

# How to Prevent Falls in Older People What works and what doesn't

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# Falls in Older People

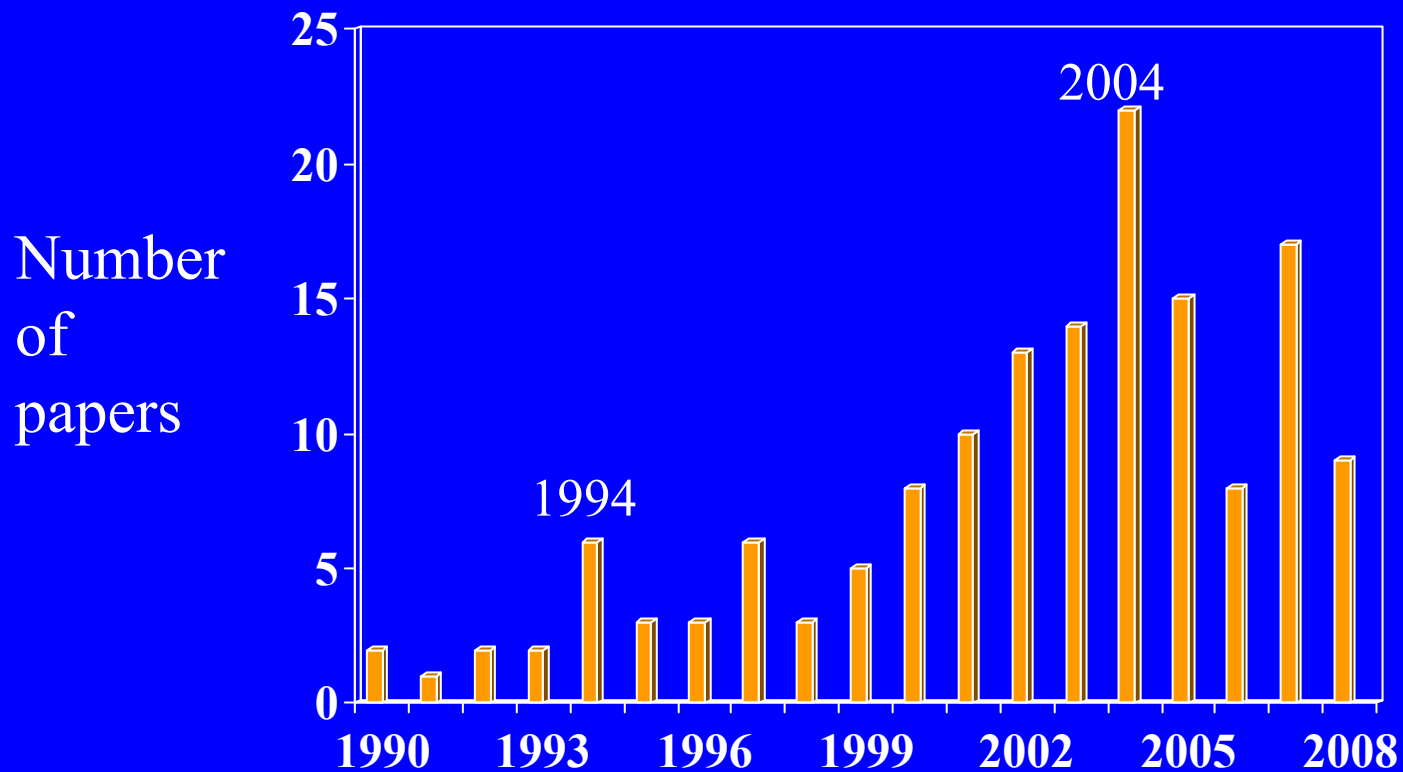
- 30% of older people fall at least once a year
- 5% of falls lead to fractures
- Falls can lead to nursing home admission
- Fear of falling is a health problem

