FALLS PREVENTION

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OBJECTIVES

- Scope of the problem
- Overview of evidence-based fall prevention interventions
  - Community
  - Acute care hospitals
  - Residential care facilities
- Take home messages

WHAT'S IN A NAME?

- DEFINITION OF FALL:

  "An event which results in a person coming to rest inadvertently on the ground or floor or other lower level."

  World Health Organization

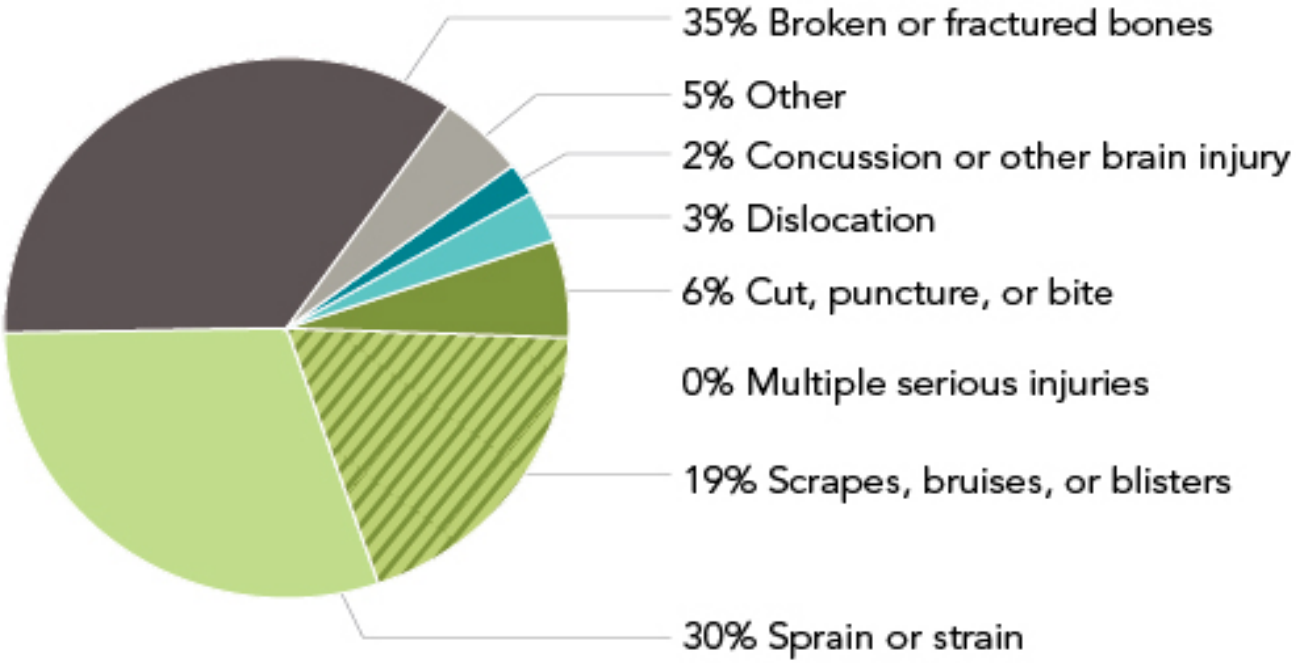
- A classic "Geriatric Syndrome"; signal of "something is wrong"

WHY SHOULD WE CARE?

- **Seniors' Falls in Canada. Second Report (2014)**
  - 20-30% of seniors fall each year
  - Up to 10% sustain serious injuries
  - 85% of all injury-related hospitalizations
  - 95% of all hip fractures
  - $2 Billion a year in direct healthcare costs

WHY SHOULD WE CARE?

