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Preventing falls in older people: what's the evidence?

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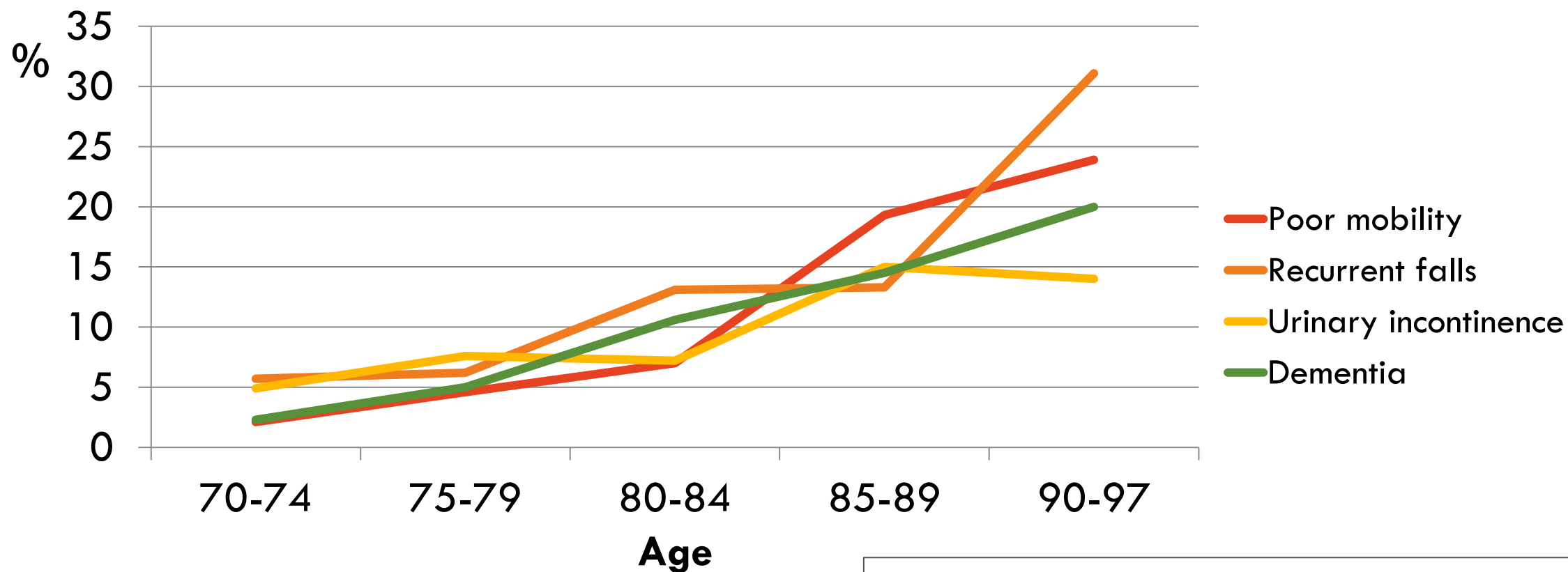


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Geriatric Giants (Bernard Isaacs, 1965)

- Immobility
- Impaired cognition
- Incontinence
- Instability

Prevalence of geriatric giants (CHAMP)



Source: Noguchi Aust J Ageing 2016;35:255-261

Falls in Older People

- 30% of older people in the community fall at least once a year
- Higher frequency in residential aged care
- 5% of falls lead to fractures
- Falls can lead to loss of independence, even without a fracture
- Fear of falling is a health problem in itself

Falls and risk of nursing home admission

Tinetti NEJM 1997;337:1279-1284

Relative risks	1 fall	2+ falls	Fall with injury
Unadjusted	4.9	8.5	19.9
Adjusted for 21 variables	3.1	5.5	10.2

How to interpret a relative risk

- Relative risk of 1.00 = no effect

Increased risk (harm) examples

- Relative risk of 1.50 = 50% increased risk
- Relative risk of 5.00 = 5-fold increased risk

Reduced risk (benefit) examples

- Relative risk of 0.50 = 50% reduced risk
- Relative risk of 0.70 = 30% reduced risk

