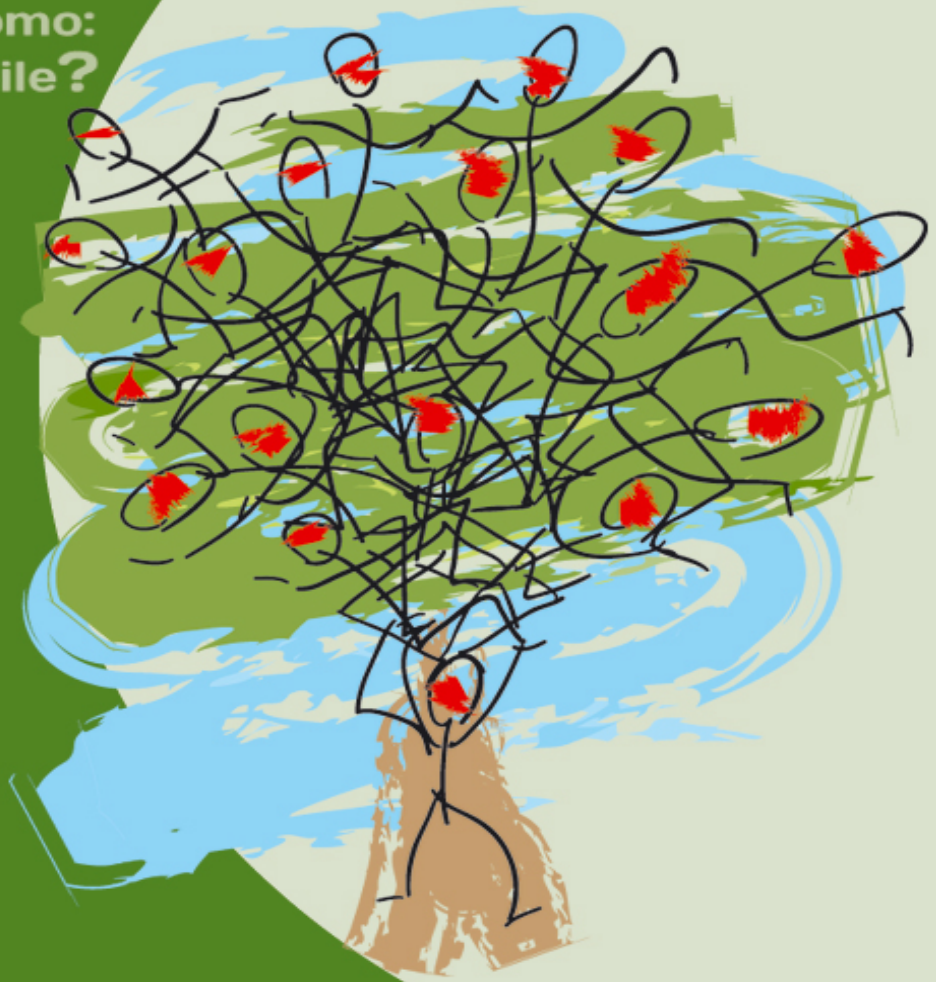
GLOBALIZZAZIONE
E MALATTIE CRONICHE
dall'evidenza scientifica alla cultura dell'uomo:
un passo impossibile?



