

# Preventing Fractures & Falls in Older Adults in Aged Care by Improving Dairy Consumption



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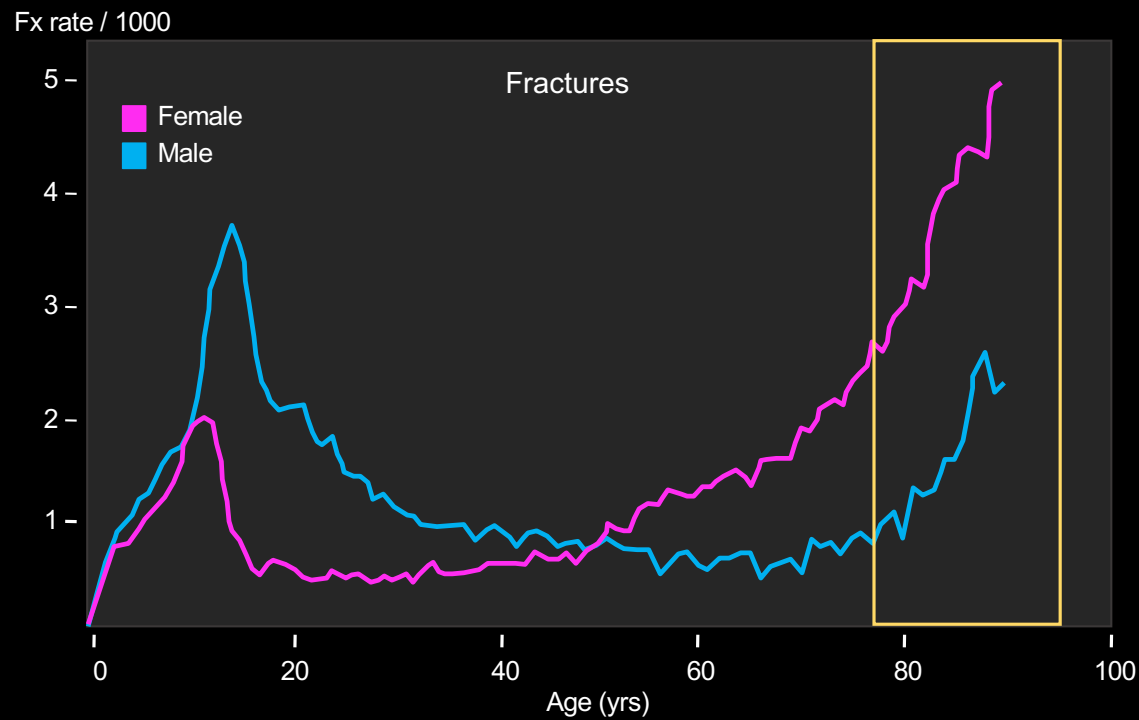


# Disclosures

- European Milk Forum: Travel support / lecture fees
- Abbott: Advisory board / lecture fees
- UK Dairy Council: Expert group-healthy aging
- Nestle Health Sciences: Lecture fees
- Israel Milk Board: Lecture fees
- Research support

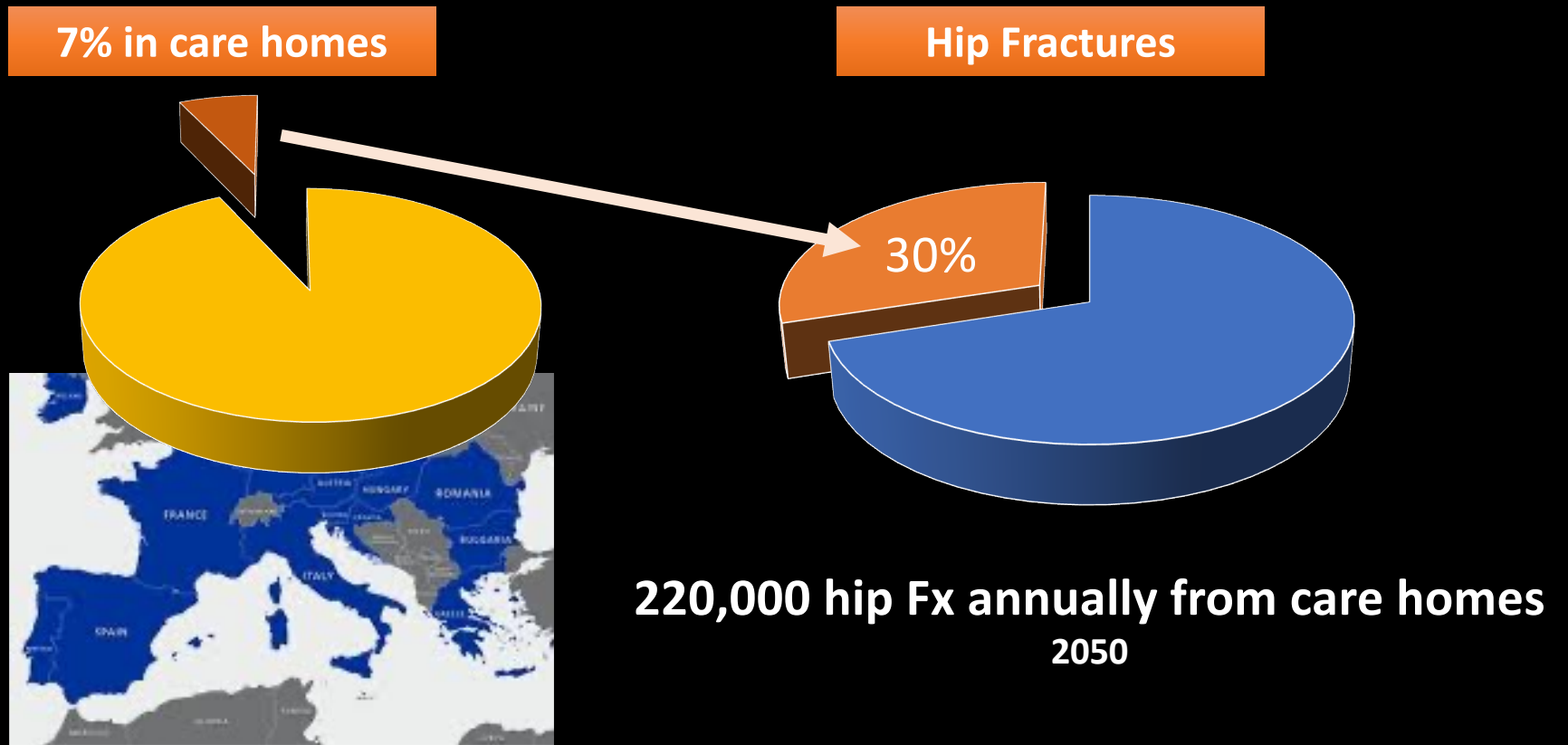


# Fractures Over the Lifespan



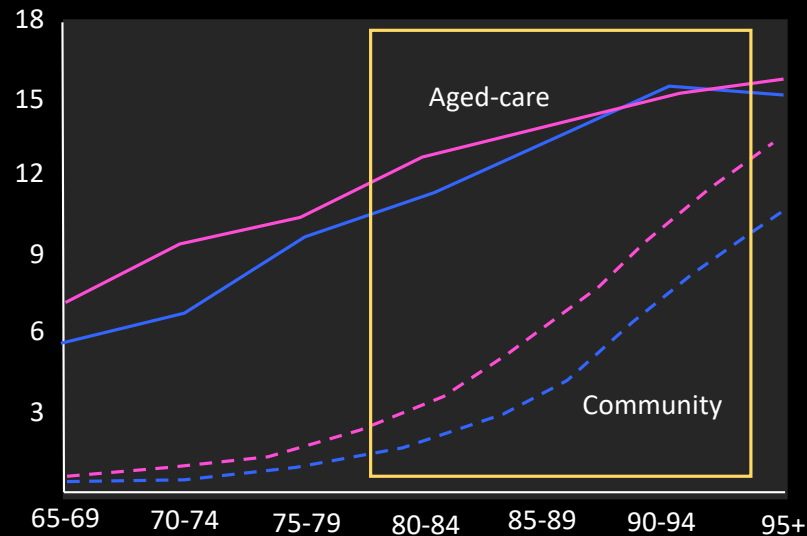
Mean age of  
Care Home  
Residents  
87 years