Falls and risk of nursing home admission

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Risk Factors for Falls

- Age
- Female sex
- Weakness, balance, gait deficits
- Poor health (inc. stroke, Parkinson's)
- Cognitive impairment
- Psychotropic medications
- Environmental hazards
- Poor vision
- Inadequate footwear

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A MULTIFACTORIAL INTERVENTION TO REDUCE THE RISK OF FALLING AMONG ELDERLY PEOPLE LIVING IN THE COMMUNITY

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Multifactorial intervention to prevent falls

Tinetti NEJM 1994;331:821-827

- Medication review
- Home-based exercise program
 - balance
 - muscle strength
- Education
- Transfer skills
- Home modifications



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Cochrane Database of Systematic Reviews

Interventions for preventing falls in older people living in the community (Review)

Gillespie LD, Robertson MC, Gillespie WJ, Sherrington C, Gates S, Clemson LM, Lamb SE

Preventing Falls in the Community

Cochrane Review 2012

- 159 RCTs
 - Exercise alone (59 trials)
 - Multifactorial interventions (40 trials)
 - Vitamin D (16 trials)
 - Home modifications (9 trials)
- 79,193 participants (median n=230)

Source: Gillespie Cochrane Library 2012

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Preventing Falls in the Community

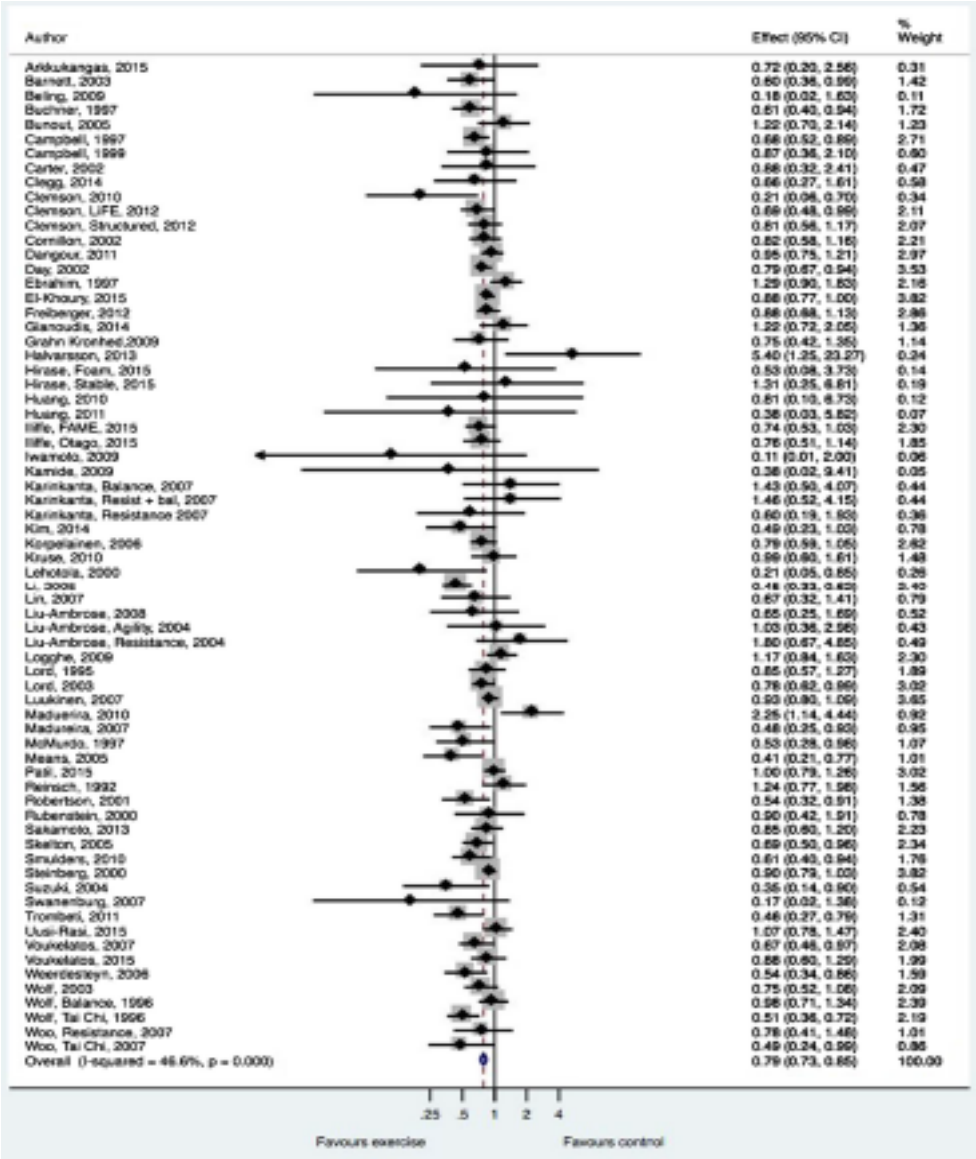
Cochrane Review 2012

Intervention	Relative risk (95% CI)
Group exercise program	0.71 (0.63-0.82)*
Home based exercises	0.68 (0.58-0.80)*
Tai chi	0.72 (0.52-1.00)
Multifactorial interventions	0.76 (0.67-0.86)*
Vitamin D supplements	1.00 (0.90-1.11)
Home modifications	0.81 (0.68-0.97)*

