

# Osteoporosis Management and Fracture Prevention

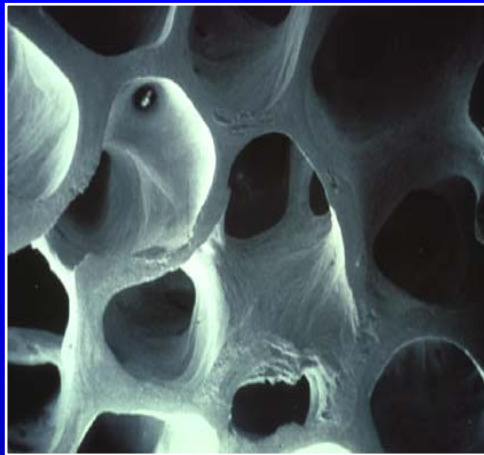


Dr. Alexandra Papaioannou  
Canadian Institutes of Health Research and Eli Lilly Chair  
McMaster University  
Hamilton Health Sciences

---

# What is Osteoporosis and how do fractures occur?

---

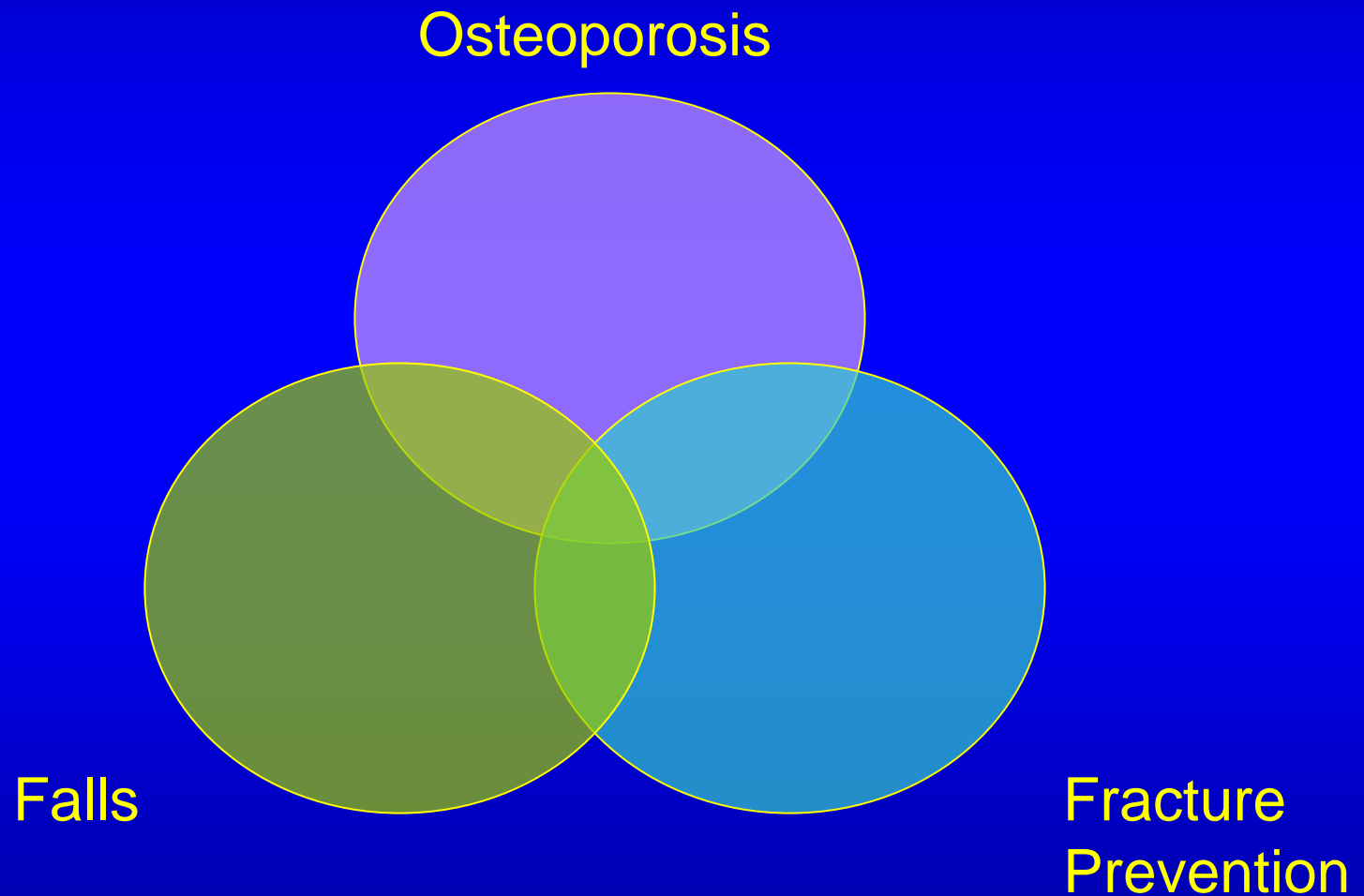


**Normal Bone**



**Porous Bone**

# Interrelated Health Issues



---

# How Common Are Hip Fractures In Long-term Care and What are the Costs?

---



# Quick Facts about Osteoporosis in Long-Term Care Homes

Hip fracture rates	2-11 times greater in LTC than in community <sup>1,2,3</sup>
Reason for admission to LTC	24% of individuals who fracture are admitted to LTC <sup>4</sup>
Prevalence in LTC	80-85% have osteoporosis <sup>5,6</sup>
Who is at risk in LTC?	<b>All residents</b>



1 Vu MQ et al. JAMDA 2006; 7:S53-8  
2 Cumming RG. *Am J Epidemiol* 1996;143(12):1191-1194.  
3 Brennan nee Saunders J, et al. *Osteoporos Int* 2003;14(6):515-519.  
4 Papaioannou A, et al *J Soc Obstet Gynaecol Can*; 2000; 22(8):591-7  
5 Duque et al. *J Am Med Dir Assoc* 2006; 7: 435-441  
6 AMDA 2009 Osteoporosis and Fracture Prevention in LTC Setting Clinical Practice Guideline, Columbia Md.

# Quick Facts about Osteoporosis in Long-Term Care Homes

Leading cause of fractures	<b>Osteoporosis (+ falls)= Fragility Fracture<sup>1</sup></b> <ul style="list-style-type: none"><li>• 10% will re-fracture within 1-year<sup>2</sup></li></ul>
Most common osteoporotic fracture	<b>Vertebral (Spinal) Fracture<sup>1</sup></b>
