

Prevention of frailty: an individual and community perspective

A. John Campbell
University of Otago Medical School

Plan for the presentation

- Present a model for frailty
- Discuss prevention using the frailty model
- Use a case to investigate how the literature on prevention applies to individual patients and the population at risk

Frail population

- Perceived diminished social value
- Fixed and low income
- Older and poorer housing - heating, lighting, access, convenience
- Less personal transport
- Decreased social groupings
- Increased physical disability

Frailty & the individual

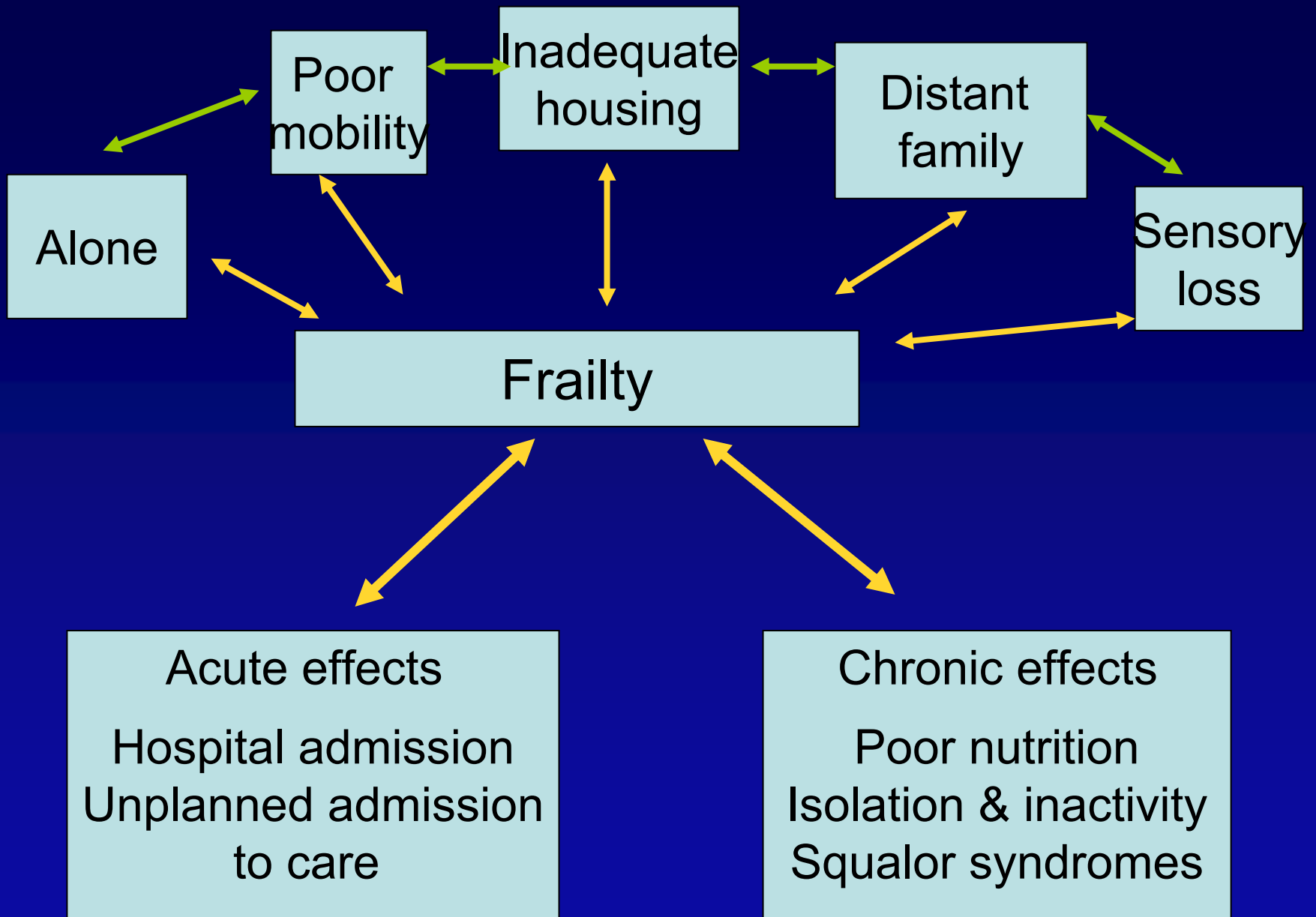
A state which results from a multi-system reduction in reserve capacity to the extent that a number of different body systems are close to, or past, the threshold of symptomatic clinical failure.