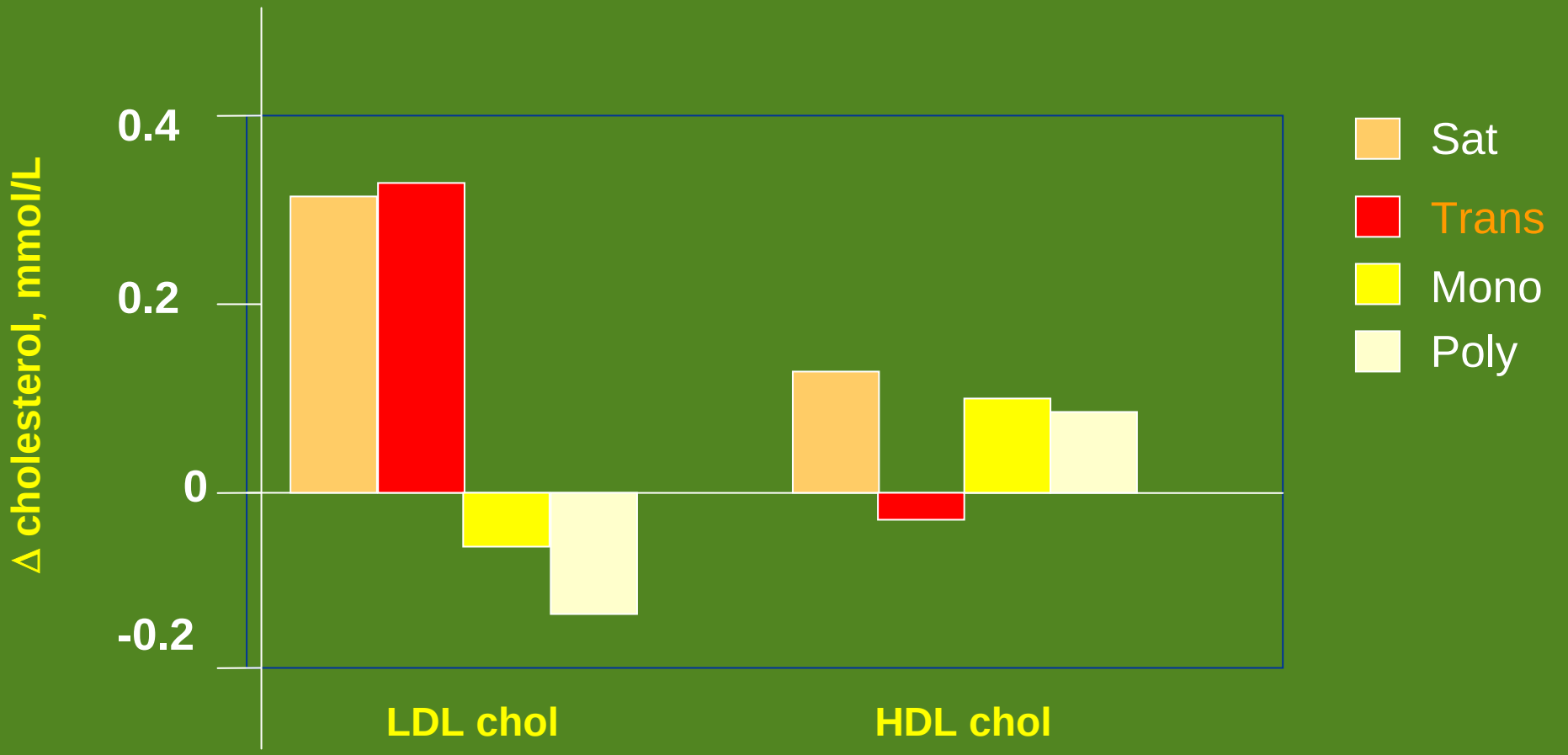
Lo stile di vita per le dislipidemie

Andrea Poli

Nutrition Foundation of Italy

SCUOLA NAZIONALE DI MEDICINA DEGLI STILI DI VITA
FIMMG - METIS
AULA POCCHIARI - Istituto Superiore di Sanita' - 09 Aprile 2010

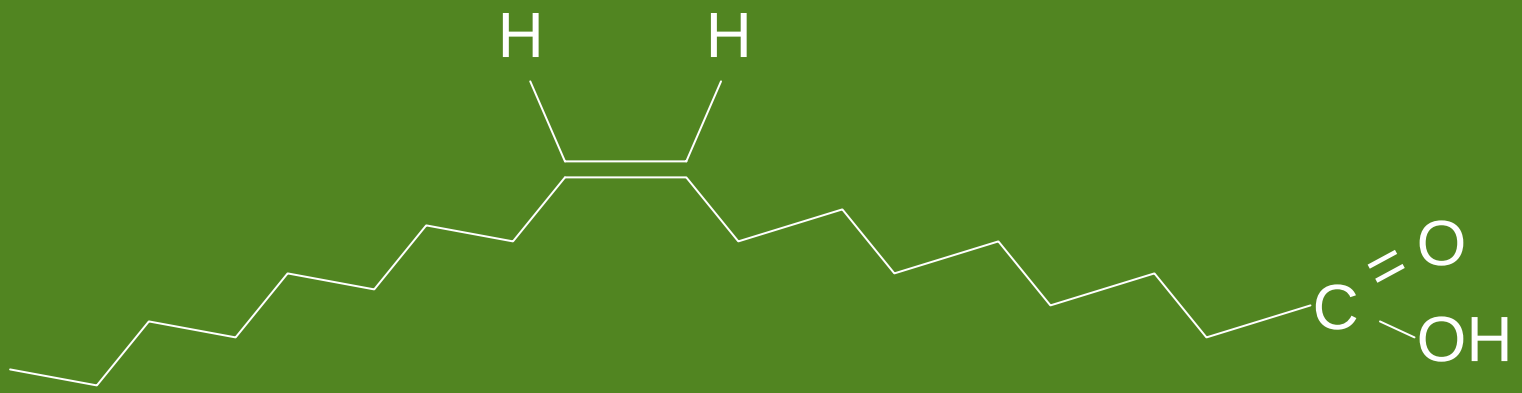
Effects of SAT, *trans* MONO, *cis* MONO, and *cis* POLY Fatty Acids on LDL and HDL Cholesterol



