Preventing Fractures in Long-Term Care
The Fracture Risk Scale (FRS)

Alexandra Papaioannou BScN, MD, MSc, FRCP(C), FACP

Professor of Medicine/Geriatric Medicine, McMaster University

Executive Director, GERAS Centre, Hamilton Health Sciences

Lynn Nash MD, CCFP, FCFP

Associate Clinical Professor, Department of Family Medicine, McMaster University

OLTCC, October 27, 2019

Presenter Disclosure

- Dr. Alexandra Papaioannou
- **Relationships with commercial interests:**
  - **Grants/Research Support:** Amgen
  - **Speakers Bureau/Honoraria:** Amgen
  - **Other:** Employee of McMaster University

Presenter Disclosure

- Dr. Lynn Nash
- **Relationships with commercial interests:**
  - **Grants/Research Support:** None
  - **Speakers Bureau/Honoraria:** None
  - **Other:** Family Physician, Ancaster, Ontario

Disclosure: Program

- **This program has received financial support from** The Canadian Institute for Health Research and the Ontario Ministry of Health and Long-Term Care **in the form** of an unrestricted educational/research grant.

- **This program has not received in-kind support from** any commercial/for profit organization

- **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.

Fracture Risk Scale Development

Authors:

George Ioannidis, PhD

Micaela Jantzi, MSc

Jenn Bucek, MSc

Jonathan Adachi, MD FRCP(C)

Lora Giangregorio, PhD

John Hirdes, PhD

Laura Pickard, MA

Alexandra Papaioannou, MD MSc FRCP(C) FACP

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

Objectives

At the conclusion of this activity, participants will be able to:

1. Recognize potential fracture risks in older adults living in long-term care (LTC)
2. Assess fracture risk using the Fracture Risk Scale (FRS)
3. Manage identified fracture risk in LTC

What do we know about fractures in LTC?

Fractures are a serious problem

- 2-6% of residents sustain a hip fracture each year
- Hip fracture is the most common fracture type in LTC (49%)
- >72% of older adults at high risk for fractures are not investigated or treated for osteoporosis

1. Ronald LA et al. *Can J Aging*. 2008;27:109-115
2. Papaioannou A. et al. Osteoporos Int. 2016;27:887-97
3. Neuman MD, et al. *JAMA*, 2014; 174(8):1273-1280.
4. Papaioannou A, et al *J Soc Obstet Gynaecol Can* 2000; 22(8):591-7

LTC fracture costs are great

- In Ontario (2013): in the first year after fracture for those:[1]
  - Newly admitted to LTC = $45,000+
  - Readmitted to LTC = $10,000+

- LTC fractures cost $1.03 Billion annually in Canada[2]

1.Nikitovic et al. Osteoporos Int 2013;24:659-669.
2.Hopkins et al. Osteoporos Int 2016;27;3023-3032

Fractures can be devastating for LTC residents

Papaioannou A, et al. *Osteoporos Int* 2001; 12(10):870-874.
Ioannidis G, et al. *CMAJ* 2009; 181(5):265-271.
Papaioannou A, et al. *CMAJ*; 2015. 187 (15): 1135-44.
Tosteson AN, et al. *Osteoporos Int* 2007; 18(11):1463-1472**.**
Neuman MD, et al. *JAMA*, 2014; 174(8):1273-1280

What tools are available to support fracture prevention in LTC?

Recommendations for Fracture Prevention in LTC[1]


CMAJ GUIDELINES

Recommendations for preventing fracture in long-term care

- Published in 2015; first of its kind aimed at LTC
- Integration of osteoporosis and falls assessment and management to reduce fractures
- Developed using GRADE approach,[2] considering:
  - Quality of evidence
  - Balance of benefits and harms
  - Values and preferences
  - Resources

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

Recommendations for Fracture Prevention in LTC[1]


Early release, published at www.cmaj.ca on September 14, 2015. Subject to revision.

CMAJ GUIDELINES

Recommendations for preventing fracture in long-term care

Alexandra Papaioannou MD MSc, Nancy Santesso RD PhD, Suzanne N. Morin MD MSc, Sidney Feldman MD, Jonathan D. Adachi MD, Richard Crilly RN MEL, Lora M. Giangregorio PhD, Susan Jaglal PhD, Robert G. Josse MBBS, Sharon Kaasalainen PhD, Paul Kaltz MD, Andrea Moser MD MSc, Laura Pickard MA, Hope Weiler RD PhD, Susan Whitlong PhD, Carly L. Skidmore MSc, Angela M. Cheung MD PhD; for the Scientific Advisory Council of Osteoporosis Canada

CMAJ Podcast: author interview at https://soundcloud.com/cmajpodcast/141331-guide

The 2010 clinical practice guideline for the diagnosis and management of osteoporosis in Canada[1] focused on the care of adults living in the community. However, the fracture rate for adults living in long-term care (residence) is two to four times that of adults of similar age living in the community, and one-third of older adults who experience hip fracture are residents in long-term care.[2] Hip fracture is one of the most serious consequences of osteoporosis and also one of the leading causes of admission to hospital.[3] When residents return to long-term care after a hospital stay, they need additional bouts of specialized care.[4,5] In addition, fracture pain and delirium frequently associated with analgesia are distressing for residents and their families. Vertebral fractures are also a concern for residents, and the reported prevalence is up to 30% (for at least one moderate to severe fracture).[6] Multiple vertebral fractures can be a substantial cause of pain, anxiety, depression, reduced pulmonary function[7] and agitation.

Frail older adults at high risk of fracture in long-term care face other challenges. More than 40% have dementia,[8] a similar percentage experience swallowing difficulties,[9,10] and over 20% may have renal insufficiency.[11,12]

It may be difficult to identify residents at high risk of fractures, as the current fracture risk assessment tools (the Canadian Association of Radiologists and Osteoporosis Canada tool[13] [CAROC] www.osteoporosis.ca/multimedia/pdf/CAROC.pdf) and the Canadian WHO Fracture Risk Assessment Tool [FRAX®, www.shef.ac.uk/FRAX]) provide 10-year fracture risk and have not been validated in long-term care, where over 20% of residents may die within one year of admission.[14,15] Most research regarding risk assessment and pharmacologic therapies has not included those with multiple comorbidities.[16,17]

Scope

This document provides guidance regarding strategies for the prevention of fractures directed toward interprofessional teams caring for frail older adults in long-term care.

Methods

This guideline, which has been endorsed by Osteoporosis Canada, was developed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach[18,19] (www.gradeworkinggroup.org), in a process led by a GRADE methodologist (N.S.). The guideline panel comprised the authors, other multidisciplinary health care providers and researchers, and representatives from residents and family councils (see Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.141331/-/DC1). The panel was first surveyed to prioritize questions and impor-

Key points

- In older adults living in long-term care (residents), fractures cause pain, agitation, immobility and transfers to hospital.
- Residents identified as being at high risk of fracture include those with one fracture of the hip or spine, those with more than one prior fracture and those with one prior fracture and recent use of glucocorticoids.
- Recommendations for preventing fracture in long-term care were developed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach, with consideration of the quality of the available evidence, the balance between benefits and harms, the preference of residents and their care providers, and the resources required to implement the recommendations.
- Strategies to prevent fractures, including vitamin D and calcium supplementation, use of hip protectors, exercise, multifactorial interventions to prevent falls and pharmacologic therapies, should be tailored to each resident's level of fracture risk, mobility, life expectancy, renal function and ability to swallow.

CMAJ 1

- Directed at interprofessional teams in LTC
- Includes recommendations related to:
  - Pharmacologic therapies for those at high risk for fracture
  - Hip protectors
  - Exercise
  - Multifactorial interventions
  - Calcium and vitamin D
- 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.

Osteoporosis Strategy for LTC

Key Activities

- Knowledge Mobilization of Best Practices (Fracture Prevention recommendation for LTC)[1]
- Engagement of LTC end-users/ stakeholders for development and implementation of toolkit to support guideline use
- Development of Fracture Risk Scale (FRS) using the RAI-MDS


Early release, published at www.cmaj.ca on September 14, 2015. Subject to revision.

CMAJ GUIDELINES

Recommendations for preventing fracture in long-term care

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CMAJ Podcast: author interview at https://soundcloud.com/cmajpodcast/141331-guide

