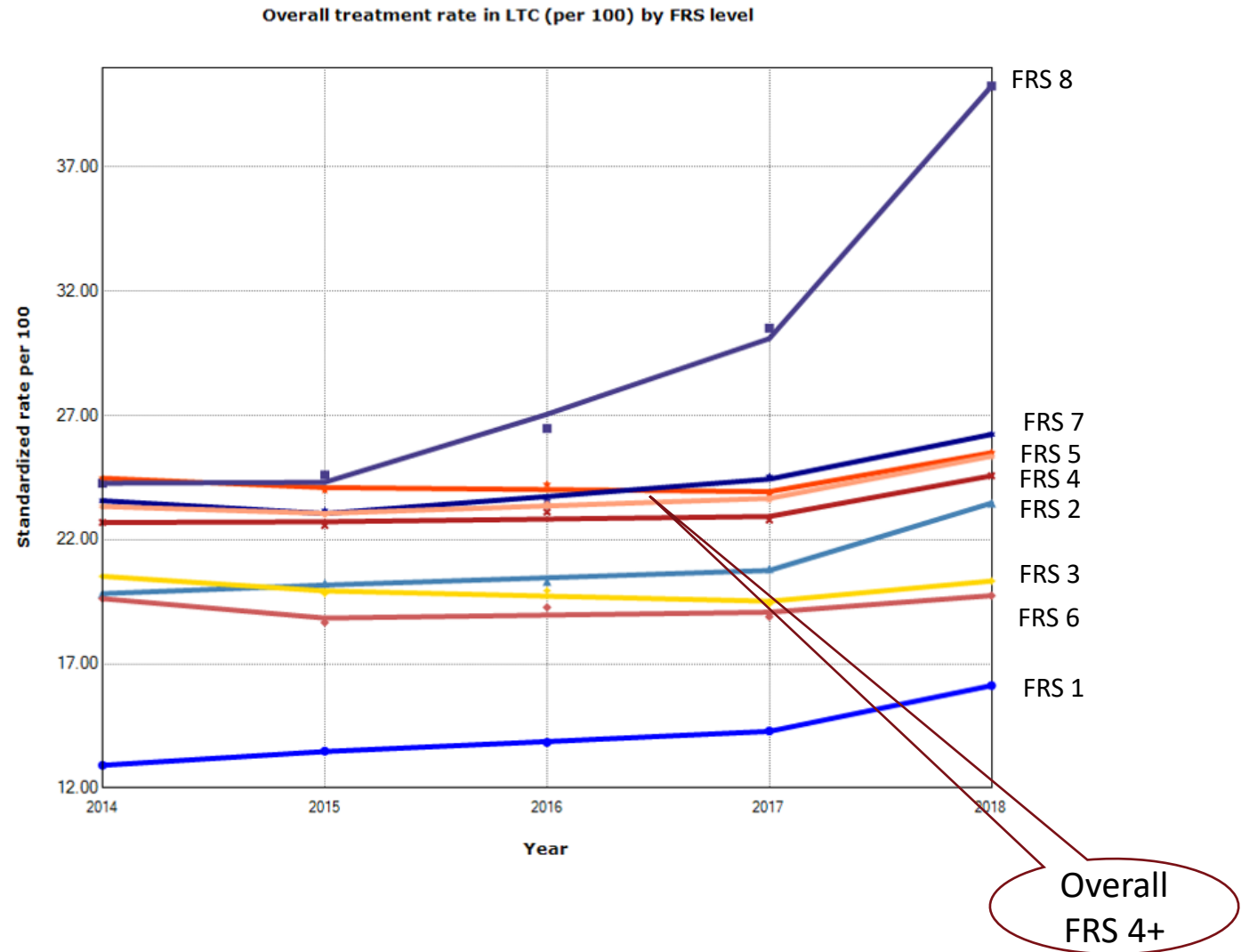
Overall standardized hip fracture rate (per 10,000) in LTC



APC= annual percent change,
AAPC=average annual percent
change

Osteoporosis treatment in LTC (2014-2018)

- Treatment rates increase with FRS scores – treatment rates are highest for FRS=8
- FRS=8 has a \uparrow increase in treatment rate over time than FRS=1 (13.2% vs 5.3%)

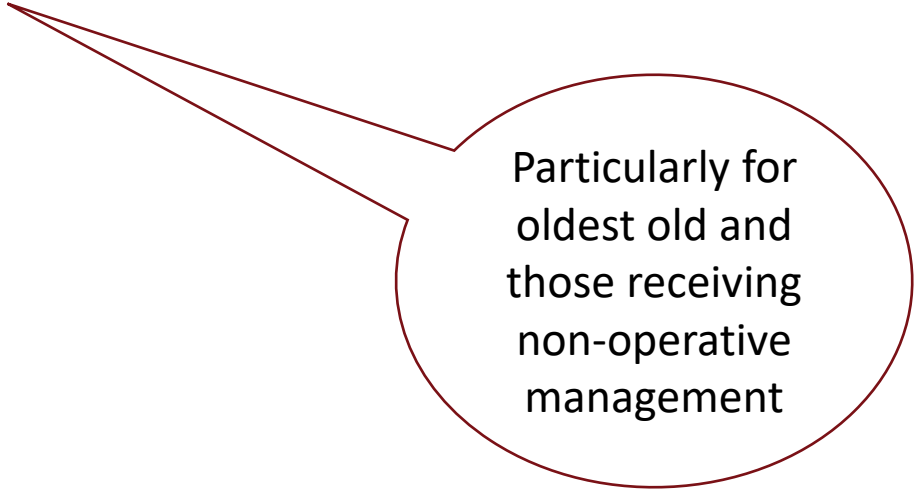


What are impacts of fractures in LTC?



Fractures are a game changer for LTC residents!

- Hip fractures are associated with:
 - Substantial mortality
 - Increased dependence in ADLs:
 - Getting in and out of bed
 - Dressing
 - Transferring
 - Personal hygiene



Particularly for
oldest old and
those receiving
non-operative
management

Neuman MD, et al. *JAMA*, 2014; 174(8):1273-1280.

Fractures result in impaired mobility

Systematic Review – 28 studies with mobility outcomes

- 2 years post-hip fracture:
 - mobility is significantly worse than for matched control
 - people were four times more likely to be unable to ambulate

Study	Outcome	Follow-Up Time	Hip Fracture	No Hip Fracture	p-value
Boonen 2004	Dependence in mobility	1 year	30%	7%	<0.001
Magaziner 2003	Disabled walking 3m	1 year	54%	21%	<0.01
Marottoli 1992	Walk independently across room	6 mos HF/ 1yr No HF	15%	72%	Not reported
Norton 2000	Retain mobility	2 years	54%	87%	<0.001
Wolinsky 1997	Mean ↑ # lower body limitations	Median 2.3 years	11.75	0.75	<0.0001
	Mean ↑ # upper body limitations		0.50	0.27	<0.001

Dyer et al. *BMC Geriatrics*, 2016;16:158.

Imminent Fracture Risk: First fractures predict second fractures!