Exercise to prevent falls in older people: An updated systematic review and meta-analysis

Source: Sherrington
Br J Sports Med 2017; 51;1749-1757

Community studies
Pooled rate ratio: 0.79 (0.73-0.85)



Exercise and falls prevention: community studies

Sherrington Br J Sports Med 2017;51:1749-1753

Intervention includes	Relative risk (95% CI)
High challenge balance training	0.79 (0.71-0.88)*
3+ hours per week	0.70 (0.60-0.83)*
High challenge balance and 3+ hours per week	0.61 (0.53-0.72)*
Neither high challenge balance or 3+ hours per week	0.90 (0.82-0.99)*

Psychotropic Medications and Falls

Meta-Analysis

Drug class	No. of studies	Odds ratio (95% CI)
Antipsychotics	22	1.5 (1.3-1.8)*
Antidepressants	27	1.7 (1.4-2.0)*
Benzodiazepines		
Long-acting	9	1.3 (1.1-1.8)*
Short-acting	9	1.4 (1.1-1.9)*

Source: Leipzig J Am Geriatr Soc 1999;47:30-39

Reducing use of psychotropic medications

Campbell J Am Geriatr Soc 1999;47:850-853

Design

- RCT (n=93)
- People using benzodiazepines or antidepressants
- Gradual withdrawal of psychotropics (blind)

Results

- **66% reduction in risk of falling**
- 81% re-commenced using psychotropics within 1 month of end of trial

Interventions for preventing falls in older people in nursing care facilities and hospitals (Review)

Cameron ID, Murray GR, Gillespie LD, Robertson MC, Hill KD, Cumming RG, Kerse N



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Preventing Falls in Institutions

Cochrane Review 2012

- 60 RCTs
 - Nursing homes (43 trials)
 - Hospitals (17 trials)
- 60,345 participants

Source: Cameron Cochrane Library 2012

Preventing Falls in Institutions

Cochrane Review 2012

In residential aged care facilities:

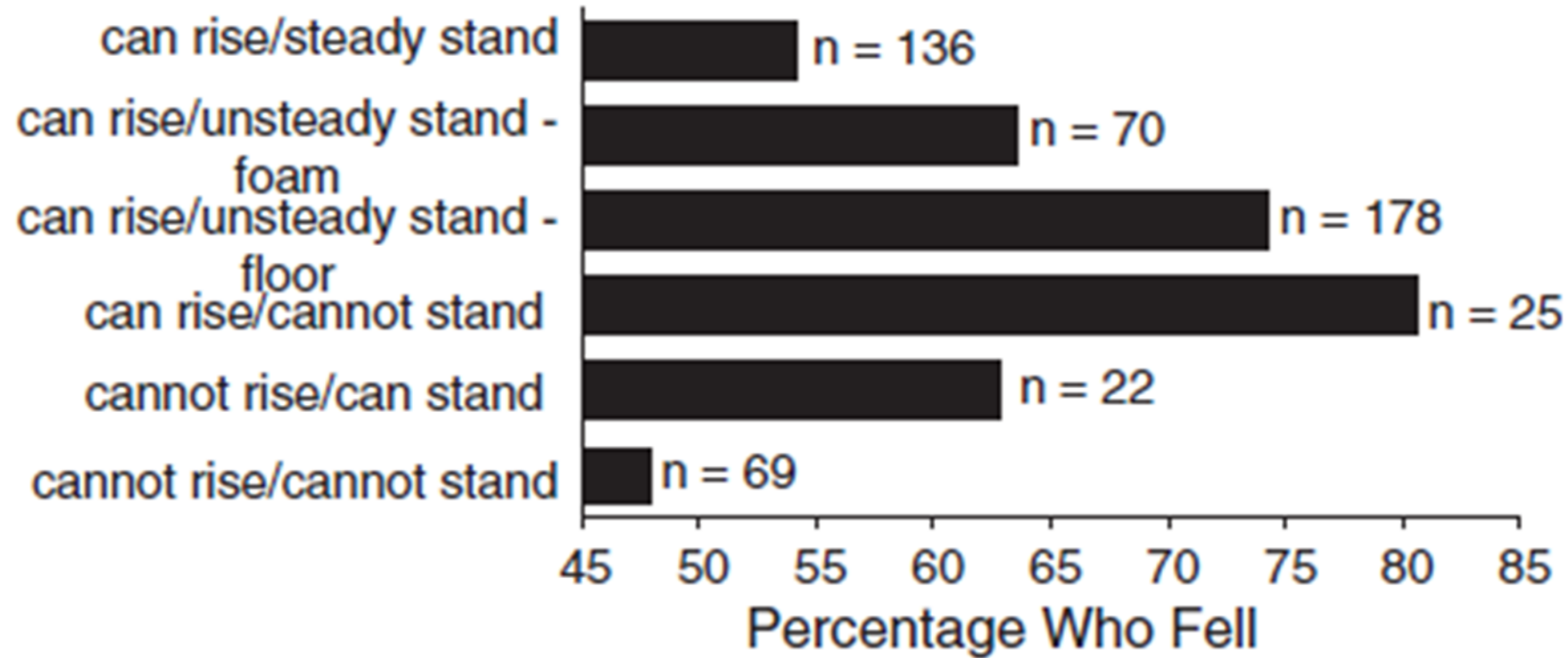
- Vitamin D supplements are effective
- Multifactorial interventions probably effective
- Results of exercise trials are inconsistent
 - Possibly reduces falls in intermediate level care
 - Possibly increases falls in high level care

In hospitals:

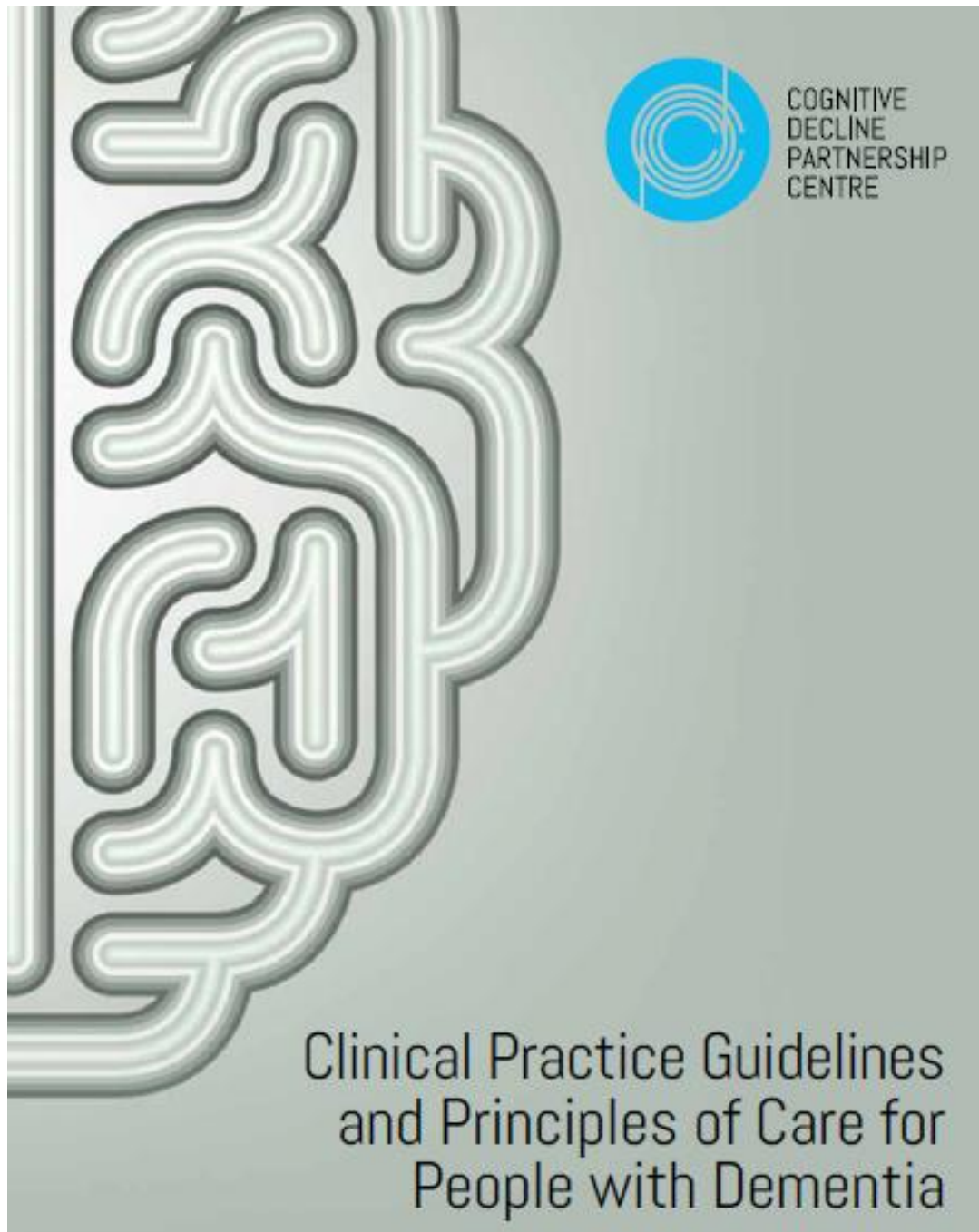
- Multifactorial interventions are effective (for patients who are in hospital for several weeks)