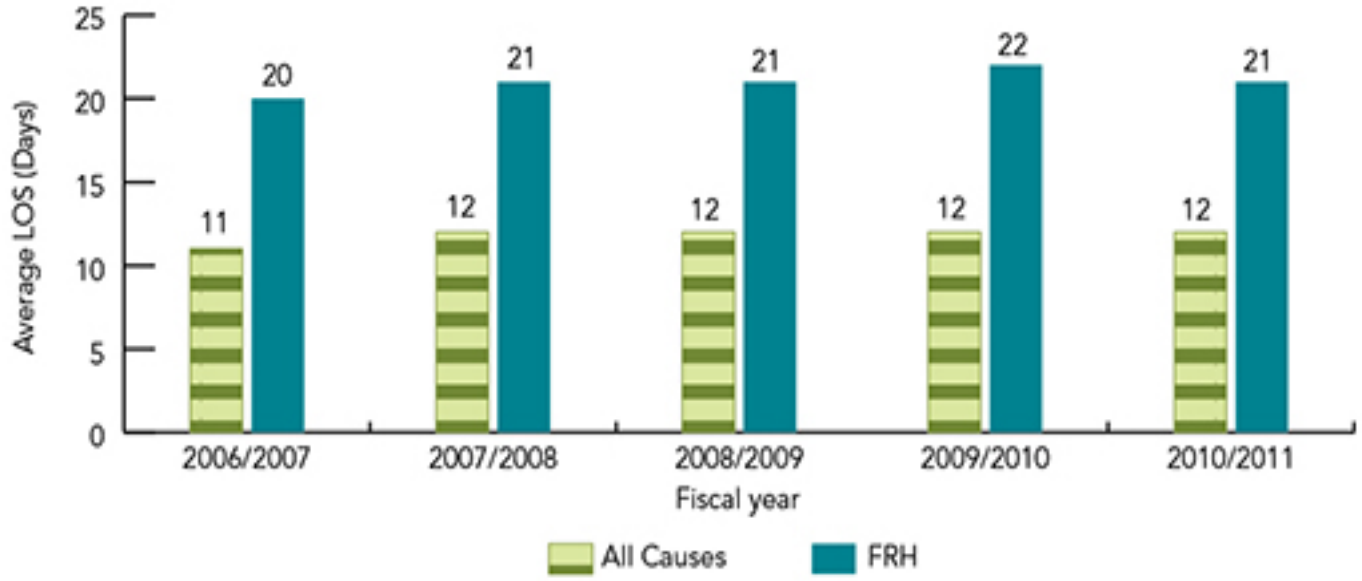
Figure 7: Type of fall-related injury, age 65+, Canada 2009/10



Seniors' Falls in Canada. Second Report (2014)

WHY SHOULD WE CARE?

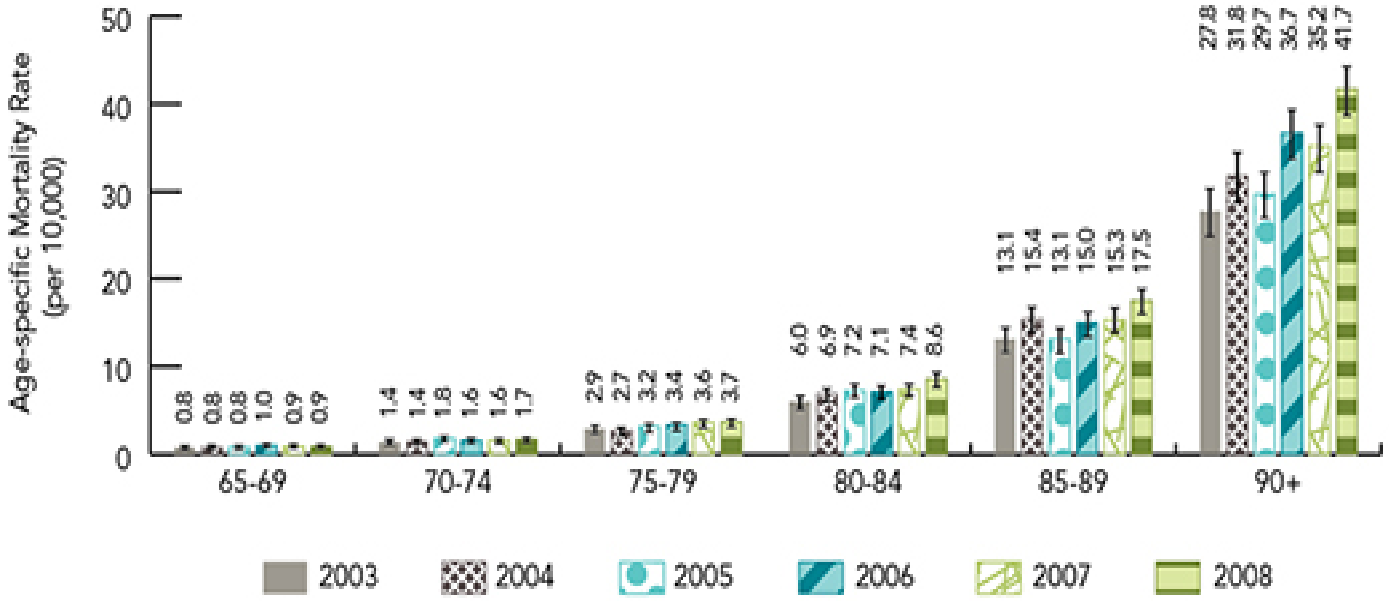
Figure 13: Average length of stay (LOS) of fall-related hospitalizations (FRH) and all-causes hospitalizations, age 65+, Canada, by fiscal year



