Recommendations for Preventing Fracture in Long-Term Care

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Dr. Alexandra Papaioannou

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• Learn how to apply the 2015 Fracture Prevention Recommendations for frail older adults in long-term care
• Improve fracture risk assessment and identification of residents at high risk
• Learn how to choose non-pharmacological and pharmacological therapies for residents at high risk of fracture
How Common Are Fractures in Older Adults in Long-Term Care?
• Prevalence of all fractures is higher in LTC\textsuperscript{1,2}
  
  – Hip fracture rate for adults in LTC is 2-4 times that of similarly aged adults living in the community
  
  – One third of older adults who experience hip fractures are residents in LTC

• Up to 30\% of residents have vertebral fracture\textsuperscript{3}

\textsuperscript{1}Crilly RG et al. J Aging Research. 2010
\textsuperscript{2}Papaioannou A et al. Osteoporos Int. 2016
\textsuperscript{3}Rodondi A et al. Osteoporos Int. 2012
What is the Impact of Fractures?
In Women, a Hip Fracture Leads to...

Future fracture
- 10% will re-fracture within one year\(^1\)

Decreased quality of life
- Among those that die 27.8% new total dependance\(^2\)

Long-term care admissions
- Up to 18% enter LTC\(^3\)

1-year Mortality
- 20% for individuals returning to the community\(^1\)
- 40% for those living in LTC\(^1\)

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\(^2\)Neuman M et al. *JAMA Intern Medicine.* 2014

\(^3\)Jean et al. *JBMR.* 2012
Those at Highest risk for Mortality Post Hip Fracture

- Older then 90
- Non operative treatment
- Very severe cognition – on cognitive performance scale

Neuman M et al JAMA 2014
Resident Story

The Impact of Living in a Long-Term Care Home
The Fracture Care Gap

• Despite availability of therapies, many individuals are not being treated after fracture\textsuperscript{1,2,3}
  
  – Men and those with cognitive impairment less likely to be on treatment\textsuperscript{2,4,5}

• Calcium and Vitamin D supplementation varies in LTC\textsuperscript{2,3}

• 32% of those with hip fracture receive osteoporosis therapy

\textsuperscript{1} Papaioannou A et al. \textit{BMC Musculoskeletal Disord.} 2004
\textsuperscript{2} Zarowitz B et al. \textit{JAMDA.} 2015
\textsuperscript{3} Kennedy C et al. \textit{Can J Aging.} 2015
\textsuperscript{4} Liel Y et al. \textit{Osteoporos Int.} 2003
\textsuperscript{5} Switzer JA et al. \textit{J Orthop Trauma.} 2009
Challenges in LTC

• Current fracture risk assessment tools have *not* been validated in LTC

• Dementia (60%) \(^1\) ; Swallowing difficulties\(^2,3\) ; Chronic kidney disease (20%) \(^4,5\)

• Research and guidelines regarding risk assessment and pharmacological therapy have *not* included those with multiple comorbidities and lifespan\(^6,7\)

1 Canadian Institute of Health Information. 2013-2014
3 Jackson LD et al. *Health Q*. 2008
7 Mutasingwa DR et al. *Can Fam Physician*. 2011
What Are Barriers to the Implementation of Osteoporosis and Fracture Prevention Guidelines in LTC
**Patient Factors**
- Complex patients
- Poly-pharmacy
- Decreased life-span

**Process/Structure**
- Fracture Hx not captured
- BMD impractical
- OP/Fracture ≠ Care-Plans

**Environement**
- Competing demands
- Unskilled staff
- High staff turnover
- Physicians off-site

**Practice-related**
- Difficulty applying risk tools
- Confusion re: whom to treat, treatment benefits
- Concern re: Side-effects

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Wall M et al, *BMC Ger.* 2013
Kennedy C et al, *Can Ger J.* 2013
## Barriers to Implementing Guidelines in LTC