Think of fracture like stroke and myocardial infarction:
The first year post event is highest risk!^{1,2}

- In Ontario (Community dwelling):
 - 14.6 per 100 2 year refracture rate in Ontario in 2017/18³
 - 5-year refracture rate of 6543 patients = 9.7%⁴



¹ Huntjen et al. *Osteo Int* 2010;2:2075-2085

² Inose et al. *Euro Spine J.* 30 January 2021

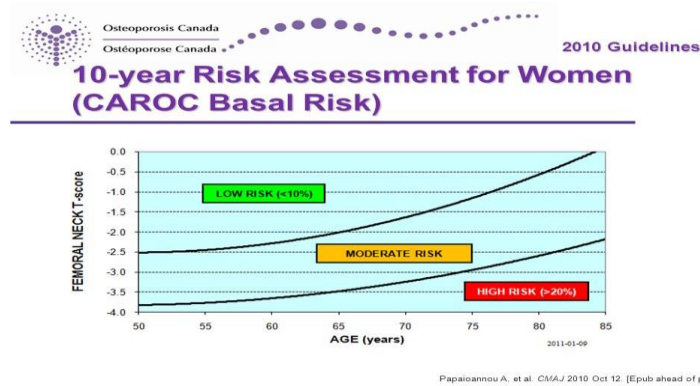
³ Ontario Osteoporosis Strategy – Provincial Performance Data for Osteoporosis Management Technical Report 2023

⁴ Sujic et al. *Osteo Int* 2019;30(8):1671-1677.

**Is fracture risk in LTC assessed the same as it is
the community?**

No! Fracture risk assessment methods in the community are not appropriate for LTC

CAROC



FRAX

Country: US (Caucasian) Name / ID: Jane Doe About the risk factors ⓘ

Questionnaire:

1. Age (between 40-90 years) or Date of birth
Age: 74 Date of birth: 1935 M, 4 D, 20

2. Sex Male Female

3. Weight (kg) 65

4. Height (cm) 165

5. Previous fracture No Yes

6. Parent fracture 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 per day No Yes

12. Femoral neck BMD (g/cm²)
Hologic 0.7 T-score: -1.3

Clear Calculate

BMI: 23.9
The ten year probability of fracture (%)

with BMD	
Major osteoporotic	16
Hip fracture	6.5

- Not validated for the LTC population – overestimate # needing treatment
- Require bone mineral density testing
- 10 year fracture prediction – average LOS in LTC is 18 months
- Missing risk factors applicable for the LTC population

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

Challenges to Bone Mineral Density testing in LTC

- Not possible to bring BMD testing machines to LTC
- Difficult to access – requires family or staff to accompany resident; transportation
- Mobility impairment
- Cognitive impairment – difficult to follow instructions
- Kyphosis – difficult/ painful to lie flat
- Frailty – difficult to maintain a steady position

Tseng et al. *Osteo Int* 2017;28:3439-3449



What is the best way to assess fracture risk in LTC?

The Fracture Risk Scale (FRS)

- ✓ Predicts hip and major fractures for LTC residents
- ✓ Requires no additional documentation or resources/ score is autogenerated
- ✓ Based on available data on fracture risk factors in LTC
- ✓ No BMD testing required
- ✓ Validated across Canada
- ✓ Can improve care, quality of life, and prevent fractures
- ✓ Supports care planning using the fracture prevention recommendations for LTC

Embedded in
RAI – MDS 2.0/
LTCF tools

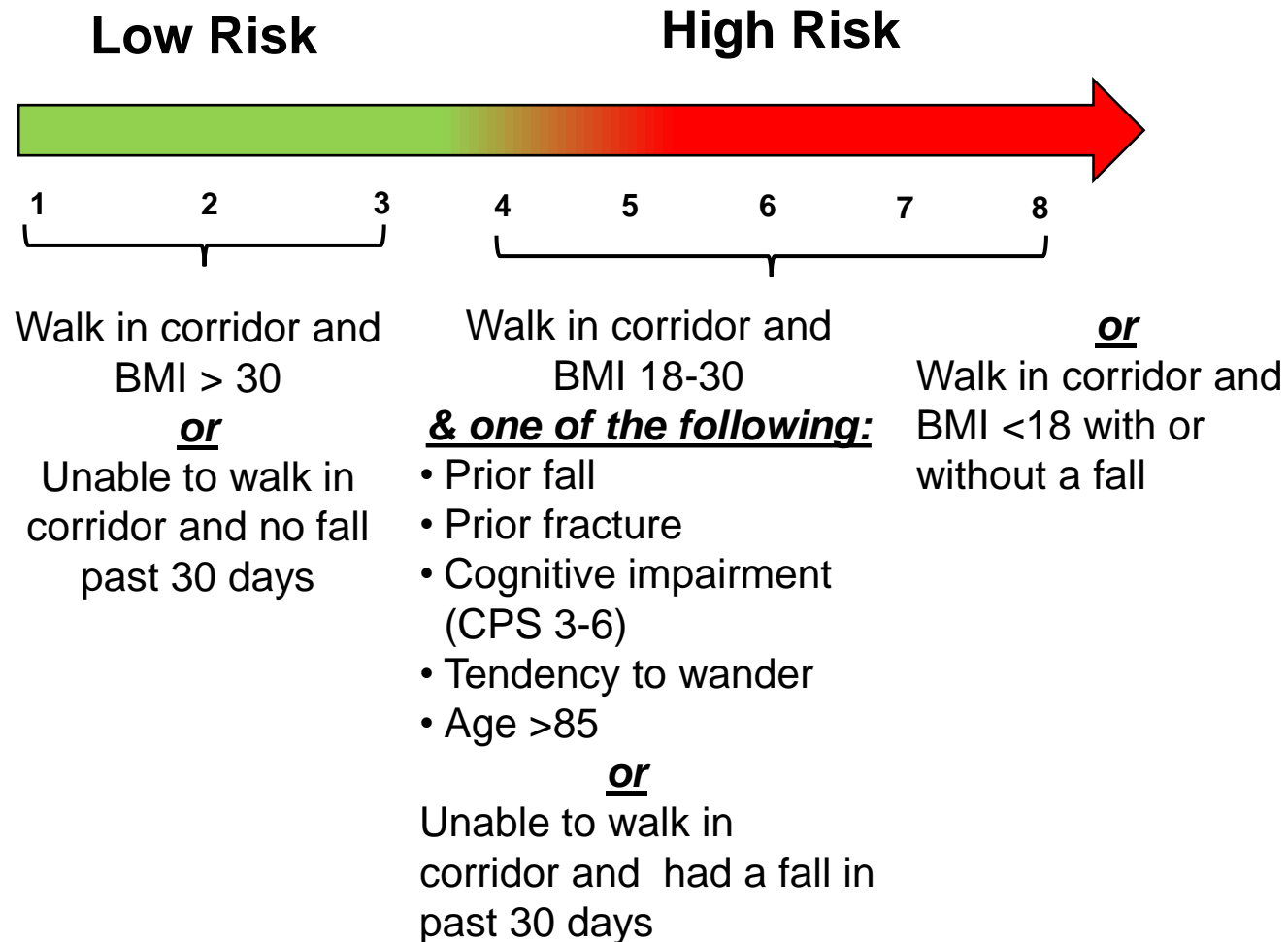
Ioannidis G, et al. *BMJ Open*, 2017;7.
Negm A, et al. *BMC Geriatrics*, 2018; 18(320).