# Hip Fracture Burden From Care Homes in the EU



# Falls in Older Adults in Care Homes

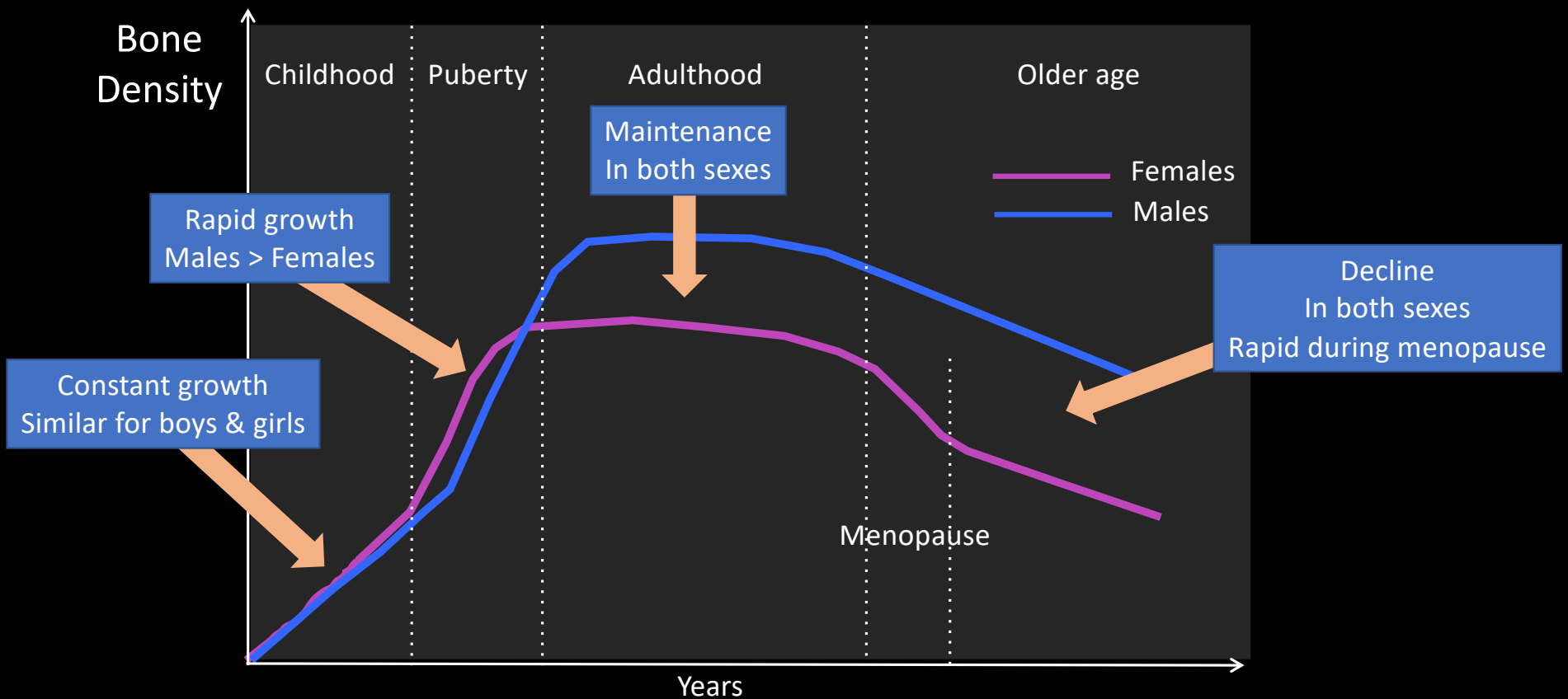
Cases per 100 population



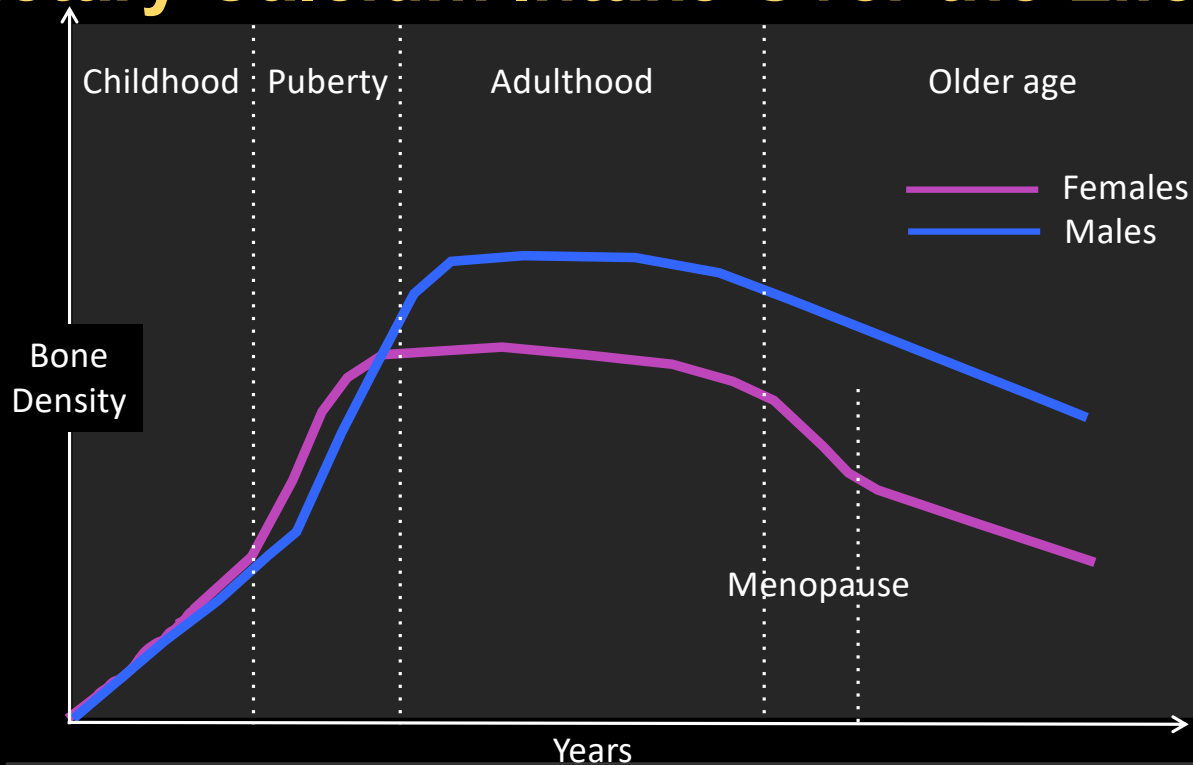
- Falls rates 3-5 x higher in aged-care (UK / Aust)
- 1 in 10 aged-care residents hospitalized annually (Australia)

- Falls rates: UK\*
  - 12 % 70+ years of age
  - 30% Residential Care homes

# Growing Up & Growing Old With Bone

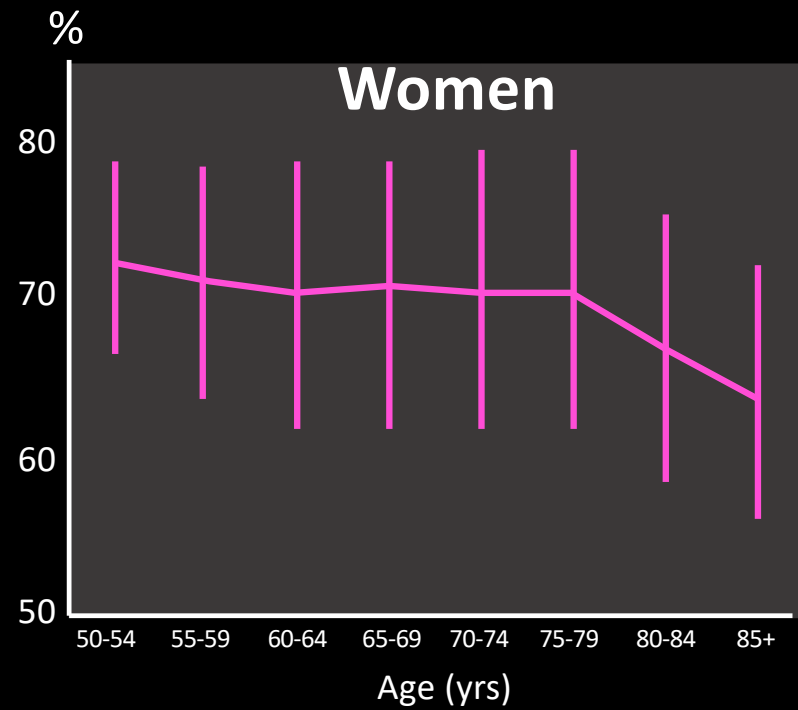
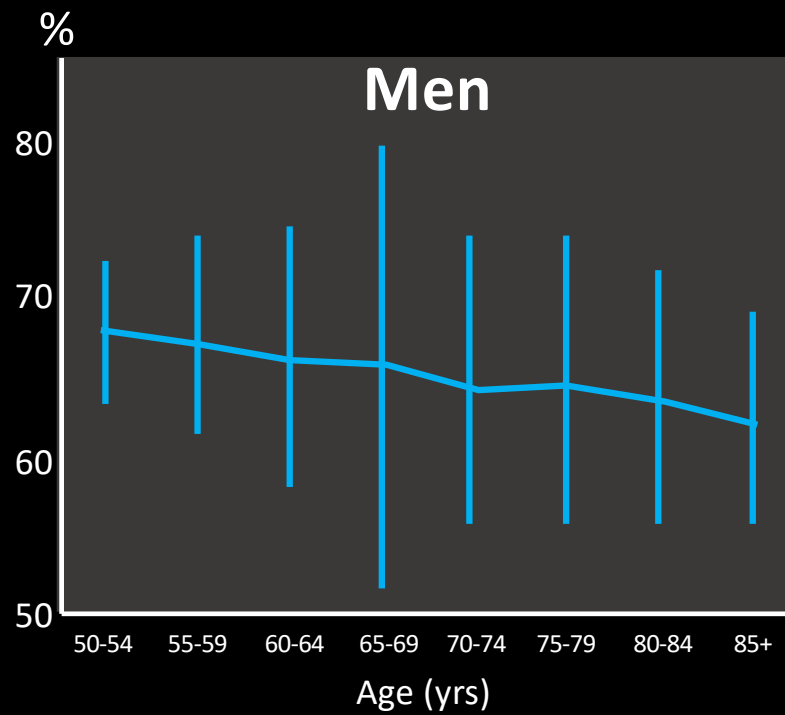


# Dietary Calcium Intake Over the Lifespan



Age	7-10	15-18	25-34	35-49	50-64	65-74	75+	80+
Male	741	878	1017	1040	1027	887	885	858
Female	656	653	731	796	823	764	693	747

# Proportion of Older Adults Consuming Dairy Daily in Europe





# Dietary Sources of Calcium

## Eatwell Guide

Check the label on packaged foods

Each serving (150g) contains

Energy	Fat	Saturated	Sugars	Salt
1048kJ/250kcal	3.0g	1.3g	34g	0.9g
	LOW	LOW	HIGH	MED
13%	4%	7%	38%	15%

of an adult's reference intake  
Typical values (as sold) per 100g: 697kJ/ 167kcal

Choose foods lower in fat, salt and sugars

Use the Eatwell Guide to help you get a balance of healthier and more sustainable food. It shows how much of what you eat overall should come from each food group.

Eat at least 5 portions of a variety of fruit and vegetables every day

Fruit and vegetables

6%

Choose wholegrain or higher fibre versions with less added fat, salt and sugar

Potatoes, bread, rice, pasta and other starchy carbohydrates

30%

10%

Beans, pulses, fish, eggs, meat and other proteins

Eat more beans and pulses, 2 portions of sustainably sourced fish per week, one of which is oily. Eat less red and processed meat

43%

Dairy and alternatives

Choose lower fat and lower sugar options



Water, lower fat

5%

and/or smoothies to a total of 150ml a day.