<table>
<thead>
<tr>
<th>Category</th>
<th>Themes</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Knowledge</td>
<td>• Patients impaired understanding of their condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect dispensing of bisphosphonates</td>
</tr>
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<td></td>
<td>Habits</td>
<td>• Low staff attendance at educational sessions</td>
</tr>
<tr>
<td>Organization</td>
<td>Regulations</td>
<td>• Inconsistent prescribing of vitamin D and calcium at the time of admission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quarterly reviews do not include osteoporosis and fracture prevention strategies</td>
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<tr>
<td></td>
<td></td>
<td>• Difficulty obtaining required information for fracture risk assessment</td>
</tr>
<tr>
<td></td>
<td>Processes of Care</td>
<td>• Limited medical history on osteoporosis and fractures</td>
</tr>
<tr>
<td>Social</td>
<td>Authorities</td>
<td>• Cumbersome process to change policies</td>
</tr>
<tr>
<td></td>
<td>Reactions of Patients</td>
<td>• Patients/Families’ unwillingness or inability to pay for Vitamin D</td>
</tr>
</tbody>
</table>
Ontario Long-term Care (LTC)$^{1,2}$

LTC homes: 24-hour access to nursing, supervision, personal care

- **625 LTC homes**
  - (77,000 beds)
- **≈ 60%** are for-profit

**Practice Setting**
- 75% nursing care by PSWs
- Physicians often off-site
- Collaborative decision-making

**Residents**
- 50% are ≥85; 70% women
- 75% mod-severe limitations ADL
- ≈85% Frail$^3$

**DOCUMENTED IN MDS-RAI**
- 13% fall within 30 days
- Hip Fracture: 8%
- Osteoporosis =25% (actual ≈60-80%$^4$)

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$^1$CIHI. 2013.
$^2$Conference Board of Canada. 2011.
$^4$Zimmerman SI et al. Osteoporos Int. 1999
Knowledge Translation (KT)

Research Evidence

Lack of uptake

Knowledge translation interventions research into practice

BARRIERS

- Lack of knowledge or awareness
- Ambiguity (who is doing what, where, when, how?)
- Ability (limited by skill, self-efficacy, system barriers)
- Inertia (maintain the status quo)

Implementation Science

Pronovost PJ. JAMA. 2013
Implementing Guidelines in LTC

The Vitamin D and Osteoporosis Study

2 Kennedy C et al. JAMDA. 2014
3 Kennedy C et al. Trials. 2015
Project 2: Objectives

**Primary**
To evaluate the feasibility of implementing a multifaceted KT intervention within LTC using a Controlled Randomized Trial (CRT) design.

To determine if the KT intervention increased the prescribing of vitamin D (≥800 IU/day) over 12-months.

**Secondary**
To determine if the KT intervention increased the prescribing of calcium (≥500 mg/day) and osteoporosis medications (high-risk residents) over 12-months.

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
(PIC, Alerts)

Key Results

Difference in absolute prescribing change (over 12-mon) B/W Intervention and Control

OR=1.82
(1.12, 2.96)

OR=1.33
(1.01, 1.74)

OR=1.17
(0.91, 1.51)

High-risk

Project 2: Key Results

Difference in absolute prescribing change (over 12-mon) B/W Intervention and Control

Per protocol

Vitamin D: 27.0 (25.5, 28.5)
Calcium: 13.1 (12.0, 14.2)
OP Med: 2.9 (1.7, 4.1)

High-risk

Kennedy C et al. Trials.2015
After participation, seven process indicators were being newly implemented by over 50% of homes

<table>
<thead>
<tr>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard admission orders <strong>(83%)</strong></td>
</tr>
<tr>
<td>1-2 staff as Osteoporosis Champions <strong>(75%)</strong></td>
</tr>
<tr>
<td>“Medication Alerts” <strong>(67%)</strong></td>
</tr>
<tr>
<td>Dietary enhancements for residents with OP <strong>(58%)</strong></td>
</tr>
</tbody>
</table>
What is the Goal of the Fracture Prevention Recommendations?
Reduce immobility, pain, transfers to hospital and improve quality of living of residents