Most debilitating osteoporotic fracture	<b>Hip Fracture</b> <ul style="list-style-type: none"><li>• Costs In Ontario:<ul style="list-style-type: none"><li>• 1 year cost of a resident readmitted to LTC after a fracture - \$33,729<sup>3</sup></li><li>• Newly admitted to LTC - \$44,156<sup>3</sup></li></ul></li></ul>

1. Bessette L, et al. Cont Clinical Trials; 2008; 29:194-210  
2. Papaioannou A, et al J Soc Obstet Gynaecol Can; 2000; 22(8):591-7  
3. Wiktorowicz M, et al. Osteo Int; 2001 12(4) 271-8

# Quick Facts about Osteoporosis in Long-Term Care Homes

Falls in LTC	38-50% of residents fall annually <sup>1,2</sup> Of those who fall: 27-44% have fallen previously <sup>1,2</sup>
Injuries from falls	24%-30% sustain a fall related injury <sup>1,2</sup>
Fractures from falls	2-7% sustain a fracture <sup>1,2</sup> 1% of all falls result in hip fractures <sup>1,2</sup>

1. AMDA 2009 Osteoporosis and Fracture Prevention in LTC Setting Clinical Practice Guideline, Columbia Md.
2. Canadian Task Force on Preventive Health Care 2003 prevention of Falls in LTC

# Quick Facts about Osteoporosis in Long-Term Care Homes

Most frequent reason for hospitalization	Hip fracture <sup>1</sup> <ul style="list-style-type: none"><li>• followed by pneumonia, cardiovascular</li></ul>
Treatment rates	Less than 10% of residents are treated <sup>2,3</sup> <ul style="list-style-type: none"><li>• Vitamin D, Calcium and Bisphosphonates</li><li>• Average length of stay is 2.5 years in LTC</li></ul>
Death rate from hip fractures	39% within 12 months <sup>4</sup> <ul style="list-style-type: none"><li>• Greater for men than women<sup>4</sup></li></ul>

