

How to Prevent Falls in Older People

What works and what doesn't

Robert Cumming

Centre for Education and Research on Ageing
and School of Public Health
University of Sydney, Australia

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Falls in Older People

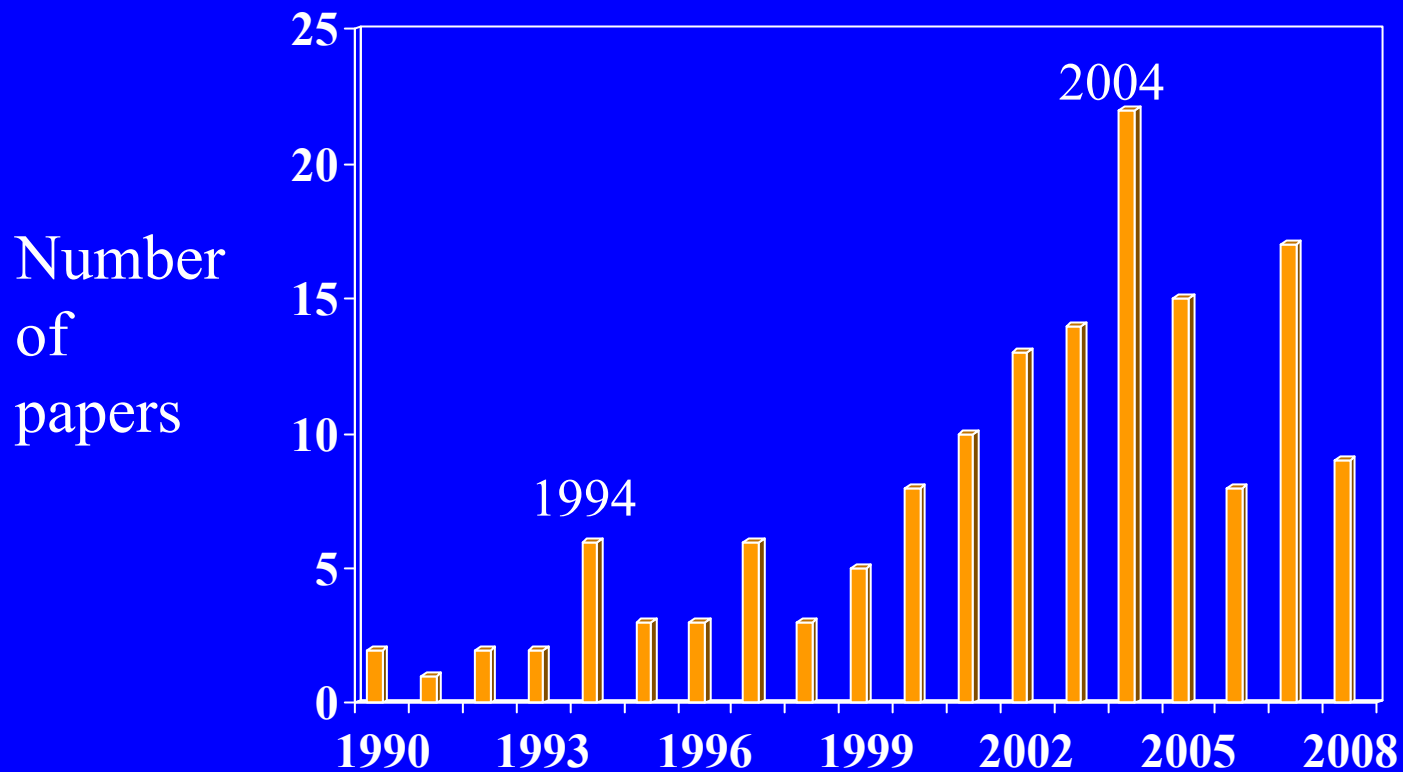
- 30% of older people fall at least once a year
- 5% of falls lead to fractures
- Falls can lead to nursing home admission
- Fear of falling is a health problem