# Risk Factors for Falls

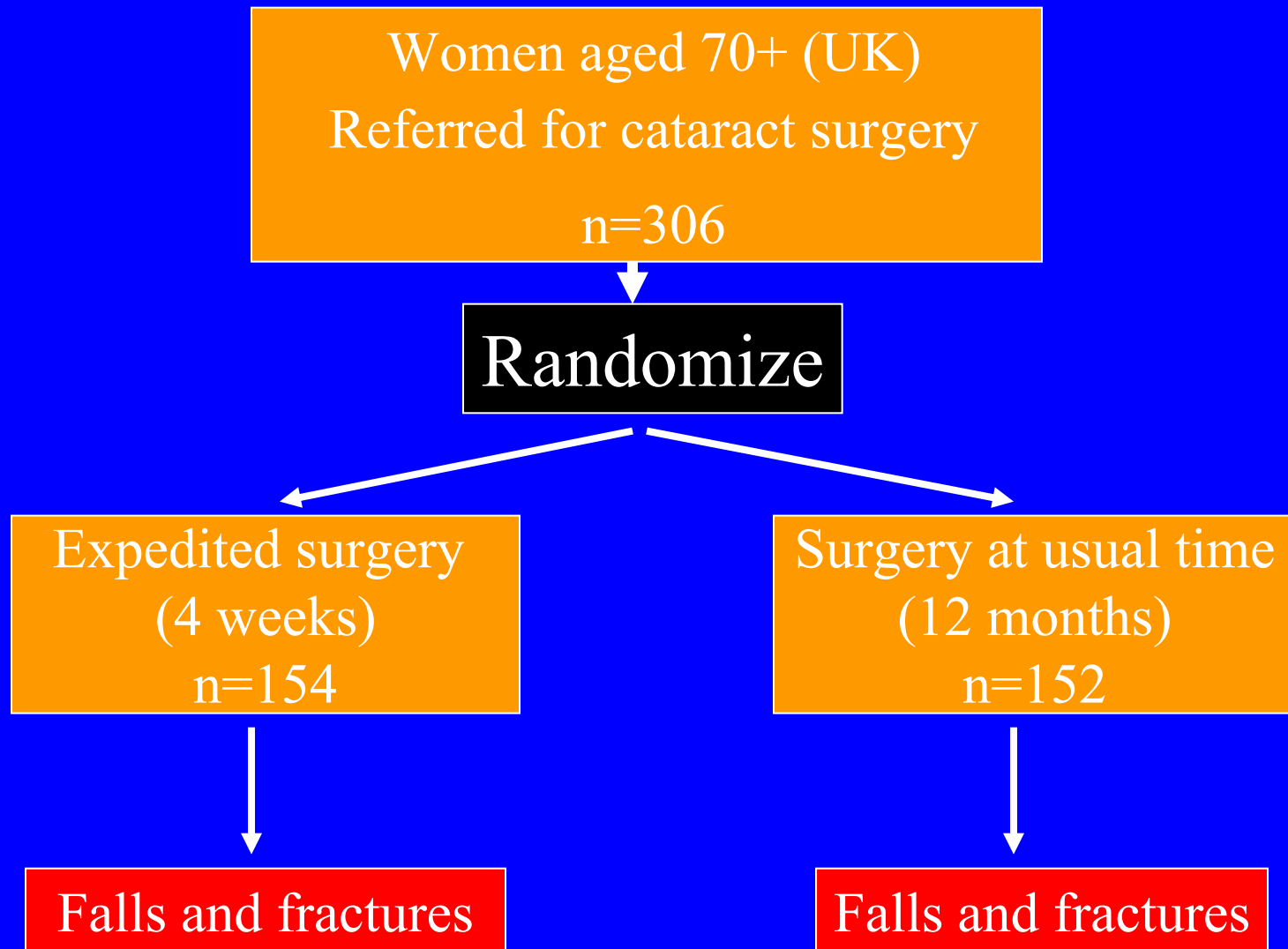
- Age
- Female sex
- Muscle weakness
- Balance and gait deficits
- Poor health (inc. stroke, Parkinson's)
- Psychotropic medications
- Poor vision
- Cognitive impairment
- Environmental hazards
- Inadequate footwear

# 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

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

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!