1. Ronald L et al. Cdn J Aging 2008; 27 (1) : 109 – 115
2. Duque et al., J Am Med Dir Assoc 2006; 7: 435–441
3. Giangregorio LM et al.. Osteo Int 2009; 20(9):1471-8
4. Papaioannou A, et al J Soc Obstet Gynaecol Can; 2000; 22(8):591-7;

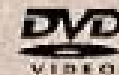
# Bone Health Protection Strategies/Best Practices for Long- Term Care

1. Improved assessments
2. Daily Vitamin D 1000 IU supplements
3. Adequate daily dietary intake of calcium and if necessary, additional supplementation
4. Bisphosphonate medications
5. Wearing hip protectors
6. Regular exercise and safe transfers

Meeting the Challenge  
of Osteoporosis  
and Fracture Prevention



ONTARIO  
OSTEOPOROSIS  
STRATEGY FOR  
LONG-TERM CARE



# Osteoporosis LTC Toolkit



Designed for long-term care and packed with a variety of resources

- Purchase Order Form
- Poster, Mini Poster and Mini Poster panel card
- DVD
- Slide deck for health care professionals (non MD)
- Panel Cards:
  - Pop Quiz panel card
  - Make it part of your falls program
  - Hip protectors: falls body armour
  - Vitamin D and Calcium
  - Bisphosphonates: How to give them
- Exercise: Weight bearing
- Case Study
- SHRTN newsletter
- BP Blogger newsletter: Bones issue
- Osteoporosis Area Managers contact info
- Osteoporosis Canada Information

WEBSITE: [www.osteostategy.on.ca](http://www.osteostategy.on.ca)

EMAIL: [osteoltc@osteoporosis.ca](mailto:osteoltc@osteoporosis.ca)

PHONE: 905-521-2100 x74161



# Register for a Toolkit Webinar: 2 dates left!

1. Tuesday December 15<sup>th</sup>  
10:30am
2. Tuesday January 19<sup>th</sup>  
10:30am

- over 150 sites have registered between 5 previous webinars

Now Available.  
More Webinars.  
Book early!



**OSTEOPOROSIS and  
FRACTURE PREVENTION  
in Long-Term Care**

**INTRODUCTION  
TO NEW  
LONG-TERM CARE  
OSTEOPOROSIS TOOLKIT**

### To register:

(registration opens September 14, 2009)

Go online and complete the registration form at:

[https://www.surveymonkey.com/s.aspx?sm=qxCQEIfEF5Uph86N\\_2f9asFw\\_3d\\_3d](https://www.surveymonkey.com/s.aspx?sm=qxCQEIfEF5Uph86N_2f9asFw_3d_3d)

(please enter this link into your web browser)

There are 4 additional webinar sessions.  
Plan to attend one of these dates:

Tuesday October 20, 2009: 10:30 -11:30 am  
Tuesday November 17, 2009: 10:30 -11:30 am  
Tuesday December 15 2009: 10:30-11:30 am  
Tuesday January 19, 2010: 10:30-11:30 am

### For more info....

Mary-Lou van der Horst

dhm9@xplornet.com

905.541.0656

OR

Emilie Sartoretto

ESartoretto@bruyere.org

613.562.6262 x1404



Great opportunity for anyone from long-term care or those caring for older adults to learn about the resources that are inside the Osteoporosis Toolkit for LTC and important bone health protection strategies.



ONTARIO HEALTH RESOURCES TRANSLATED NETWORK  
Linking Caregivers, Researchers & Policy Makers