Risk Factors for Falls

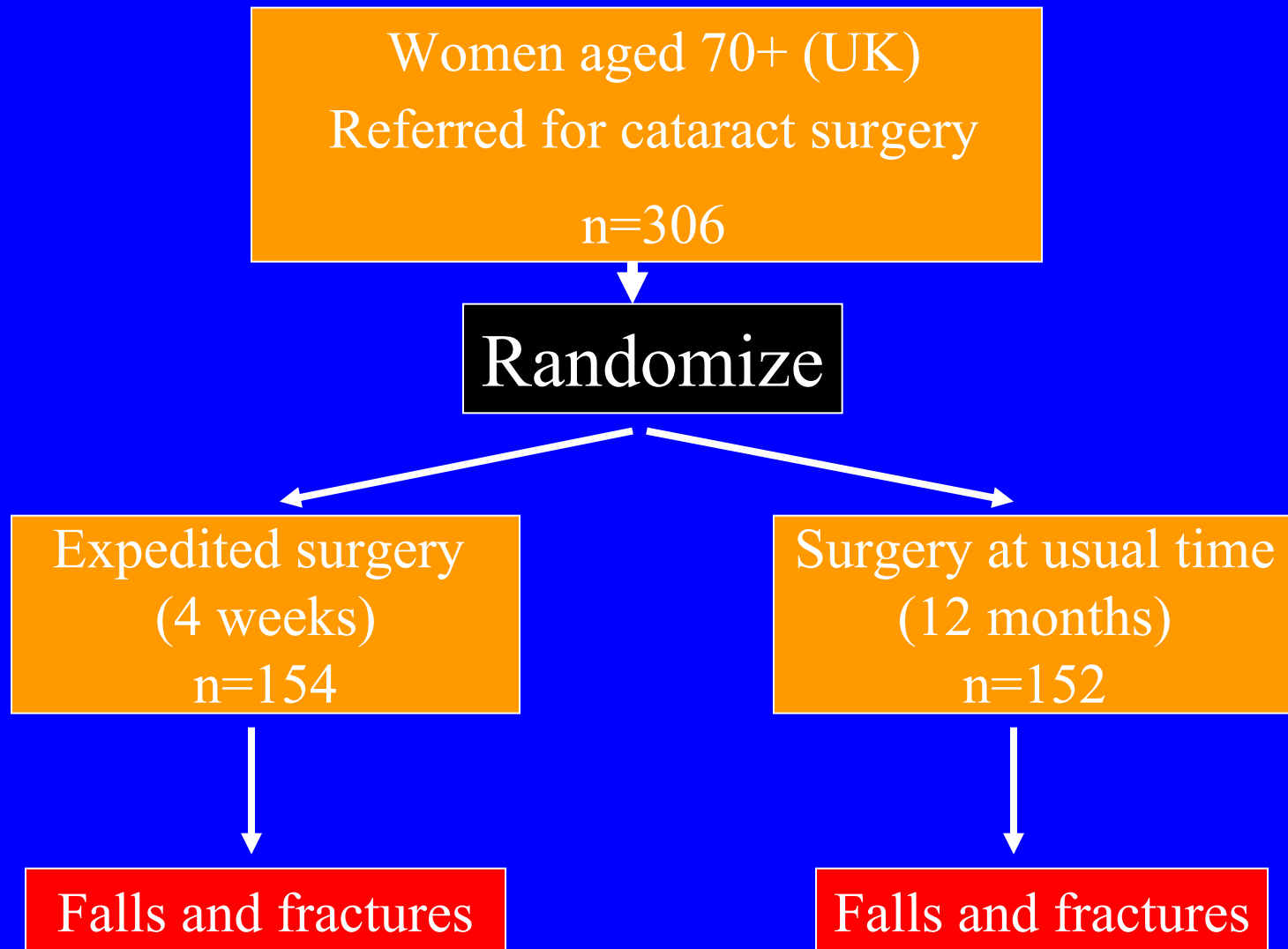
- Age
- Female sex
- Muscle weakness
- Balance and gait deficits
- Poor health (inc. stroke, Parkinson's)
- Psychotropic medications
- Poor vision
- Cognitive impairment
- Environmental hazards
- Inadequate footwear

Randomized Controlled Trials (RCTs)

Falls Prevention Interventions



Cataract Surgery to Prevent Falls



Source: Harwood et al. Br J Ophthalmol 2005;89:53-59

Cataract Surgery Prevents Falls and Fractures

RCT of 306 women with cataracts

Outcome	Intervention group	Control group	RR (95% CI)
>= 1 fall	49%	45%	1.1 (0.9-1.4)
Fall rate (per 1000 person days)	1.00	1.52	0.7 (0.5-0.9)*
Fractures	3%	8%	0.4 (0.1-0.9)*