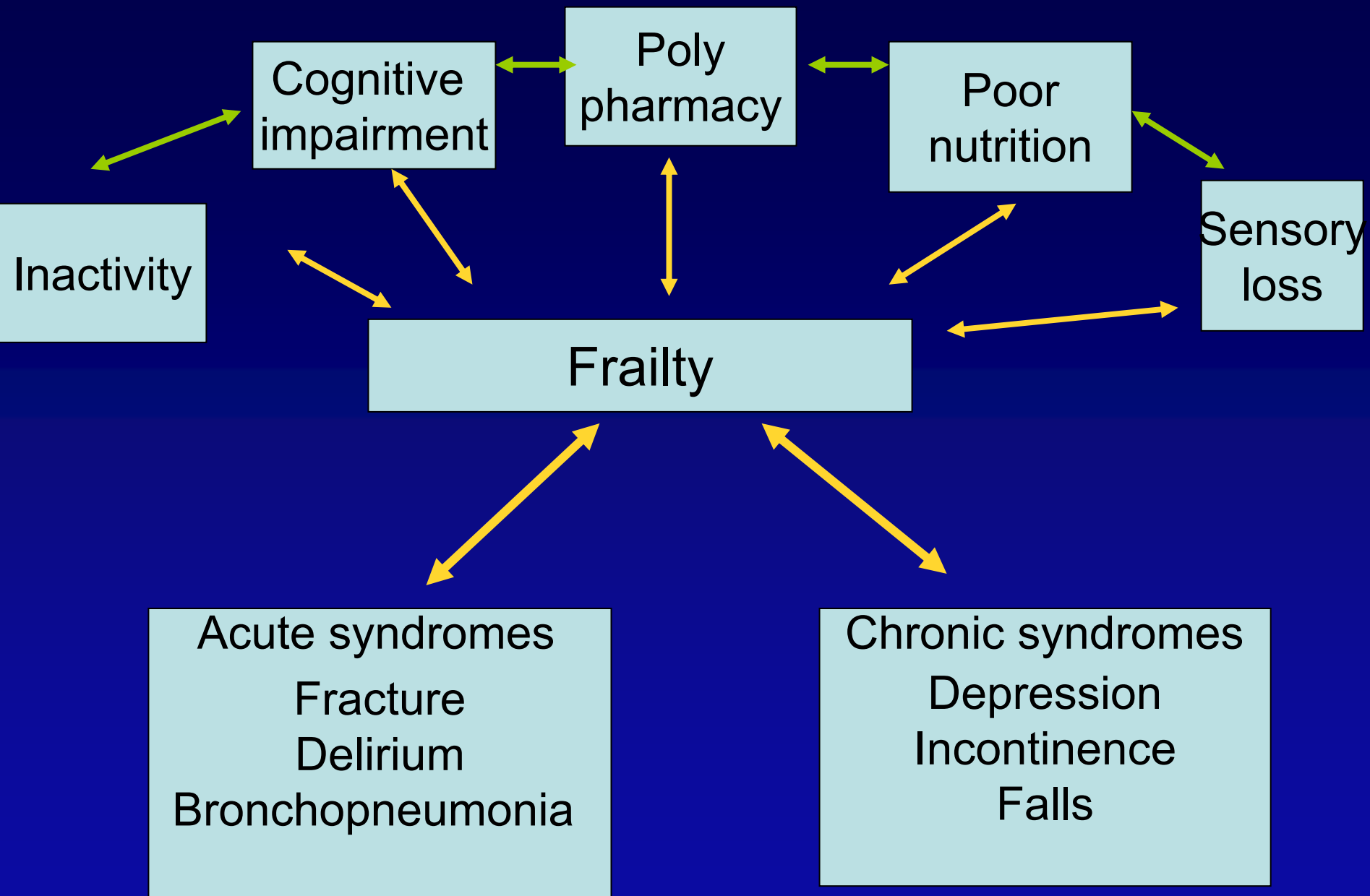
Frailty

As a consequence the frail person is at increased risk of disability and death from minor external stresses.