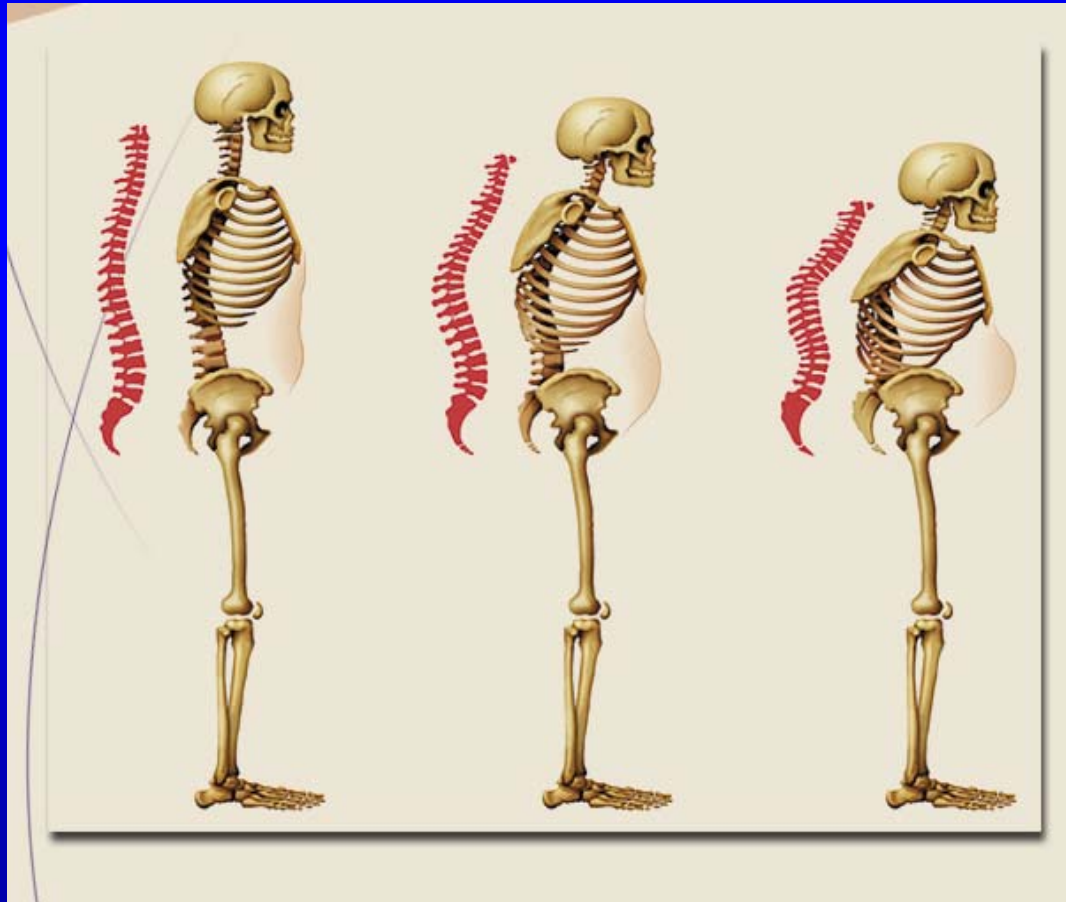
ONTARIO  
OSTEOPOROSIS  
STRATEGY FOR  
LONG-TERM CARE




---

# What are the Risks for Fractures?

---





# Almost all fractures in LTC are due to falls *and* osteoporosis

## ***Strongest risk factors in Long-Term Care:***

- Transfer independence <sup>1</sup>
- Prior fracture : 30-60% increase in hip fractures <sup>1,2,3</sup>
- Cognitive impairment <sup>1, 2</sup>

## **Other risk factors:**

- Age >65 <sup>1</sup>
- 3 or more co-morbid conditions <sup>2, 3</sup>
- Residents with low BMD values <sup>1</sup>
- Medications associated with falls <sup>1, 2, 3</sup>
- History of falls <sup>1</sup>
- Low weight (poor nutrition) <sup>1,2</sup>
- Vitamin D deficiency <sup>3</sup>

1. Chandler et al. JAMA 2000; 284(8)  
2. Chen et al. Age and Ageing 2008; 37:536-541  
3. Colon-Emeric et al. OI 2003 Jul;14(6):484-9

---

# What can we do to prevent fractures and falls?

---



Osteoporosis Canada

---

Ostéoporose Canada

NOVEMBER IS OSTEOPOROSIS MONTH

# What do we know about Vitamin D?



- *Improves bone density, muscle function, body sway, coordination*
- *Reduces muscle pain, hip and spinal fractures and the debilitating effects of osteoporosis*
- *Reduces falls by 20% (fracture, post operative infection and readmission to acute care)*
- Vitamin D levels are alarmingly low in LTC

**Recommended dose: Vitamin D 1000-2000 IU daily**

# Vitamin D: 3 key studies

---

- Meta-analysis : Community, institution, mean age 78y, 89% women
  - Non vertebral fractures 12 high quality RCTs N= 42,279
  - Hip fractures 8 high quality RCTs N=40,886
- No fracture reduction was observed for doses <400IU
- 484-770IU reduced nonvertebral fractures by at least 20% and hip fractures by at least 18%

---

1

Bischoff-Ferrari, H.A., Willett, W.C., Wong, J.B., et. (2009). Prevention of nonvertebral fractures with oral vitamin D and dose dependency. A meta-analysis of randomized controlled trials. *Arch Intern Med*, 69(6), 551-561.