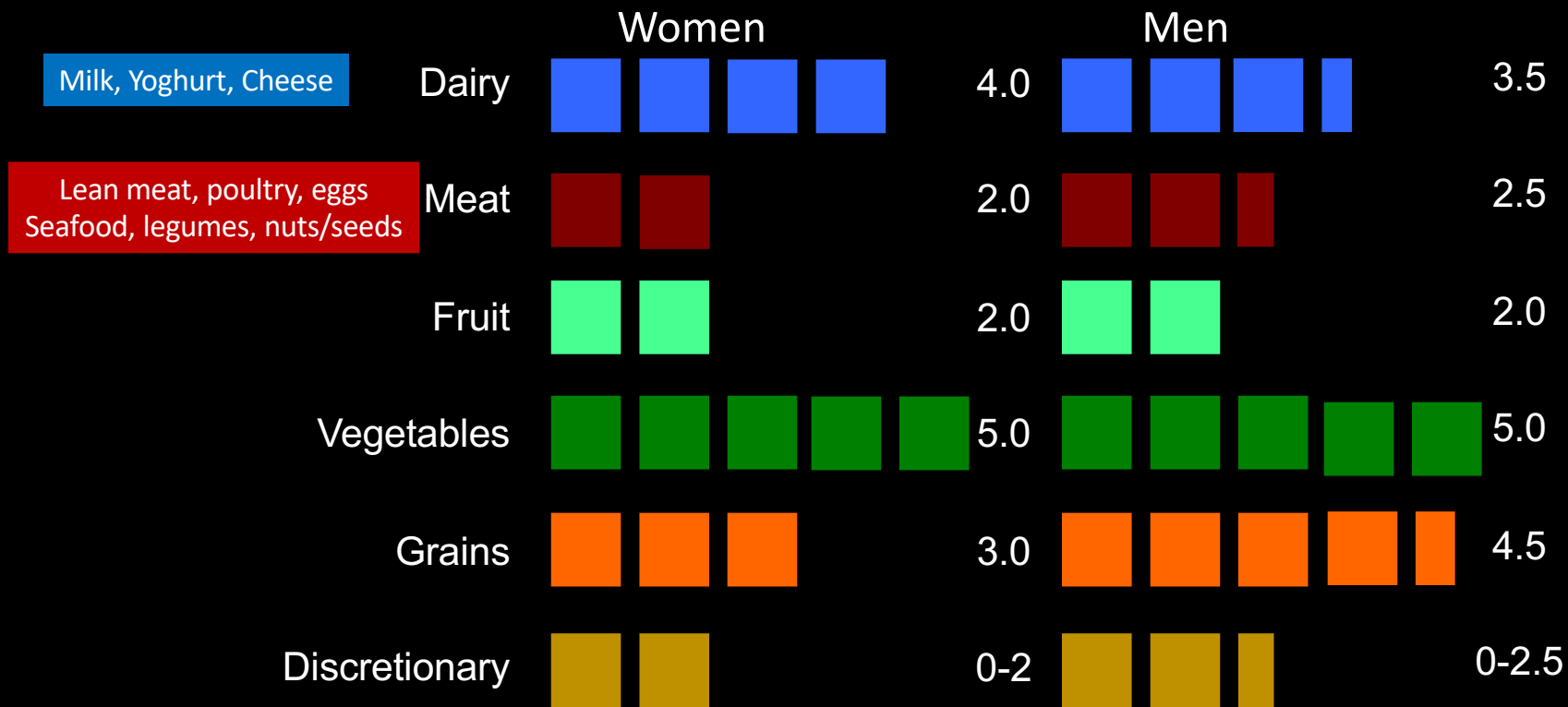
Eat less often and in small amounts



Choose unsaturated oils and use in small amounts

Per day 2000kcal 2500kcal = ALL FOOD + ALL DRINKS

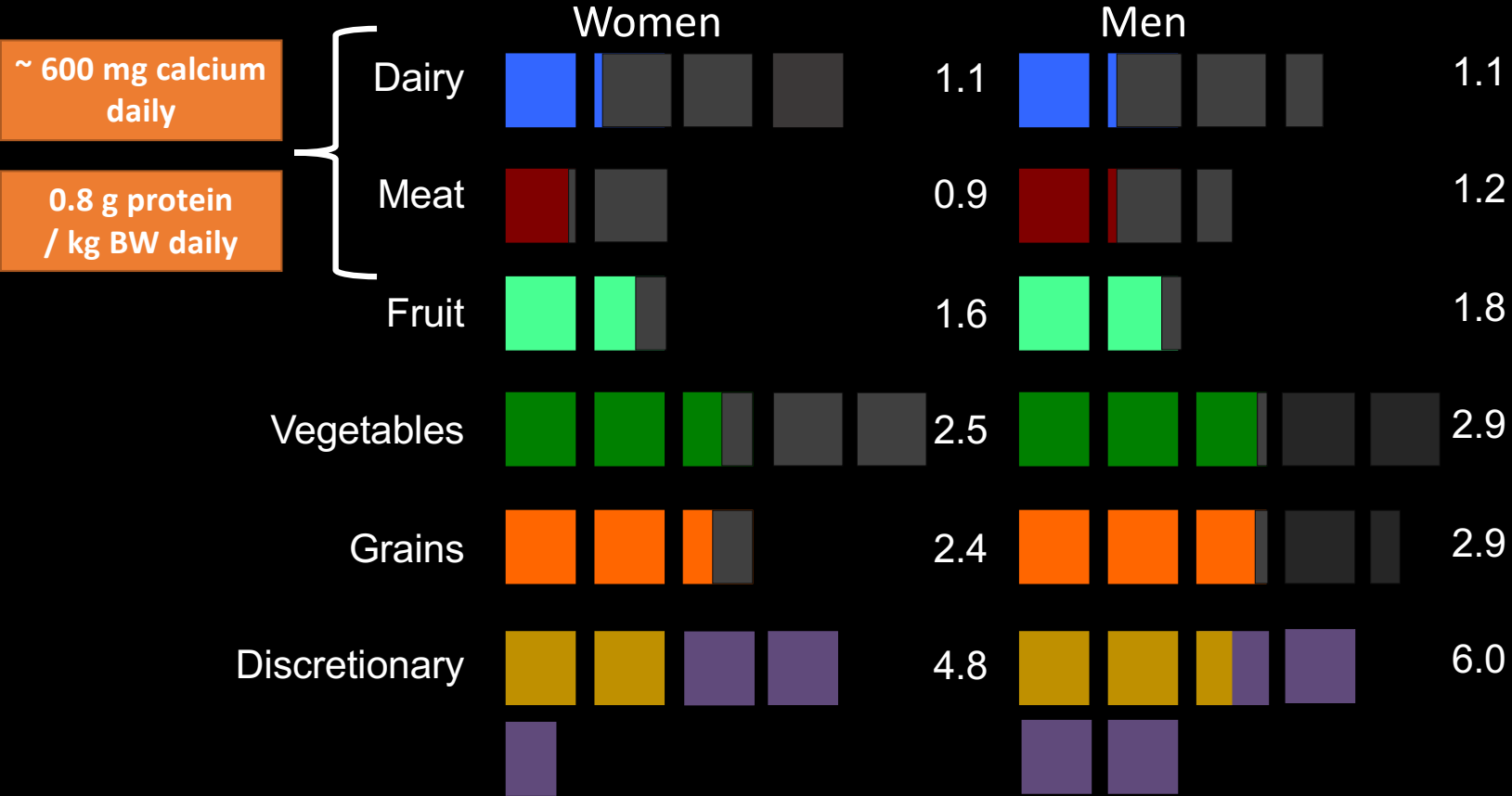
# Recommended Food Intake in Older Adults



# Current Food Intake in Aged-Care Residents



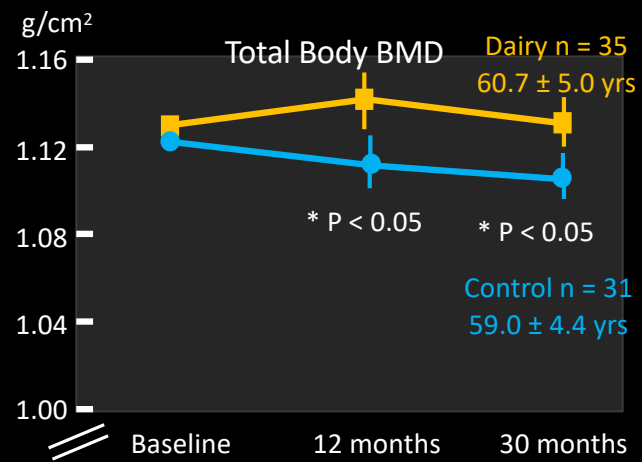
# Current Food Intake in Aged-Care Residents



## Protein Requirements in Older Adults

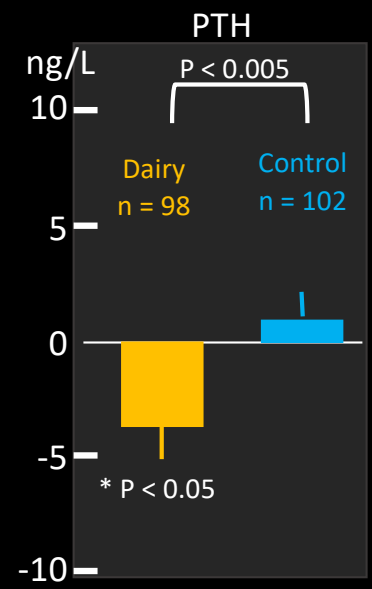
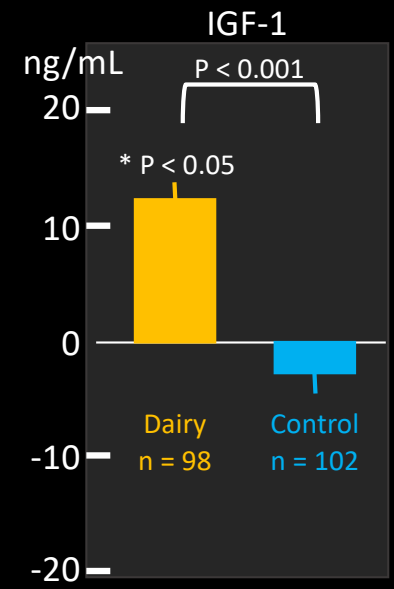
Condition	Daily Needs g/kg BW	
Healthy Adult	0.8	Actual intake
Older Adult	1.2 – 1.5 *	Suggested intake
Stress (trauma / infection / surgery)	1.5 - 2.0	
Presence of wound	1.5	
Restore weight lost	1.5	
Correct protein-energy malnutrition	1.5	