Frailty

The concept of diminished reserve and threat to independence from minor change underpins **social** as well as **physical and functional** frailty.

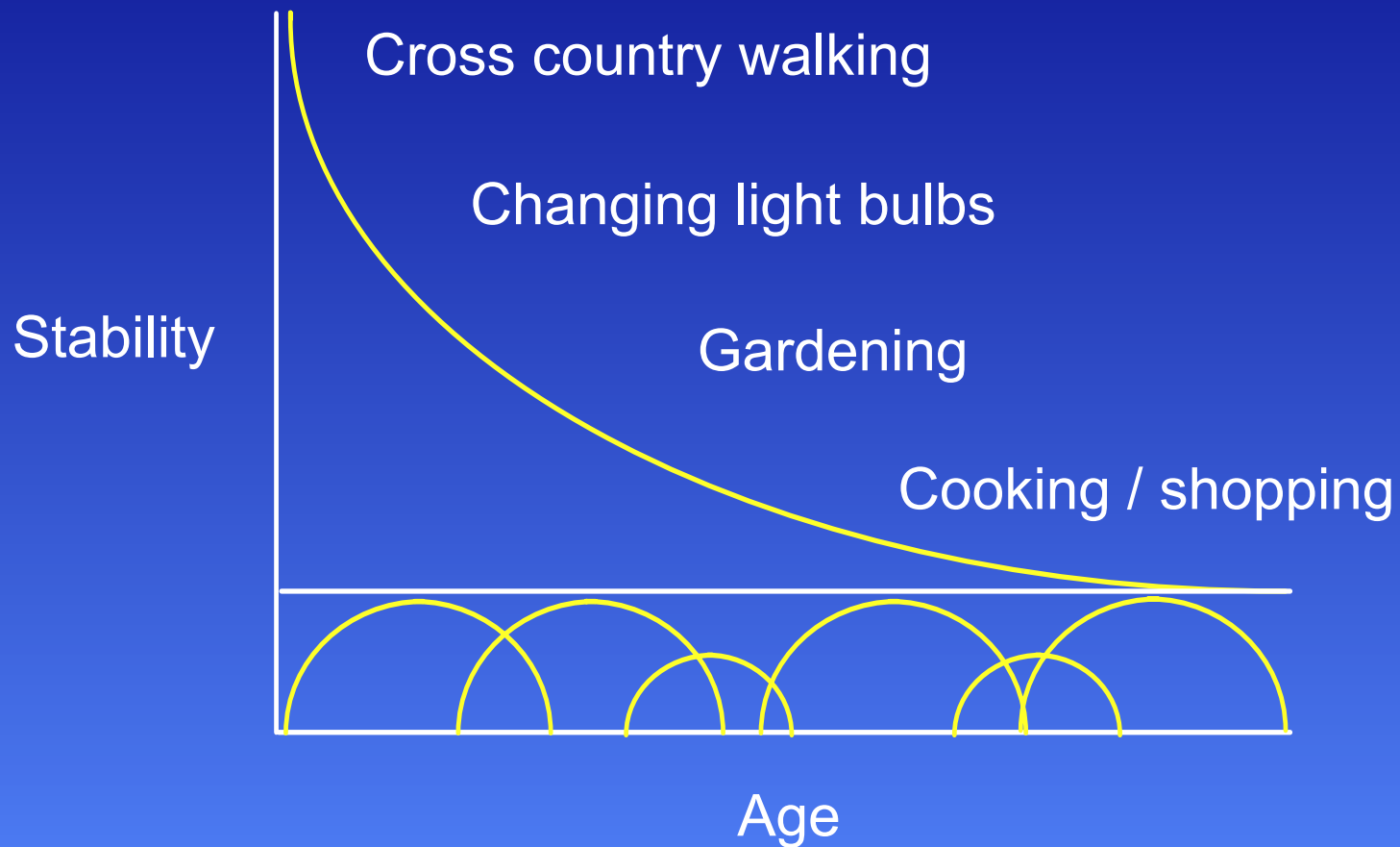




Frailty - key concepts

- Multiple systems
- Inter-related
- Minor stresses
- Physical, psychological and social morbidity as well as mortality affected
- Threshold