Source: Harwood et al. Br J Ophthalmol 2005;89:53-59

Cochrane Falls Reviews

- Community (111 trials)
- Nursing homes and hospitals (41 trials)
- Countries where trials conducted:
 - USA: 38 trials
 - UK: 32 trials
 - Australia: 26 trials
 - Germany: 3 trials

Preventing Falls in the Community

Cochrane Review 2009

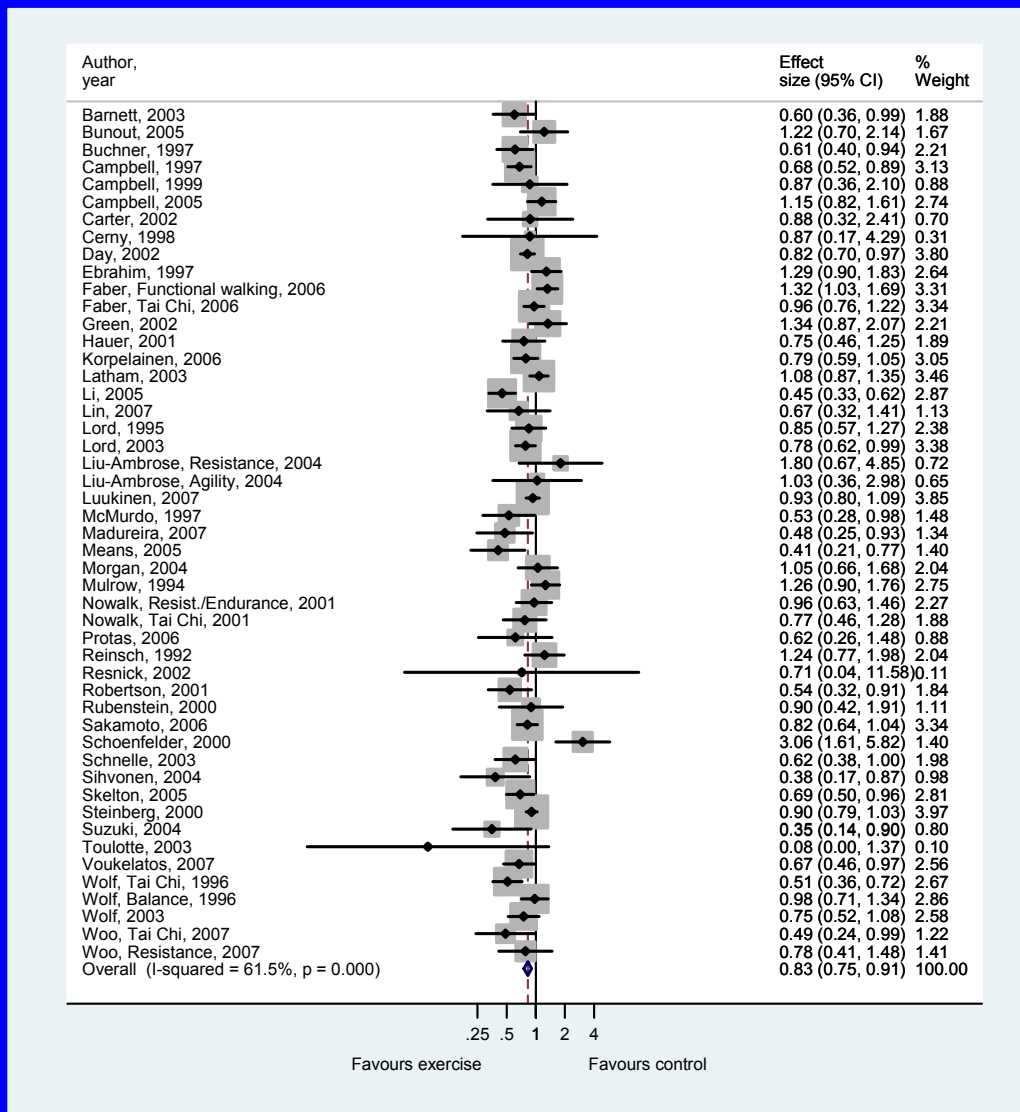
- 111 RCTs
 - Exercise (43 trials)
 - Multifactorial interventions (31 trials)
 - Vitamin D (13 trials)
 - Home modifications (10 trials)
- 55,303 participants (median n=239)
- The review is 327 pages long!