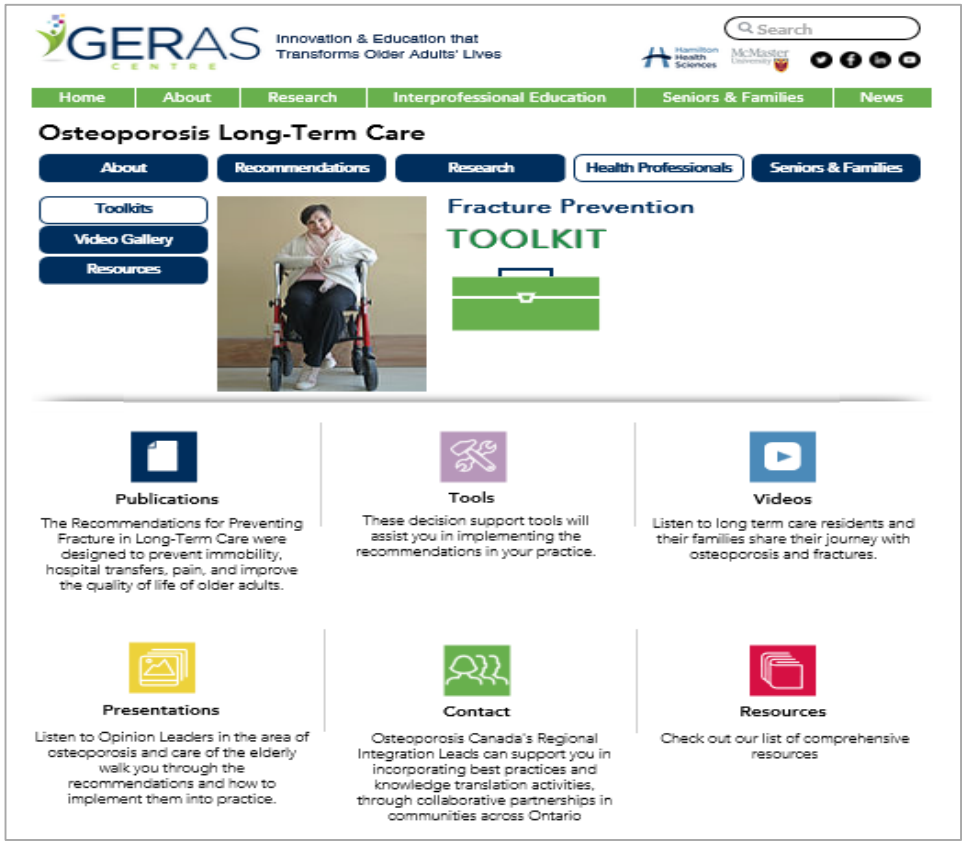
Scope

Methods

Key points

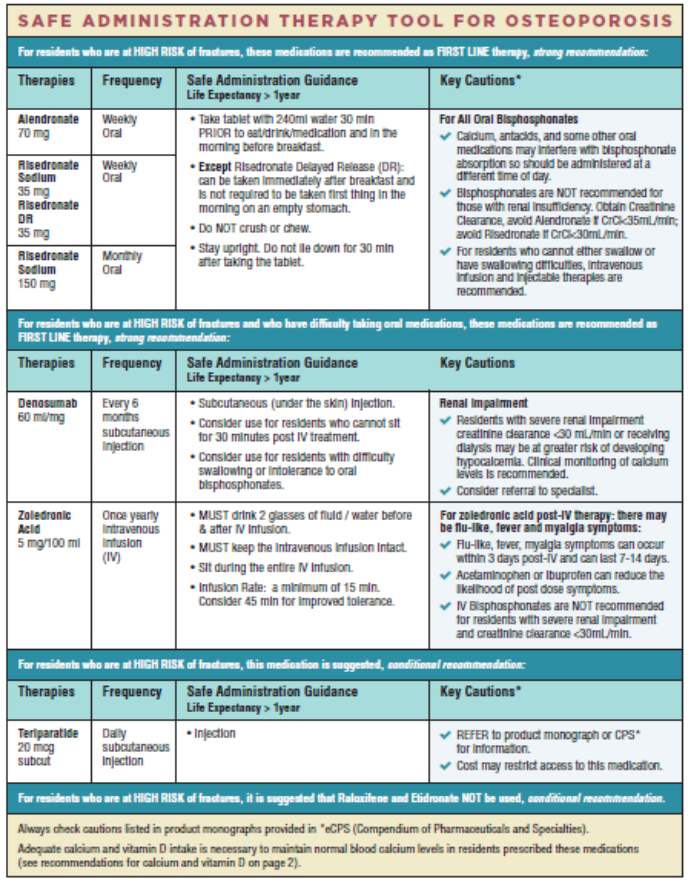
1. Papaioannou, A. et al. CMAJ, 2015; 187(15): 1135-44

Web-based resources



www.gerascentre.ca
www.osteroporosis.ca

Safe Administration Tool



SAFE ADMINISTRATION THERAPY TOOL FOR OSTEOPOROSIS

For residents who are at HIGH RISK of fractures, these medications are recommended as FIRST LINE therapy, *strong recommendation:*

Therapies	Frequency	Safe Administration Guidance Life Expectancy > 1year	Key Cautions*
Alendronate 70 mg	Weekly Oral	• Take tablet with 240ml water 30 min PRIOR to eat/drink/medication and in the morning before breakfast. • **Except** Risedronate Delayed Release (DR): can be taken immediately after breakfast and is not required to be taken first thing in the morning on an empty stomach. • Do NOT crush or chew. • Stay upright. Do not lie down for 30 min after taking the tablet.	**For All Oral Bisphosphonates** ✓ Calcium, antacids, and some other oral medications may interfere with bisphosphonate absorption so should be administered at a different time of day. ✓ Bisphosphonates are NOT recommended for those with renal insufficiency. Obtain Creatinine Clearance, avoid Alendronate if CrCl<35mL/min; avoid Risedronate if CrCl<30mL/min. ✓ For residents who cannot either swallow or have swallowing difficulties, intravenous infusion and injectable therapies are recommended.
Risedronate Sodium 35 mg **Risedronate DR** 35 mg	Weekly Oral		
Risedronate Sodium 150 mg	Monthly Oral		

For residents who are at HIGH RISK of fractures and who have difficulty taking oral medications, these medications are recommended as FIRST LINE therapy, *strong recommendation:*

Therapies	Frequency	Safe Administration Guidance Life Expectancy > 1year	Key Cautions
Denosumab 60 ml/mg	Every 6 months subcutaneous injection	• Subcutaneous (under the skin) injection. • Consider use for residents who cannot sit for 30 minutes post IV treatment. • Consider use for residents with difficulty swallowing or intolerance to oral bisphosphonates.	**Renal Impairment** ✓ Residents with severe renal impairment creatinine clearance <30 mL/min or receiving dialysis may be at greater risk of developing hypocalcemia. Clinical monitoring of calcium levels is recommended. ✓ Consider referral to specialist.
Zoledronic Acid 5 mg/100 ml	Once yearly intravenous infusion (IV)	• MUST drink 2 glasses of fluid / water before & after IV infusion. • MUST keep the intravenous infusion intact. • Sit during the entire IV infusion. • Infusion Rate: a minimum of 15 min. Consider 45 min for improved tolerance.	**For zoledronic acid post-IV therapy: there may be flu-like, fever and myalgia symptoms:** ✓ Flu-like, fever, myalgia symptoms can occur within 3 days post-IV and can last 7-14 days. ✓ Acetaminophen or Ibuprofen can reduce the likelihood of post dose symptoms. ✓ IV Bisphosphonates are NOT recommended for residents with severe renal impairment and creatinine clearance <30mL/min.

For residents who are at HIGH RISK of fractures, this medication is suggested, *conditional recommendation:*

Therapies	Frequency	Safe Administration Guidance Life Expectancy > 1year	Key Cautions*
Teriparatide 20 mcg subcut	Daily subcutaneous injection	• Injection	✓ REFER to product monograph or CPS* for information. ✓ Cost may restrict access to this medication.

For residents who are at HIGH RISK of fractures, it is suggested that Raloxifene and Etidronate NOT be used, *conditional recommendation.*

Always check cautions listed in product monographs provided in *eCPS (Compendium of Pharmaceuticals and Specialties).

Adequate calcium and vitamin D intake is necessary to maintain normal blood calcium levels in residents prescribed these medications (see recommendations for calcium and vitamin D on page 2).

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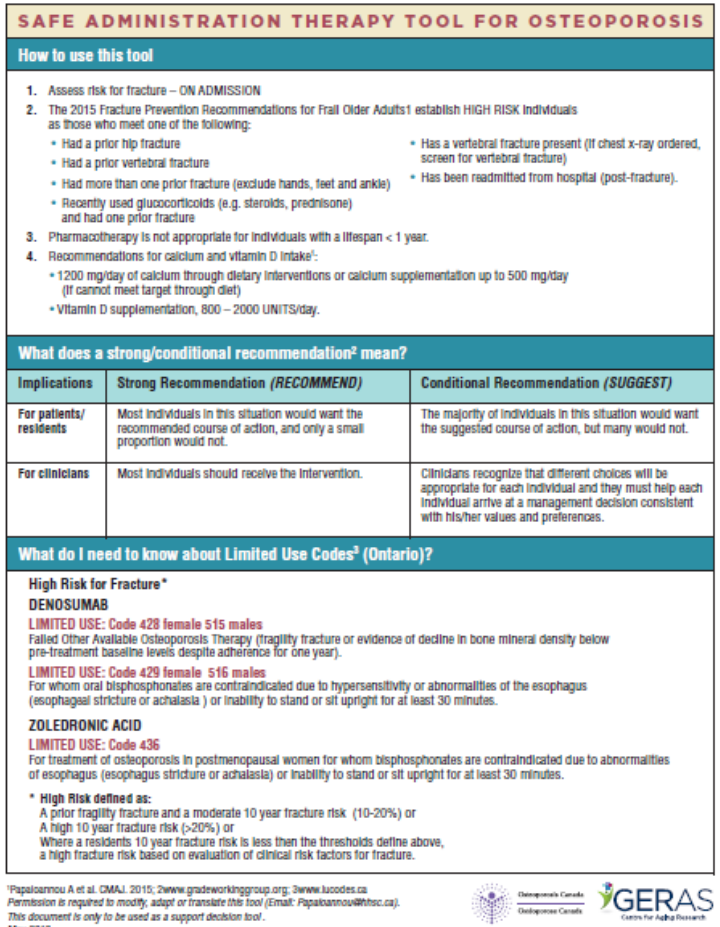

SAFE ADMINISTRATION THERAPY TOOL FOR OSTEOPOROSIS

How to use this tool

1. Assess risk for fracture – ON ADMISSION
2. The 2015 Fracture Prevention Recommendations for Frail Older Adults[1] establish HIGH RISK individuals as those who meet one of the following:
   - Had a prior hip fracture
   - Had a prior vertebral fracture
   - Had more than one prior fracture (exclude hands, feet and ankle)
   - Recently used glucocorticoids (e.g. steroids, prednisone) and had one prior fracture
   - Has a vertebral fracture present (If chest x-ray ordered, screen for vertebral fracture)
   - Has been readmitted from hospital (post-fracture).
3. Pharmacotherapy is not appropriate for individuals with a lifespan < 1 year.
4. Recommendations for calcium and vitamin D intake[1]:
   - 1200 mg/day of calcium through dietary interventions or calcium supplementation up to 500 mg/day (If cannot meet target through diet)
   - Vitamin D supplementation, 800 – 2000 UNITS/day.

What does a strong/conditional recommendation[2] mean?