Papaioannou A et al. CMAJ. 2015
The Recommendations
• The proposed recommendations integrate falls and osteoporosis assessment taking into consideration lifespan, renal impairment and simultaneous risks of falls and fractures

• Recommendations consider various treatment strategies in addition to pharmacotherapy
How Were the Recommendations Developed?
Using the GRADE Approach¹

How Can the Recommendations Be Interpreted?
Interpreting the Recommendations

<table>
<thead>
<tr>
<th>Implications</th>
<th>Strong Recommendation “we recommend”...</th>
<th>Conditional Recommendation “we suggest”...</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR PATIENTS/RESIDENTS</td>
<td>Most individuals in this situation would want the recommended course of action, and only a small proportion would not</td>
<td>The majority of individuals in this situation would want the suggested course of action, but many would not</td>
</tr>
<tr>
<td>FOR CLINICIANS</td>
<td>Most individuals should receive the intervention</td>
<td>Clinicians recognize that different choices will be appropriate for each individual and that clinicians must help each individual arrive at a management decision consistent with his/her values and preferences</td>
</tr>
</tbody>
</table>

1[www.gradeworkinggroup.org](http://www.gradeworkinggroup.org)
Interpreting the Evidence

| ☘◘◘◘      | HIGH        | We are very confident that the true effect lies close to that of the estimate of the effect |
| ☘◘◘◘◘     | MODERATE    | We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different |
| ☘◘◘◘◘     | LOW         | Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect |
| ☘◘◘◘◘◘    | VERY LOW    | We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect |

How Do We Assess High Risk of Fracture in LTC?
Guidelines Intervention Groups

Recommendations for interventions to prevent fracture were developed for the following groups:

- Older residents in LTC at high risk of fracture
- Older residents in LTC not at high risk of fracture
Who Is at HIGH Risk for Fractures?
Percentage of Residents Eligible for Treatment Based on Screening Strategy\textsuperscript{1}

\textsuperscript{1}Greenspan SL et al. JAGS. 2012
Ask the Following Questions on Admission

<table>
<thead>
<tr>
<th>Determine...</th>
<th>How to assess?...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior hip fracture</td>
<td>“have you ever broken your hip?”</td>
</tr>
<tr>
<td>Prior vertebral fracture</td>
<td>“have you lost height?”&lt;br&gt;<strong>If YES and &gt;6 cm historically, order lateral thoracic and lumbar spine</strong></td>
</tr>
<tr>
<td>More than one prior fracture (excluding fractures of the hands/feet/ankle)</td>
<td>“have you had a broken bone after 50?”</td>
</tr>
<tr>
<td>If recently used systemic glucocorticoids and have had one prior fracture</td>
<td>Are you using medications such steroids or prednisone?</td>
</tr>
<tr>
<td>If identified as high risk and/or on osteoporosis treatment prior to admission</td>
<td>“have you been on osteoporosis medications?”</td>
</tr>
</tbody>
</table>

*BMD is not required to identify residents at high risk of fracture*

1Papaioannou A et al. *CMAJ*. 2010
Fracture Prevention for LTC Residents

Fracture Risk Assessment on Admission

If YES to any of the above, resident is considered HIGH RISK

RECOMMEND:
• Dietary Calcium 1200mg/day
• Calcium supplements ≤500 mg/day
  if dietary calcium not met
• Vitamin D supplements (800-2000 UNITS/day)
• Hip protectors for those who are mobile

SUGGEST:
• Exercise program ONLY when part of multifactorial fracture and fall prevention program

http://www.osteoporosis.ca/health-care-professionals/clinical-tools-and-resources/
If the answer is YES to any of the previous questions, the resident is considered at **HIGH RISK** for fracture

Papaioannou A et al. CMAJ. 2015
What Are the Recommendations for Calcium and Vitamin D?
• For all residents, we recommend dietary interventions to meet the recommended dietary allowance (RDA) for calcium
  – The RDA for people >70 years for calcium is 1200 mg daily (3 servings of dairy or dairy equivalents)
• For residents at high risk who cannot meet the RDA for calcium through dietary intake, we recommend daily supplements of calcium up to 500 mg.

