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# Mediterranean Diet, Lifestyle Factors, and 10-Year Mortality -The HALE project-

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## Outline of the presentation

1. HALE study
2. Mediterranean diet & lifestyle and mortality
3. Implications of the HALE project



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# HALE

## Healthy Ageing: a Longitudinal study in Europe

Aim of the HALE project:

Investigate changes and determinants of usual and healthy ageing in terms of morbidity, mortality as well as in terms of physical, psychological, cognitive and social functioning in 11 European countries.



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# HALE

## Healthy Ageing: a Longitudinal study in Europe

4 workpackages in HALE:

- WP1: Constructing the database
- WP2: Biological determinants of healthy ageing
- WP3: Dietary determinants of healthy ageing
- WP4: Age-related changes and cultural differences in indicators of functioning

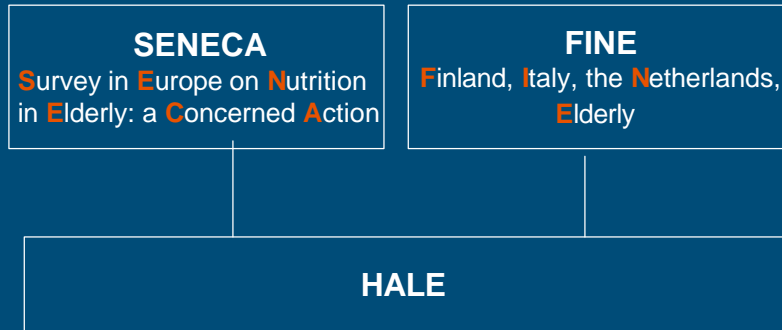


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# HALE

## Healthy Ageing: Longitudinal study in Europe



# HALE

## Healthy Ageing: a Longitudinal study in Europe

Study	SENECA	FINE
Number	2396	1409
Gender	Men & Women	Men
Birth Years	1913-1918	1900-1920
Measurements	'89-'93-'99	'90-'95-2000
10-year mortality	962 (40%)	838 (59%)





## HALE study

- Information of 11 European countries
- Repeated measurements of socio-demographic variables, diet, lifestyle, biological factors
- Morbidity (stroke, myocardial infarction, diabetes, cancer) and 10-year mortality data

## HALE Healthy Ageing: Longitudinal study in Europe

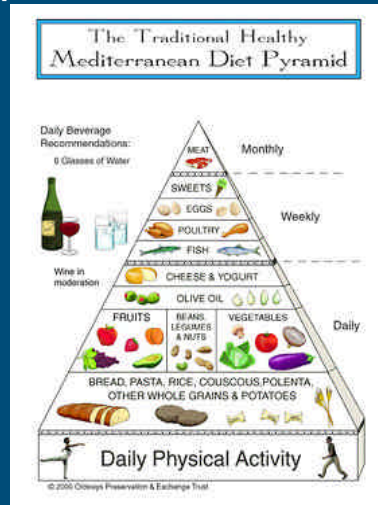


## Objective of this presentation

To investigate the single and combined effect of:

- Mediterranean type of diet
- moderate alcohol consumption,
- physical activity
- nonsmoking

on mortality in elderly



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## Mediterranean diet score

- Original score: Greek Mediterranean diet score  
(Trichopoulou et al, BMJ 1995,  
New England Medical Journal 2003)
- Score measures the agreement between the dietary intake and the Greek Mediterranean diet
- Score contains 8 components (+ fish in 2003)
- Cut-off points are based on the median of a Greek population



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## Modified Mediterranean Diet Score

Component (g/day)		Men	Women
Vegetables & potatoes	>	290	273
Fruit	>	221	260
Legumes/nuts/seeds	>	8	4
Meat & Poultry	<	127	108
Milk and milk products	<	357	324
Fish	>	24	25
Grains	>	238	192
MS/S ratio	>	0.95	0.95
Alcohol	>	4	0

Median in g/day, adjusted for 2500 kcal in men and 2000 in women



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## Diet & lifestyle variables in the model

Variable	Definition
Diet score:	0 < 4 on the diet score 1 = 4 on the diet score
Alcohol:	0 No alcohol consumption 1 > 0 g alcohol/day
Activity:	0 First tertile of activity score 1 2 + 3 tertile
Smoking:	0 Smoking or stopped 15 years ago or less 1 Nonsmoking or stopped > 15 y ago



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## Confounders in the model

- Age
- Sex
- Number of years of education
- BMI
- Study

Subjects with diabetes, cardiovascular diseases and cancer at baseline were excluded



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## Results: Baseline characteristics

Variable	SENECA		FINE
	WOMEN (N=832)	MEN (N=781)	MEN (N=726)
Median diet score (p10-p90)	4 (2-6)	4 (2-6)	4 (2-6)
% Alcohol users	56	83	76
% Nonsmokers	88	43	58
Age (mean) (sd)	73 (2)	73 (2)	77 (4)
% BMI < 25 kg/m <sup>2</sup>	41	39	42
Education (years) (mean) (sd)	8 (4)	9 (4)	7 (5)



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## Mortality Data

Cause of death (%)	SENECA		FINE Men
	Women	Men	
All-causes	24	47	51
• Coronary heart disease	9	12	16
• Cardiovascular diseases	39	32	48
• Cancer	18	26	27
• Other causes	13	15	17
• Unknown causes	30	27	8



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## All-cause mortality Hazard Rates (95% Confidence Intervals)

Lifestyle factor	All-causes
Diet ( $\geq 4$ vs $< 4$ )	0.77 (0.68-0.88)
Alcohol ( $> 0$ vs none)	0.78 (0.67-0.91)
Activity (T2, T3 vs T1)	0.63 (0.55-0.72)
Nonsmoking	0.65 (0.57-0.75)



