

## Summary notes

# Preventing fractures and falls in older adults in residential care homes by improving dairy consumption

An interview with Dr Sandra Iuliano by Prof David J Armstrong



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## Effect of dietary sources of calcium and protein on hip fractures and falls in older adults in residential care: cluster randomised controlled trial

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### ABSTRACT

#### OBJECTIVE

To assess the antifracture efficacy and safety of a nutritional intervention in institutionalised older adults replete in vitamin D but with mean intakes of 600 mg/day calcium and <1 g/kg body weight protein/day.

#### DESIGN

Two year cluster randomised controlled trial.

#### SETTING

60 accredited residential aged care facilities in Australia housing predominantly ambulant residents.

#### PARTICIPANTS

7195 permanent residents (4920 (68%) female; mean age 86.0 (SD 8.2) years).

#### INTERVENTION

Facilities were stratified by location and organisation, with 30 facilities randomised to provide residents with additional milk, yoghurt, and cheese that contained 562 (166) mg/day calcium and 12 (6) g/day protein achieving a total intake of 1142 (353) mg calcium/day and 69 (15) g/day protein (1.1 g/kg body weight). The 30 control facilities maintained their usual menus, with residents consuming 700 (247) mg/day calcium and 58 (14) g/day protein (0.9 g/kg body weight).

#### MAIN OUTCOME MEASURES

Group differences in incidence of fractures, falls, and all cause mortality.

#### RESULTS

Data from 27 intervention facilities and 29 control facilities were analysed. A total of 324 fractures (135 hip fractures), 4302 falls, and 1974 deaths were observed. The intervention was associated with risk reductions of 33% for all fractures (121 v 203; hazard ratio 0.67, 95% confidence interval 0.48 to 0.93; P=0.02), 46% for hip fractures (42 v 93; 0.54, 0.35 to 0.83; P=0.005), and 11% for falls (1879 v 2423; 0.89, 0.78 to 0.98; P=0.04). The risk reduction for hip fractures and falls achieved significance at

five months (P=0.02) and three months (P=0.004), respectively. Mortality was unchanged (900 v 1074; hazard ratio 1.01, 0.43 to 3.08).

#### CONCLUSIONS

Improving calcium and protein intakes by using dairy foods is a readily accessible intervention that reduces the risk of falls and fractures commonly occurring in aged care residents.

#### TRIAL REGISTRATION

Australian New Zealand Clinical Trials Registry ACTRN12613000228785.

#### Introduction

Longevity increases the proportion of older adults in the population. The accompanying increased prevalences of chronic illnesses, loss of musculoskeletal mass, frailty, and bone fragility increase the risk of falls and fractures.<sup>1</sup> Loss of independence increases the number of people needing full time institutionalised care, the source of around 30% of all hip fractures in the community.<sup>2</sup> Thus, targeting an intervention to all aged care residents is a rational approach to reducing the fracture burden in the whole community.

The widespread use of antiresorptive therapy is unlikely to reduce this fracture burden because of a paucity of evidence of antifracture efficacy in people over 80 years of age, the common occurrence of adverse events, and high cost given the large numbers of people that must be treated.<sup>3</sup> However, these people often have calcium intakes below 700 mg daily, an amount unlikely to offset obligatory loss of calcium.<sup>4</sup> They also often have protein intakes below 1 g/kg body weight/day, predisposing to loss of lean muscle mass.<sup>5</sup> Thus, an alternative approach is to target all institutionalised older adults with a non-pharmaceutical nutritional intervention.

Few studies have investigated the efficacy and safety of a nutritional approach to reduction of fracture risk in aged care residents. Chapuy and colleagues showed antifracture efficacy with pharmacological doses of calcium and vitamin D in female nursing home residents with low calcium intakes and vitamin D deficiency.<sup>6</sup> No studies have examined the effects of protein supplementation on reduction of fracture risk, despite evidence of improved muscle function and reduced falls.<sup>7</sup>

Consumption of milk, yoghurt, and cheese, foods rich in calcium and protein, slows bone loss and improves insulin-like growth factor 1.<sup>8,9</sup> These foods are widely available, palatable, and low cost and so are likely to be adhered to. Accordingly, we conducted a prospective,

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#### WHAT IS ALREADY KNOWN ON THIS TOPIC

Few studies have investigated the efficacy and safety of a nutritional approach to reduction of fracture risk in institutionalised older adults

One study using pharmacological doses of calcium and vitamin D reduced hip fractures in female nursing home residents with low calcium intakes and vitamin D deficiency

#### WHAT THIS STUDY ADDS

Supplementation using high calcium, high protein dairy foods reduced falls and fractures in vitamin D replete older adults in aged care