Factors that increase fracture risk in LTC (N = 29,848)

Risk Factors	% All Residents
Age group (85+)	45.9%
Women	66.0%
Previous fracture	10.1%
Body mass index	
<18	8.0%
18-30	74.6%
Fall in past 180 days	33.8%
Walking in corridor	
Independently	35.3%
With supervision/ assistance	31.3%
Total dependence	33.4%
Cognitive impairment	56.2%
Wandering frequency - Daily (in past 7 days)	11.7%

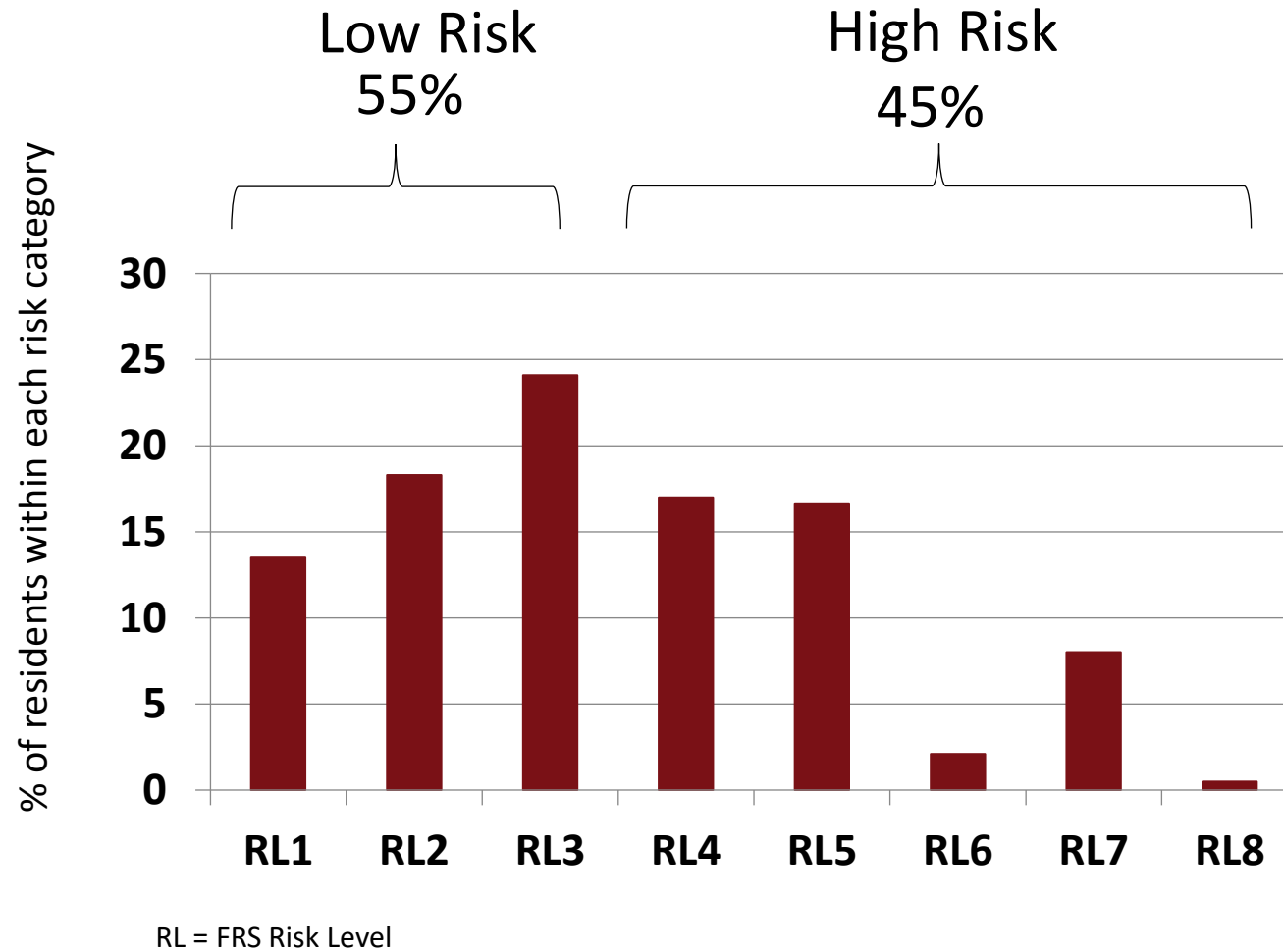
Ioannidis G, et al. *BMJ Open*, 2017;7.

FRS Scores and Hip Fracture Risk Factors



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

Percentage of residents within each risk level

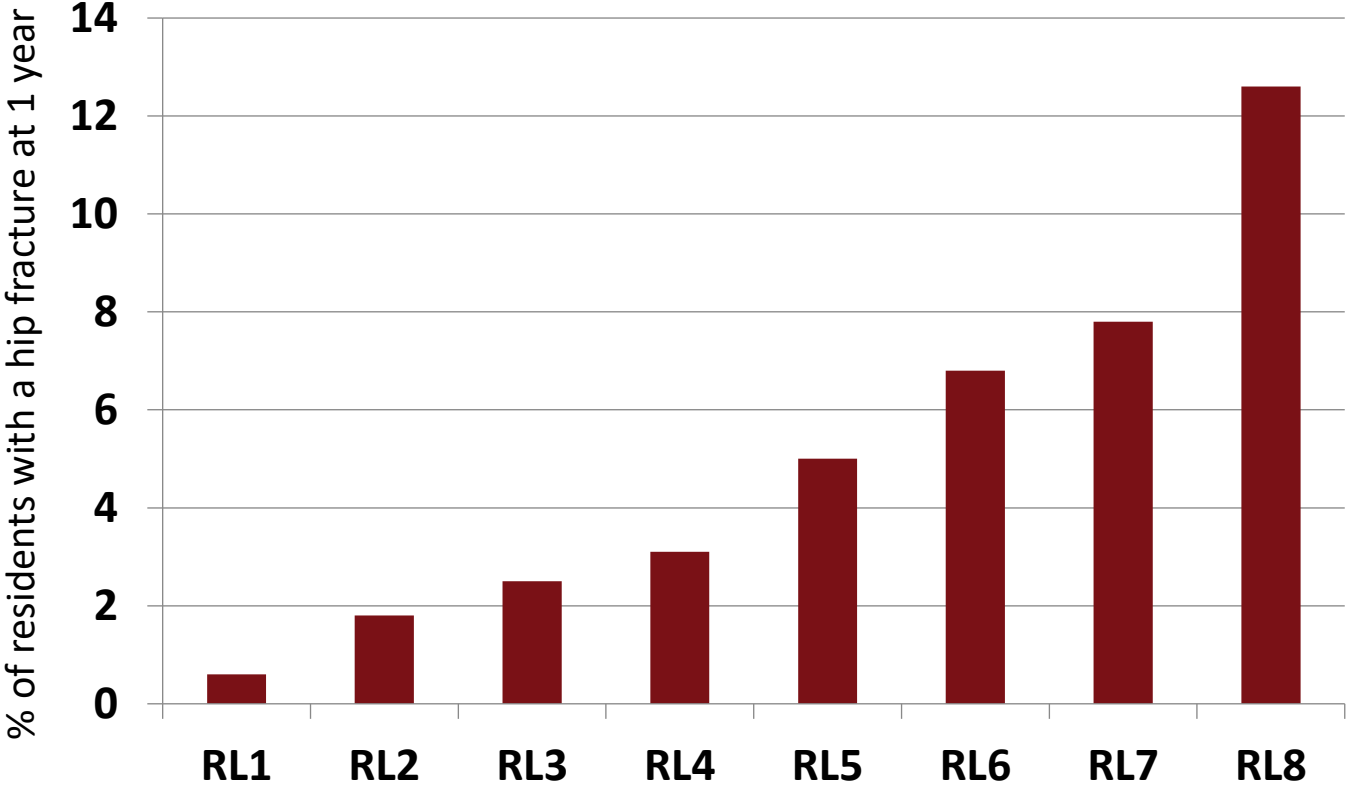


Ioannidis G, et al. *BMJ Open*, 2017;7.