Implications	Strong Recommendation *(RECOMMEND)*	Conditional Recommendation *(SUGGEST)*
For patients/ residents	Most individuals in this situation would want the recommended course of action, and only a small proportion would not.	The majority of individuals in this situation would want the suggested course of action, but many would not.
For clinicians	Most individuals should receive the intervention.	Clinicians recognize that different choices will be appropriate for each individual and they must help each individual arrive at a management decision consistent with his/her values and preferences.

What do I need to know about Limited Use Codes[3] (Ontario)?

High Risk for Fracture*

DENOSUMAB

LIMITED USE: Code 428 female 515 males
Failed Other Available Osteoporosis Therapy (fragility fracture or evidence of decline in bone mineral density below pre-treatment baseline levels despite adherence for one year).

LIMITED USE: Code 429 female 516 males
For whom oral bisphosphonates are contraindicated due to hypersensitivity or abnormalities of the esophagus (esophageal stricture or achalasia) or inability to stand or sit upright for at least 30 minutes.

ZOLEDRONIC ACID

LIMITED USE: Code 436
For treatment of osteoporosis in postmenopausal women for whom bisphosphonates are contraindicated due to abnormalities of esophagus (esophagus stricture or achalasia) or inability to stand or sit upright for at least 30 minutes.

*** High Risk defined as:**
A prior fragility fracture and a moderate 10 year fracture risk (10-20%) or
A high 10 year fracture risk (>20%) or
Where a residents 10 year fracture risk is less than the thresholds define above, a high fracture risk based on evaluation of clinical risk factors for fracture.

[1]Papaioannou A et al. CMAJ. 2015; 2www.gradeworkinggroup.org; 3www.lucodes.ca
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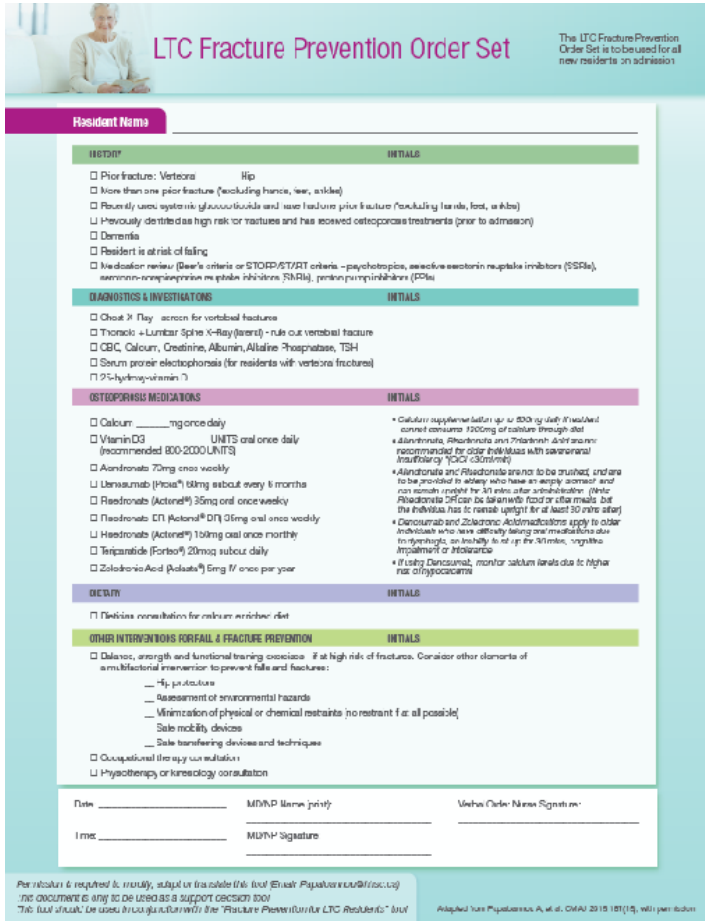
May 2018

Osteoporosis Canada / Ostéoporose Canada — GERAS Centre for Aging Research

Order Set



LTC Fracture Prevention Order Set

The LTC Fracture Prevention Order Set is to be used for all new residents on admission

Resident Name

HISTORY	INITIALS
☐ Prior fracture: Vertebral Hip	
☐ More than one prior fracture (excluding hands, feet, ankles)	
☐ Recently used systemic glucocorticoids and have had one prior fracture (excluding hands, feet, ankles)	
☐ Previously identified as high risk for fractures and has received osteoporosis treatments (prior to admission)	
☐ Dementia	
☐ Resident is at risk of falling	
☐ Medication review (Beer's criteria or STOPP/START criteria – psychotropics, selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), proton pump inhibitors (PPIs)	

DIAGNOSTICS & INVESTIGATIONS	INITIALS
☐ Chest X-Ray – screen for vertebral fractures	
☐ Thoracic + Lumbar Spine X-Ray (lateral) - rule out vertebral fracture	
☐ CBC, Calcium, Creatinine, Albumin, Alkaline Phosphatase, TSH	
☐ Serum protein electrophoresis (for residents with vertebral fractures)	
☐ 25-hydroxy-vitamin D	

OSTEOPOROSIS MEDICATIONS	INITIALS
☐ Calcium ______ mg once daily	• *Calcium supplementation up to 500mg daily if resident cannot consume 1200mg of calcium through diet*
☐ Vitamin D3 UNITS oral once daily (recommended 800-2000 UNITS)	• *Alendronate, Risedronate and Zoledronic Acid are not recommended for older individuals with severe renal insufficiency (CrCl <30ml/min)*
☐ Alendronate 70mg once weekly	• *Alendronate and Risedronate are not to be crushed, and are to be provided to elderly who have an empty stomach and can remain upright for 30 mins after administration. (Note: Risedronate DR can be taken with food or after meals, but the individual has to remain upright for at least 30 mins after)*
☐ Denosumab (Prolia®) 60mg subcut every 6 months	
☐ Risedronate (Actonel®) 35mg oral once weekly	
☐ Risedronate DR (Actonel® DR) 35mg oral once weekly	• *Denosumab and Zoledronic Acid medications apply to older individuals who have difficulty taking oral medications due to dysphagia, an inability to sit up for 30 mins, cognitive impairment or intolerance*
☐ Risedronate (Actonel®) 150mg oral once monthly	
☐ Teriparatide (Forteo®) 20mcg subcut daily	
☐ Zoledronic Acid (Aclasta®) 5mg IV once per year	• *If using Denosumab, monitor calcium levels due to higher risk of hypocalcemia*

DIETARY	INITIALS
☐ Dietician consultation for calcium enriched diet	

OTHER INTERVENTIONS FOR FALL & FRACTURE PREVENTION	INITIALS
☐ Balance, strength and functional training exercises if at high risk of fractures. Consider other elements of a multifactorial intervention to prevent falls and fractures:	
__ Hip protectors	
__ Assessment of environmental hazards	
__ Minimization of physical or chemical restraints (no restraint if at all possible)	
Safe mobility devices	
__ Safe transferring devices and techniques	
☐ Occupational therapy consultation	
☐ Physiotherapy or kinesiology consultation	

Date ______________ MD/NP Name (print) ______________ Verbal Order Nurse Signature ______________

Time ______________ MD/NP Signature ______________

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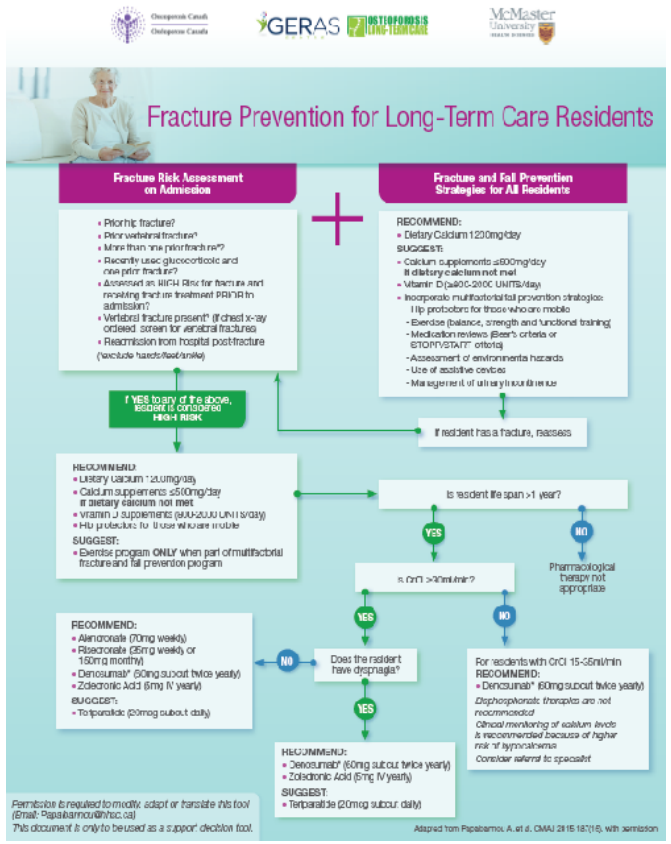
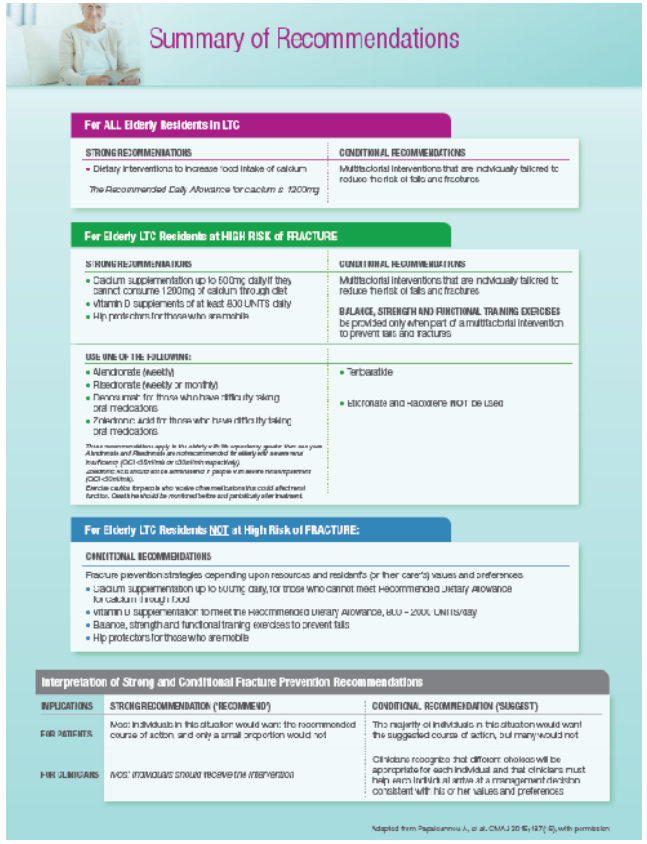
This document is only to be used as a support decision tool
This tool should be used in conjunction with the "Fracture Prevention for LTC Residents" tool

Adapted from Papaioannou A, et al. CMAJ 2015 187(15), with permission

Quick Reference Guide





Resident – related videos

Meeting the Challenges of Osteoporosis – English Version

Learn about the challenges of osteoporosis as well strategies to prevent falls and fractures in LTC.