Stability and Fall Threshold



Patient Mrs A

- Mrs A, 85 years, transferred from orthopaedic service after PFF
- Previous controlled CHF secondary to IHD, hypertension
- Recovery complicated by a post operative episode of left ventricular failure and atrial fibrillation

Patient Mrs A

- Frail, somewhat unsteady, mentally alert
- Does wish to return home
- Does wish to reduce her medications
- No specific adverse effects
- Lives alone, no close family nearby.
Predominantly young, working people in immediate environment

Patient Mrs A

Medications:

metoprolol

digoxin

frusemide

quinapril

simvastatin

aspirin

alendronate

spironolactone

calcium

monthly Vitamin D

warfarin

amitriptyline

Key issues

How do we decrease the likelihood that Mrs A will:

- i) have a further hip fracture?
- ii) have a stroke?

What community programmes might have decreased the risk of a fall and fracture in the first place?

Prevention: Mrs A & her community

Intervention	Individual	Community
Alendronate	*	
Fall prevention	*	*
Hip protector pads	*	*
Warfarin	*	

University of Otago 2008

QuickTime?and a
TIFF (LZW) decompressor
are needed to see this picture.

Time course

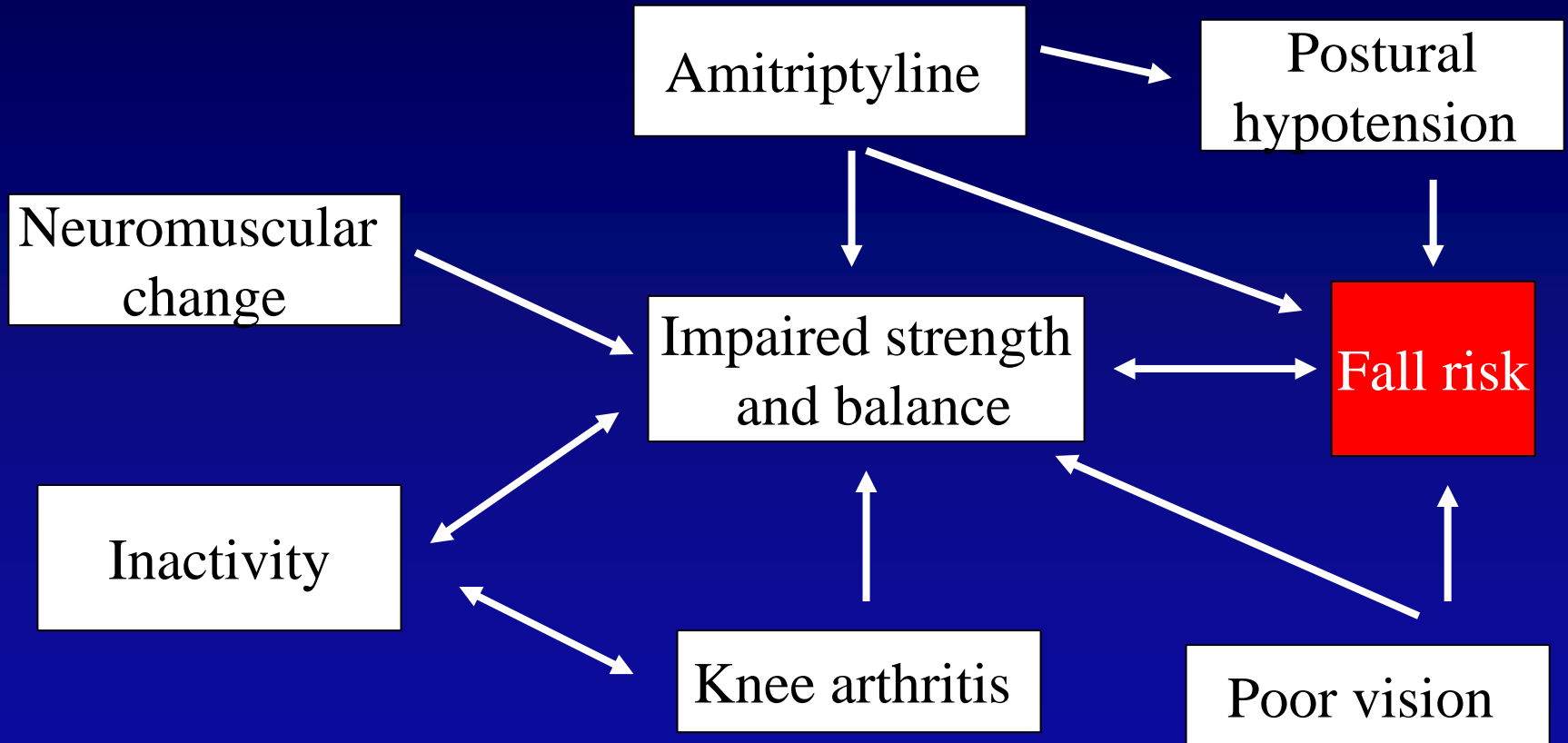
- Immediate
 - hip protector pads
 - some fall prevention programmes
- Within 1 year
 - strength and balance retraining
 - bisphosphonates
 - calcium & Vit D RHs
- Mortality after hip fracture
 - 33% 1 year
 - 92% 1year CHF
 - 71% 1 year chest infection
 - BMJ 2005;331:1374