Source: Cameron Cochrane Library 2012

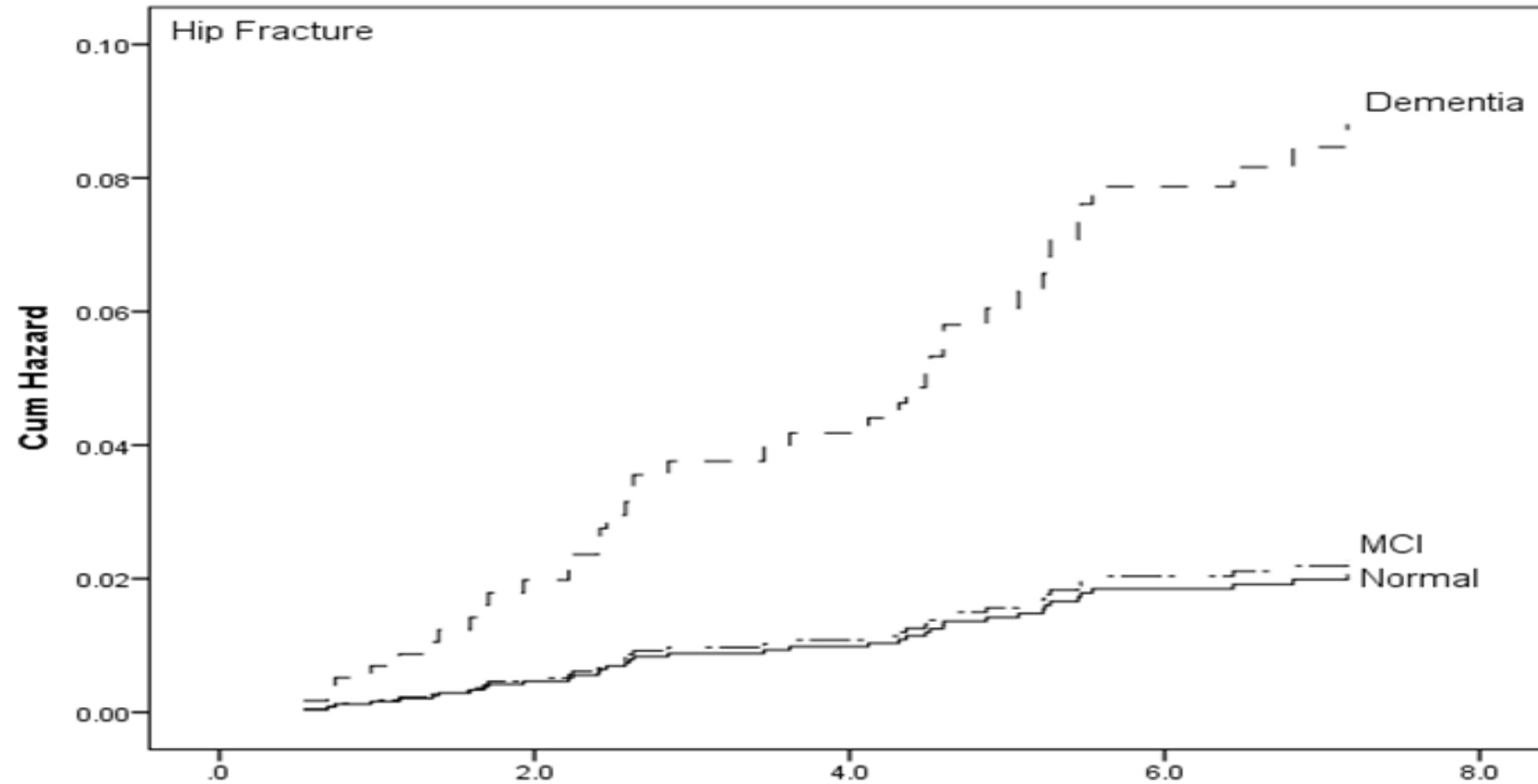
Who is at highest risk of falling in aged care facilities?