# Dairy Supplementation In Older Adults



	Baseline	12 months	30 months
Dairy	683	1140	1183
Control	676	750	671

- Dairy (milk, yoghurt) Cal Vit D
- PM women



Δ 12 weeks

- 3 x milk drinks
- Ca/d ~1400mg v 700mg
- Men & Women ~ 65yo

# Dairy Food and Older Adults in Residential Aged-Care

- Source of 30% of hip fractures in the community.
- Falls rates are 5 times higher than community peers.
- High rates of malnutrition.
- Calcium intake 635 mg/day
- Protein intake 0.8g / kg body weight
- Dairy intake 1.5 serving daily\*

\*250 ml milk, 200 g yoghurt, 40 g cheese

# Can Improved Nutrition Using High-Calcium, High-Protein Dairy Foods Reduce Falls & Fractures Risk in Older Adults in Aged-Care?





# Dairy and Fracture Trial

30 Dairy-supplemented^  
n = 1950

60 aged-care Facilities

30 Usual Care-controls\*  
n = 2031

Falls, Fractures, Mortality recorded for all residents  
For 24 months

27 facilities#  
n = 3301 24 months  
Fx, Falls, Mortality

BL & M12 Subset  
Bone density, structure  
& metabolism Serum

29 facilities  
n = 3894 24 months  
Fx, Falls, Mortality

# Study Design

Food service supported to increase dairy options on the menu

Addition



Fortification



Substitution



Modification



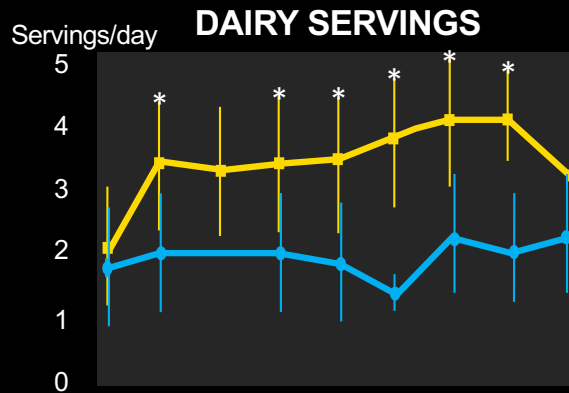
# Baseline Characteristics

	Intervention	Controls		
Demographics	n=3301	n=3894		
	Women (n; %)	2194 (66%)	2680 (69%)	
	Age (yrs)	87 (8)	86 (8)	
	Height (m)	1.60 (0.1)	1.60 (0.1)	
	Weight (kg)	66.5 (15.6)	66.2 (15.8)	
	Medications (n)*	12 (6)	12 (7)	
	Medical Conditions (n)*	10 (5)	10 (7)	
Biochemistry	n=170	n=130	Vitamin D replete	
	25(OH)D (nmol/L)	72 (29)		73 (26)
	CTX (ng/ml)	445 (312)		416 (227)
	P1NP (µg/L)	59.7 (61.5)		53.3 (32.8)
	PTH (pg/ml)	6.8 (4.9)		6.9 (3.8)
	IGF-1 (nmol/L)	15.2 (5.7)	16.0 (6.6)	
Bone morphology	n=77	n=79		
	FN BMD (g/cm <sup>2</sup> )	0.74 (0.13)	0.76 (0.15)	
	LS BMD (g/cm <sup>2</sup> )	1.08 (0.27)	1.14 (0.28)	
	Distal Tibia			
	Total vBMD (mgHA/cm <sup>3</sup> )	214 (61)	230 (76)	
	Cortical porosity (%)	76 (7)	75 (7)	
	Trabecular vBMD (mgHA/cm <sup>3</sup> )	149 (48)	161 (58)	
	Distal Radius			
	Total vBMD (mgHA/cm <sup>3</sup> )	270 (76)	276 (86)	
Cortical porosity (%)	69 (7)	68 (8)		
	Trabecular vBMD (mgHA/cm <sup>3</sup> )	145 (51)	146 (58)	

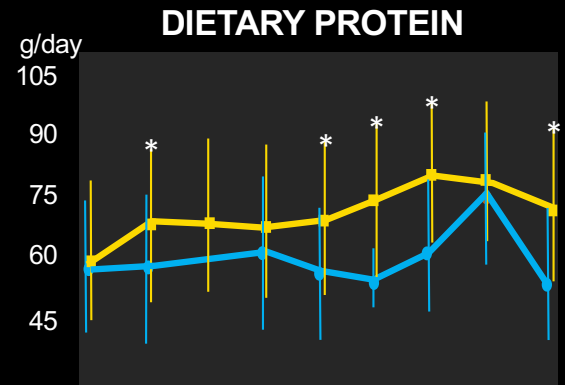
\*median

# Improved Nutrient intake with Dairy Supplementation

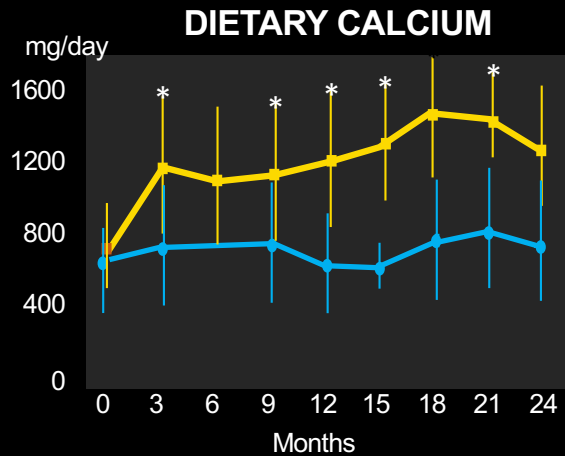
**~3.5**  
Servings  
daily



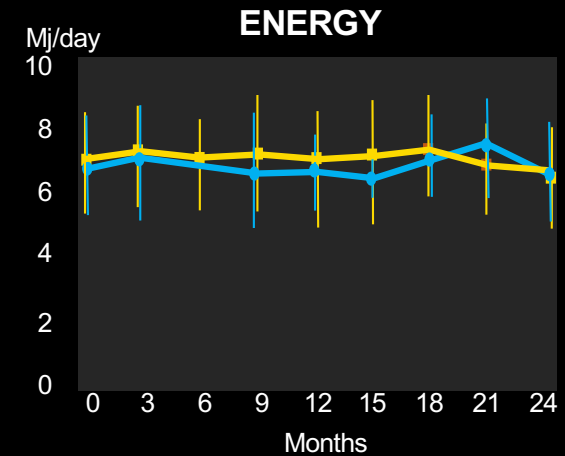
**72g/day**  
**1.1g/kg BW**



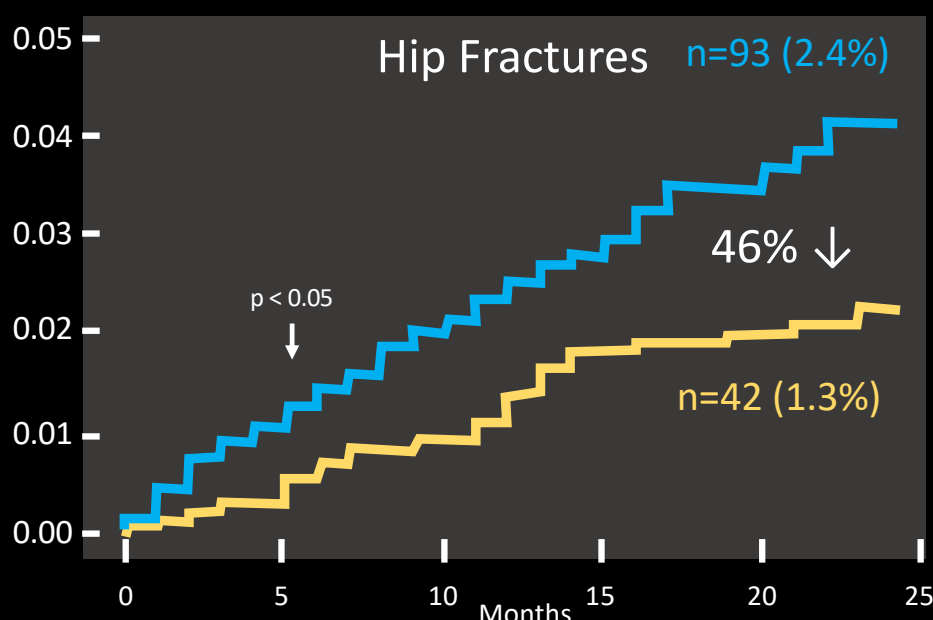
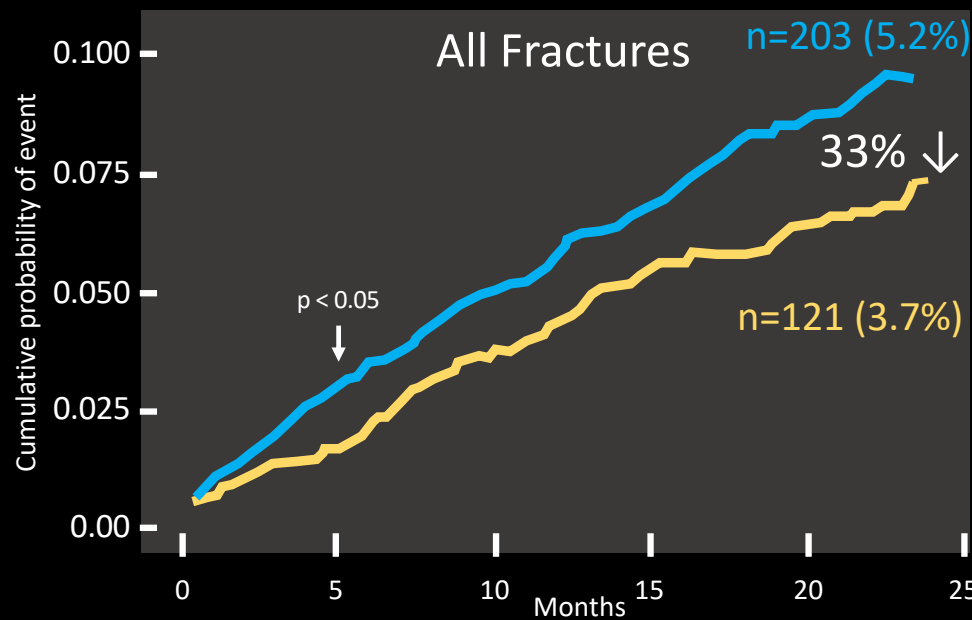
**~1100**  
Mg/day