Prevention: Mrs A & her community

Intervention	Individual	Community
Alendronate	*	
Fall prevention	*	*
Hip protector pads	*	*
Warfarin	*	

University of Otago 2008

Fall risk - predisposition



Elderly woman living alone in unsafe home

Prevention plan: Mrs A

- Full multidisciplinary assessment
- Home visit, assessment, support
- Medication review particularly amitriptyline
- Strength and balance retraining
- Hip protector pad
- Vitamin D

Prevention

Personal

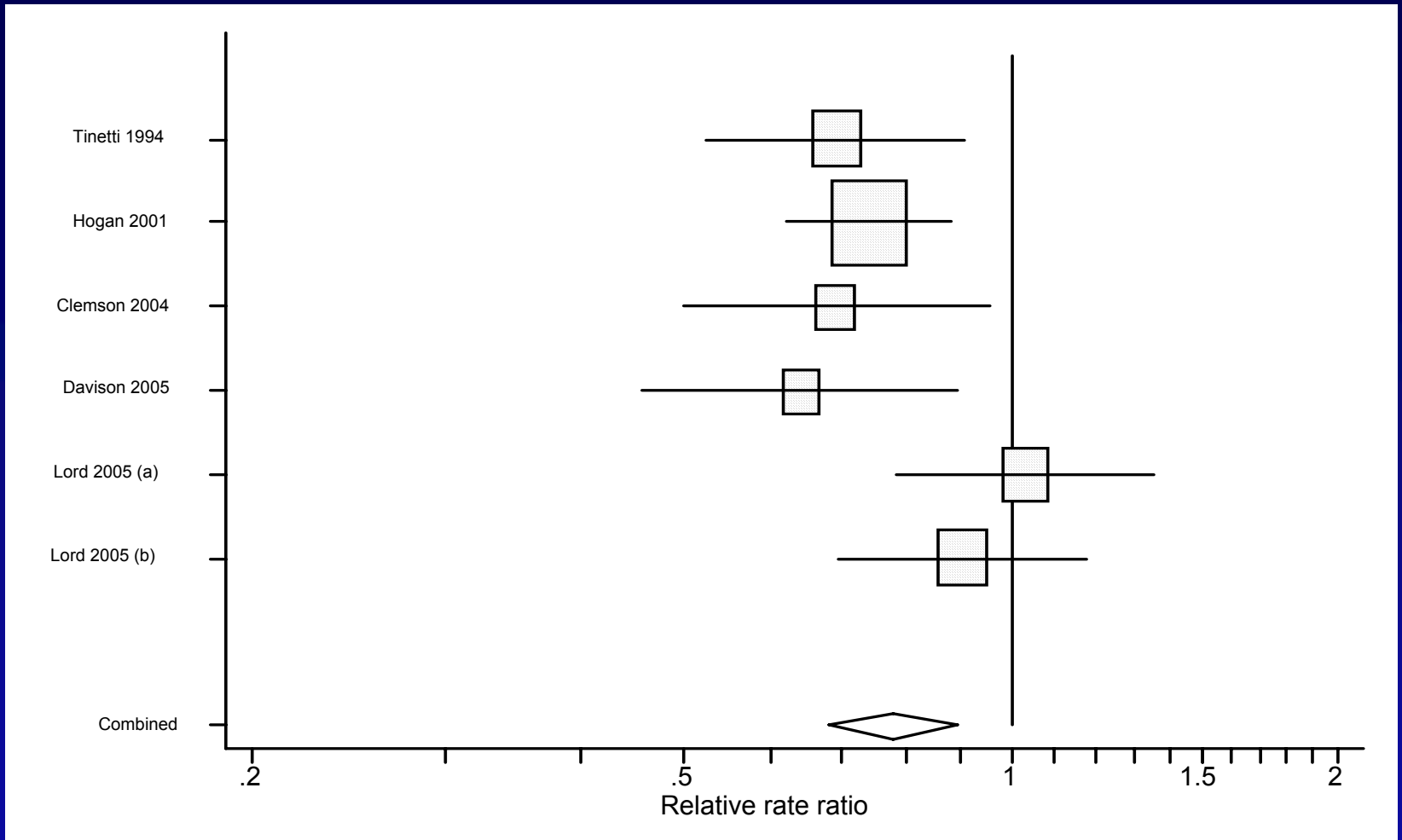
- individual
- team based
- diagnosis based
- costly
- maximum individual benefit
- low population cover