Learn More

Combatting Fear with Knowledge About Osteoporosis

Mark shares his experience of caring for his mother who has osteoporosis.

Learn More

The Presence of Pain and Undiagnosed Osteoporosis

Devora shares her experience living with osteoporosis.

Learn More

The Presence of Pain and Undiagnosed Osteoporosis

Devora shares her experience living with osteoporosis.

Learn More

Osteoporosis Lessons in a Shared Family History

Sharon shares her experiences with osteoporosis.

Learn More

Risk and Consequences with Osteoporosis

Sylvia discusses changes she had to make her daily life when diagnosed with osteoporosis.

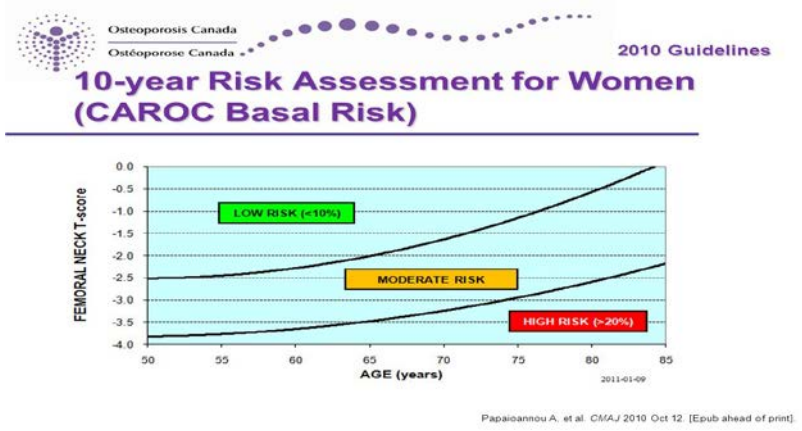
Learn More

How is fracture risk usually assessed?

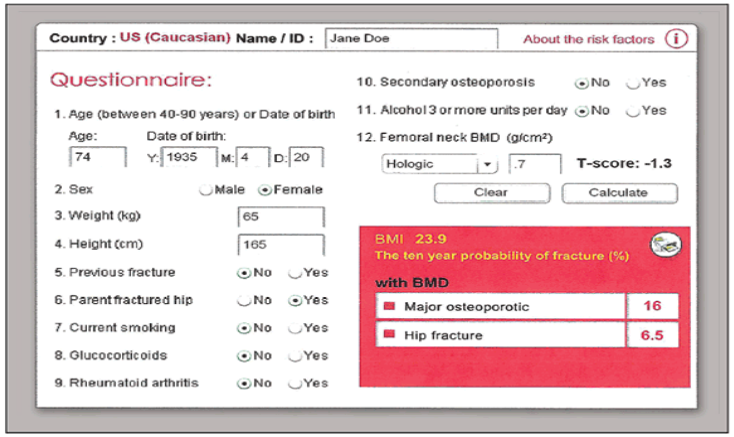
Fracture Risk Assessment

- In Canada, two tools are used to identify fracture risk in the community

CAROC



FRAX

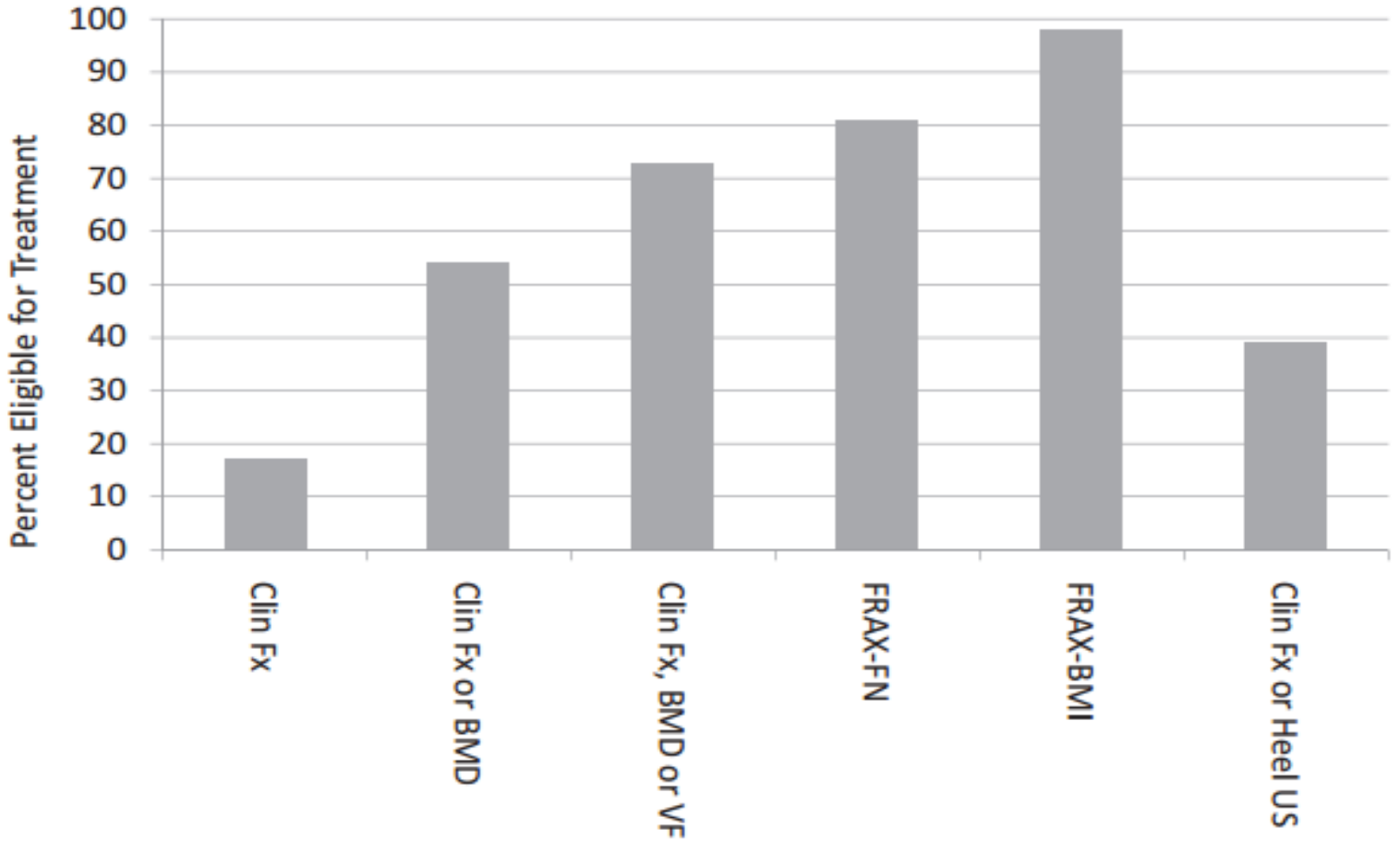


- Both predict fractures risk over 10 years

Issues with Fracture Risk Assessment in LTC

- Tools have been well characterized in community dwelling populations but are not validated for LTC
- Provide 10-year fracture risk – not helpful given that the average length of stay in LTC is 18 months
- Missing LTC risk factors applicable for the LTC population

Percentage of Residents eligible for Treatment based on Screening Strategy



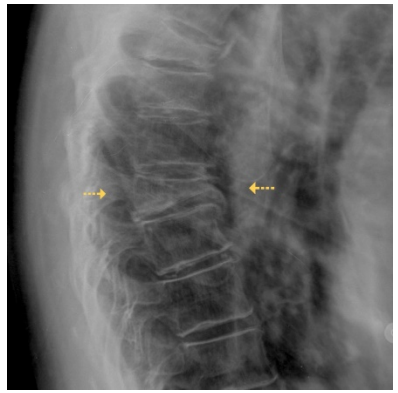
1. Greenspan SL. et al. J Am Geriatr Soc 2012,60(4): 684.

Meet Mrs. Andrews

87 year old woman just admitted to LTC – six months following the death of her husband; she was unable to care for herself at home

Mrs. Andrews

- History:
  - moderate dementia
  - wrist fracture 8 years ago – from a fall while walking
  - prescribed antidepressant for 2 years; PPI recently prescribed while in hospital
  - Prior fall
  - no osteoporosis diagnosis/ no osteoporosis medications
  - family reported recent weight loss and height change from 5’5” (165 cm) to 5’2”(157 cm) on admission
  - Height loss prompted a lateral thoracolumbar x-ray ordered – 2 vertebral fractures found



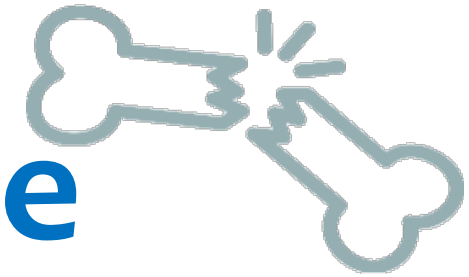
Mrs. Andrews

- LTC Assessment:
  - Appetite seems good and she is willing to eat food without difficulty
  - No significant dysphagia noted by staff
  - Wandering frequently around the home
  - Able to walk in corridor independently
  - BMI <18

At what level of risk for fractures is Mrs Andrews?