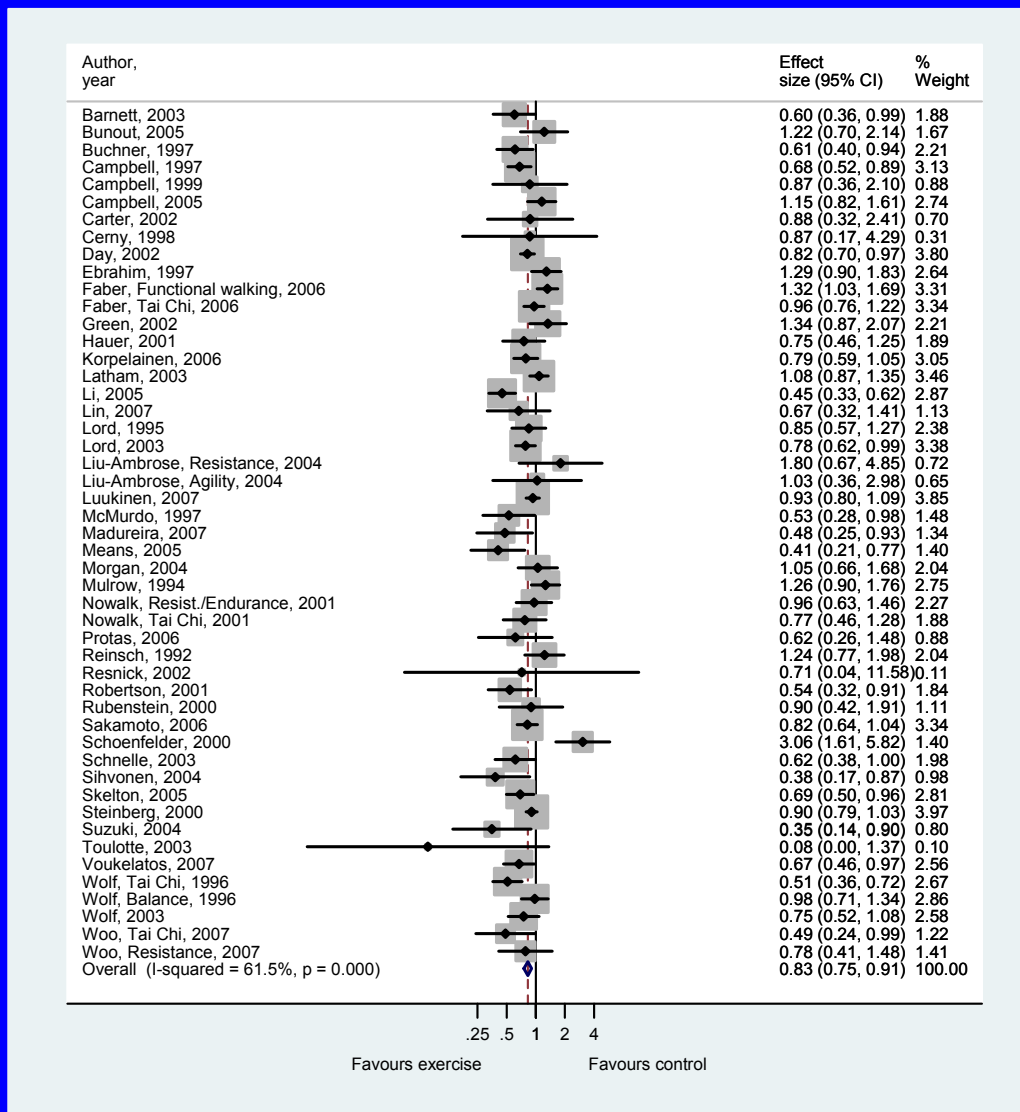


# Preventing Falls in the Community

## 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

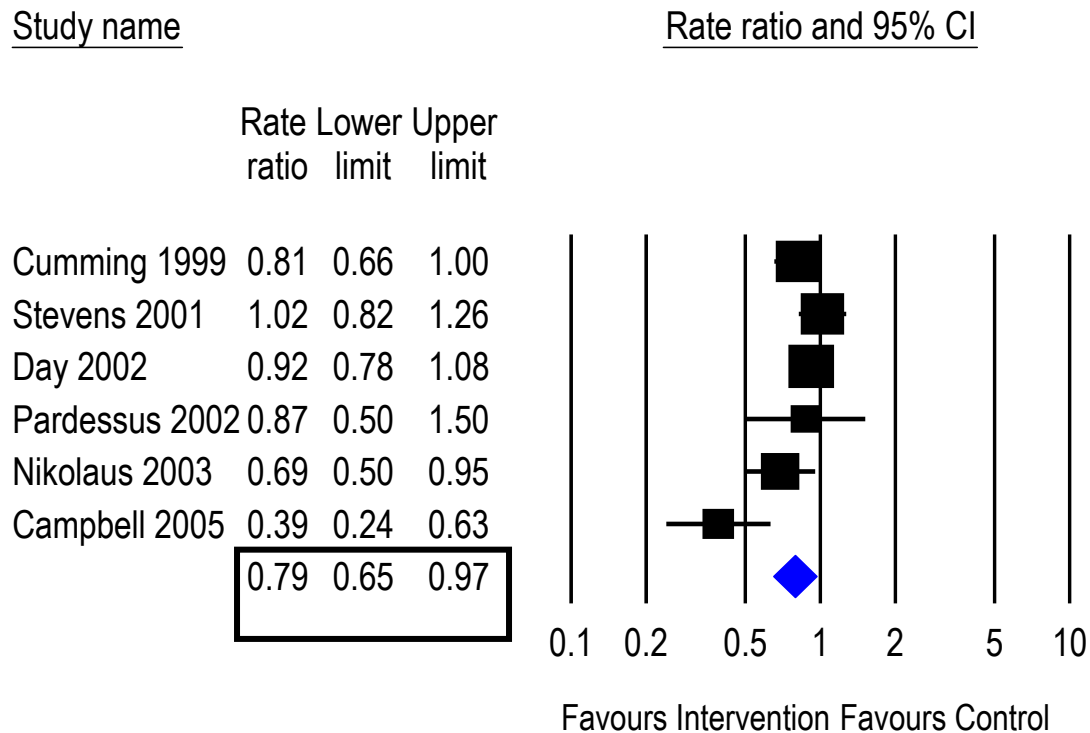
# Vitamin D and Falls: Studies in Community