Study

# Study design

Cluster randomised controlled trial



# Servings of dairy food per day

Portion size

Before the  
study

During the  
intervention

Australian<sup>1</sup>

2

3.5

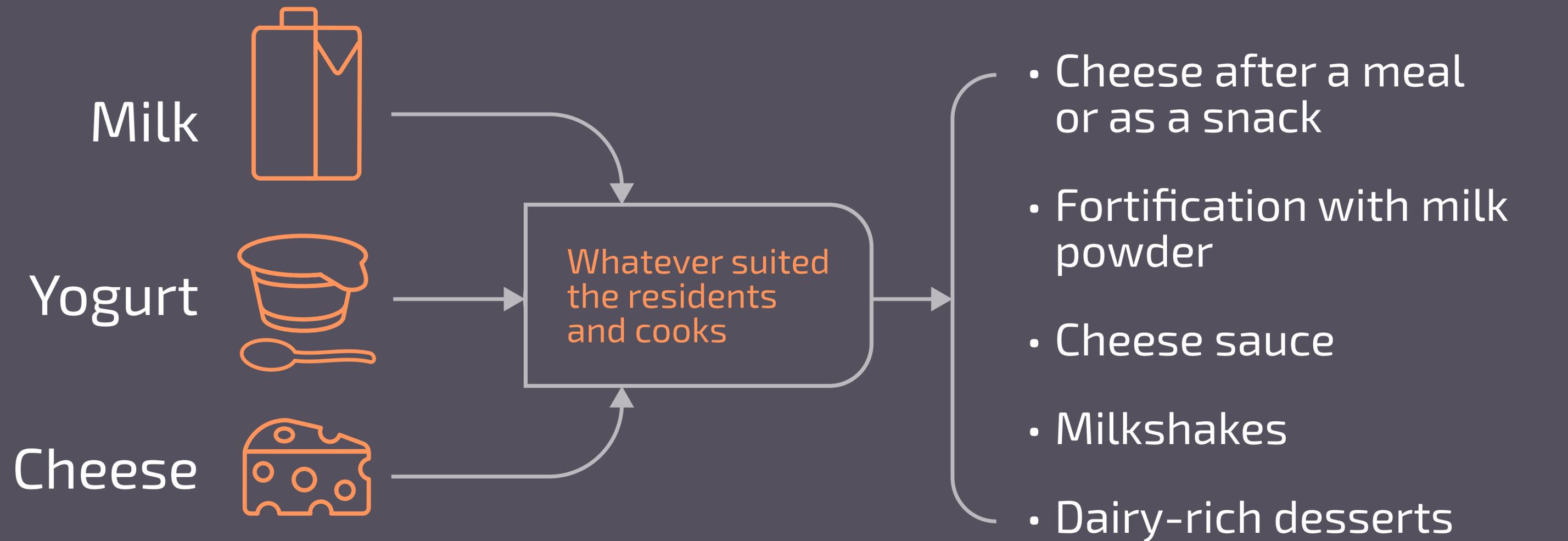
European  
Equivalent<sup>2</sup>

3

5

<sup>1</sup> portion size: 250ml milk, 200g yogurt, 40g cheese    <sup>2</sup> portion size: 150-250ml milk, 125-150g yogurt, 20-30g cheese

# How dairy foods were used



# Results

# Results of study

Over 2 years

## Significant decrease in falls and fractures

11%

Reduction in

Falls

33%

Reduction in

All  
fractures

46%

Reduction in

Hip  
fractures

No difference in mortality between the intervention group and the controls.

# Mechanistic aspects

Intervention

With extra  
dairy foods

Maintained bone density  
and appendicular  
muscle mass

Controls

Without extra  
dairy foods

Continued to lose bone  
density and appendicular  
muscle mass

# Nutritional changes with extra dairy foods

Intervention

**With extra dairy foods**

Per day

**Calcium 1142mg**

(increased calcium by 562mg)

**Protein 69g**

**1.1g/kg body weight**

(increased protein by 12g)

Controls

**Without extra dairy foods**

Per day

**Calcium 700mg**

**Protein 58g**

**0.9g/kg body weight**

No differences in energy intake between groups. Both groups vitamin D replete.

# Cost of the extra dairy foods

Per person, per day

**\$0.70** = **€0.45** Euro  
Australian Dollar **£0.40** Pound

# Conclusion

Providing extra dairy foods to older people in residential care homes can significantly reduce their risk of fractures and falls.



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**Milk**  
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[www.milknutritiousbynature.eu](http://www.milknutritiousbynature.eu)