Seniors' Falls in Canada. Second Report (2014)

WHY SHOULD WE CARE?

Figure 22: Age-specific mortality rate for deaths due to falls (per 10,000), age 65+, Canada, 2003-2008 (95% CIs shown)



Seniors' Falls in Canada. Second Report (2014)

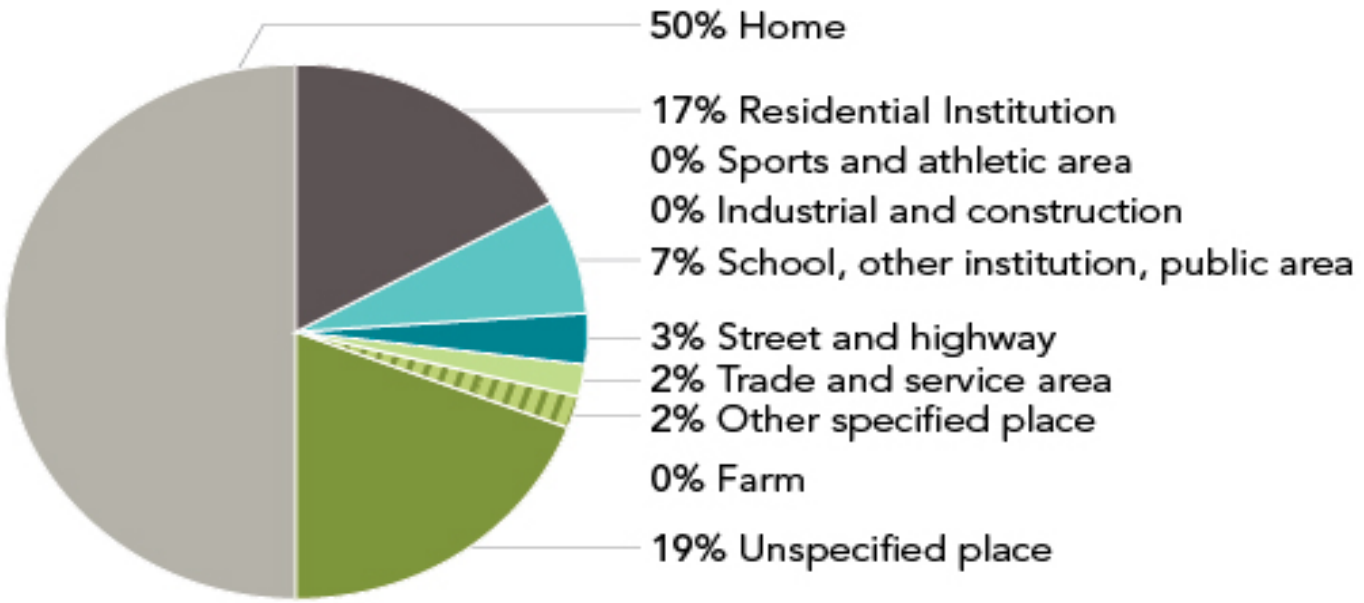
WHY SHOULD WE CARE?

- **Falls also lead to**
  - Loss of confidence, reduced mobility and independence
  - Increased risk of admission to a nursing home
  - Fear of falling
  - Activity restriction
  - Social isolation

Huang *et al* 2012
Fillit, Rockwood, & Woodhouse 2010

WHY SHOULD WE CARE?

Figure 15: Fall-related hospitalizations, by place of occurrence of fall, age 65+, Canada, pooled across all fiscal years



Seniors' Falls in Canada. Second Report (2014)

WHY SHOULD WE CARE?