How can you estimate fracture risk?

Fracture Risk Scale (FRS)



Assessing fracture risk for LTC residents to put strategies into place to prevent fractures

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

A LTC Specific Tool Will:

- Improve care - enhance the diagnosis and appropriate treatment to prevent fractures in LTC.
- Ensure all those at high risk are identified and treated.
- Support the Fracture Prevention Recommendations for LTC, which stress the importance of identifying fracture risk.[1]


CMAJ GUIDELINES CME

Recommendations for preventing fracture in long-term care

Alexandra Papaioannou MD MSc, Nancy Santesso RD PhD, Suzanne N. Morin MD MSc, Sidney Feldman MD, Jonathan D. Adachi MD, Richard Crilly BSc MD, Lora M. Giangregorio PhD, Susan Jaglal PhD, Robert G. Josse MBBS, Sharon Kaasalainen PhD, Paul Katz MD, Andrea Moser MD MSc, Laura Pickard MA, Hope Weiler RD PhD, Susan Whiting PhD, Carly J. Skidmore MSc, Angela M. Cheung MD PhD; for the Scientific Advisory Council of Osteoporosis Canada

CMAJ Podcasts: author interview at https://soundcloud.com/cmajpodcasts/141331-guide

1. Papaioannou, A. et al. Recommendations for preventing fracture in long-term care. CMAJ, 2015; 187(15): 1135-44

The FRS:

- ✓ Predicts hip fractures for LTC residents
- ✓ Requires no additional documentation or resources
- ✓ Does not require BMD testing
- ✓ Validated across Canada

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

Where do I find the FRS score for my resident?

PointClickCare®

RAI-MDS (MDS 2.0) / LTCF

Outcomes Summary Report

How was the Fracture Risk Scale (FRS) Developed?

FRS Development

Three databases were linked to develop the FRS:

- RAI-MDS 2.0
  - Standardized global assessment tool mandated for use in all LTC homes in Ontario
- DAD (Discharge Abstract Database)
  - National database
  - Administrative, clinical and demographic information on hospital visits
- NACRS (National Ambulatory Care Reporting System)
  - National database
  - Emergency department visits, & day surgery

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

Methods

- Potential risk factors were collected using the RAI-MDS
- The DAD & NACRS databases were used to identify incident fractures
- Data were analyzed using Decision Tree Analysis

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

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

Risk Factors	% All Residents
Age group (85+)	45.9%
Women	66.0%
Fall in last 180 days	33.8%
Previous fracture	10.1%
Body mass index	
<18	8.0%
18-30	74.6%

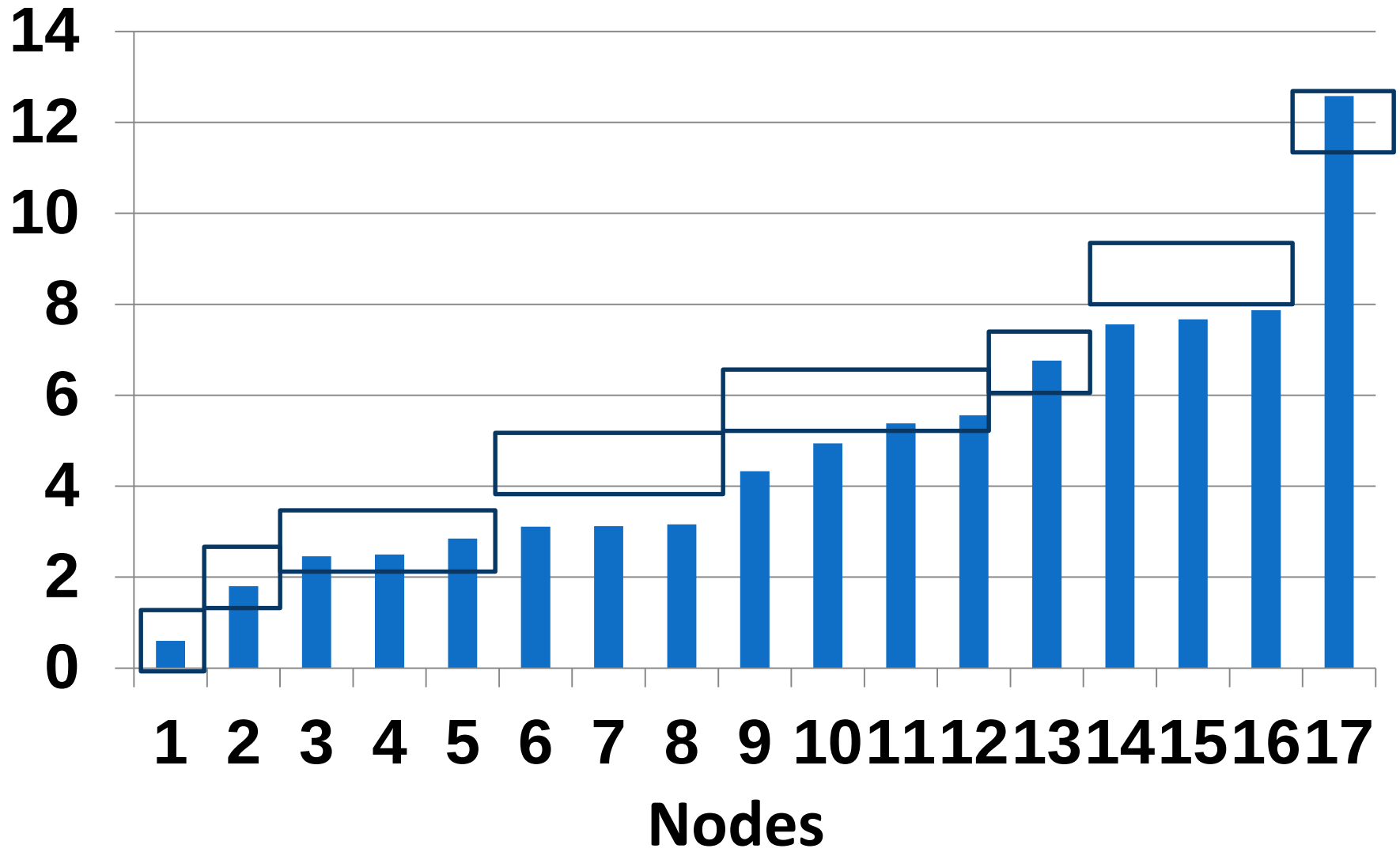
Ioannidis G, et al. BMJ Open, 2017;7.

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

Risk Factors	% All Residents
Walking in corridor	
Independently	35.3%
With supervision/ assistance	31.3%
Total dependence	33.4%
Cognitive impairment	17.3%
Wandering frequency	
Daily (in past 7 days)	11.7%

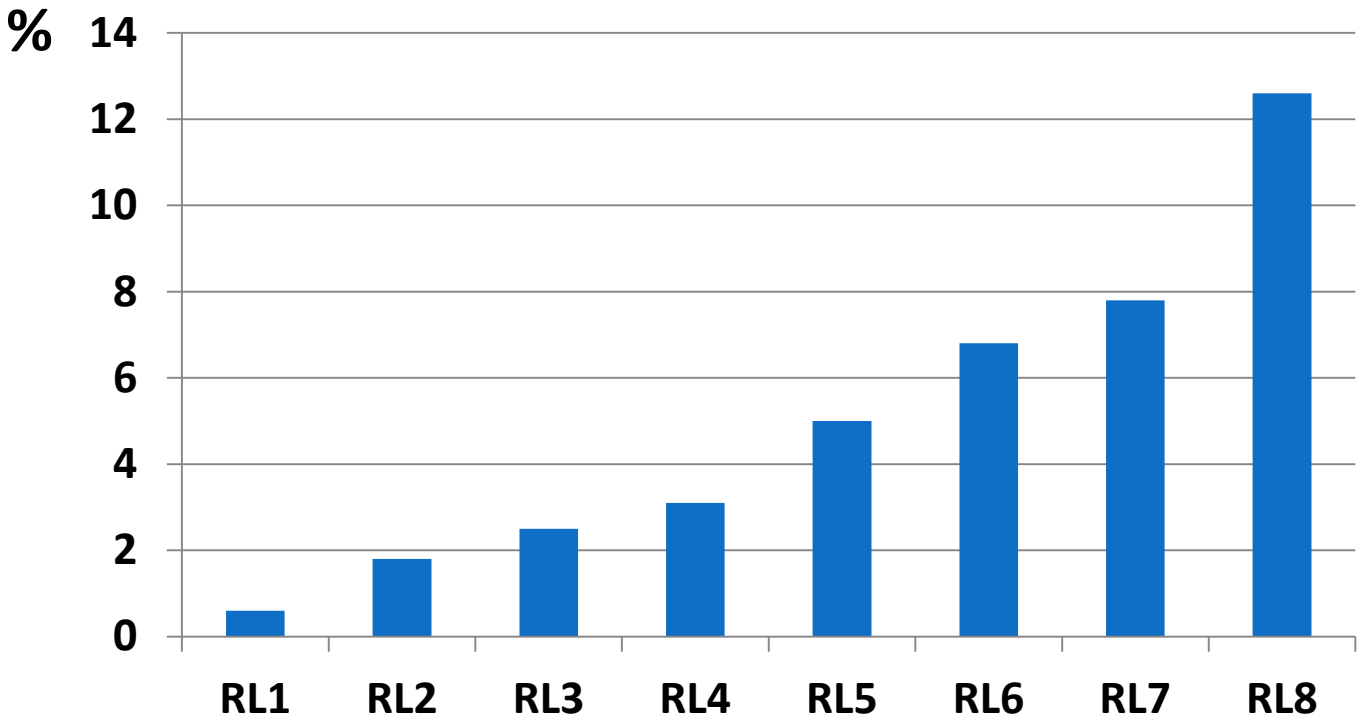
Ioannidis G, et al. BMJ Open, 2017;7.