# Fracture Reduction and Vitamin D

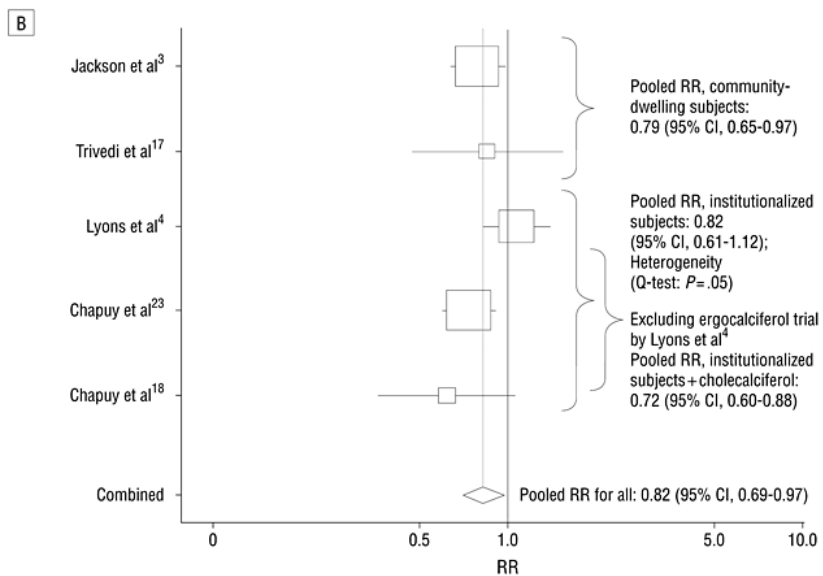
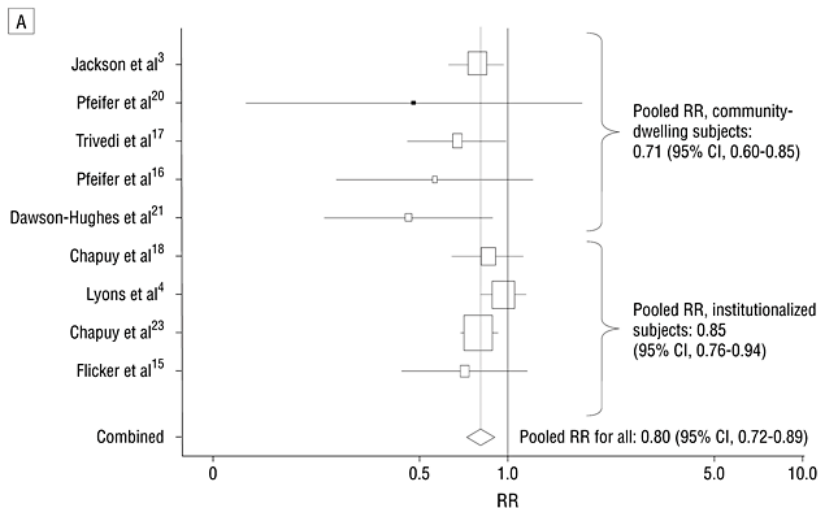