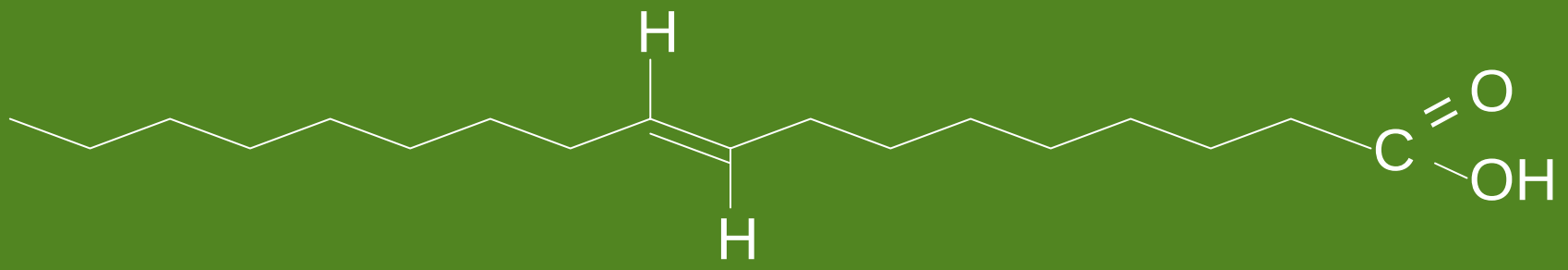
Values obtained by meta-analysis of 32 controlled dietary trials in humans