Decision Tree end Nodes



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

% With a Hip Fracture at 1 Year



RL = FRS Risk Level

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

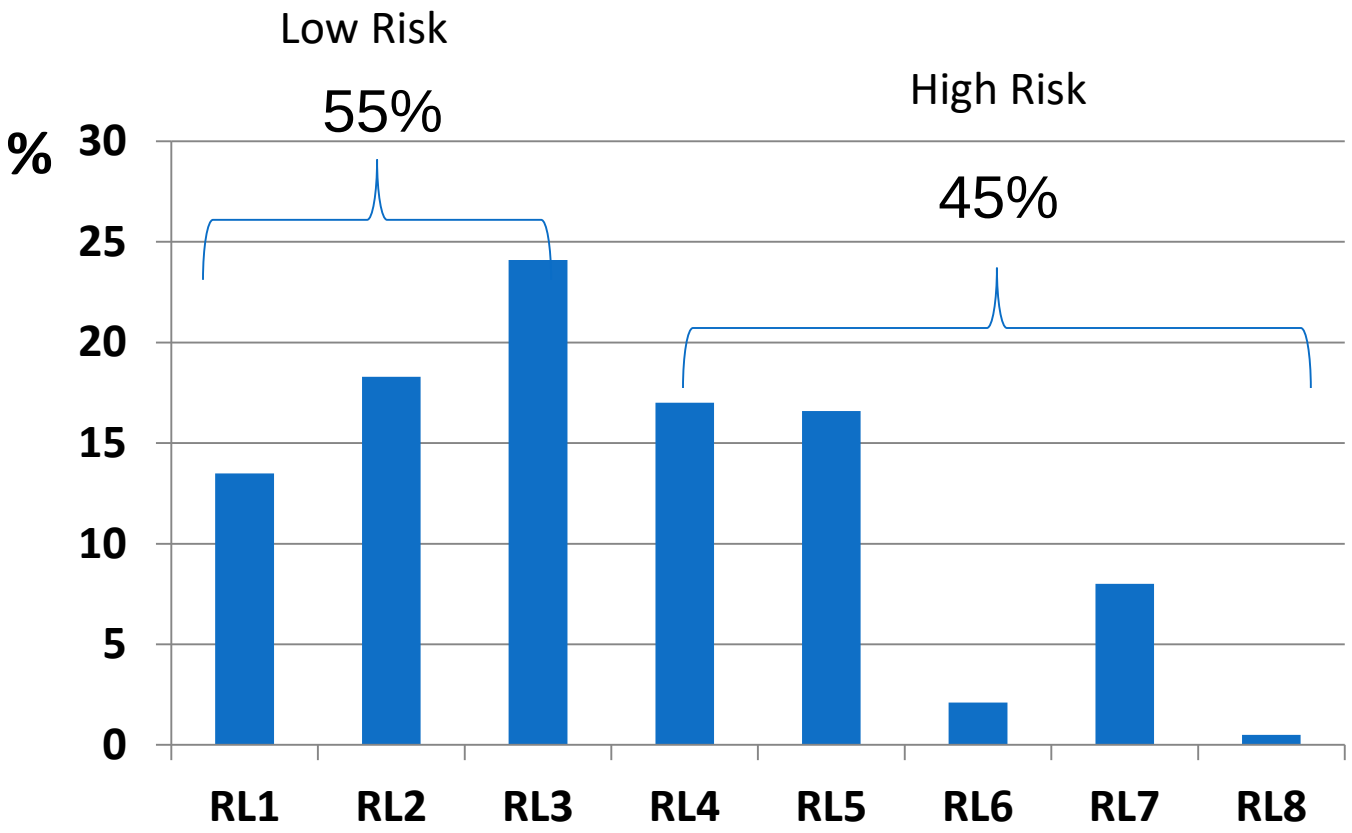
Odds Ratios* for Hip Fracture by Risk Level

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

*Odds calculated using multivariable logistic regression analysis

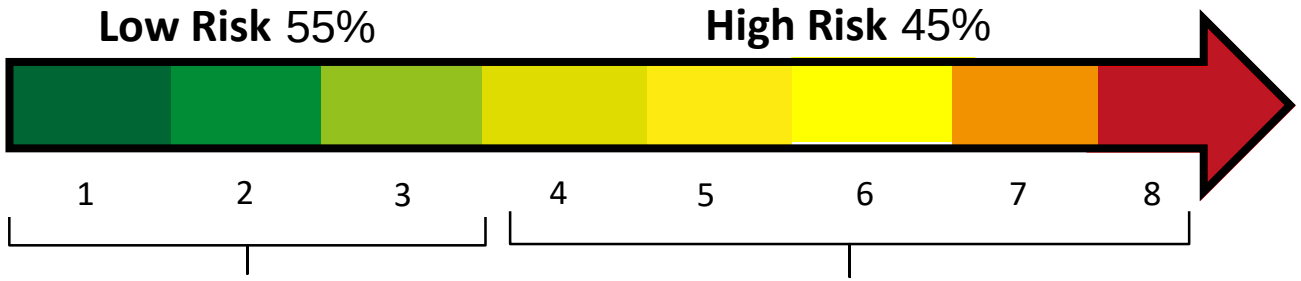
Ioannidis G, et al. BMJ Open, 2017;7.

% of Residents within Each Risk Category



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

FRS – Risk Prediction



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

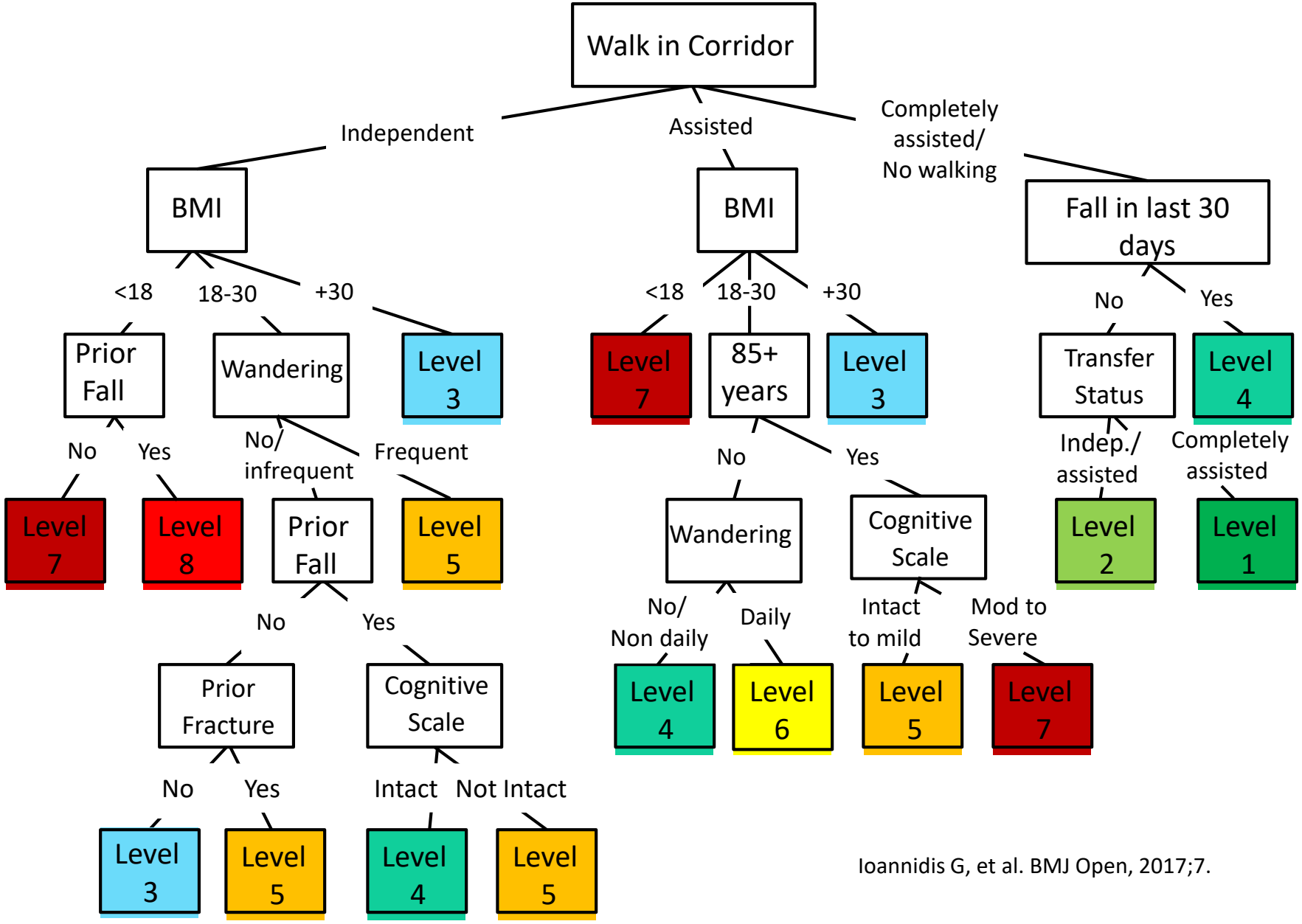
High Risk Resident
Walks in corridor and
BMI 18-30
& one of the following:
- Prior fall
- Prior fracture
- Cognitive impairment
- Tendency to wander
- Age >85