What is the percentage of hip fractures at each FRS risk level?



% of Residents with a Hip Fracture at 1 Year in each Risk Category



RL = FRS Risk Level

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

Odds Ratios* for Hip Fracture for each Risk Level

Risk Levels	Odds Ratio of Hip Fracture
FRS 2 vs 1	3.0 (1.9-4.6)
FRS 3 vs 1	4.2 (2.7-6.3)
FRS 4 vs 1	5.2 (3.4-7.9)
FRS 5 vs 1	8.3 (5.5-12.6)
FRS 6 vs 1	11.6 (7.0-19.1)
FRS 7 vs 1	13.4 (8.8-20.5)
FRS 8 vs 1	23.0 (12.5-42.3)

*Odds calculated using multivariable logistic regression analysis

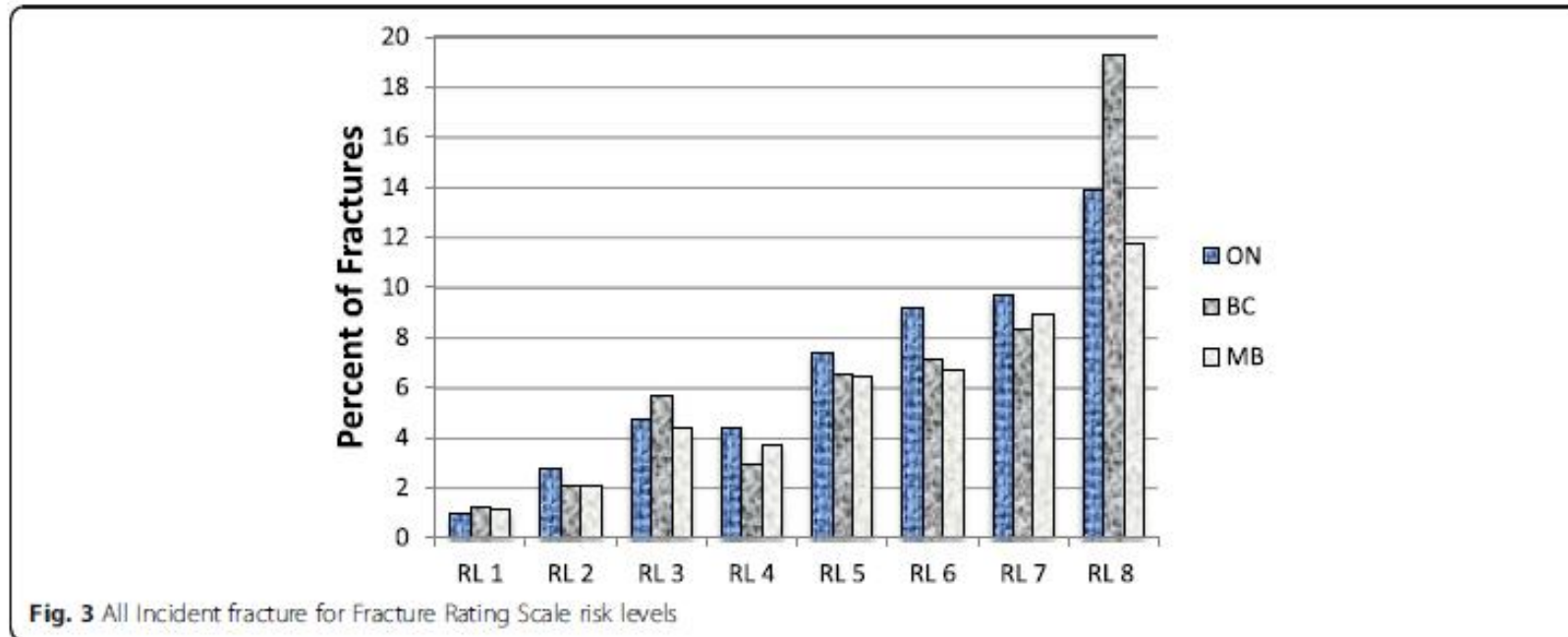
Ioannidis G, et al. *BMJ Open*, 2017;7.



Does the FRS only predict hip fractures?



FRS has been validated for hip and all clinical fractures



hip, spine, humerus,
forearm, pelvis



Where can I find the FRS Score?



Quick access to FRS score

1. Navigate to the resident *Dash*

The screenshot shows a resident dashboard for Barbara Sinatra (00006). The 'Dash' tab is circled in red. Below the navigation bar, there are buttons for 'Edit Layout' and 'Printable View'. The main content area shows 'UDA Scores in the Last 6 Months' with a table of scores. The 'FRS' score is highlighted in a red box.

ARD	Type	Category	Score
		No Records Found.	
		DRS	10
		COMM	0
		PAIN	1
		ISE	5
		ADL Short	16
		ADL Long	28
		ADL Self	6
		CHESS	0
		ABS	8
		PSI	9
		FRS	4

2. View the MDS scores – Find the FRS Score in the list

Alternate method

The screenshot shows the PointClickCare interface for a resident named Barbara Sinatra (00006). The navigation menu includes Home, Admin, Clinical, QIA, GLAP, and Reports. The resident's profile shows her status as Current, location as Rainy Meadows 101-A, gender as Female, DOB as 3/10/1927, age as 93, and physician as Johnny BeGood. The MDS tab is selected in the navigation bar. Below the navigation bar, there are tabs for Canadian CCRS MDS 2.0 and a 'New' button. A table shows MDS assessments with columns for Date and Description. The 'Print' button in the table is circled in red.

Date	Description
4/1/2020	Admission assessment (required by day 14) Full
4/1/2020	Admission assessment (required by day 14) Face Sheet

1. Navigate to the Resident's MDS tab



2. Click *Print*



3. Check the *Outcome Summary Report* box



The screenshot shows the 'Print Options' dialog box in Google Chrome. The URL is www1.pointclickcare.com/care/reports/printpopup.j... The 'Printing options' section is titled 'Select print options' and includes several checkboxes: MDS Assessments, Section V, RAPS Worksheets, Outcome Summary Report (checked and circled in red), Note Report, Warnings Report, and Audit Report. At the bottom, there are 'Print' and 'Cancel' buttons. The 'Print' button is circled in red.

4. Click on *print*



The Outcome Summary Report will be generated.
This will give the FRS Score for that MDS Assessment.