Figure 2

Nonvertebral and hip fracture reduction

# Fracture Reduction and Vitamin D

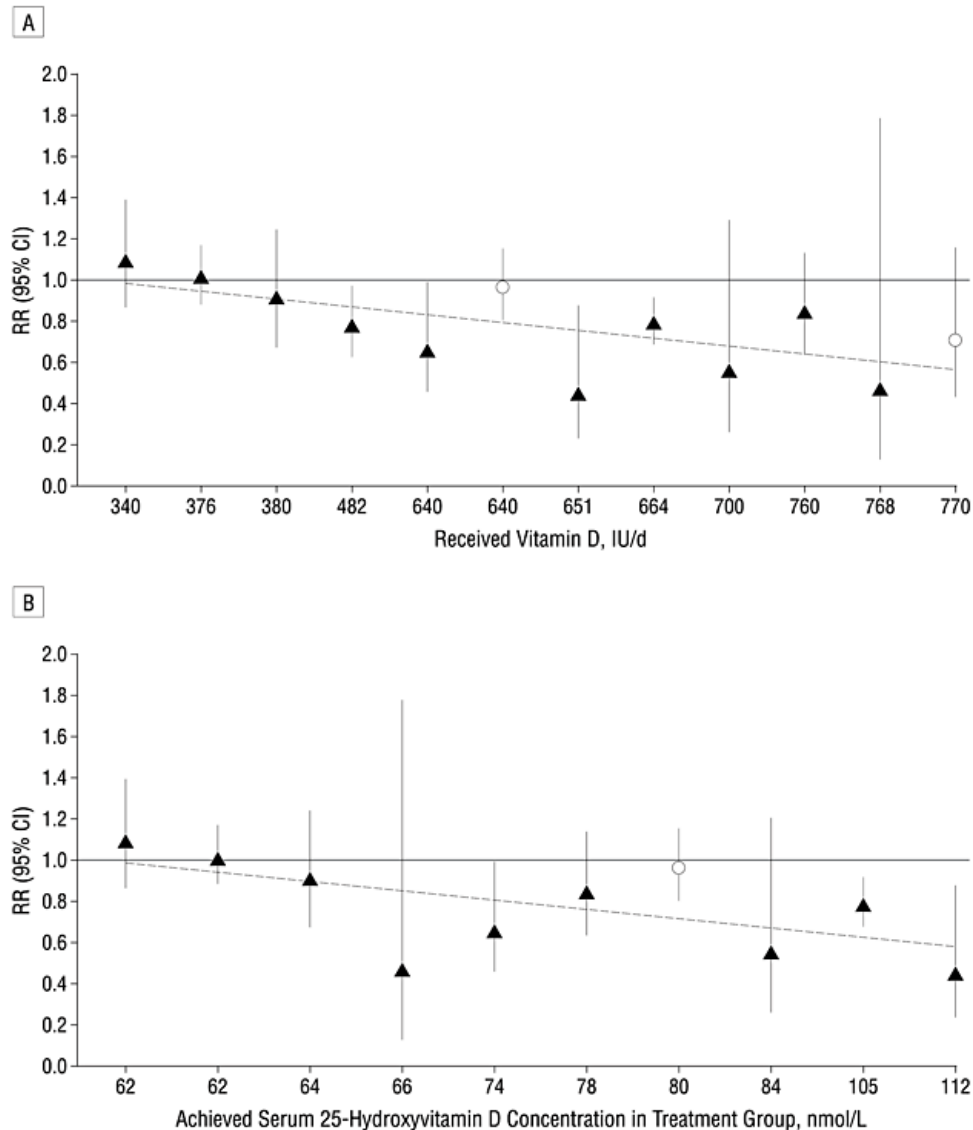


Figure 3

Nonvertebral fracture prevention by received dose and achieved 25-hydroxyvitamin D levels in treatment group

# Vitamin D: 3 key studies

---

- Meta-analysis: 8 RCTs N=2426
- High-dose Vitamin D supplementation 23% reduction in falls (pooled RR 0.77, 95% CI 0.65 to 0.90)
- Falls were not notably reduced by low dose supplemental vitamin D or by achieved serum 25-hydroxyvitamin D concentrations of less than 60 nmol/l
- Supplemental vitamin D in a dose of 700-1000 IU a day reduced the risk of falling among older individuals by 19%

---

2

Bischoff-Ferrari, H.A., et al. (2009). Fall prevention with supplemental and active forms of vitamin D: a meta-analysis of randomised controlled trials. *BMJ* 2009;339:b3692