• For residents who are not at high risk of fractures and who cannot meet the RDA for calcium through dietary intake, we suggest daily supplements of calcium up to 500 mg, depending on resources and their (or their caregiver’s) values and preferences.
Vitamin D

- For residents at high risk of fractures, we recommend daily supplements of 800 – 2000 UNITS vitamin D₃.

- For residents not at high risk, we suggest daily supplements of 800 – 2000 UNITS vitamin D₃, depending on resources and their (or their caregiver’s) values and preferences.

Papaioannou A et al. CMAJ. 2015
We found that vitamin D in addition to calcium probably reduces hip fractures more than vitamin D alone or calcium alone\textsuperscript{1-3}:

\begin{itemize}
\item Moderate
\item For residents at high risk, estimated 15/1000 fewer hip fractures
\item For residents not at high risk, 5/1000 fewer hip fractures; and,
\item For all residents, 7/1000 fewer deaths
\end{itemize}

\textsuperscript{1}Bischoff-Ferrari HA et al. \textit{N Engl J Med}. 2012
\textsuperscript{2}Avenell A et al. \textit{Cochrane Database Syst Rev}. 2009
\textsuperscript{3}Murad MH et al. \textit{J Clin Endocrinol Metab}. 2012
### TABLE: Dietary Reference Intakes for Calcium and Vitamin D

<table>
<thead>
<tr>
<th>Life Stage Group</th>
<th>Estimated Average Requirement (mg/day)</th>
<th>Recommended Dietary Allowance (mg/day)</th>
<th>Upper Level Intake (mg/day)</th>
<th>Estimated Average Requirement (IU/day)</th>
<th>Recommended Dietary Allowance (IU/day)</th>
<th>Upper Level Intake (IU/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0 to 6 months</td>
<td>*</td>
<td>*</td>
<td>1,000</td>
<td>**</td>
<td>**</td>
<td>1,000</td>
</tr>
<tr>
<td>Infants 6 to 12 months</td>
<td>*</td>
<td>*</td>
<td>1,500</td>
<td>**</td>
<td>**</td>
<td>1,500</td>
</tr>
<tr>
<td>1–3 years old</td>
<td>500</td>
<td>700</td>
<td>2,500</td>
<td>400</td>
<td>600</td>
<td>2,500</td>
</tr>
<tr>
<td>4–8 years</td>
<td>800</td>
<td>1,000</td>
<td>2,500</td>
<td>400</td>
<td>600</td>
<td>3,000</td>
</tr>
<tr>
<td>9–13 years old</td>
<td>1,100</td>
<td>1,500</td>
<td>3,000</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>14–18 years old</td>
<td>1,100</td>
<td>1,300</td>
<td>3,000</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>19–30 years old</td>
<td>800</td>
<td>1,000</td>
<td>2,500</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>31–50 years old</td>
<td>800</td>
<td>1,000</td>
<td>2,500</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>51–70 year old males</td>
<td>800</td>
<td>1,000</td>
<td>2,000</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>51–70 year old females</td>
<td>1,000</td>
<td>1,200</td>
<td>2,000</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>&gt;70 years old</td>
<td>1,000</td>
<td>1,200</td>
<td>2,000</td>
<td>400</td>
<td>800</td>
<td>4,000</td>
</tr>
<tr>
<td>14–18 years old, pregnant/lactating</td>
<td>1,100</td>
<td>1,300</td>
<td>3,000</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
<tr>
<td>19–50 years old, pregnant/lactating</td>
<td>800</td>
<td>1,000</td>
<td>2,500</td>
<td>400</td>
<td>600</td>
<td>4,000</td>
</tr>
</tbody>
</table>

*For infants, Adequate Intake is 200 mg/day for 0 to 6 months of age and 260 mg/day for 6 to 12 months of age.