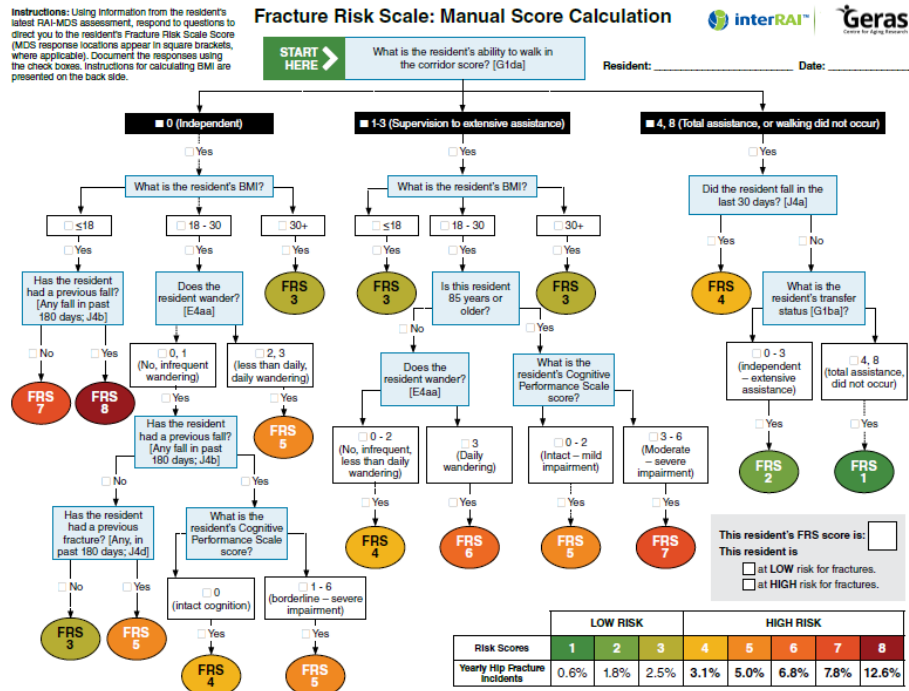
Outcomes	
RUG	SSC
CMI	1.4
CPS	0
DRS	10
COMM	0
PAIN	1
ISE	5
ADL Short	16
ADL Long	28
ADL Self	6
CHESS	0
ABS	8
PSI	9
PURS	3
FRS	4

My EMR does not include the FRS, how can I calculate fracture risk?



No access to the FRS? Use our new manual calculation tool!

Page 1: Respond to the algorithm questions to calculate the FRS score



How to find BMI: Locate where the resident's height and weight intersect; BMI is listed in the square

		WEIGHT																																																				
		lbs							kgs																																													
		90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	cm																															
ft/in	kg/m	41	45	50	54	59	64	68	73	77	82	86	91	95	100	104	109	113	118	122	127	132	162	167	173	178	183	188	193	198	203	208	213	218	223	228	233	238	243	248	253	258	263	268	273	278	283	288	293					
4'0"	142.2	20	22	24	26	28	30	32	35	37	39	41	43	45	47	49	52	54	56	58	61	63	65	142.2	147.2	152.2	157.2	162.2	167.2	172.2	177.2	182.2	187.2	192.2	197.2	202.2	207.2	212.2	217.2	222.2	227.2	232.2	237.2	242.2	247.2	252.2	257.2	262.2	267.2	272.2	277.2	282.2	287.2	292.2

Online BMI Calculators:
<https://bmi.calculatorcanada.com/>
<https://www.calculator.net/bmi-calculator.html>
https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi_calculator.html

Treatment Considerations

LOW RISK			HIGH RISK				
1	2	3	4	5	6	7	8
<ul style="list-style-type: none"> Vitamin D: 800-2000IU Calcium: 1200mg (daily total diet & supplement) Exercise: functional strength & balance 			<ul style="list-style-type: none"> Vitamin D: 800-2000IU Calcium: 1200mg (daily total diet & supplement) Exercise: functional strength & balance Osteoporosis medications Hip protectors 				

Considerations for medication use

- Fracture risk – residents at high risk should be treated
- Residents' preferences and goals for care
- Life expectancy (> 1 year)
- Kidney function (creatinine clearance)
- Swallowing issues (dysphagia)

Interpret the score: low or high fracture risk?

Page 2: Calculate BMI for page 1 and consider treatment options

Available at: <https://www.gerascentre.ca/fracture-prevention-toolkit/>

Some cautions about the FRS



- Only includes fractures that were experienced in the past 180 days (6 months).
- FRS assesses risk for hip fracture but may underestimate the risk for vertebral fractures.
- FRS calculates risk based on variables available in the RAI-MDS 2.0 – other risk factors may exist that are not included.
- The FRS is only as good as the data that is entered into the RAI-MDS.

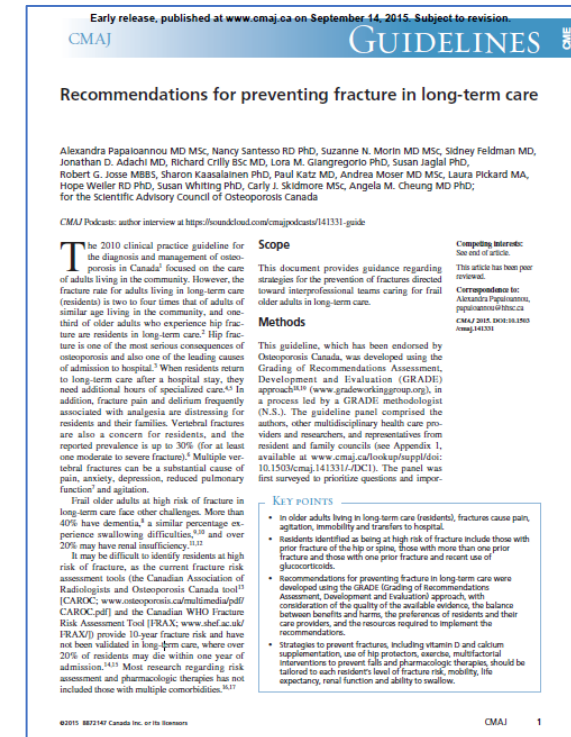


Now that fracture risk is known, what next?



Recommendations for Fracture Prevention in LTC¹

- Directed at interprofessional teams in LTC
- Recommendations related to:
 - Pharmacologic therapies for those at high risk
 - Hip protectors
 - Exercise
 - Multifactorial interventions
 - Calcium and vitamin D
- FRS CAP — Coming soon!
- Goals:
 - Reduce pain, immobility, and hospital transfers
 - Improve quality of life for residents in LTC



1. Papaioannou, A. et al. *CMAJ* 2015; 187(15): 1135-44.
2. Guyatt, GH. Et al. *BMJ* 2008; 336:1049-51.

Fracture prevention for those at low risk (FRS scores 1 – 3)

Diet and supplements

- Dietary calcium 1200 mg/day
- Calcium supplements ≤ 500 mg/day if dietary cannot be met, considering values and preferences
- Vitamin D supplementations (800-2000 IU/day)

Multifactorial fall prevention strategies

- Exercise (balance, strength, and functional training)
- Medication reviews (Beer's criteria or STOPP/START criteria)
- Assessment of environmental hazards
- Use of assistive devices
- Management of urinary incontinence
- Hip protectors for those who are mobile considering resources and residents' values and preferences
 - Opportunities to try various models
 - Education on benefits and limitations