**No Change**



# Dairy Supplementation and Fractures in Aged-Care Residents

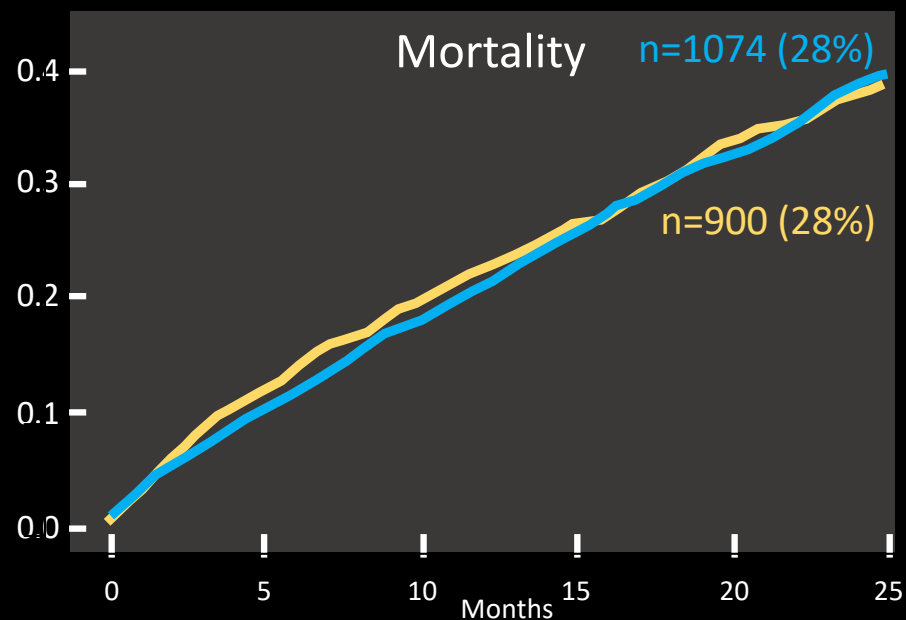
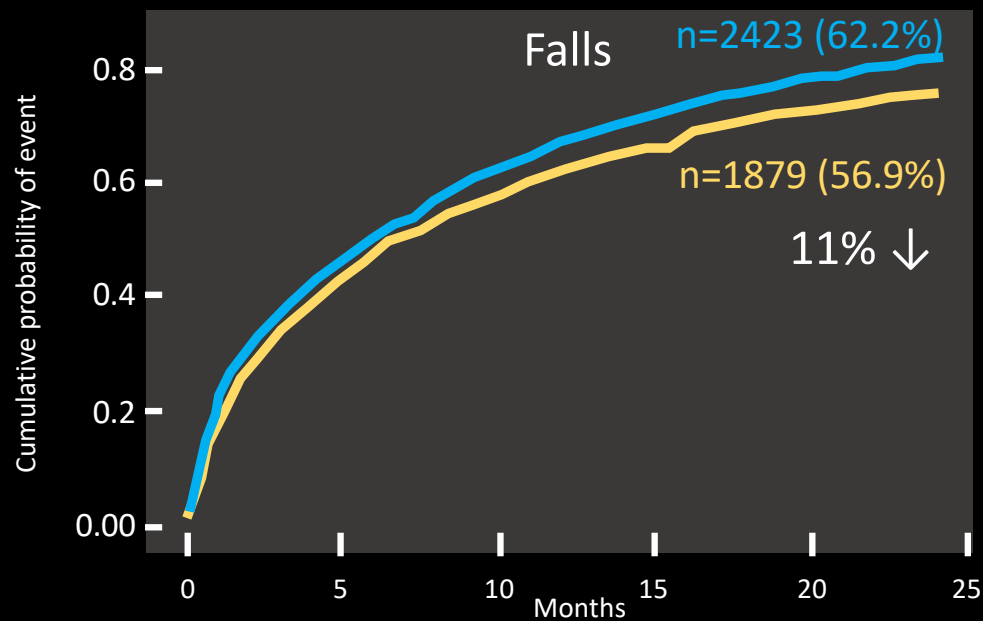


	0	5	10	15	20	25		0	5	10	15	20	25
Control	3894	2719	2089	1568	1148	0		3894	2758	2140	1625	1206	0
Intervention	3301	2314	1777	1373	964	0		3301	2336	1815	1408	999	0

HR 0.67, 95%CI 0.48 - 0.93, p=0.018

HR 0.54, 95%CI 0.35 - 0.83, p=0.005

# Dairy Supplementation and Falls & Mortality in Aged-Care Residents

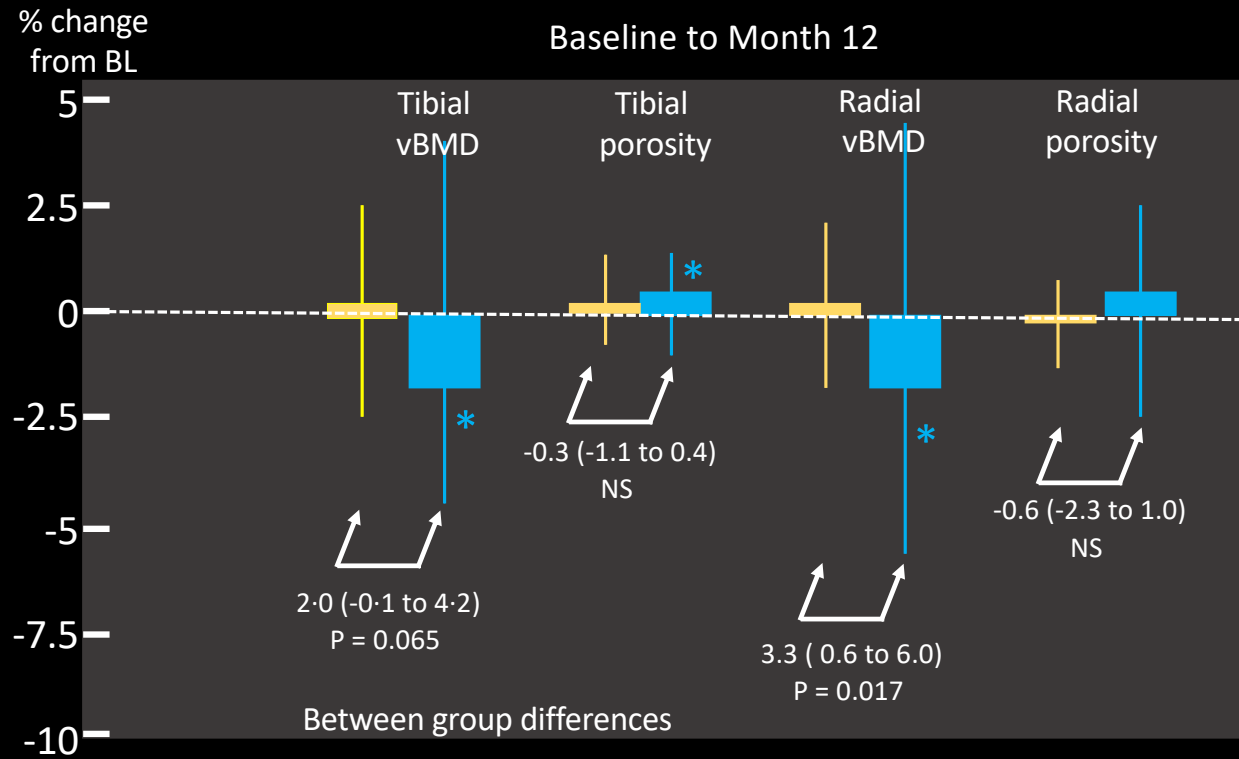


Control	3894	1591	911	531	334	0	3894	2778	2173	1661	1239	0
Intervention	3301	1403	838	541	337	0	3301	2302	1801	1402	1010	0