- **What about falls in hospitals?**
  - Rate of falls: 4.8-8.4 per 1000 bed-days
  - Rate of fall-related morbidity (e.g., fractures): 0.8 per 1000 patients in Ontario Hospitals in 2011
  - Seniors with hospital-acquired proximal femoral fractures:
    - more likely to die in the hospital
    - to be discharged to LTC facilities
    - less likely to return to preadmission ADL status and ambulation

- Compare: Average rate of hospital-acquired *C. Difficile* infection= 0.36 cases per 1000 bed-days in Ontario in 2011

Healey *et al* 2008
Health Quality Ontario 2011
Murray 2007

WHY SHOULD WE CARE?

- **What about falls in residential care settings?**
  - One of the most common adverse events
  - 16-75% residents fall each year (mean of 43%)
  - About 1 fall can be expected every other day in LTC facilities
  - Higher incidence of hip fractures than community fallers (23 per 1000 person-years vs. 5.7 per 1000 person-years)
  - Associated with increased care needs, hospitalization, mortality and economic cost

Rubenstein & Josephson 2002
Sugarman 2002
Becker & Rapp 2010

WHAT CAN WE DO ABOUT IT IN THE COMMUNITY?

= Community Health Agencies
= Primary Care Providers
= Specialized or Tertiary Care Providers

Champlain Falls Prevention Strategy

Aug 2015

All adults 65+ should be screened for falls on an annual basis in community programs or with a Primary Care Practitioner. Consider use of "Staying Independent Checklist' *

Screen for fall(s) or near falls:
- Two or more falls or near falls in past 6 months
- Fall with injury
- Difficulty with walking or balance
- Score of 4 or more on Staying Independent Checklist

Yes to any one of the screening questions?
- Obtain fall history
- Evaluate gait and use of aids if difficulty or change in walking

Is recurrence of fall likely?

YES

NO

Single fall in past 6 months or several near falls?

YES

Evaluate Gait: Abnormalities noted? Yes/No

YES

NO

NO

Primary Care Assessment/Intervention/Referral

1. Obtain relevant medical history, history of falls, physical examination, including cognitive and functional assessment to identify root cause.
2. Determine multifactorial fall risk by assessing: (see assessment checklist on reverse)

a. **Postural hypotension**
   - Heart rate and rhythm

b. **Pills/medication:** minimize meds contributing to falls and consider pharmacy consult; optimize pain management

c. **Pain,** gait, balance, mobility and muscle strength (i.e TUG or other tests). Evaluate pain-related mobility: consider referral for appropriate mobility aids

d. Visual acuity

e. Other neurological impairments and refer appropriately

f. Bone health; assess calcium intake and fracture risk; nutritional review. Supplement vitamin D and consider calcium; if ongoing fall risk - consider bone density and treat if OP or history of fragility fractures then treat

g. Feet and footwear;

h. Environmental hazards: consider home hazard checklist at stopfalls.ca

i. Depression and Behavioural Risk Factors ie ETOH.

REFER

If appropriate, refer to specialized programs and services (see referral and resource list - includes referral forms)
stopfalls.ca

Health Promotion Key Messages:
- Encourage regular periodic health visit; annual medication, alcohol review and eye exam
- Complete a home safety checklist annually
- 150 minutes of physical activity per week – consider Champlain Exercise Programs: Champlainhealthline.ca
- Muscle and bone strengthening exercises to improve balance
- Eat 3 or more servings of calcium rich foods daily
- Take a daily vitamin D supplement

Algorithm based on AGS and BGS Geriatric algorithm: http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/prevention_of_falls_summary_of_recommendations/ *Staying Independent Checklist available online at (www.stopfalls.ca). Health Canada http://hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php

http://www.rgpeo.com/en/health-care-practitioners/falls-prevention-program.aspx

SPECIAL ARTICLES

Summary of the Updated American Geriatrics Society/British Geriatrics Society Clinical Practice Guideline for Prevention of Falls in Older Persons