Preventing Falls in the Community

Cochrane Review 2009

Intervention	RR (95% CI)
Group exercise program	0.78 (0.71-0.86)*
Tai Chi	0.63 (0.52-0.78)*
Home based exercises	0.66 (0.53-0.82)*
Multifactorial interventions	0.75 (0.65-0.86)*
Vitamin D	0.95 (0.80-1.14)
Home modifications	0.90 (0.79-1.03)

Exercise for Falls Prevention: A Systematic Review



Exercise for Falls Prevention

Systematic Review

PROGRAM	High Balance Challenge	Lower Balance Challenge
High dose and walking	0.76 (0.66-0.88)*	0.96 (0.80-1.16)
High dose, no walking	0.58 (0.48-0.69)*	0.73 (0.60-0.88)*
Low dose and walking	0.95 (0.78-1.16)	1.20 (1.00-1.44)
Low dose, no walking	0.72 (0.60-0.87)*	0.91 (0.79-1.05)

Source: Sherrington et al. J Am Geriatr Soc 2008;56:2234-43

Multifactorial Intervention

Tinetti 1994

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

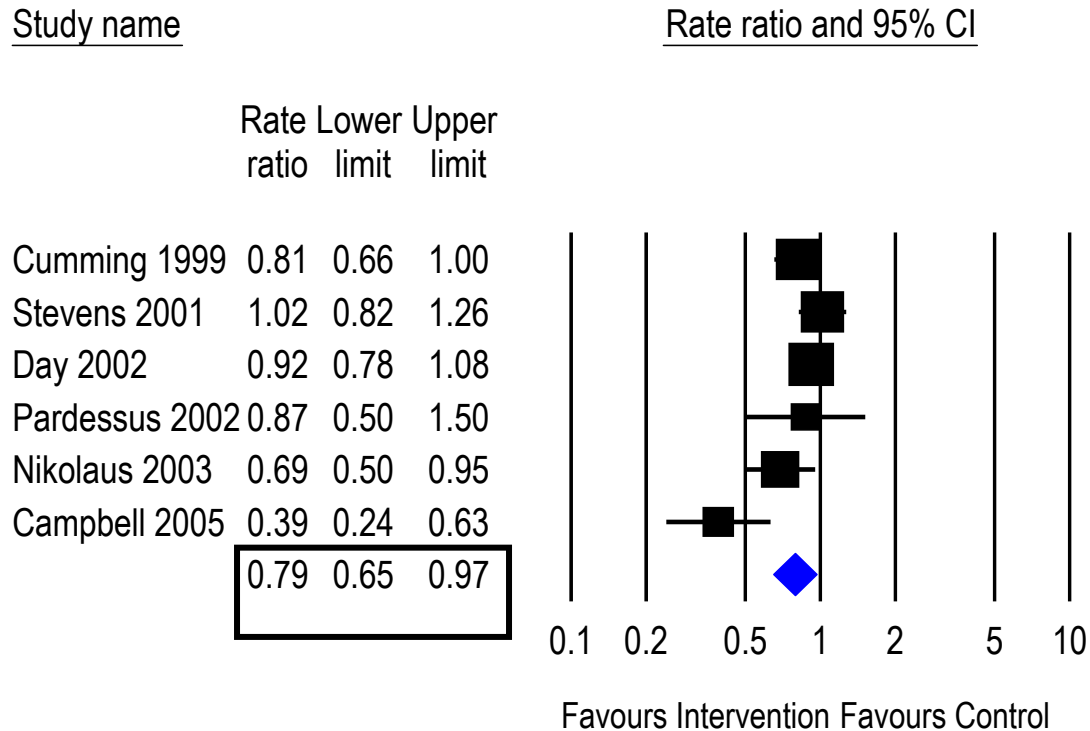
Vitamin D and Falls: Studies in Community

Group	No. of studies	RR (95% CI)
All studies	10	0.96 (0.92-1.01)
Subjects with low vitamin D	3	0.65 (0.46-0.91)*
Subjects with various levels of vitamin D	7	0.97 (0.92-1.02)