HR 0.89, 95%CI 0.78 - 0.98, p=0.041

HR 1.01, 95%CI 0.43 to 3.08, p=0.913

# Dairy Supplementation and Changes in Bone Density

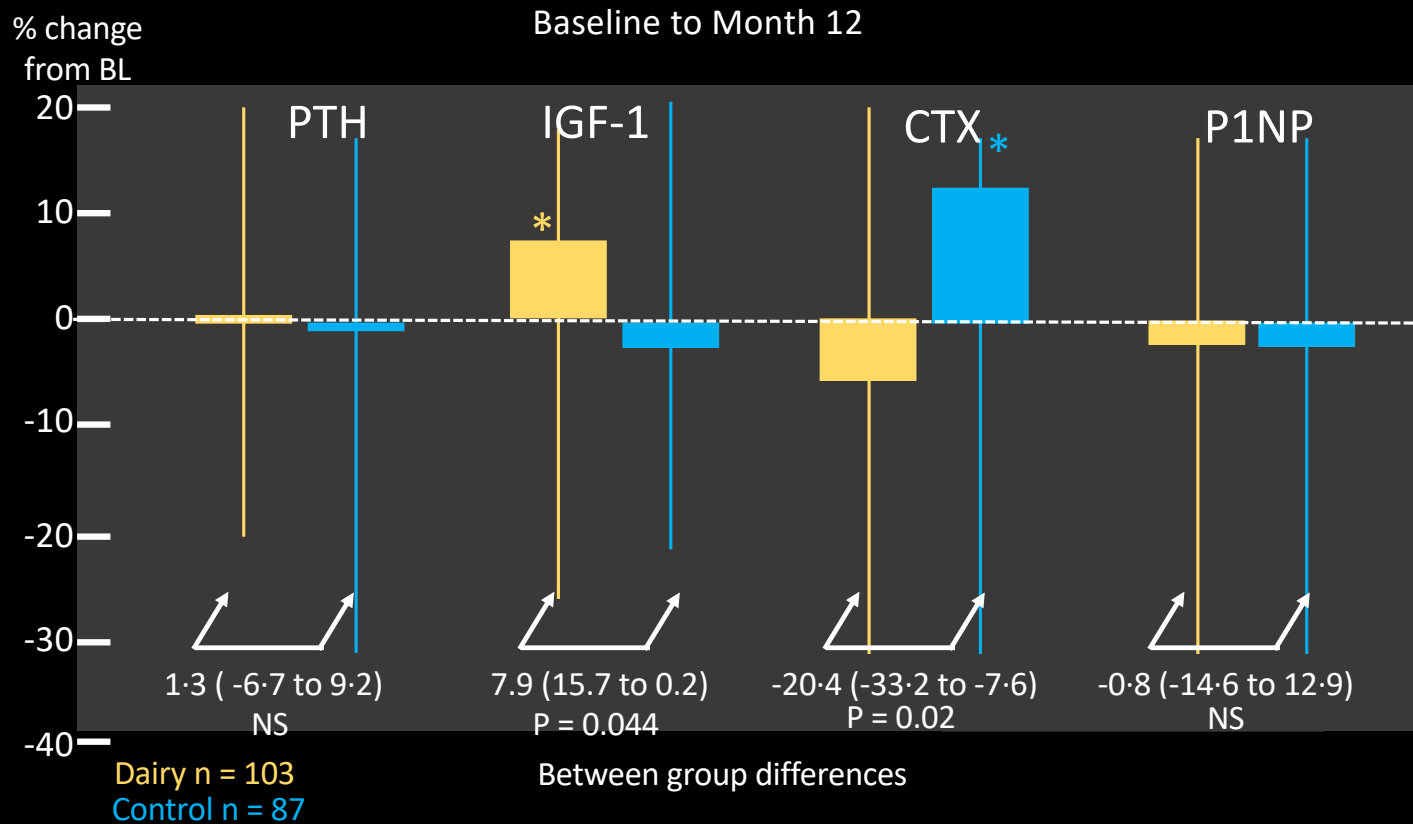


Mean ± SE

Dairy n = 33  
Control n = 39

\*\*p<0.01, \* p<0.05 different to baseline

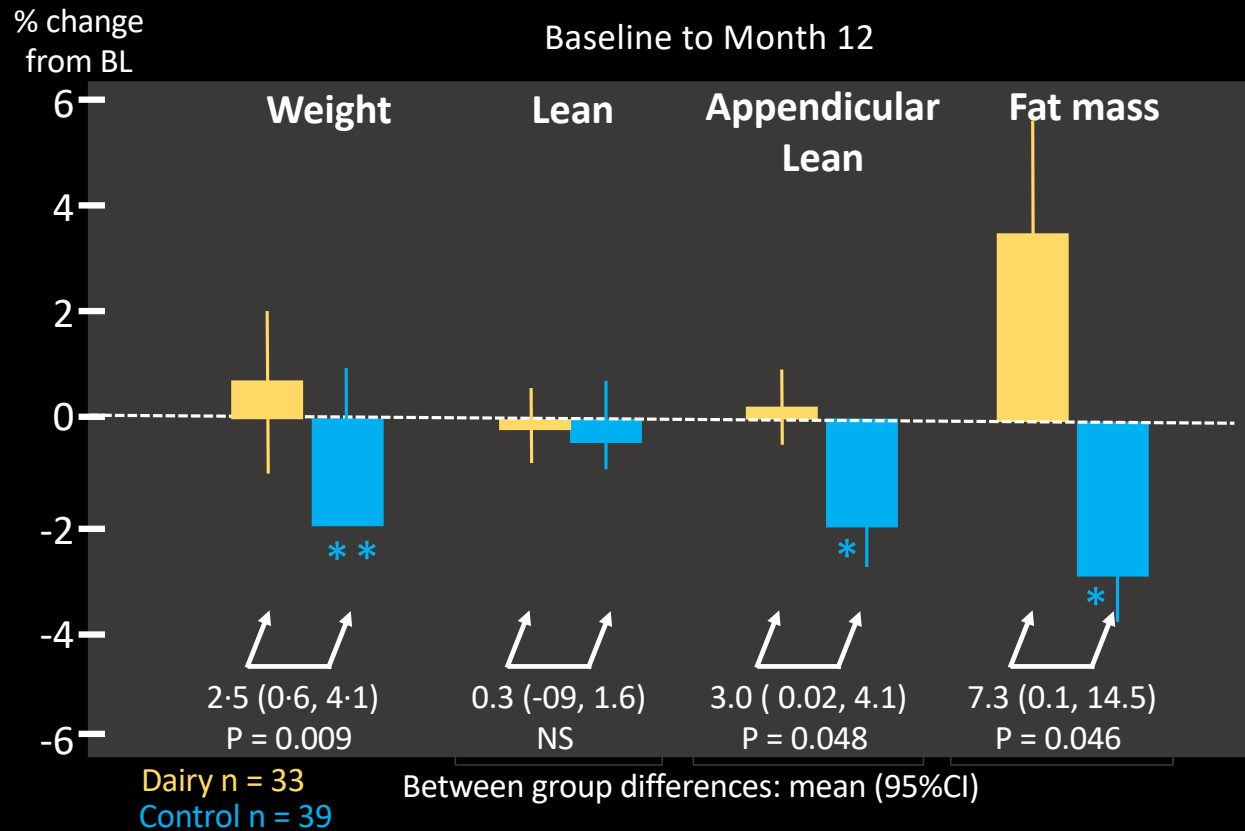
# Dairy Supplementation and Changes in Bone Metabolism



\* p<0.05 different to baseline

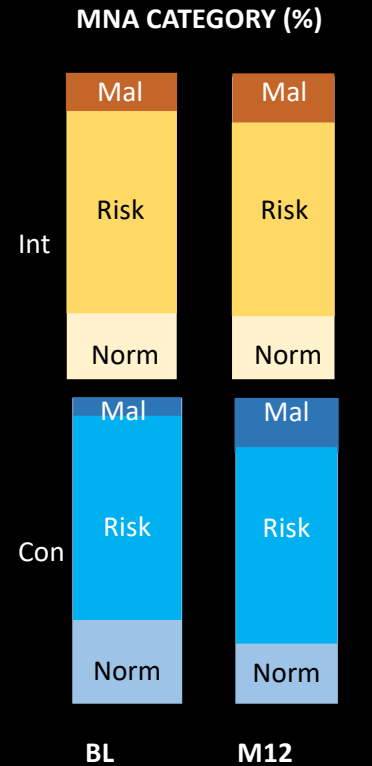
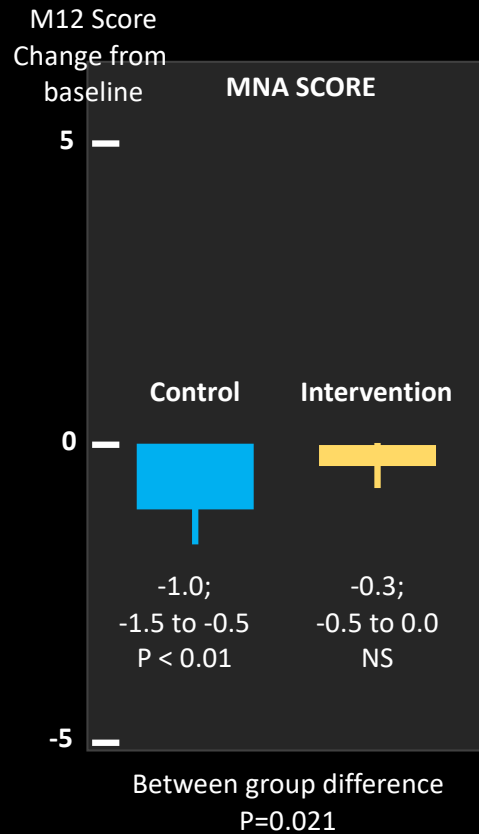


# Dairy Supplementation and Changes in Body Composition

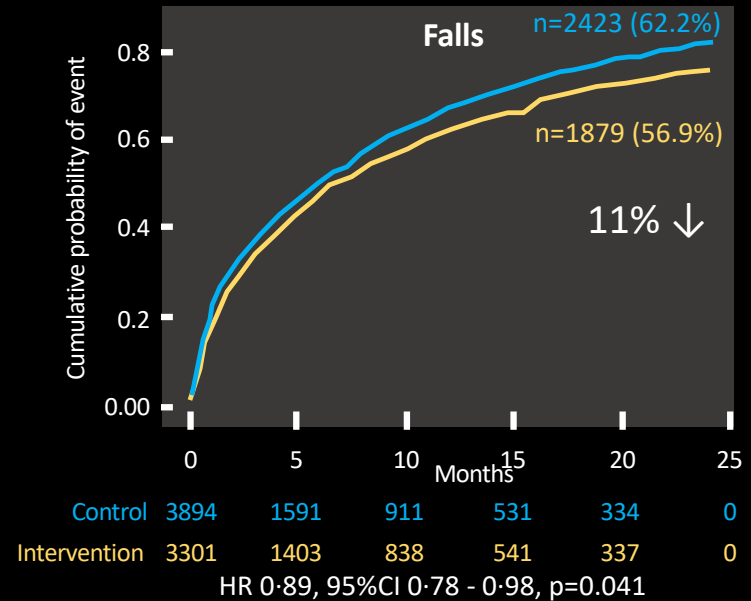
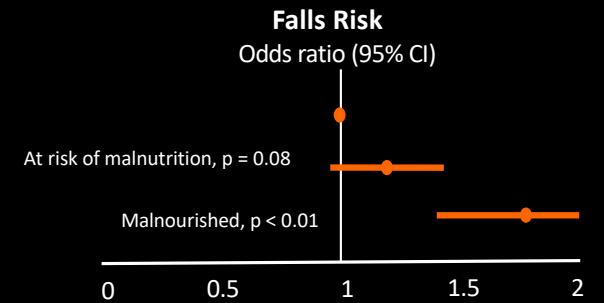