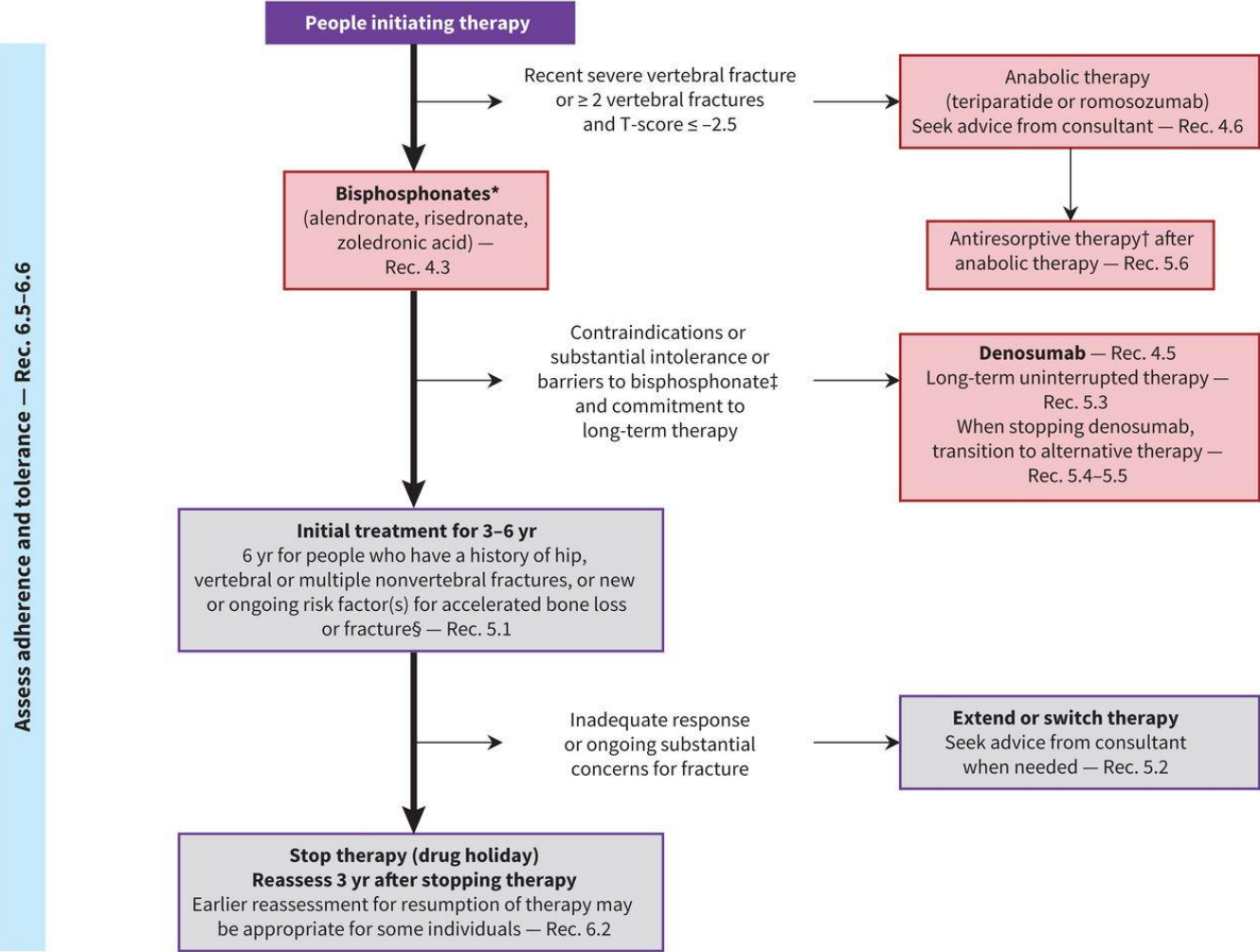
McArthur et al. *JAMDA*, 2021; 22(8):1726-1734

Fracture prevention for those at high risk (FRS scores 4 – 8)

Diet and supplements	<ul style="list-style-type: none">• Dietary calcium 1200 mg/day• Calcium supplements ≤500 mg/day if dietary cannot be met• Vitamin D supplementations (800-2000 IU/day)
Multifactorial fall prevention strategies	<ul style="list-style-type: none">• Hip protectors for those who are mobile (value, preference & resource dependent)• Exercise (balance, strength, and functional training) as part of a multifactorial fracture and fall prevention strategy, considering:<ul style="list-style-type: none">• residents' preferences, desires, beliefs and attitudes• promoting social support (e.g., group exercise)• providing stimulating environments (e.g., coloured equipment, music).• providing training and involve residents, family members, volunteers and primary health care providers
Medications	<ul style="list-style-type: none">• Prescribe osteoporosis medications; considering:<ul style="list-style-type: none">• residents' preferences and values• adequacy of kidney function (creatinine clearance)• presence of dysphagia• whether life expectancy exceeds time to benefit from the medication

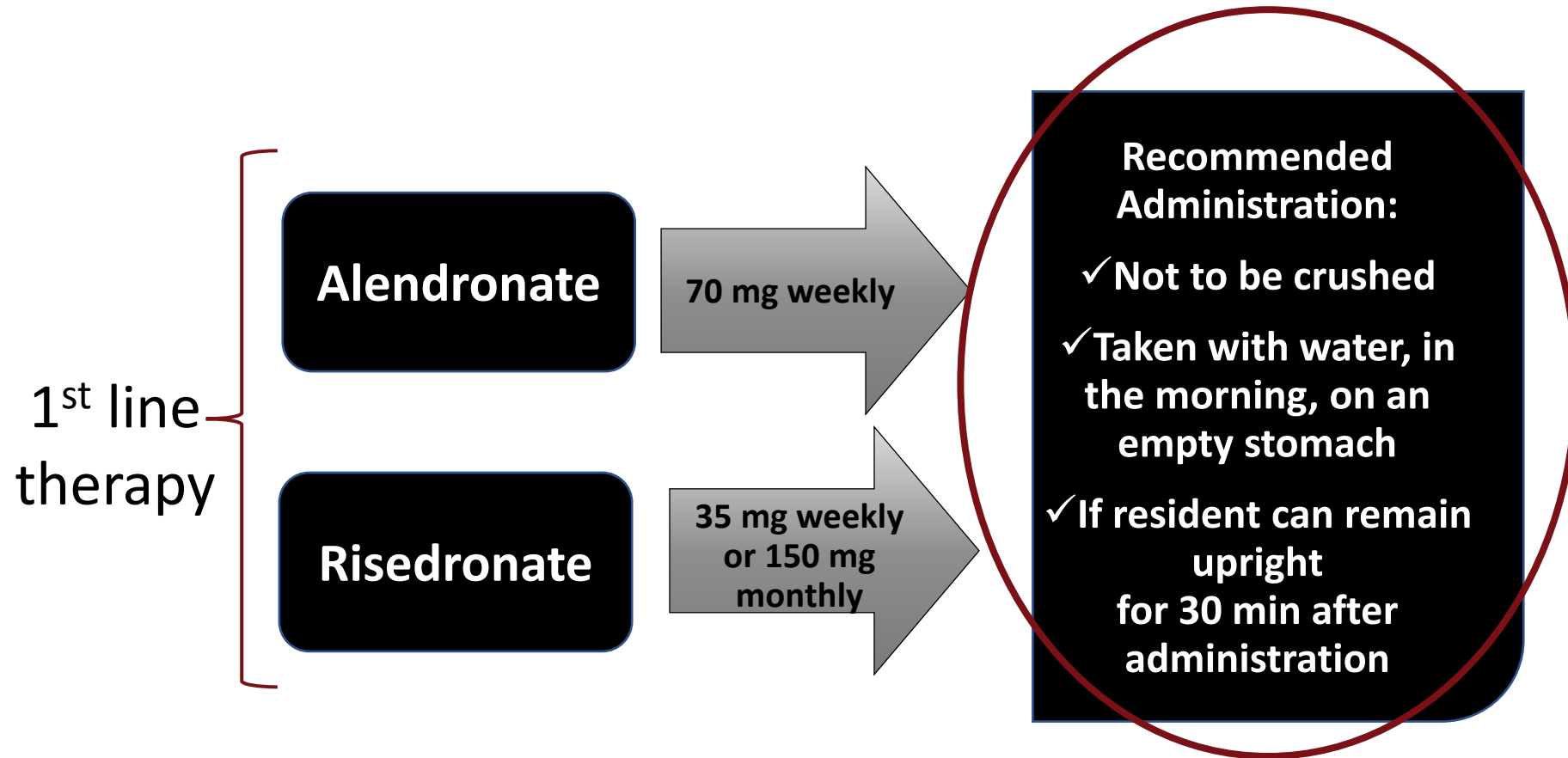
McArthur et al. *JAMDA*, 2021; 22(8):1726-1734

Approach to pharmacotherapy to prevent fractures.