**For infants, Adequate Intake is 400 IU/day for 0 to 6 months of age and 400 IU/day for 6 to 12 months of age.

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1 Calcium Vitamin D. *Institute of Medicine of the National Academies.* 2011
Resident Story

Devora Greenspoon on the Importance of Diet

http://gerascentre.osteoporosislongtermcare.ca/stories/
What Are the Recommendations for Exercise?
• For residents at high risk of fractures, we suggest balance, strength and functional training exercises only when part of a multifactorial intervention to prevent falls
  – *This recommendation places a high value on avoiding the small increase in falls which may occur among individuals at high risk of falls who participate in exercises, such as balance, strength and functional training*

• For residents not at high risk, we suggest balance, strength and functional training exercises to prevent falls
  – *This recommendation places a high value on the probably small reduction in falls that is achieved with exercise, as falls may lead to serious injuries. It also places high value on the other benefits that exercise could provide.*
Impact of Exercise on Falls

Informed by subgroup analyses for high-level versus intermediate level care\(^1\)

For those at high risk of fractures

*Subgroup analyses for older adults in high-level care*

**SUGGESTED INCREASES**

- in the number of falls: 870 more falls per 1000 older adults\(^1\)
- in the number of older adults falling: 85 more per 1000\(^1\)

For those not at high risk of fractures

*Subgroup analyses for older adults in intermediate-level care*

**SUGGESTED REDUCTIONS**

- in the number of falls: 660 fewer falls per 1000 older adults\(^1\)
- in the number of older adults falling: 20 fewer fall per 1000\(^1\)

\(^1\)Cameron ID et al. Cochrane Database Syst Rev. 2012
EXAMPLE BALANCE EXERCISES

Standing – supported semi-tandem stance

Seated – weight shifting

Sample provided by Dr. Lora Giangregorio. University of Waterloo. 2016
EXAMPLE STRENGTH EXERCISES, LOWER BODY

Standing
Supported sit to stand

Seated
Knee extension

Supine – Bridging

Sample provided by Dr. Lora Giangregorio. University of Waterloo. 2016
EXAMPLE STRENGTH EXERCISES, UPPER BODY

Standing – Pulldown

Seated – Sash

Supine – Bow and arrow

Sample provided by Dr. Lora Giangregorio. University of Waterloo. 2016
More information


• Dr. Lora Giangregorio video series on exercise and osteoporosis:

Visit the Osteoporosis Canada website ([www.osteoporosis.ca](http://www.osteoporosis.ca)) to watch the video series
What Are the Recommendations for the Use of Hip Protectors?
For residents who are mobile and at high risk of fractures, we recommend hip protectors.

For residents who are not at high risk of fracture but are mobile, we suggest hip protectors depending on resources available and the residents’ values and preferences.
Hip Protectors

• Moderate quality evidence from systematic reviews showed a relative risk reduction in hip fracture of 18% in older persons wearing hip protectors in institutional settings\(^1\)

  – In the older persons at higher risk: 11 fewer hip fractures per 1000
  – Over one year, 4 fewer hip fractures per 1000 older persons wearing hip protectors maybe likely

• Moderate evidence showed little or no difference in falls or adverse effects requiring medical attention\(^1\)

\(^1\)Santesso N et al. *Cochrane Database Syst Rev.* 2014
What Are Multifactorial Interventions and Recommendations?
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

For all residents, we suggest multifactorial interventions that are individually tailored to reduce the risk of falls and fractures
Evidence Profile Re: Multifactorial Interventions

• **Number of falls / 1000 people**
  ⊕⊕◯◯ Low
  660 fewer falls /1000

• **Number of people who fall at least once in 1 year**
  ⊕⊕◯◯ Low
  55 fewer people fall per 1000

• **Number of people who have a hip fracture in 1 year**
  ⊕⊕◯◯ Low
  10 fewer per 1000

Papaioannou A et al. *CMAJ.* 2015
Resident Story

Devora Greenspoon on Her Fear of Falling

http://gerascentre.osteoporosislongtermcare.ca/stories/
Quick Reference Guide (cont.)