\*\*p<0.01, \* p<0.05 different to baseline

# Dairy Supplementation And Malnutrition Risk



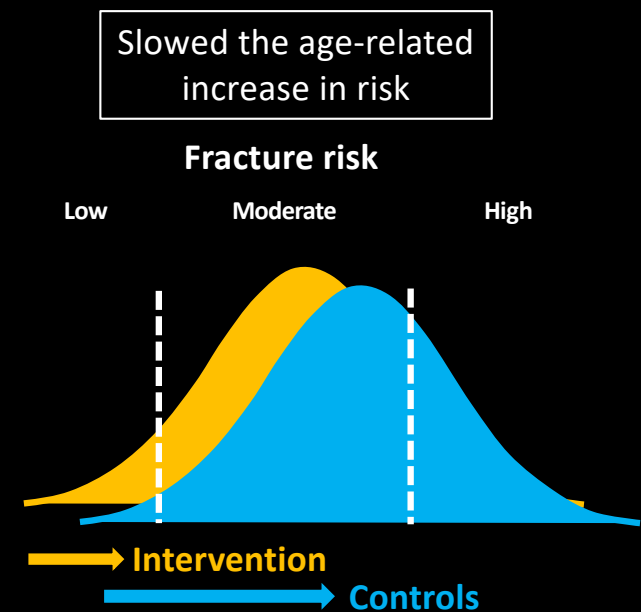
Decline in Nutritional Status  
Int 22% v Con 32%, p = 0.019



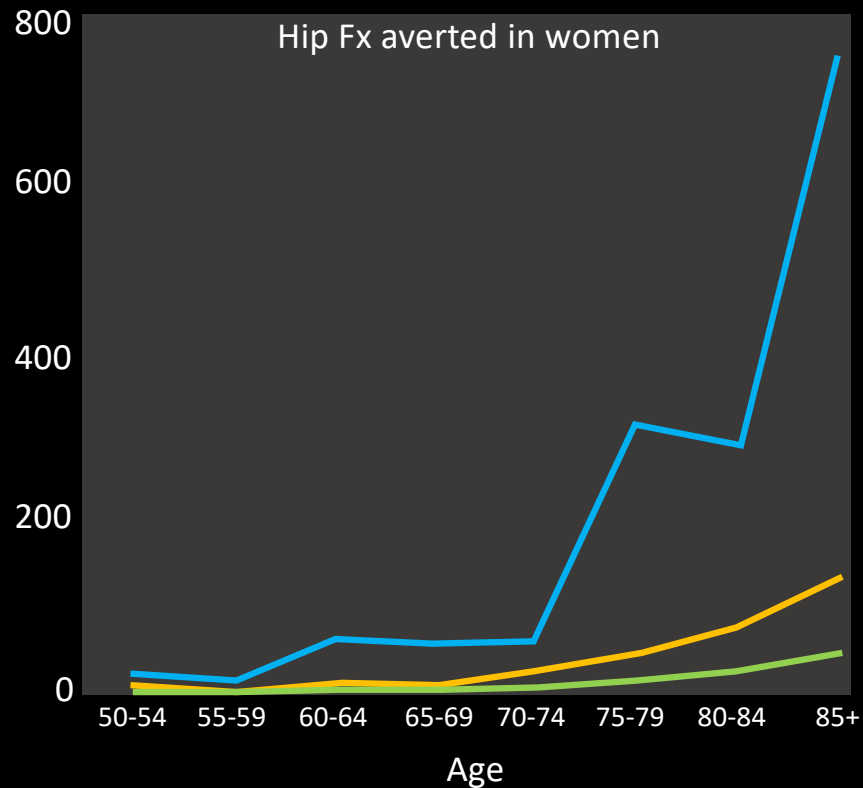
## Summary

Dairy supplementation achieving 3.5 servings daily in older adults with inadequate calcium and protein intakes was associated with;

- Relative risk reduction of 33% for all fractures  
46% for hip fractures  
11% for falls
- Slow bone loss
- Increase in IGF-1
- Maintained nutritional status
- Maintained weight



# Hip Fractures Averted With Increased Dairy Consumption



	% women Ca < 600 mg/d	Daily cost of dairy foods	Potential annual Cost savings
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France