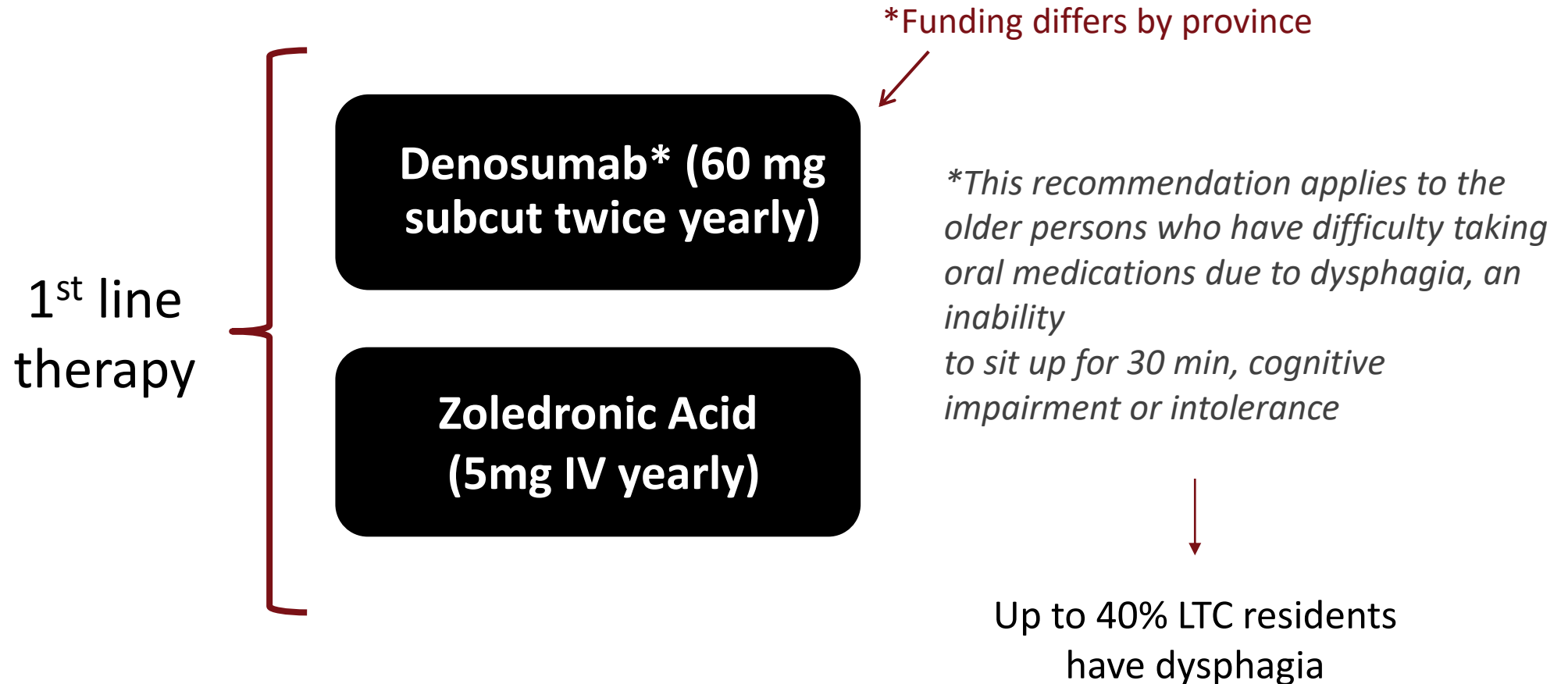
Suzanne N. Morin et al. CMAJ 2023;195:E1333-E1348

For HIGH RISK residents, we recommend...



Papaioannou, A. et al. *CMAJ* 2015; 187(15): 1135-44.

For HIGH RISK Residents + Difficulty Taking Oral Medications, we recommend...



Papaioannou A et al. *CMAJ*. 2015;187:1135-1144.

Namasivayam & Steele. *J Nutr Gerontol Geriatr* 2015;34:1-21.



Do you have a case for discussion?





How is the FRS used?

CASE STUDY

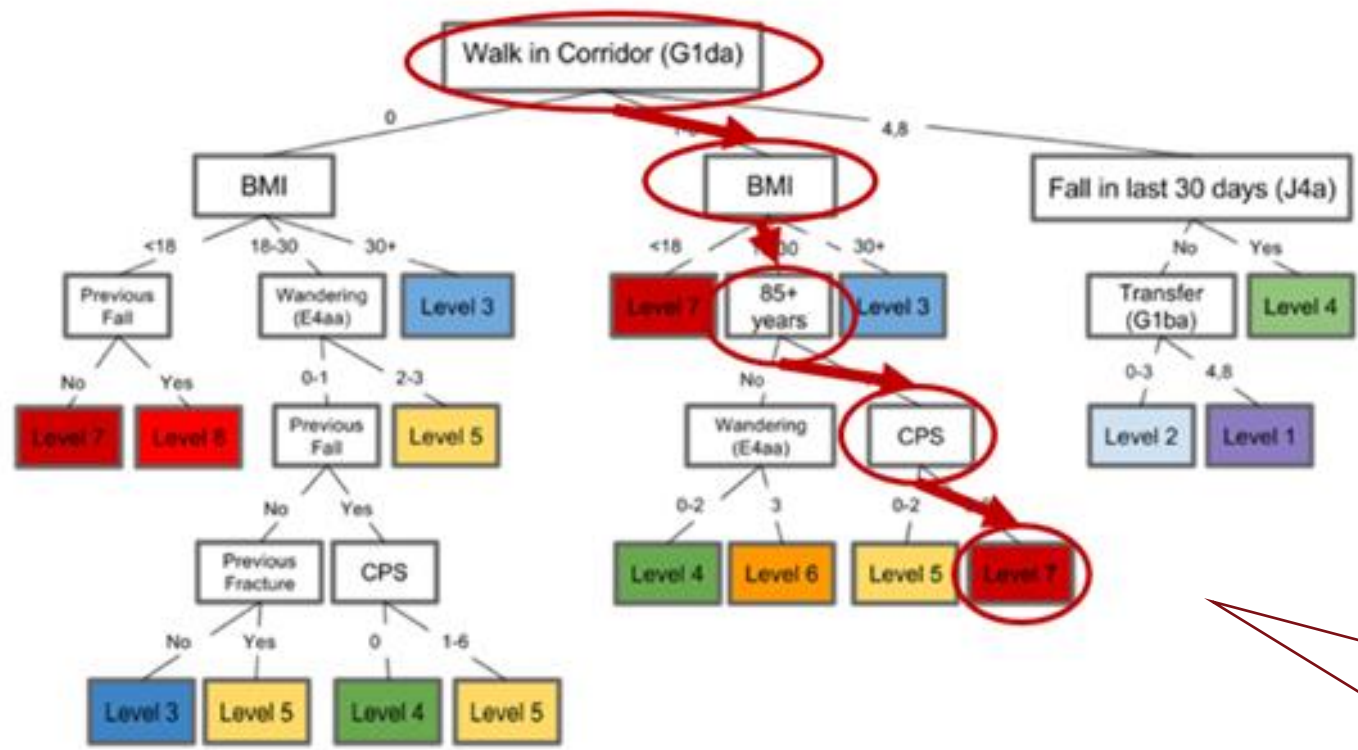
Meet Harry Haines



What is Harry's fracture risk?
High? Low?