Developed by the Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society

The following article is a summary of the American Geriatrics Society/British Geriatrics Society Clinical Practice Guideline for Prevention of Falls in Older Persons (2010). This article provides additional discussion of the guideline process and the differences between the current guideline and the 2001 version and includes the guidelines' recommendations, algorithm, and acknowledgments. The complete guideline is published on the American Geriatrics Society's Web site (http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2010/). **J Am Geriatr Soc 2010.**

perience, and publications in fall prevention and care of older patients. Panel members included experts in physical therapy, pharmacy, orthopedics, emergency medicine, occupational therapy, nursing, home care, and geriatric clinical practice. The literature search included meta-analyses, systematic literature reviews, randomized controlled trials (RCTs), controlled before-and-after studies, and cohort studies published between May 2001 and April 2008. (The panel reviewed the RCTs published between April 2008 and July 2009 and concluded that the additional evidence did not change the ranking of the evidence or the guideline

http://www.americangeriatrics.org/files/documents/health_care_pros/JAGS.Falls.Guidelines.pdf

MULTIFACTORIAL FALL RISK ASSESSMENT

1. Obtain relevant medical history, history of falls, physical examination, including cognitive and functional assessment to identify root cause.
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h. Environmental hazards: consider home hazard checklist at stopfalls.ca

i. Depression and Behavioural Risk Factors ie ETOH.

http://www.rgpeo.com/en/health-care-practitioners/falls-prevention-program/fall-risk-assessment-and-intervention.aspx

FALL PREVENTION IN COMMUNITY DWELLERS

- Key: Implement customized “multifactorial intervention” based on individual risk factors identified in each patient
- Different from “multicomponent intervention”
- Reduces rate of falling but not risk of falling

http://www.americangeriatrics.org/files/documents/health_care_pros/JAGS.Falls.Guidelines.pdf

1. MINIMIZE HIGH-RISK MEDICATIONS

Huang *et al* 2012

Table I. Risk of falling and drug use: results from meta-analyses, pooled odds ratios from Leipzig et al.[42,43]

Drugs	Odds ratio (95% CI)
Any psychotropic	1.73 (1.52, 1.97)*
Antipsychotics	1.50 (1.25, 1.79)*
Sedative/hypnotics	1.54 (1.40, 1.70)*
Benzodiazepines (any)	1.48 (1.23, 1.77)*
Short acting	1.44 (1.09, 1.90)*
Long acting	1.32 (1.09, 1.90)*
Antidepressants	1.66 (1.41, 1.95)*
TCAs	1.51 (1.14, 2.00)*
Type 1a anti-arrhythmics	1.59 (1.02, 2.48)*
Digoxin	1.22 (1.05, 1.42)*
Centrally acting antihypertensives	1.16 (0.87, 1.55)
Nitrates	1.13 (0.95, 1.36)
ACE inhibitors	1.20 (0.92, 1.58)
β-Blockers	0.93 (0.77, 1.11)
Calcium channel blockers	0.94 (0.94, 1.14)
Any diuretic	1.08 (1.02, 1.16)*
Thiazide diuretics	0.97 (0.78, 1.20)
Loop diuretics	0.90 (0.73, 1.12)
Opioids	0.97 (0.78, 1.12)
Non-opioids	1.09 (0.88, 1.34)
NSAIDs	1.16 (0.97, 1.38)
Aspirin	1.12 (0.80, 1.57)

ACE = angiotensin-converting enzyme; **CI** = confidence interval; **NSAIDs** = nonsteroidal anti-inflammatory drugs; **TCA** = tricyclic antidepressant; * indicates statistically significant odds ratio.

1. MINIMIZE HIGH-RISK MEDICATIONS

- Does the patient need this drug?
- Are there lower risk pharmacologic or non-pharmacologic alternatives?
- Do the benefits outweigh the risks?

1. MINIMIZE HIGH-RISK MEDICATIONS

- Gradual withdrawal of psychotropic medications significantly decreased rate of falls (but not risk of falling)
- Intervention combining education for primary care physicians to improve prescribing practice, patient engagement, and medication review decreased risk of falling
- If can't stop high-risk medication, consider reducing the dose

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

1. MINIMIZE HIGH-RISK MEDICATIONS

- Typical and atypical antipsychotic medications both increase risk of falling (and fractures)
- Risk of hip fracture is greater in those exposed to SSRIs (adjusted OR = 2.4) than that in patients exposed to secondary amine TCAs (adjusted OR = 2.2) and to tertiary amine TCAs (adjusted OR = 1.5)
- Benzodiazepines, regardless of half-life, increase risk of falls in a dose-dependent fashion