Public

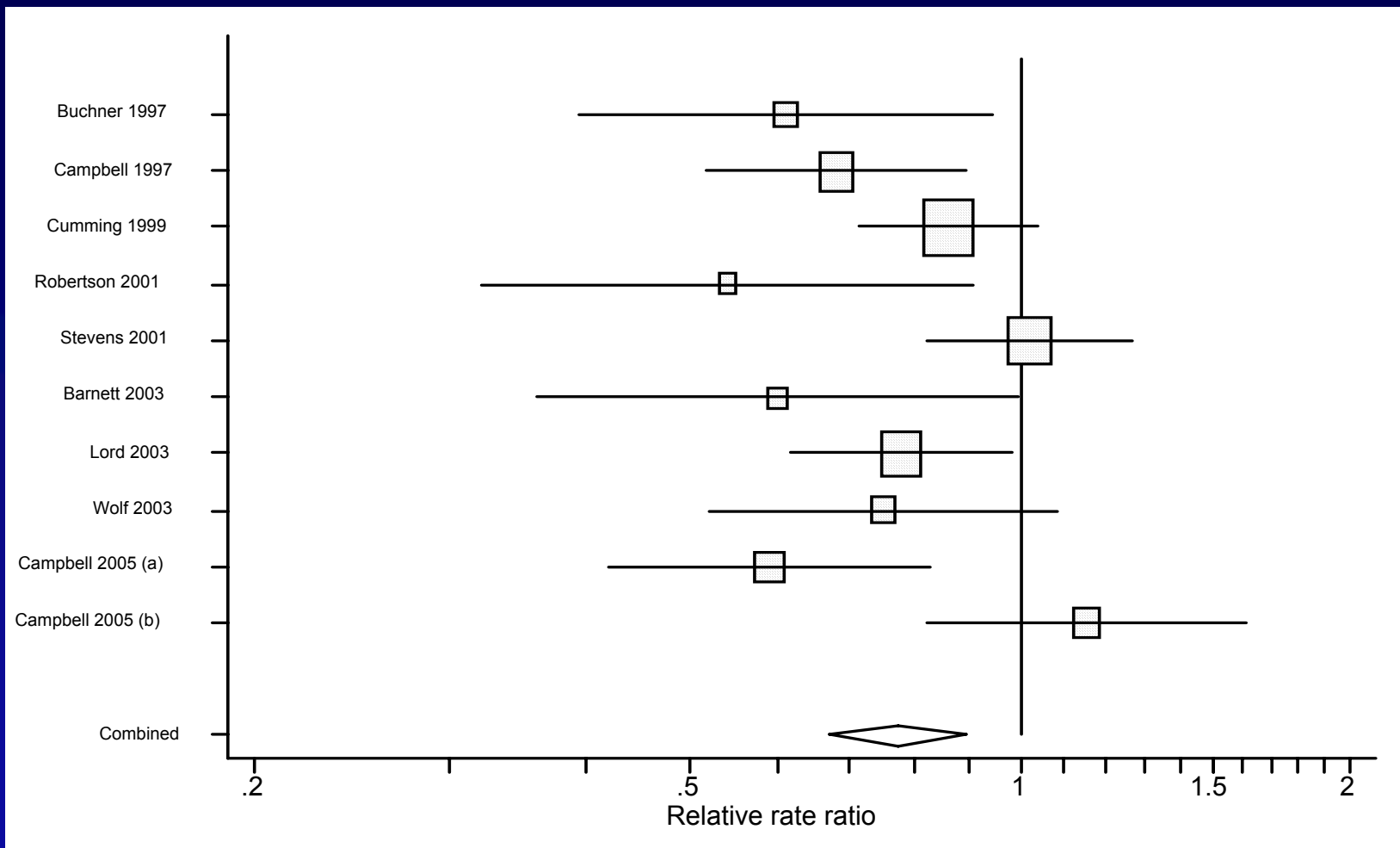
- targeted population
- individual worker
- protocol driven
- low per person cost
- maximum population benefit
- high population cover