- 87 year old male,
- Height = 5'.6"; Weight = 146 lbs; BMI = 23.6
- Walks with a walker, with assistance
- Previous falls, but no fractures to date
- **Diagnoses:** Lewy body dementia (CPS = 4); osteoarthritis, bilateral knee replacement; Parkinson's disease
- Kidney function: EGFR = 52;
- Swallowing is impaired; eating difficulties
- **Medications:** Rivastigmine patch 5mg; Levadopa/Carbidopa 100-25mg/ 4 times/daily; Senokot twice/daily; Acetaminophen 1000 3 time/daily

Harry's Decision Tree



FRS = 7
Harry is at **HIGH**
risk for fractures



FRS = 7

Harry's treatment plan

- Therapy – prescribe denosumab
- Vitamin D 1000IU
- Increase dietary calcium – monitor intake
- Physiotherapy – functional and balance training; reassess walker use
- Consider use of hip protectors; start with a trial to see if acceptable
- Comprehensive falls assessment

Fracture risk for immobile residents

- **Fracture Risk Scale¹**
 - Inability to walk independently = low risk
 - Inability to walk independently + a fall in last 30 days = high risk
 - May underestimate vertebral fractures and potential for these with transfers or shifting in bed

- **Immobilization** is a risk factor for bone loss and increases risk for osteoporotic fractures²

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

2. Chen et al *J Bone Min Res* 2006;21:324-31.



How should I treat fracture risk if I think my resident's life expectancy is likely not more than one year?

Medication management and life expectancy

- Life expectancy is but one of several criteria to inform decision-making.
- Residents at high risk for fractures should be treated considering:
 - Residents' preferences and values
 - Adequacy of kidney function (creatinine clearance)
 - Presence of dysphagia
 - Whether life expectancy exceeds time to benefit from medication

McArthur et al. *JAMDA* 2021; 22(8):1726-1734



How does fracture prevention in LTC differ from the community?



Fracture prevention is different in LTC

- Community – different response to falls; more likely to experience spine and non-hip fractures
- Life expectancy is more of an issue in LTC – average LOS = 18months
- Need for drug holidays is less relevant
- ONJ is less of a concern – most residents wear dentures and few receive invasive dental treatments
- Poor kidney function (creatinine clearance) and presence of dysphagia more prevalent in LTC (70% vs 38%)

McArthur et al. *JAMDA*2020; 21(2) 289-290.

Papaioannou et al. *Am J Med*; 2001; 111(7):569-73.

Namasivayam-McDonald et al. *Can J Dietetic Pract Res*; 2019;80(3):122-126.



How can I implement the fracture prevention recommendations in my LTC home?



Everyone has a role to play in fracture prevention

- **Physicians** – team lead, investigations, medication prescribing/ deprescribing
- **Nurses** – liaison with MD, other team members, resident, family; falls assessment
- **Pharmacists** – medication review; medication recommendations; review with MD
- **Physiotherapy** – balance, strength and functional training assessment, planning
- **Dietitian** – nutritional assessment for calcium and protein intake; suggestions for increasing dietary calcium
- **Recreation/ Activation/ Restorative care** – practice spine sparing strategies, balance and strength exercises, promote proper posture/ postural cues
- **Personal Support Workers** – ensure safe transferring techniques, proper positioning, remove trip/ fall hazards, ensure mobility aids are used and are close by
- **Resident Care Managers** – ensure care plan is developed and implemented

NEW

Invitation to participate in a
CIHR-funded LANDMARK
research study looking to
improve care in long-term care



NOW RECRUITING
2023-2024

Please contact Geras Research Coordinator Lauren Kane at kanel@hhsc.ca
or 905-521-2100 ext. 77866



**BRIGHTER
WORLD**



For more information
about PREVENT, visit
the Ontario
Osteoporosis Strategy
booth (#106) in the
main foyer area



What tools are available to support fracture risk reduction in LTC?





Fracture Prevention in Long-Term Care

We are dedicated to provide healthcare professionals, older adults, and their families access to quality information, resources, and clinical support tools about fracture prevention.

LEARN MORE



Fracture Risk Assessment

OSTEOPOROSIS LTC RECOMMENDATIONS
Identifying those at high risk of fracture is important to avoid the devastating consequences of bone disease. Knowing fracture risk will allow for appropriate intervention for both timely prevention and treatment.

LEARN MORE



Fracture Prevention Toolkit

Our team has created a variety of tools to increase awareness of fracture risk and to support the implementation of recommendations for fracture prevention in long-term care.

LEARN MORE



Calcium & Vit D

OSTEOPOROSIS LTC RECOMMENDATIONS
Calcium and vitamin D are an important component to maintaining bone health. People who have osteoporosis and/or who are at high risk for fracture, should consume enough calcium and vitamin D through diet or supplements. If you are an older adult not sure about whether you need supplements, speak to your healthcare provider.

LEARN MORE



<https://www.gerascentre.ca/bone-health/>



<https://www.gerascentre.ca/bone-health/osteoporosis-ltc-guidelines/>



LTC fracture prevention

Fracture Prevention Toolkit Resources

 Osteoporosis and related Fractures in Canada: Report from the Canadian Chronic Disease Surveillance System 2020 + DOWNLOAD	 Osteoporosis and Related Fractures in Canada + DOWNLOAD	 Keeping it Together + DOWNLOAD
 Osteoporosis and Fracture Prevention Resources for Family Councils + DOWNLOAD	 Recommendations for Preventing Fracture in Long-Term Care + DOWNLOAD	 Fracture Prevention Guidelines Presentation (ENG) + DOWNLOAD
 Fracture Prevention Guidelines Presentation (FR) + DOWNLOAD	 Talk Sheet: Accessing information on osteoporosis and fracture prevention + DOWNLOAD	 CMAJ Podcast on Preventing Fractures in LTC VIEW WEBSITE
 CMAJ Publication on Preventing Fractures in LTC + DOWNLOAD		



Fracture Risk Scale Resources

 FRS Information Sheet + DOWNLOAD	 FRS Visual Abstract + DOWNLOAD	 Fracture Risk Scale Manual Calculation Tool + DOWNLOAD
 LTC Fracture Prevention Quick Reference Guide (ENG) + DOWNLOAD	 LTC Fracture Prevention Quick Reference Guide (FR) + DOWNLOAD	 Fracture Risk Factors for LTC Residents + DOWNLOAD

<https://www.gerascentre.ca/fracture-prevention-toolkit/>

Geras

Centre for Aging Research