Source: Gillespie LD et al. Cochrane Library 2009

Home Modifications for Falls Prevention: A Systematic Review

Figure 1 Meta-analysis of environmental interventions to reduce falls



Heterogeneity $Q = 16, p = 0.007, I^2 = 69$

Source: Clemson et al. J Aging and Health 2008;20:954-71

Figure 2 High risk sub-groups: Meta-analysis of environmental interventions to reduce falls

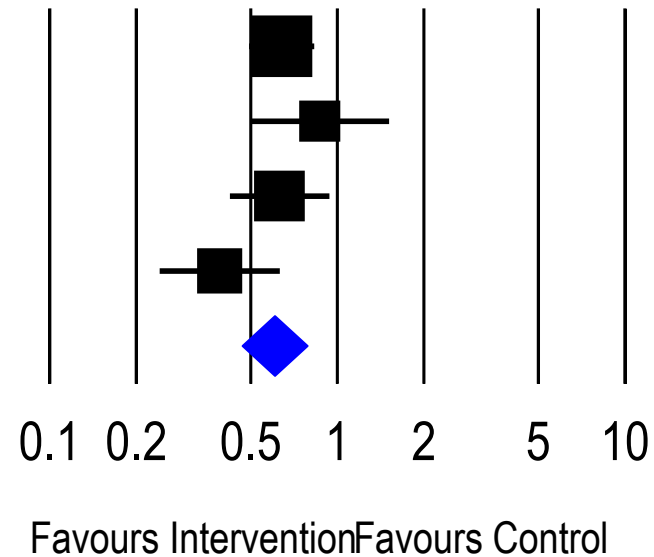
Study name

Rate ratio and 95% CI

Rate ratio
Lower limit
Upper limit

Cumming 1999b	0.64	0.50	0.82
Pardessus 2002	0.87	0.50	1.50
Nikolaus 2003b	0.63	0.43	0.93
Campbell 2005	0.39	0.24	0.63

0.61	0.47	0.79
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Heterogeneity $Q = 5.2, p < 0.05, I^2 = 42$

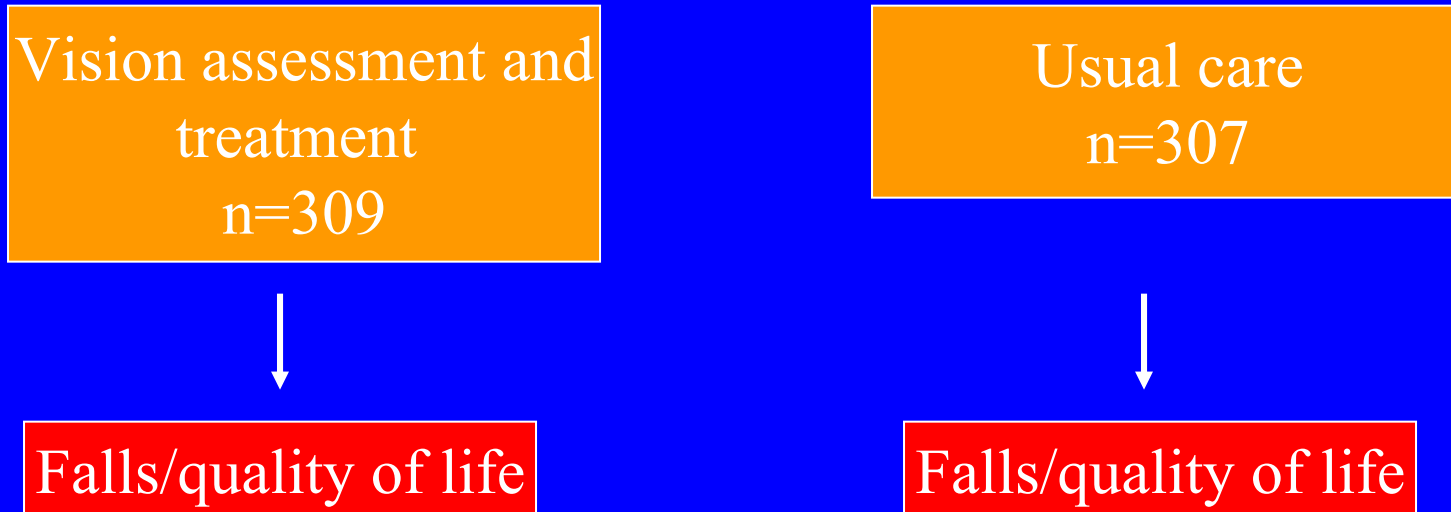
Source: Clemson et al. J Aging and Health 2008;20:954-71