# Fall Prevention and D

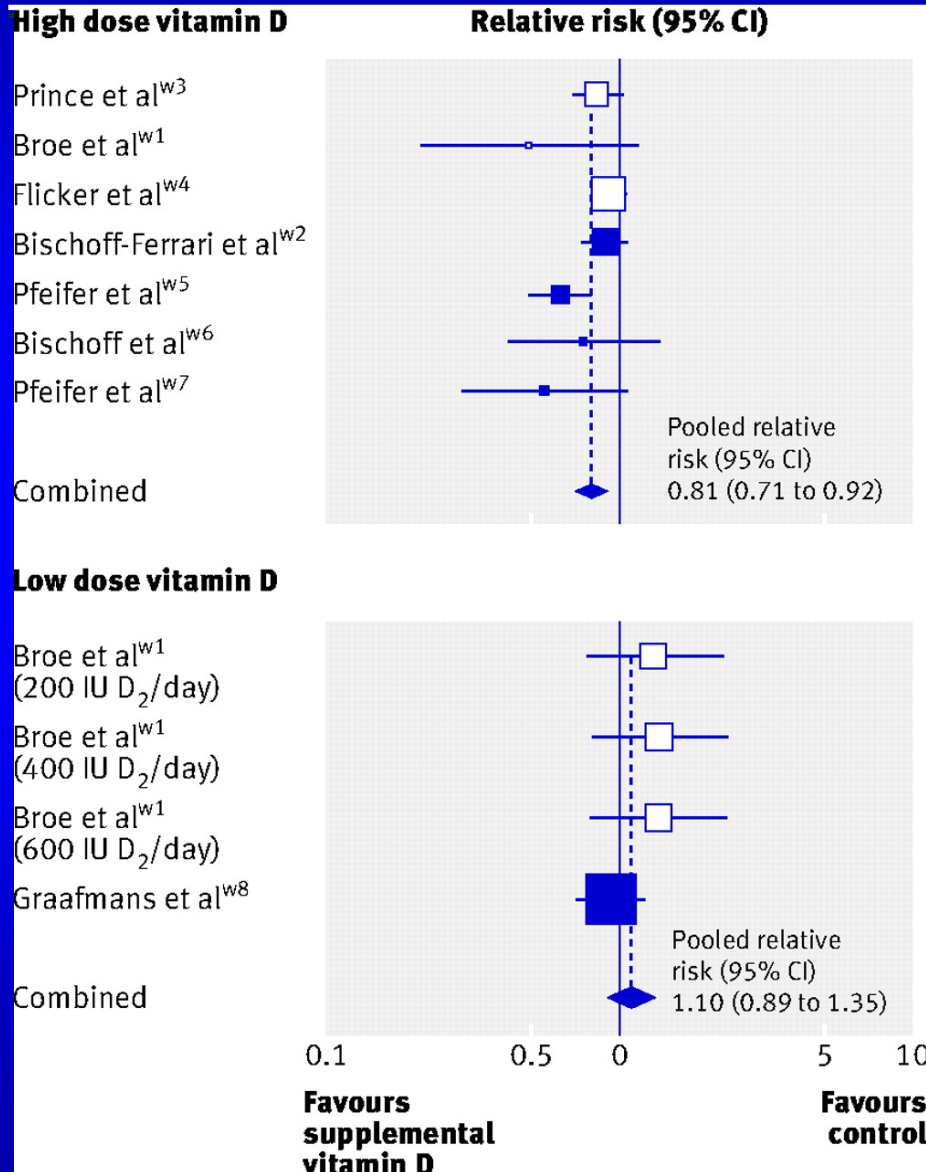


Figure 2

Fig 2 Fall prevention with high dose (700-1000 IU a day) and low dose (200-600 IU a day) of supplemental vitamin D.