Systematic review, meta-regression single v multiple RCTs

- Random allocation
- 65 years and older
- Majority independent in the community
- Prospective using diary or calendar monthly
- Follow up 12 months or more
- 70% completed
- All falls for at least 50 participants in analysis
- Relative rate ratio (95% CI) comparing total number of falls



Multifactorial interventions (initial pooling)



Single interventions (initial pooling)

Pooled rate ratio (95% CI)

- Multifactorial interventions
 - Initial pooling: 0.78 (0.68 to 0.89)
 - Sensitivity analysis: 0.77 (0.68 to 0.87)
- Single interventions
 - Initial pooling: 0.77 (0.67 to 0.89)
 - Sensitivity analysis: 0.71 (0.62 to 0.80)

Campbell AJ & Robertson MC
Age & Ageing 2007; 36: 656 - 662

Number of fall events prevented per 100 person years

Subgroup	Falls	Injurious falls
Aged ≥ 80 , fall(s) in previous year	54	29
Fall(s) in previous year	44	21
Aged ≥ 80	41	20
All participants (65 to 97 years)	34	16
Aged ≥ 80 , no fall in previous year	26	12
No fall in previous year	24	11
Aged 65 to 79	5	-2

Robertson MC *et al.* J Am Geriatr Soc 2002;50:905-911

Prevention: Mrs A & her community

Intervention	Individual	Community
Alendronate	*	
Fall prevention	*	*
Hip protector pads	*	*
Warfarin	*	

University of Otago 2008

Hip Protector Pads

- If worn at time of fall, risk of fracture reduced by 80%
- RCTs & meta-analyses do not show consistent benefit
- Trial design complicated by cluster or individual randomisation
- Adherence affected by the HPP, individual factors and staff attitudes

Hip Protector Pads

- Intention to treat analysis may obscure benefit to the individual patient
- Individual patient choice is critical
- May be more effective as part of a falls and fracture prevention programme
- Investment as a public health measure to prevent fractures not currently justified

Prevention: Mrs A & her community

Intervention	Individual	Community
Alendronate	*	
Fall prevention	*	*
Hip protector pads	*	*
Warfarin	*	