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

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

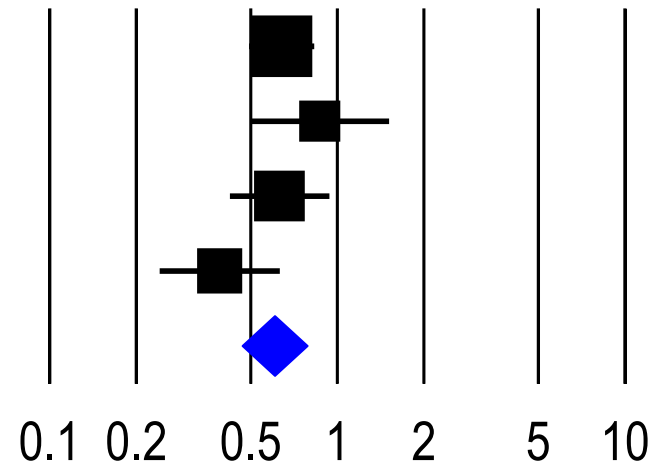
Cumming 1999b 0.64 0.50 0.82

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



Favours Intervention Favours Control

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

Vision assessment and  
treatment  
n=309

Usual care  
n=307

Falls/quality of life

Falls/quality of life

# Falls during Follow-Up

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

# **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:

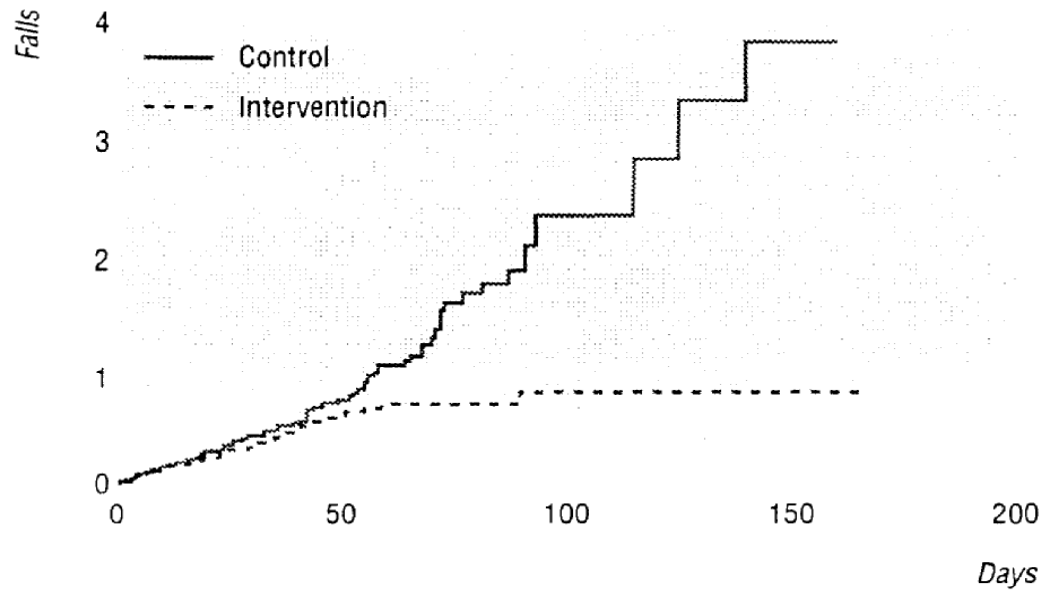
- A multidisciplinary team approach is effective
- Vitamin D is effective
- Results of exercise trials are inconsistent

In hospitals:

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

## Papers

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

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# Results: Relative Risk of Falls

## POPI Study of Falls in Hospital

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

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!***