40%

€ 0.64

€ 129 mil

Intervention  
< € 0.7

Sweden

31%

€ 0.68

€ 34 mil

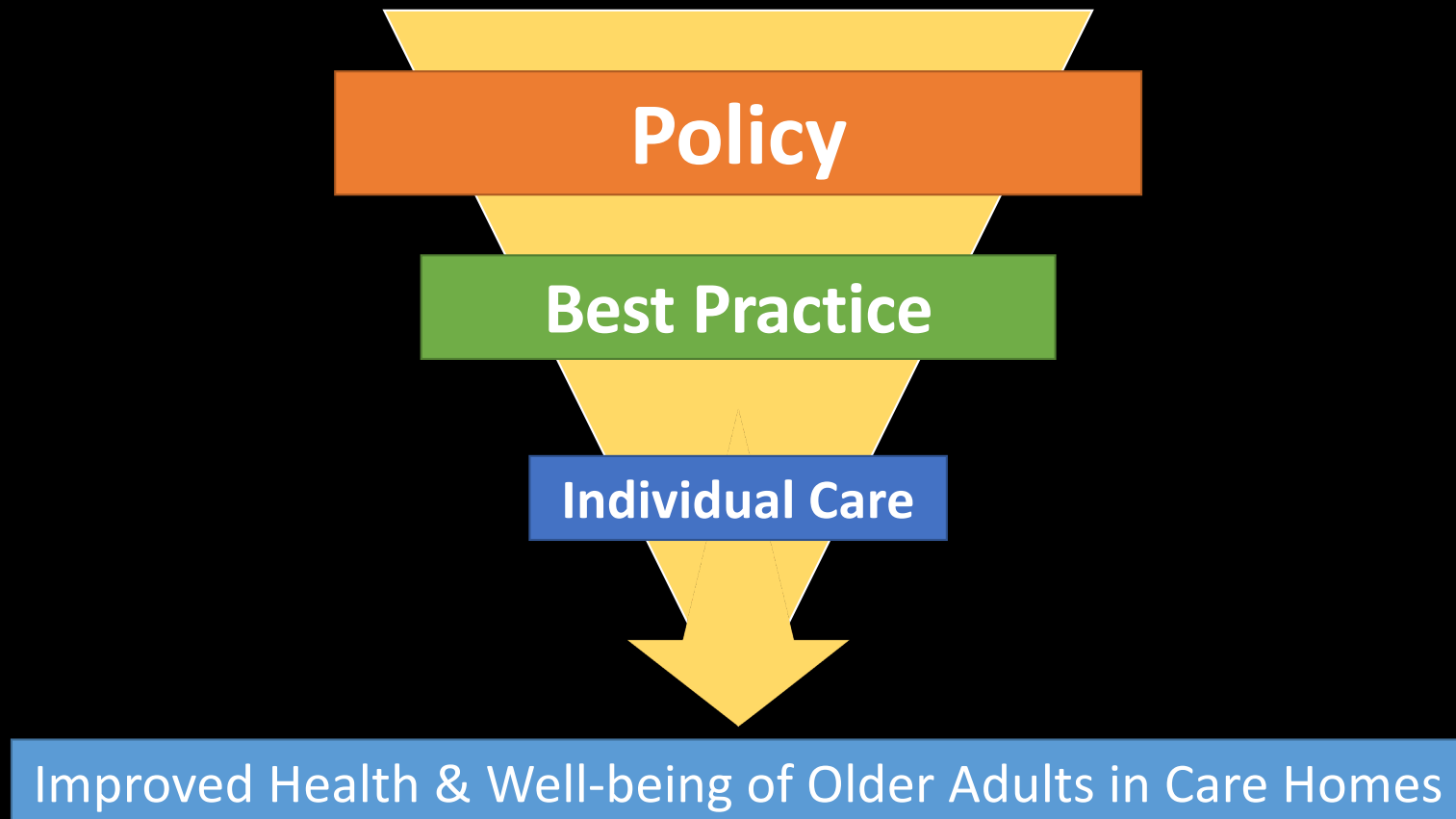
Netherlands

8%

€ 0.44

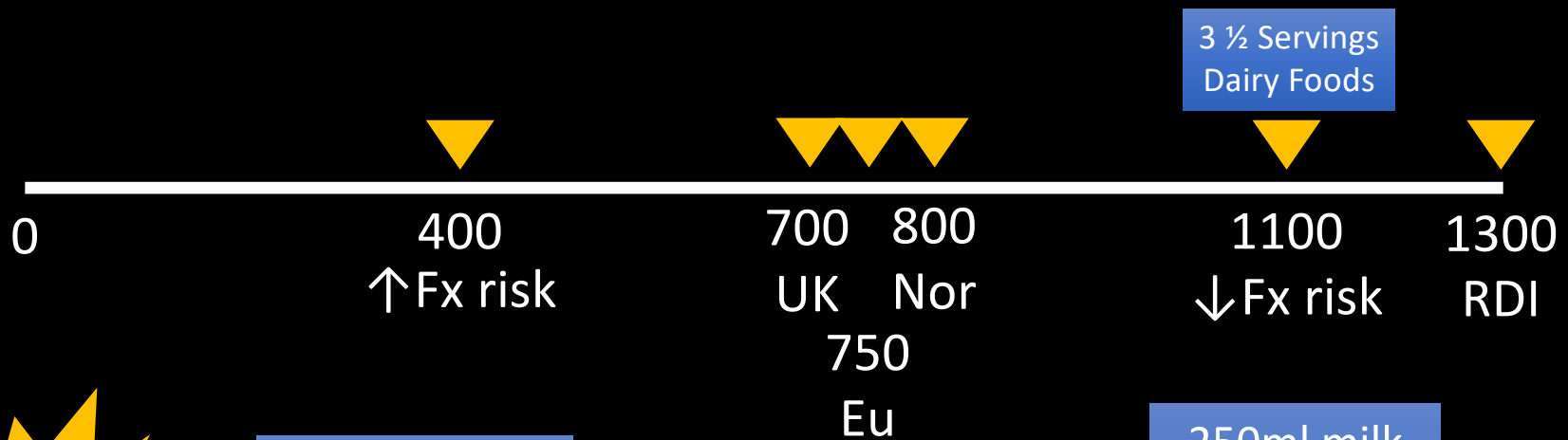
€ 6 mil

# The Importance of Implementation



# Translating Evidence to Policy: Calcium & Dairy Intake

Recommended Daily Calcium Intake



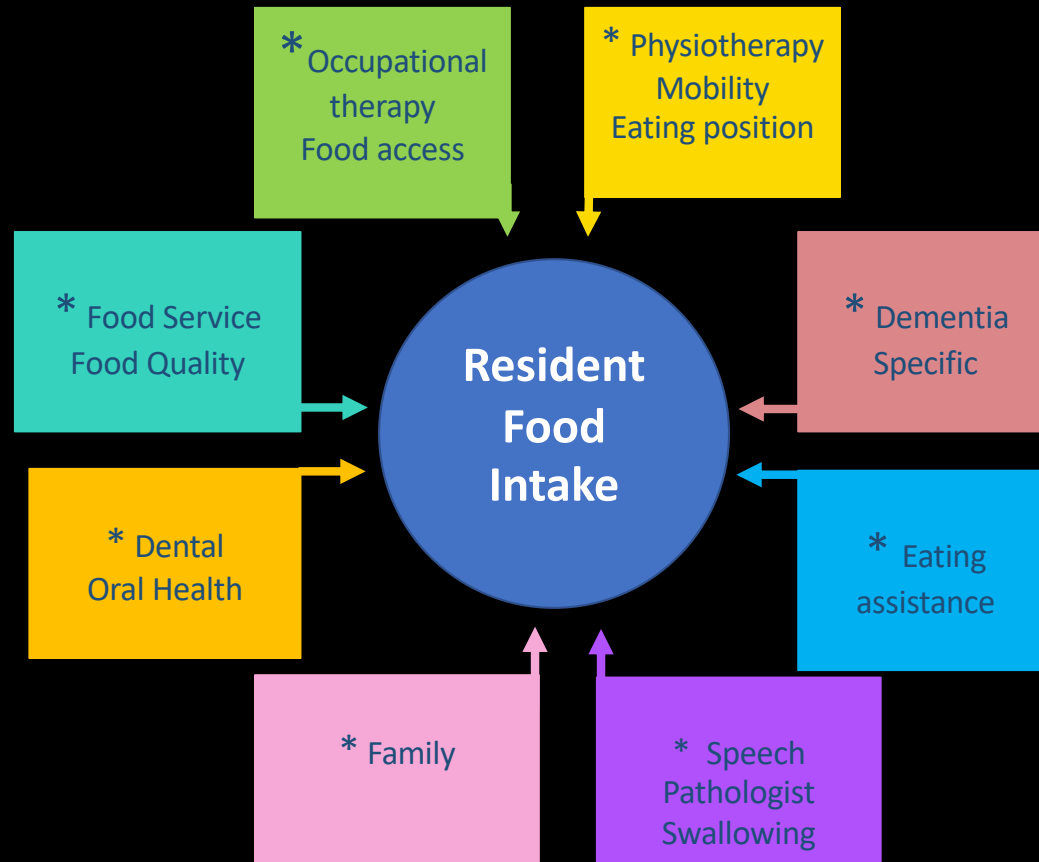
**< 5 servings  
Daily**

Servings Equivalent  
1.25 milk  
1.6 cheese  
1.6 yoghurt  
+  
Extra 0.8 serve

Recommendations  
3 servings  
200 ml milk  
25g cheese  
125 g yoghurt

250ml milk  
200g yoghurt  
40g cheese  
+  
Extra 1/2 serve

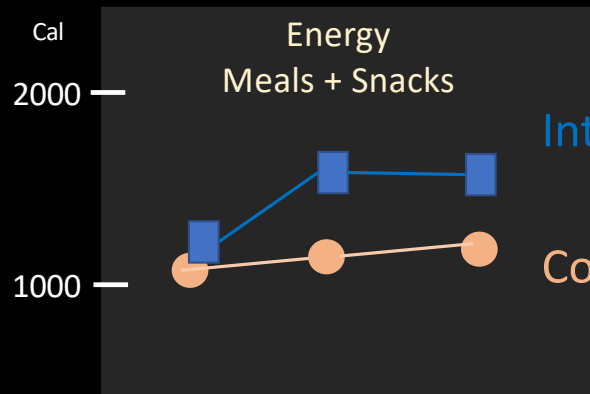
# Reducing Falls & Fracture Risk in Older Adults in Care Homes



## Feeding Assistance for older Adults in Aged-Care

- 24 week cross over study
- N = 76 residents at risk of malnutrition
- 85% female mean age 83 yrs

~ 300 cal increase  
1.82 kg increase in wt



Intervention: Meals  $42 \pm 19$  min  
Snacks  $14 \pm 10$  min

Control period: Meals 5 min  
Snacks < 1 min

Supplements	Meals	Snacks
Provided (ml)	$180 \pm 60$	$180 \pm 60$
Consumed (%)	83	66
Assistance (min)	6	< 1

One-on-one and small groups  
25%: mealtime assistance  
75%: assistance with snacks



## Practical Application for Clinicians

Consider food-based solutions to support clinical decisions in care homes

- Encourage provision of high-quality sources of dietary protein
- Consider what additional support is required (short & long term)
- Sufficient eating assistance (during and post hospital admission)
- Consider assessment of nutritional risk
- Ability to slow decline

## Fracture Risk Reduction in Older Adults in Care Home Evidence & Practicalities

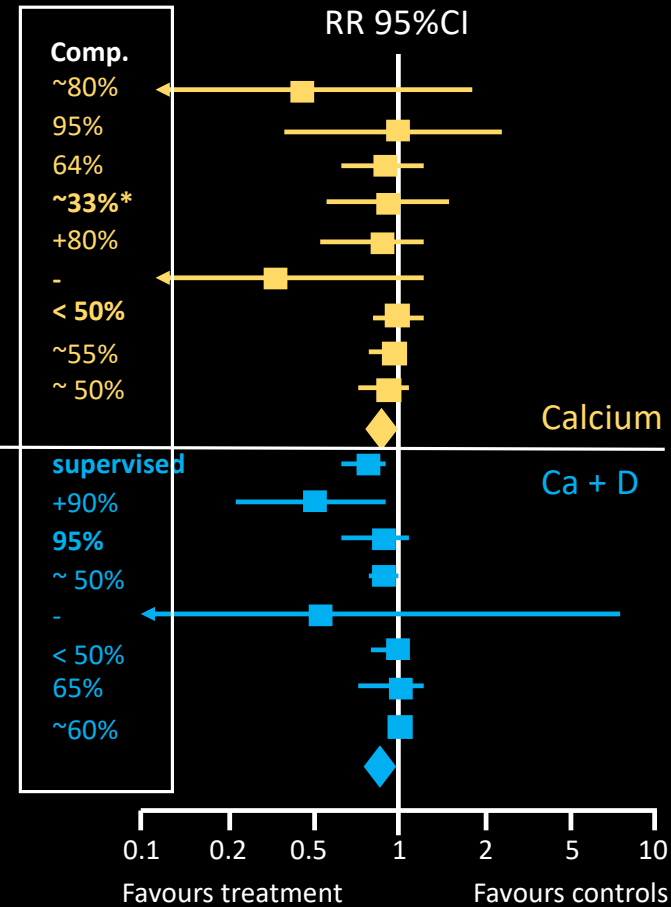
- ✗ ▪ Calcium alone                      No evidence
- ✓ ▪ Calcium + vitamin D              Vit D def older adults in care homes  
Daily medications = 12
- ? ▪ Calcium supplementation + non-dairy sources of protein  
Not tested
- ? ▪ Non-dairy / animal sources of calcium & protein Not tested  
Capacity to consume sufficient food

# Calcium and Vitamin D and Fractures

Study	Group	Calcium	Vit D
Reid	Healthy PM women	750	-
Chevally	Healthy & Fx men & women	650	> 50
Recker	PM women	< 500	> 50
Riggs	Healthy PM women	700	< 50
Peacock	Older men & women	< 600	> 50
Fujita	Hospital older women	600	-
RECORD	Older men & women Fx	-	< 50
Reid (b)	Healthy PM women	850	50
Prince	Healthy older women	900	-
Overall			



* Chapuy	NH older women	< 600	< 50
Dawson-Hughes	Healthy men & women	700	> 50
Chapuy (b)	Supported older women	< 600	< 50
Larsen	Older men & women	-	< 50
Harwood	Older women Fx	-	< 50
RECORD (b)	Older men & women Fx	-	< 50
Porthouse	High-risk women	> 1000	
Jackson	Healthy PM women	> 1100	< 50
Overall			



## Conclusion

Dairy foods are an important source of calcium and protein for older adults in care homes, that reduces fractures, falls, weight loss and malnutrition risk.

Clinicians have a central role in ensuring adequate nutritional intake in older adults to support clinical decisions.

# Preventing Fractures & Falls in Older Adults in Aged Care by Improving Dairy Consumption

Thank you

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