# Fall Prevention and D

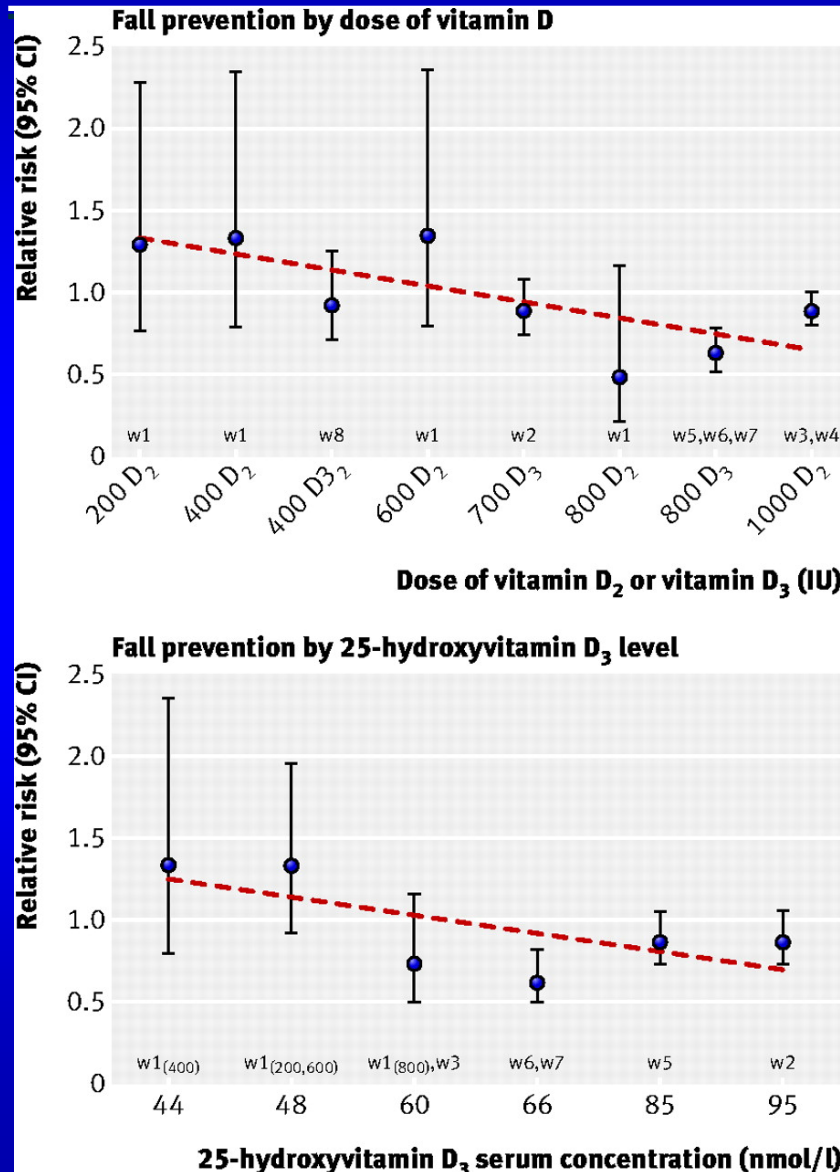


Figure 3

Fall prevention by dose and achieved 25(OH)D concentrations

# Vitamin D: 3 key studies

---

- RCT: N=173 acute hip fracture patients
  - 79% women; mean age 84 years; 77% living in the community;
  - 51% of patients had severe vitamin D deficiency (<30 nmol/l)
- Post discharge hip fracture at 12months best outcome
  - Vitamin D 2000IU + extended 1h PT
  - 25% reduction in falls
  - 39% reduction in readmissions to hospital
  - 60% reduction in fall related injuries
  - 90% reduction in infections requiring hospitalization

---

3

Bischoff-Ferrari, H.A., et al. (2009). Effect of extended physiotherapy and high-dose vitamin D on rate of falls and hospital re-admission after acute hip fracture: a randomized controlled trial. *Abstract 31<sup>st</sup> ASBMR, September, Denver Colorado.*

# Ontario-Wide Study: Vitamin D Blood Levels

---

## Background

- The best indicator of vitamin D status in the body is the concentration of serum 25-hydroxyvitamin D<sub>3</sub> [25(OH)D<sub>3</sub>].
- Suboptimal levels of Vitamin D have not been recently noted in Ontario LTC homes.

## Primary Outcome

- The prevalence of vitamin D insufficiency in Ontario LTC homes (serum 25(OH)D<sub>3</sub> <75 nmol/L)

## Secondary Outcome

- The association between vitamin D supplementation regimes and resulting 25(OH)Vitamin D<sub>3</sub> blood levels

# Ontario Osteoporosis Strategy for Long-Term Care: Vitamin D and Osteoporosis (ViDOS)

---

## ViDOS Participation Benefits

- Assist each LTC home to implement osteoporosis and fracture prevention best practices.
- Offer strategies that support the reduction of resident fractures and falls.

## Primary Outcome

- The prevalence of vitamin D insufficiency in Ontario LTC homes (serum 25(OH)D<sub>3</sub> <75 nmol/L)

## Secondary Outcome

- The association between vitamin D supplementation regimes and resulting 25(OH)Vitamin D<sub>3</sub> blood levels



Exercise is a dirty  
word. Every time  
I hear it, I wash my  
mouth out with  
chocolate.

Charles M. Schulz