Huang *et al* 2012

2. START A CUSTOMIZED EXERCISE PROGRAM

- **Multicomponent program targeting strength, gait, and balance (longer than 12 weeks, 1-3 times a week)**
  - Group or home-based individual
  - e.g. Tai chi, Otago exercises
  - Decrease rate of falling AND risk of falling
- **Single component program reduces rate of falling only**
- **Walking alone or strength training alone DO NOT reduce falls!**

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

3. TREAT VISION PROBLEM

- Expedited cataract surgery for the first eye significantly reduced rate of falling
- Vision assessment and provision of new glasses if needed may increase rate of falls and risk of falls
- Changing to single lens glasses decreases all falls and outside falls in the subgroup that regularly do outside activities

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

4. VITAMIN D SUPPLEMENTATION

- Beneficial for bone health and possibly neuromuscular function
- May reduce rate of falls or risk of falling in people with lower vitamin D levels and normal vitamin D levels

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

5. MODIFICATION OF HOME ENVIRONMENT

- Reduces rate of falls and risk of falling
  - Higher fall risk population
  - Visually impaired
- Occupational Therapists-led interventions were more effective

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

6. OTHER INTERVENTIONS

- Anti-slip shoes for icy conditions; low heel height and high surface contact shoes better
- Multifaceted podiatry for people with disabling foot pain; treat other foot problems (e.g toe deformities)
- Managing postural hypotension
- Cardiac pacemaker for people with carotid sinus hypersensitivity

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

7. PROVIDE EDUCATION AND INFORMATION

- Often part of fall prevention programs
- Not effective as single intervention for reducing rate of falls or risk of falling

Gillespie *et al* 2012
AGS/BGS Guidelines 2010

LOCAL RESOURCES - OTTAWA

- Montfort Falls Prevention Clinic
- West End Integrated Falls Prevention Program
- Falls Assessment and Streamlined Treatment (FAST) Clinic (based at the Ottawa Hospital, Geriatric Day Hospital)

http://www.rgpeo.com/en/health-care-practitioners/falls-prevention-program/community-resources.aspx

WHAT CAN WE DO ABOUT IT IN THE HOSPITAL?

PREDISPOSING RISK FACTORS FOR FALLS

- **Patient-specific factors:**
  - Increasing age
  - Muscle weakness and gait instability
  - Agitated confusion (dementia and delirium)
  - Urinary incontinence/frequency
  - Fall history
  - High-risk medications
  - Postural hypotension

Oliver, Healey, & Haines 2010

PRECIPITATING RISK FACTORS FOR FALLS

- **Environmental factors:**
  - Clutter
  - Unsafe chair/bed height
  - Tubing
  - …
- **Staff-related factors:**
  - Staffing levels
  - Attitudes toward fall prevention

Oliver, Healey, & Haines 2010

INSTRUMENTS FOR FALL RISK SCREENING

- **STRATIFY:**

History of falls, agitation, visual impairment, frequent toileting, able to stand but needs assistance with moving

- **Morse Falls Scale:**

History of falls, secondary diagnoses, parenteral therapy, use of ambulation aids, gait, mental status

"…widespread adoption of either is unlikely to generate benefits significantly greater than that of nursing staff clinical judgment."

Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL

- Difficult to study
- Potential for confounders
- Incident reporting data unreliable

Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: SINGLE INTERVENTION

- **What works:**
  - Additional physiotherapy in rehabilitation wards significantly reduced risk of falling
  - Medication review by specialist pharmacist or physician prescribing advisory by computer-based system
  - Targeted patient specific education reduced rate of falling in cognitively intact patients
  - Vinyl floor better than carpeted floor in subacute ward for lower rate of falls

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: SINGLE INTERVENTION

- **What does not work:**
  - Special identification bracelets for high fall-risk patients
  - Calcium and vitamin D or calcium supplement alone
  - Low-low beds (1 for every 12 beds)
  - Inappropriate bedrail use
  - Bed exit alarms
  - Physical restraints
  - Dissemination of fall prevention guidelines routinely or targeted at nursing staff
  - Behavioral advisory service for people with confusion
  - Care in an Acute Care for the Elderly unit vs. general medical unit

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: SINGLE INTERVENTION

- **Not enough evidence:**
  - Increased supervision
  - Vision correction
  - Environmental modification
  - Attention to footwear
  - Continence management
  - Detection and management of dizziness, presyncope, orthostasis

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: MULTIFACTORIAL INTERVENTION