Zock, 1997

Structure of *cis* and *trans* Fatty Acids



cis double bond: oleic acid



trans double bond: elaidic acid

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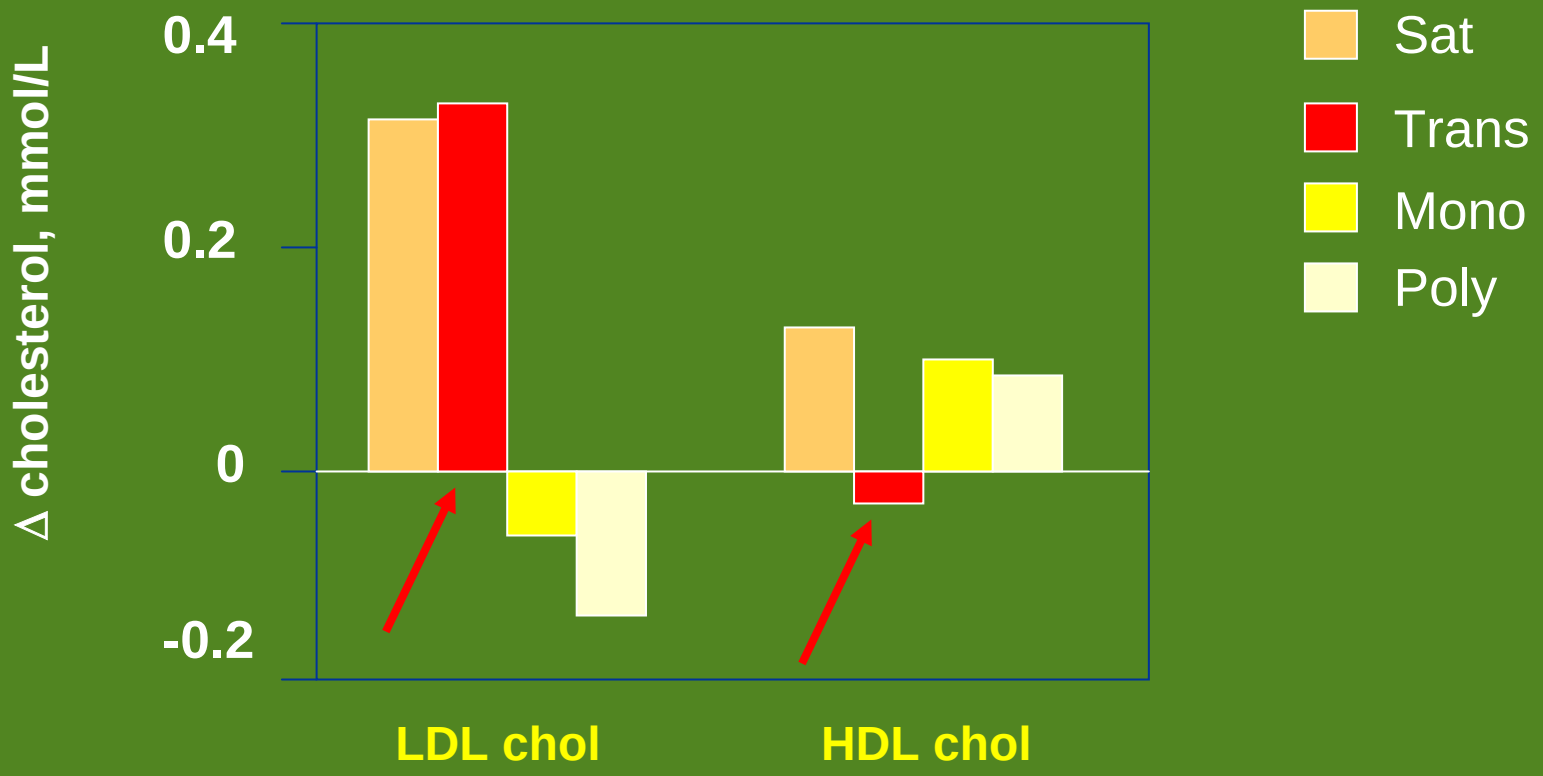

Values obtained by meta-analysis of 32 controlled dietary trials in humans