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

FRS Prediction Outcome Algorithm



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

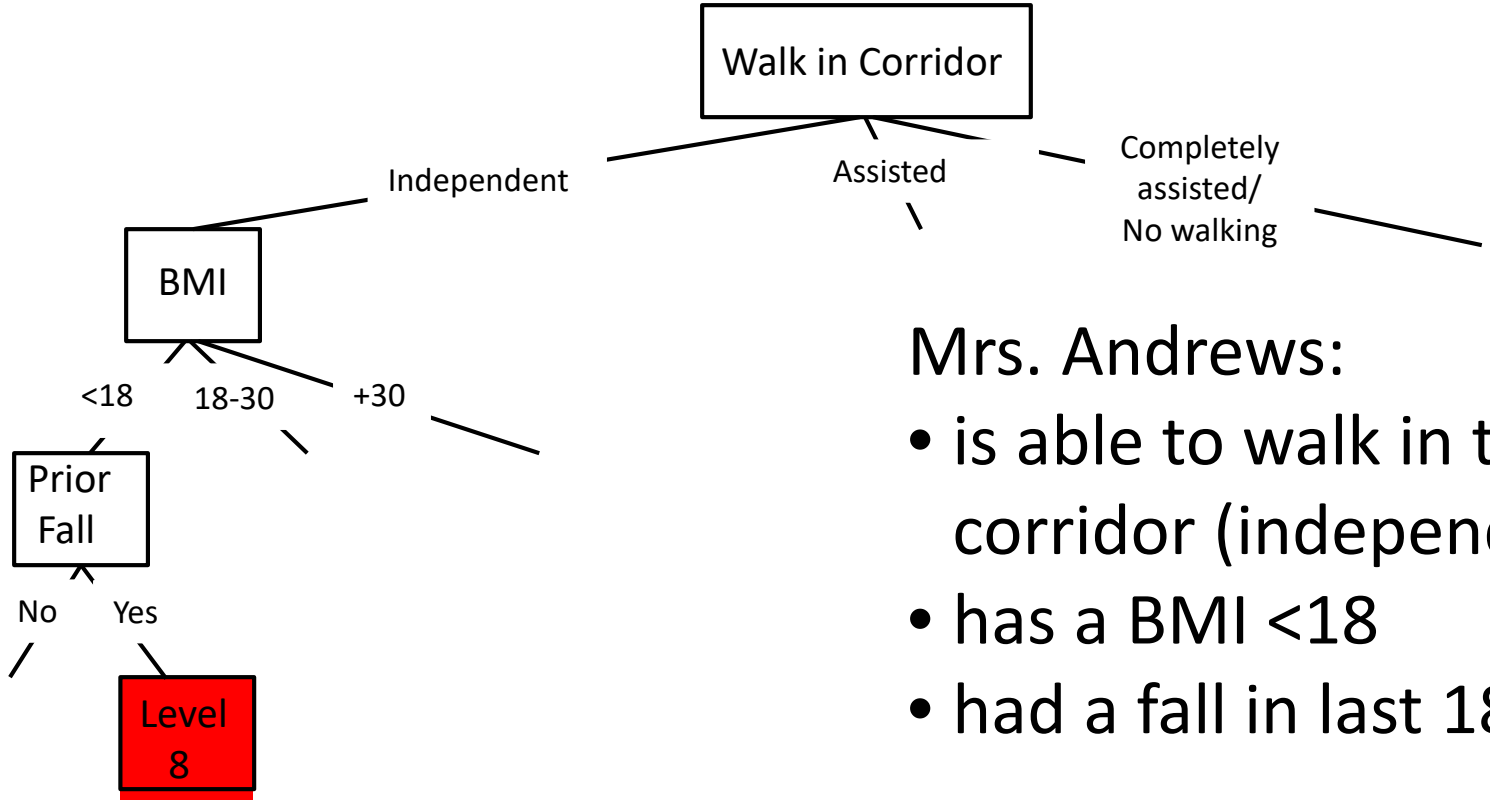
Some Cautions

- 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

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

… Back to Mrs. Andrews

Mrs. Andrews FRS score



Mrs. Andrews:

- is able to walk in the corridor (independently)
- has a BMI <18
- had a fall in last 180 days

Is at the highest level of risk

Treatment recommendations for Mrs. Andrews

LTC Recommendations:
Dietary interventions to meet the recommended dietary allowance (RDA) for calcium (>70 = 1200 mg calcium; 3 servings of dairy or dairy equivalents)[1]

Calcium & Vitamin D

- She is able to get sufficient calcium from her diet, so no supplement required
- Added 1,000 UNITS vitamin D daily

LTC Recommendations:
Daily supplements of 800 – 2000 UNITS vitamin D_3

What impact does calcium and Vitamin D have on fractures and mortality?

- Vitamin D in addition to calcium probably reduces hip fractures and mortality more than vitamin D alone or calcium alone[1-3]:
  - For residents at high risk, estimated 15/1000/yr fewer hip fractures
  - For residents not at high risk, 5/1000/yr fewer hip fractures; and,
  - For all residents, 7/1000/yr fewer deaths

[1]Bischoff-Ferrari HA et al. *N Engl J Med*. 2012

[2]Avenell A et al. *Cochrane Database Syst Rev*. 2009

[3]Murad MH et al. *J Clin Endocrinol Metab*. 2012

Treatment recommendations for Mrs. Andrews

LTC Recommendations:
Balance, strength and functional training exercises only when part of a multifactorial intervention to prevent falls

Exercise

- Conduct an individual physio assessment to determine whether she would benefit most from an individual or group exercise program, focusing on balance, strength and functional exercises

www.gerascentre.ca/ltcseries

www.osteoporosis.ca

Impact of exercise on falls

Informed by subgroup analyses for high-level versus intermediate level care

For those *at high risk* of fractures

Subgroup analyses for older adults in high-level care

SUGGESTED INCREASES

- Per 1000 older adults/yr:
  - 870 more falls
  - 85 more older adults falling

For those *not at high risk* of fractures

Subgroup analyses for older adults in intermediate-level care

SUGGESTED REDUCTIONS

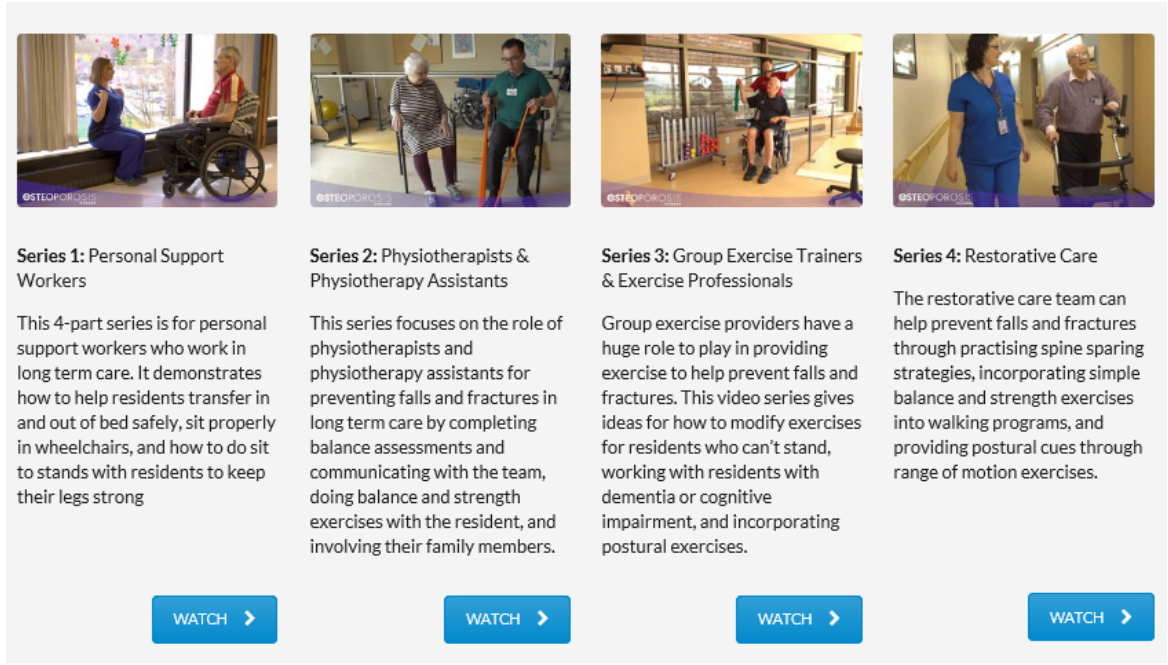
- Per 1000 older adults/yr:
  - 660 fewer falls
  - 20 fewer older adults falling

Cameron ID et al. *Cochrane Database Syst Rev*. 2012

Worth watching…

Long Term Care Series

Videos targeted at Personal Support Workers, Physiotherapists, Group Exercise Instructors, and Restorative Care workers in LTC



https://osteoporosis.ca/health-care-professionals/clinical-practice-guidelines/long-term-care/

Treatment recommendations for Mrs. Andrews

Hip protectors

- Given that Mrs. Andrews spends much time wandering aimlessly around her home hip protectors are recommended

LTC Recommendations:
For residents who are mobile and at high risk of fractures, hip protectors are recommended.

Summary of evidence

- Moderate quality evidence from systematic review showed relative risk reduction in hip fractures = 18% (95% CI, 0 to 33%) among older persons wearing hip protectors in institutional settings

- Over 1 year, per 1000 residents:
  - 4 fewer hip fractures wearing hip protectors may be likely
  - 11 fewer fractures among those at higher risk
  - 1 more pelvic fracture for older persons not at high risk
  - 8 more pelvic fracture for older persons at high risk.

- Moderate evidence, probably little or no difference in frequency of falls or adverse events requiring medical attention. Minor adverse events, e.g. skin irritation, occurred in < 2% people wearing hip protectors.

[1]Santesso N et al. *Cochrane Database Syst Rev*. 2014

Can hip protectors prevent fractures?

- Moderate evidence, probably little or no difference in frequency of falls or adverse events requiring medical attention. Minor adverse events, e.g. skin irritation, occurred in < 2% people wearing hip protectors.