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## Cause specific mortality Hazard rates (95% Confidence Intervals)

Lifestyle factor	Cancer	CHD	CVD
Diet ( $\geq 4$ vs $< 4$ )	0.90 (0.70-1.17)	0.61 (0.43-0.88)	0.71 (0.58-0.88)
Alcohol ( $> 0$ vs none)	0.73 (0.54-0.98)	0.60 (0.40-0.88)	0.74 (0.59-0.93)
Activity (T2,T3 vs T1)	0.64 (0.48-0.84)	0.72 (0.48-1.07)	0.65 (0.52-0.81)
Nonsmoking	0.47 (0.36-0.62)	0.80 (0.51-1.17)	0.68 (0.54-0.85)



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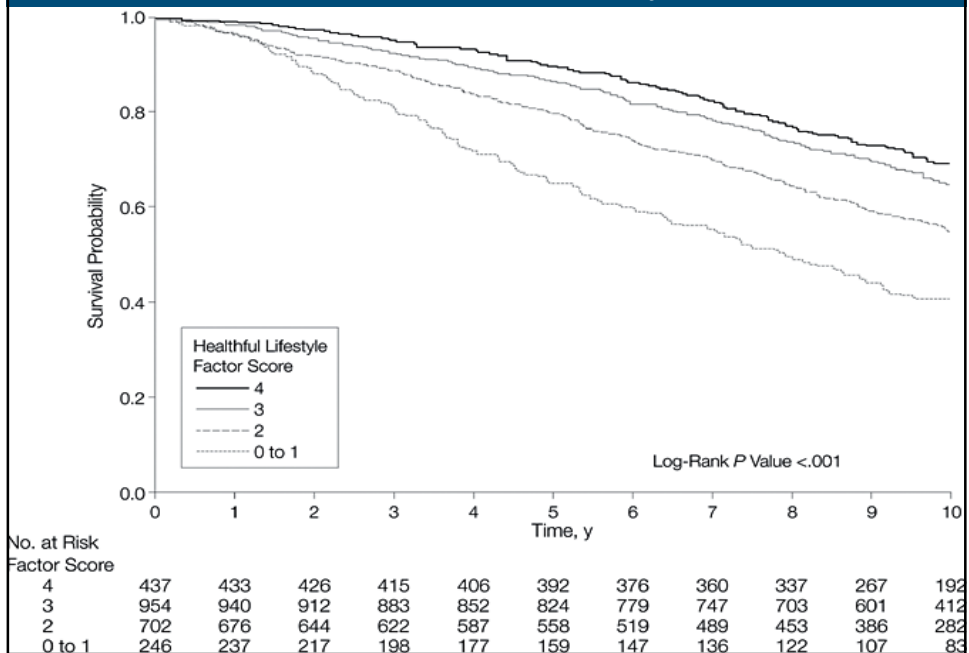
## Diet & lifestyle score for all-cause mortality

Number of healthful factors	Hazard Rates (95% Confidence Intervals)
0-1 (n=246)	1.00
2 (n=702)	0.62 (0.51-0.75)
3 (n=954)	0.45 (0.37-0.54)
4 (n=437)	0.35 (0.28-0.44)



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# Number of Healthful Lifestyle Factors



## Discussion

- Including participants with baseline chronic diseases and adjust for diseases did not change our conclusions
- Despite the large study, only few participants with 0 healthful diet and lifestyle factors
- Adjustment for region (Northern/Southern Europe) did not influence the results



## Conclusion

Among individuals aged 70 to 90 years, adherence to a Mediterranean diet and a healthful lifestyle is associated with a more than 50% lower rate of all-causes and cause-specific mortality.



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## Implications and recommendations for elderly: The HALE project (Louise Davies is preparing a booklet)

Workpackage 3	Other Workpackages
<ul style="list-style-type: none"><li>• Use a Mediterranean type of diet</li><li>• Be physically active</li><li>• If you use alcohol, do so in moderation</li><li>• Do not smoke</li></ul>	<p>Maintain:</p> <ul style="list-style-type: none"><li>• Body weight</li><li>• Low systolic blood pressure (&lt; 140 mm Hg)</li><li>• Low cholesterol (&lt; 5 mmol/L)</li></ul>



## Use a Mediterranean type of diet

The traditional Mediterranean diet is characterised by

- Relatively high intake of bread, cereals, legumes, vegetables, fruits, fish and wine, with olive oil as principal source of fat
- Relatively low intake of milk, cheese, meat, eggs, animal fats, margarines, potatoes, sweet beverages, cakes, cookies, sugar, beer and spirits

BUT: There is no such thing as THE ONLY healthy diet!!



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## Be physically active

- The HALE project recommends to be physically active, preferably 30 minutes per day

BUT: This is just an average time at which to aim!  
(possibly more on some days , even just 10 minutes at other days)

- Aim is to exercise regularly and wisely and make it part of a healthful lifestyle



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## If you use alcohol, do so in moderation

- The HALE project demonstrated that moderate alcohol consumption compared with non-drinking decreases mortality
- Moderate consumption means 1-3 glasses/day for men and 1-2 glasses for women, but this may vary individually
- Red wine is popular in Mediterranean regions, but there is no convincing evidence that only red wine is protective



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## Do not smoke

- A non-smoker is defined in the HALE project as one who has never smoked, or who has given up smoking for more than 15 years
- Smoking is one of the major causes of preventable death



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## Acknowledgement

Study is supported by a grant from the European Union  
(QLK6-CT-2000-00211)

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Thank you for your attention !



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