University of Otago 2008

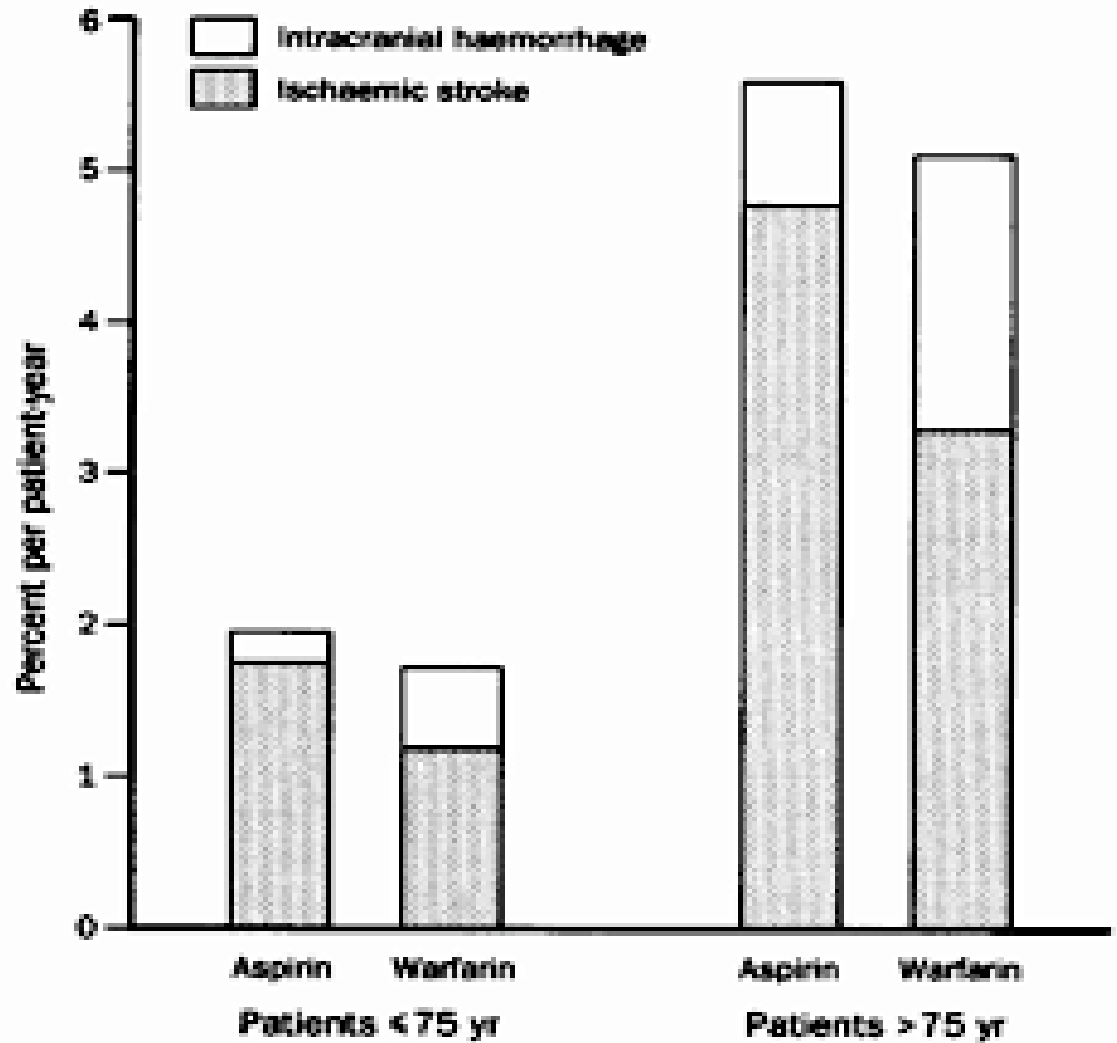


Figure 2: Combined rate of ischaemic stroke and intracranial haemorrhage according to antithrombotic therapy and age group

Lancet 1994; 343: 687-91

QuickTime and a
TIFF (LZW) decompressor
are needed to see this picture.

Warfarin in AF: practice v trials

- Older
- More co-morbid conditions
- Longer between coagulation checks
- Less often in target ratios
- Bleeding increased (3% v 1.3% or 1 in 8 when started)
- Treatment failures (ischaemic strokes) more common

Conclusions

- Trial evidence of population benefit, or lack of benefit, may not be relevant to the individual
- Trial populations, especially for pharmaceutical trials, seldom include the frail elderly patients we treat

Conclusions

- Preventive measures may be different for individuals and communities

Individual & community factors

- Patient's wishes
- Strength of evidence
- Applicability of evidence
- Cost
- Co-morbidities
- Prognosis
- Community concerns & wishes
- Strength of evidence
- Applicability of evidence
- Cost
- Coverage
- Staff resources

Conclusions

- There is strong evidence that preventive measures are effective in frail individuals and frail populations
 - high absolute risk
 - small physiological gains, large functional improvement