- 4 trials analyzed
- Overall reduction of rate of falling (RaR 0.69) and risk of falling (RR 0.71)
- No reduction of fracture
- Each study contained different combinations of interventions

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: MULTIFACTORIAL INTERVENTION

- Haines 2004
  - 3 subacute wards; 626 patients
  - Intervention: falls risk alert card and information brochure, exercise program, education program and hip protectors
  - Reduced rate of falls (RaR 0.70) but not risk of falling
  - Benefits “most obvious after 45 days of observation”

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

FALL PREVENTION IN HOSPITAL: MULTIFACTORIAL INTERVENTION

- Stenvall 2007
  - Post-operative care in usual care in orthopedic ward vs. ward with comprehensive geriatric service
  - Intervention: comprehensive geriatric assessment, fall risk factor treatment by multidisciplinary team
  - Reduced rate of falls (RaR 0.38) and risk of falling (RR 0.41)
  - Benefits seen even in patients with dementia

Cameron *et al* 2012
Oliver, Healey, & Haines 2010

WHAT CAN WE DO ABOUT IT IN RESIDENTIAL CARE FACILITIES?

PREDISPOSING RISK FACTORS FOR FALLS

- Cognitive impairment
- Visual impairment
- Weakness
- Neurologic problems
- Gait/balance problems
- Urinary urge incontinence

Becker & Rapp 2010

PRECIPITATING RISK FACTORS FOR FALLS

- Environmental
  - New admission to facility
- Staffing
- Acute illness
- Medications
- Transferring activity

Becker & Rapp 2010

FALL PREVENTION IN CARE FACILITIES

- Design of institutional care widely different
- Lack of clear definition of different care facilities, e.g. “nursing home” vs. long-term care (LTC) vs. assisted living facility
- Lack of information about functioning of participants and level of cognitive impairment
- Varied combinations of interventions and durations of studies

Becker & Rapp 2010
AGS/BGS Guidelines 2010

FALL PREVENTION IN CARE FACILITIES: SINGLE INTERVENTIONS

- **What works:**
  - Vitamin D supplementation in people with low serum levels (50 nmol/L or less)
- **What does not work:**
  - Exercise (except in balance training using mechanical apparatus in intermediate level care facilities)
  - Staff training about fall prevention, guideline implementation
  - Increased sunlight exposure
- **Not enough evidence:**
  - Medication review by a pharmacist

Becker & Rapp 2010
Cameron *et al* 2012

FALL PREVENTION IN CARE FACILITIES: MULTI-COMPONENT INTERVENTIONS

- Evidence available show uncertain benefit in reducing falls
- Schnelle 2003
  - 4 nursing homes (190 participants)
  - Intervention: Supervised exercises, fluid offering, regular toileting
  - Trend toward reduced rate of falling and risk of falling

Schnelle *et al* 2003
Cameron *et al* 2012

FALL PREVENTION IN CARE FACILITIES: MULTIFACTORIAL INTERVENTIONS

- Very different combinations of interventions
- Pooled data from seven trials show a trend toward reducing rated of falls and risk of falls

Becker & Rapp 2010
Cameron *et al* 2012

FALL PREVENTION IN CARE FACILITIES: MULTIFACTORIAL INTERVENTIONS

- Becker 2003
  - 6 LTC facilities (981 residents)
  - Intervention: Staff and resident education on fall prevention, advice on environmental adaptations, progressive balance and resistance training and hip protectors
  - Reduced rate of falls (RR = 0.55) and risk of falls (RR = 0.75)

Becker *et al* 2003

FALL PREVENTION IN CARE FACILITIES: MULTIFACTORIAL INTERVENTIONS

- Dyer 2004
  - 20 care homes (196 residents)
  - Intervention: 3 month gait and balance training, staff education, medical review, environment modification, podiatry and optometry
  - Reduced rate of falls: 2.2 falls per resident per year in intervention group vs. 4.0 in control group (not statistically significant)

Dyer *et al* 2004

NOW WHAT?

TAKE HOME MESSAGES

- **Falls in seniors:**
  - Bad regardless of setting
  - Require comprehensive fall risk evaluation

- **Falls are preventable to some degree:**
  - More evidence for interventions for community fallers
  - Multifactorial interventions may also work for hospital and residential care settings
  - Usually need to involve multidisciplinary team

THANK YOU!

ANY QUESTIONS?