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Zock, 1997

Zock, 1997

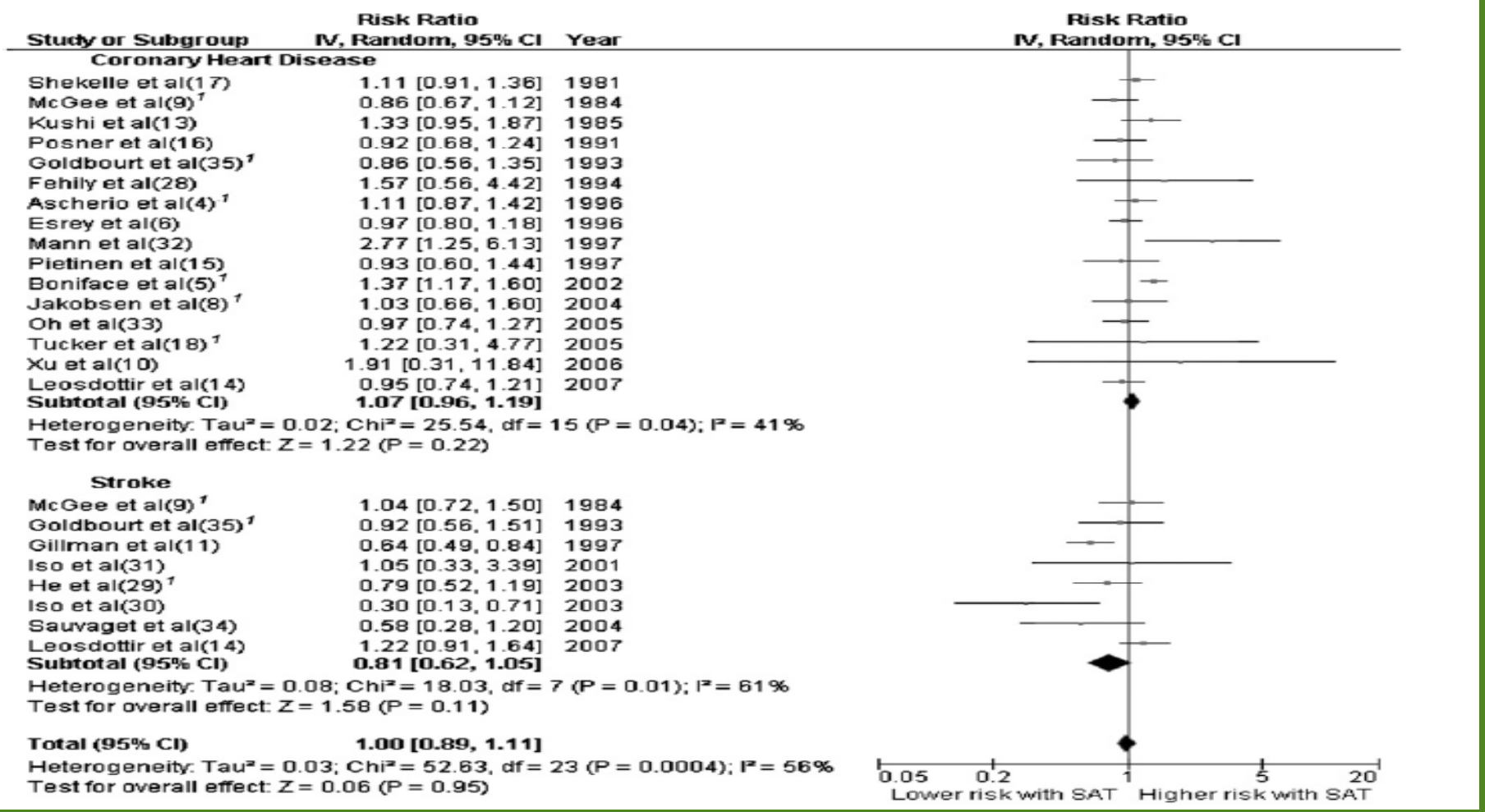
Biomarkers of inflammation and endothelial dysfunction and trans fatty acid intake in the Nurses' Health Study (1986-1990)