Source: Lord J Am Geriatr Soc 2003;51:1645-1650

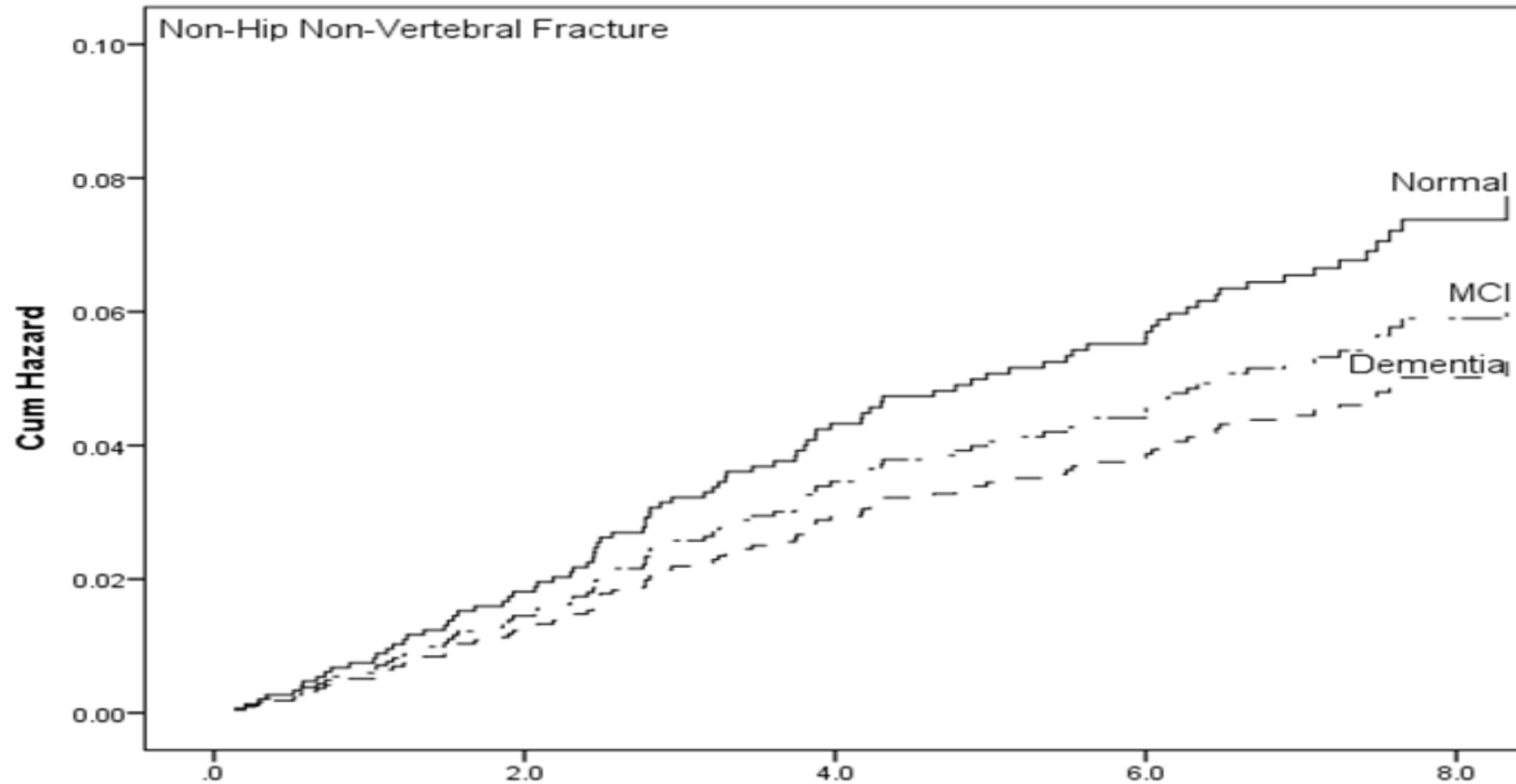


Risk of hip fracture in people with dementia (CHAMP)



Source: Hsu Geriatr Gerontol Int 2018 (in press)

Risk of other fractures in people with dementia (CHAMP)



Source: Hsu Geriatr Gerontol Int 2018 (in press)

Prevention of hip fractures: RCT evidence

- Vitamin D and calcium (Chapuy, 1992)
- Hip protectors (Lauritzen, 1993)
- Alendronate (Black, 1996)
- Risedronate (McClung, 2001)
- HRT (Women's Health Initiative, 2002)*
- Zoledronic acid (Black, 2007)
- Strontium ranelate (Reginster, 2008)*
- Denosumab (Cummings et al, 2009)



Cochrane
Library

Cochrane Database of Systematic Reviews

Hip protectors for preventing hip fractures in older people (Review)

Santesso N, Carrasco-Labra A, Brignardello-Petersen R

Hip protectors for prevention of hip fracture

Cochrane Review 2014

Setting	Relative risk (95% CI)
Community (5 studies)	1.15 (0.84-1.58)
Residential aged care (14 studies)	0.82 (0.67-1.00)*

Source: Santesso Cochrane Library 2014

Conclusions

Preventing falls in the community

- Avoid psychotropic medications
- Home modifications supervised by an occupational therapist
- Exercise that emphasises balance and is done at least 3 hours a week*
- Multifactorial interventions*

*And in intermediate level care facilities?

Preventing falls in residential aged care

- Vitamin D supplements

And avoid psychotropic medications

Preventing hip fractures in residential aged care

- Hip protectors
- Multifactorial interventions?