If **YES** to any of the above, resident is considered **HIGH RISK**

**RECOMMEND:**
- Dietary Calcium 1200mg/day
- Calcium supplements ≤500 mg/day
  **if dietary calcium not met**
- Vitamin D supplements (800-2000 UNITS/day)
- Hip protectors for those who are mobile

**SUGGEST:**
- Exercise program **ONLY** when part of multifactorial fracture and fall prevention program
What Are Pharmacological Therapy Recommendations for Older Adults?
We calculated the effects of benefits and harms at one year or more and therefore, these recommendations apply to older persons with life expectancy greater than one year.
For HIGH RISK Residents, We Recommend..

1st line therapy

- Alendronate 70 mg weekly
- Risedronate 35 mg weekly or 150 mg monthly

Recommended Administration:
- Not to be crushed
- In the morning, on an empty stomach
- If resident can remain upright for 30 min after administration

NOTE
- Risedronate DR can be taken immediately after breakfast and is not required to be taken first thing in the morning on an empty stomach.

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..

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.

Zoledronic Acid:
• Health Canada advises that caution is necessary for people who receive other medications that could affect renal function; CrCl 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).

Papaioannou A et al. CMAJ. 2015
For HIGH RISK Residents
We Suggest...

Teriparatide
(20 mcg subcut daily)

Although the benefits of teriparatide (in particular on vertebral fracture) probably outweigh harms of treatment, the cost of therapy restricts its access, and there may be a higher burden due to daily injections

Papaioannou A et al. CMAJ. 2015
For HIGH RISK Residents, We Suggest **Not** to Use...

**Etidronate**

There is moderate quality evidence for little to no reduction in fractures (in particular hip fractures) with etidronate. The cost is also high given the lack of important benefits.

**Raloxifene**

The harms of raloxifene (e.g. venous thromboembolism and musculoskeletal events – arthralgia, myalgia) probably outweigh the probable reduction in vertebral fractures and small reductions in hip and non-vertebral fractures.
Is Mrs. S considered a high risk?

Back to the Quick Reference Guide....

Papaioannou A et al. CMAJ. 2015

http://www.osteoporosis.ca/health-care-professionals/clinical-tools-and-resources/
Back to the Quick Reference Guide....

**RECOMMEND:**
- Alendronate (70mg weekly)
- Risedronate (35mg weekly or 150 mg monthly)
- Denosumab* (60mg subcut twice yearly)
- Zoledronic Acid (5mg IV yearly)

**SUGGEST:**
- Teriparatide (20mcg subcut daily)

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Does the resident have dysphagia?

**NO**

For residents with CrCl 15-35 ml/min

**RECOMMEND:**
- Denosumab* (60mg subcut twice yearly)
- Bisphosphonate therapies are not recommended
- Clinical monitoring of calcium levels is recommended because of higher risk of hypocalcemia
- Consider referral to specialist

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**YES**

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

**SUGGEST:**
- Teriparatide (20mcg subcut daily)
Summary of Evidence
Pharmacological Therapy

⊕⊕⊕ Moderate
From network meta-analysis with trials with risk of bias; population primarily community¹-³

- Risk of bias in some studies and uncertainty when applying effects in post-menopausal women to long-term care residents
  - Probable reductions in hip fractures (∼25/1000 fewer) across all drugs & relatively smaller reductions with etidronate & raloxifene
  - Probable reductions in vertebral fractures (∼100/1000 fewer) and non-vertebral fractures (∼20/1000 fewer) with all drugs, relatively greater reductions w/teriparatide & smaller reductions w/raloxifene.

¹Hopkins RB et al. BMC Musculoskelet Disord. 2011
²Levis S et al. J Manag Care Pharm. 2012
³Murad MH et al. J Clin Endocrinol Metab. 2012
Summary

• Determine risk of fracture on resident’s admission
  • Calcium and vitamin D supplementation
  • Exercise, hip protectors and multifactorial interventions
  • Pharmacological therapy for residents at high risk
For access to the recommendations and other tools and resources, please visit:

Osteoporosis Canada at www.osteoporosis.ca

GERAS website at www.gerascentre.ca

French resources: http://www.osteoporosecanada.ca/


¹Copy-paste link to your internet browser