Interventions Proven Effective in Only 1 RCT

- Psychotropic medication withdrawal
- Prescribing modification program for GPs
- Anti-slip device for shoes for icy conditions
- Cardiac pacemaker
- Cataract surgery

Improving Vision to Prevent Falls: A Randomized Trial

People aged 70 years and over
referred to an aged care service in
Central Sydney, 8/2002 to 6/2004



Falls during Follow-Up

Outcome	Intervention group	Control group
No. of falls	758	516
>= 1 fall	65%	50%
>= 2 falls	38%	31%
Fall rate (per person per year)	2.42	1.66
Fractures	10%	6%

Falls Prevention in Nursing Homes and Hospitals

Preventing Falls in Institutions

Cochrane Review 2010

- 41 RCTs
 - Nursing homes (30 trials)
 - Hospitals (11 trials)
- 25,422 participants
- Only 119 pages long

Preventing Falls in Institutions

Cochrane Review 2010

In nursing homes:

- A multidisciplinary team approach is effective
- Vitamin D is effective
- Results of exercise trials are inconsistent

In hospitals:

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

Papers

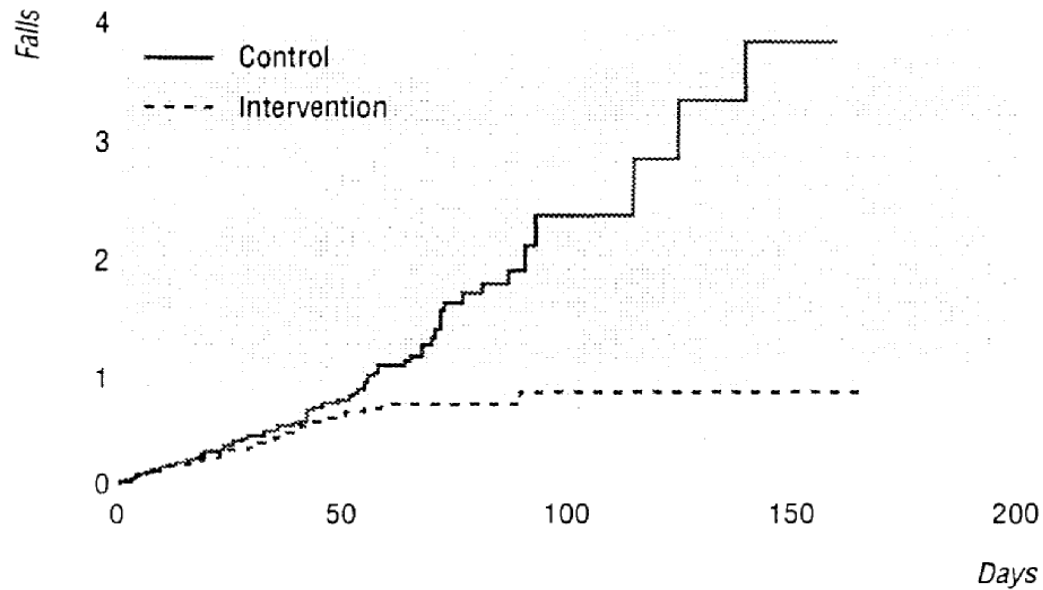


Fig 3 Nelson-Aalen cumulative hazard estimates of the control and intervention groups

Results: Relative Risk of Falls

POPI Study of Falls in Hospital

	Incidence rate ratio	95% CI	p value
Unadjusted	1.02	0.70-1.48	0.93
Adjusted for past falls	0.96	0.72-1.28	0.79

Source: Cumming et al. BMJ 2008;336:758-60

Conclusions

- Many falls are preventable
 - it is possible to reduce risk of falling among people living in the community by at least 30%
- Effective interventions:
 - multifactorial assessment and intervention
 - (some) exercise programs
 - home modifications (by OTs)
 - vitamin D supplements (if low vitamin D)
 - reduced use of psychotropics
 - cataract surgery

Barriers to Falls Prevention

Effective falls prevention involves:

1. Employing more staff
 - physios, OTs, geriatricians
2. Changing doctor and patient behaviour
 - reducing use of psychotropic meds
3. Changing health services
 - more cataract surgery

This is all very, very hard!