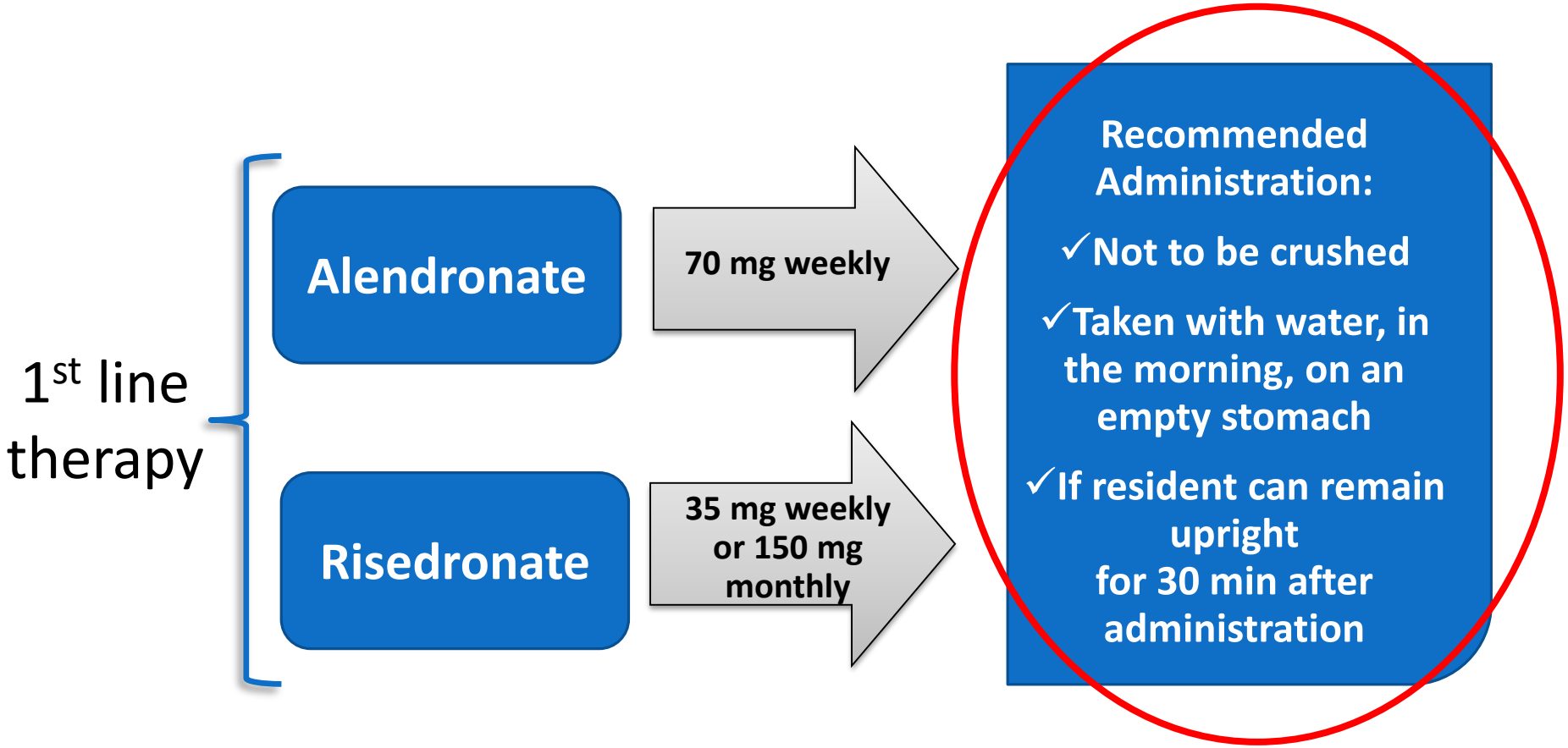
[1]Santesso N et al. *Cochrane Database Syst Rev*. 2014

More about Mrs. Andrews

- She is able to swallow and has normal kidney function
- Despite her vertebral fractures and underlying dementia she is well.
- She has reasonable life expectancy (it would be a surprise if she died within the next 12-months)
- Goals of care are active treatment and her substitute decision maker wants therapy if it will help prevent future fractures.

Would she benefit from pharmacotherapy?

LTC recommendations for HIGH RISK residents…



Papaioannou A et al. *CMAJ*. 2015

Contraindications

Alendronate and risedronate are not recommended for older persons with severe renal insufficiency (creatinine clearance <35 mL/min or <30 mL/min, respectively)

Papaioannou A et al. *CMAJ*. 2015

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

*Funding differs by province

1st line therapy

- **Denosumab* (60 mg subcut twice yearly)**
- **Zoledronic Acid (5mg IV yearly)**

**This recommendation applies to the older persons who have difficulty taking oral medications due to dysphagia, an inability to sit up for 30 min, cognitive impairment or intolerance*

Papaioannou A et al. *CMAJ*. 2015

Contraindications

Denosumab:

- While denosumab can be prescribed to residents with renal impairment, they are at higher risk of developing hypocalcemia
- Drug holidays not recommended as benefits are lost after discontinuation:
  - increased rate of vertebral fracture after one year, similar to those who never took the drug

Sui et al. Ann Int Med 2019; April 23.

Contraindications

Zoledronic Acid:

- Health Canada advises that caution is necessary for people who receive other medications that could affect renal function.
- Creatinine clearance should be monitored before and periodically after treatment.
- Appropriate hydration (500 mL of water) is necessary before and after treatment.
- This medication should not be administered in people with severe renal impairment (CrCl <30 mL/min).

Number Need to Treat (NNT)

First Line Drug Therapies to prevent fractures in older persons at High Risk of fractures in long-term care[1]

		Bisphosphonates[2]				
		Alendronate	Risedronate	Zoledronate	Denosumab[3]	Teriparatide[3]
Hip Fractures	Number of hip fractures prevented per 1000 treated	24 fewer	23 fewer	22 fewer	22 fewer	26 fewer
	Confidence interval	(14 - 32 fewer)	(15 - 31 fewer)	(12 – 29 fewer)	(6-32 fewer)	(40 fewer to 34 more)
	NNT to prevent one hip fracture	**42** (71 - 31)	**43** (67 - 32)	**45** (83 - 34)	**45** (167 - 31)	**n/a**
Vertebral Fractures	No. of vertebral fractures prevented per 1000 treated	89 fewer	97 fewer	120 fewer	124 fewer	130 fewer
	Confidence Interval	(35-124 fewer)	(55-128 fewer)	(62 - 152 fewer)	(60- 155 fewer)	(79 - 162 fewer)
	NNT to prevent one vertebral fracture	**11** (29 - 8)	**10** (18 - 8)	**8** (16 - 7)	**8** (17 - 6)	**8** (13 - 6)

[1]Quality of evidence was assessed as moderate. Estimated effects assumed baseline risk of hip fx at 6% and vertebral fx at 20%
[2]Primarily with at least 500 mg of calcium, and with/without vitamin D
[3]With calcium and vitamin D

Papaioannou A et al.*CMAJ*.2015

Multifactorial interventions

- Any combination of interventions that are tailored to an individual's risk to reduce falls.
- Such interventions may include:
  - medication reviews, assessment of environmental hazards, use of assistive devices, exercise, management of urinary incontinence and educational interventions directed to staff

LTC Recommendations: For all residents, multifactorial interventions that are individually tailored to reduce the risk of falls and fractures are suggested.

Papaioannou A et al. *CMAJ*. 2015

Centre for Effective Practice: Falls Prevention Guide

☑ Focus on *Modifiable Risk Factors*

- Restraint Use – **10.2* - i.e** Residents using restraints have a **10.2** time increased risk of fracture or serious injury
- Medications:
  - Opioids – **4.5** for fracture risk compared to NSAIDS
  - Psychotropics – **2.8** in LTC
  - Benzodiazepines – 1.61 in LTC
  - Antipsychotics – 1.5
  - SSRIs – 1.66

☑ Use BEEEACH Checklist: **B**ehaviour-**E**nvironment-**E**quipment-**E**ducation-**A**ctivity-**C**lothing & Footwear-**H**ealth Management

*Odds Ratio (OR) provided for the risk of fall
effectivepractice.org/academicdetailing

Centre for Effective Practice:

Medication associated with falls and fracture

Medication Class	Falls	Fractures	Hip Fracture	No. of fall reports meeting ISMP criteria (n=243)*
Opioids	✓	✓	✓	**25.1%**
Psychotropics: - Antidepressants (SSRIs, tricyclic antidepressants) - Antipsychotics - Sedatives & hypnotics	✓	✓	✓	**21.4%**
Cardiac Medications	✓	✓	✓	**17.3%**
Benzodiazepines	✓	✓		**13.6%**
Nonsteroidal anti-inflammatory drugs	✓			

*Institute for Safe Medication & Practices (ISMP) Canada report (Aug 1, 2000 – Dec 31, 2014)
Evidence for hypoglycemic agents and falls is lacking, especially in frail older adults. Clinically, caution is warranted
effectivepractice.org/academicdetailing

Multifaceted Intervention Components

Interactive Small-group **0, 6 and 12-months**	**Opinion Leader**	**Learning Modules**
Audit & Feed-back (Home & Physicians)	**Action Planning**	**Point of Care Tools** **(Alerts)**

Kennedy C et al. *Implementation Science*. 2012

Process Changes

After participation, seven process indicators were being newly implemented by over 50% of homes

Examples
Standard admission orders (83%)
1-2 staff as Osteoporosis Champions (75%)
“Medication Alerts” (67%)
Dietary enhancements for residents with OP (58%)

Kennedy C et al. *JAMDA*. 2014

Conclusions

- The FRS:
  - Builds on the 2015 recommendations for fracture prevention and supporting tools
  - Does not require BMD testing
  - Requires no additional documentation – risk level is automatically calculated once MDS-RAI information is entered
  - Is effective at discriminating and predicting hip fractures in LTC residents

Conclusions

- The FRS:
  - When used, has the potential to significantly increase fracture risk identification and management and reduce fractures
  - Will reduce pain, suffering, disability, and reduced quality of life associated with fractures

Conclusions

- Integration within the RAI-MDS:
  - Minimizes the workload of LTC professionals
  - Improves health planning
  - Promotes teamwork and interprofessional practice
  - Promotes resident safety


QUESTIONS?
COMMENTS?
CONCERNS?

OLTCC Evaluation Survey
Please provide your feedback!

Located in the OLTCC APP under the conference bag icon