Quintile	*n*	*CRP mg/L*	*IL-6 ng/L*	*E-selectin ng/L*
Trans fatty acids (range; g/d)				
Q1 (0.61-1.87)	147	1.1 (0.9, 1.3)	1.8 (1.6, 2.0)	41.8 (39.0, 44.9)
Q2 (1.88-2.26)	145	1.3 (1.1, 1.6)	1.7 (1.5, 2.0)	41.9 (39.0, 45.0)
Q3 (2.27-2.64)	146	1.5 (1.3, 1.8)	1.8 (1.6, 2.0)	41.9 (39.0, 45.0)
Q4 (2.65-3.13)	146	1.7 (1.4, 2.0)	1.9 (1.7, 2.2)	45.1 (42.0, 48.4)
Q5 (3.14-7.58)	146	1.9 (1.6, 2.3)	2.1 (1.8, 2.3)	50.3 (46.8, 54.0)
P for trend*		<0.001	0.02	<0.001

* P for trend of medians in each quintiles

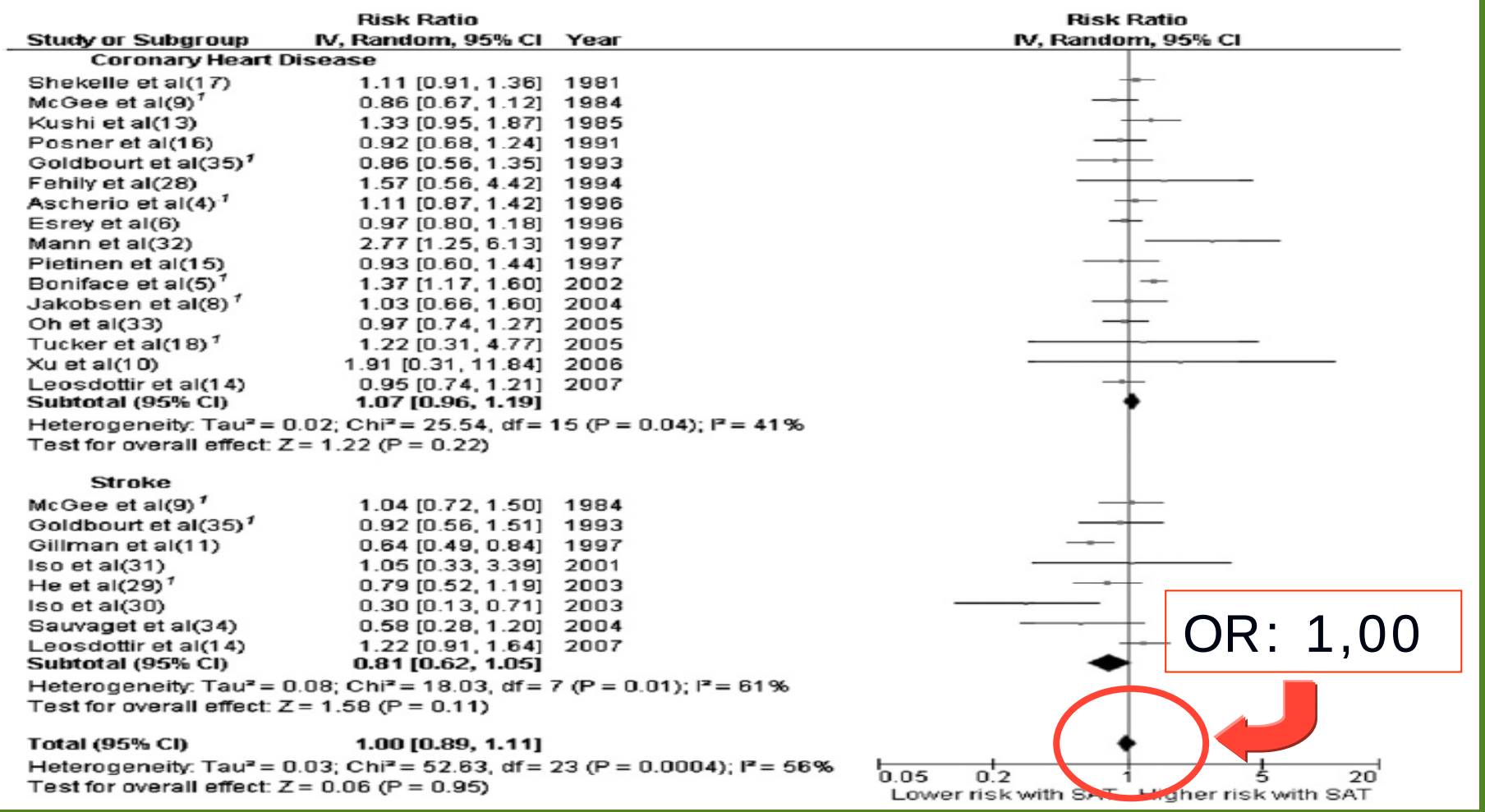
Lopez-Garcia, J Nutr 2005

Saturated fats and CVD: a metanalysis



Siri-Tarino PW et al Am J Clin Nutr 2010

Saturated fats and CVD: a metanalysis

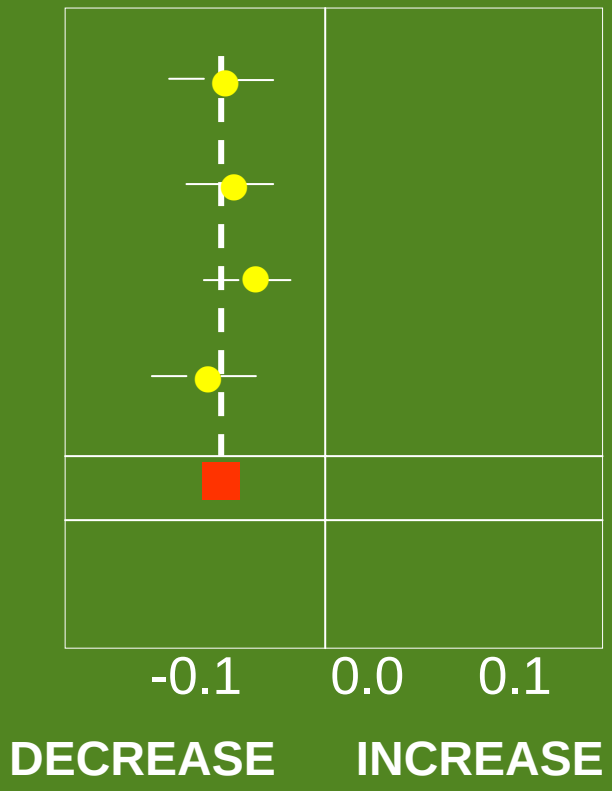


Siri-Tarino PW et al Am J Clin Nutr 2010

Effect of different fatty acids on plasma cholesterol in human studies: a meta-analysis

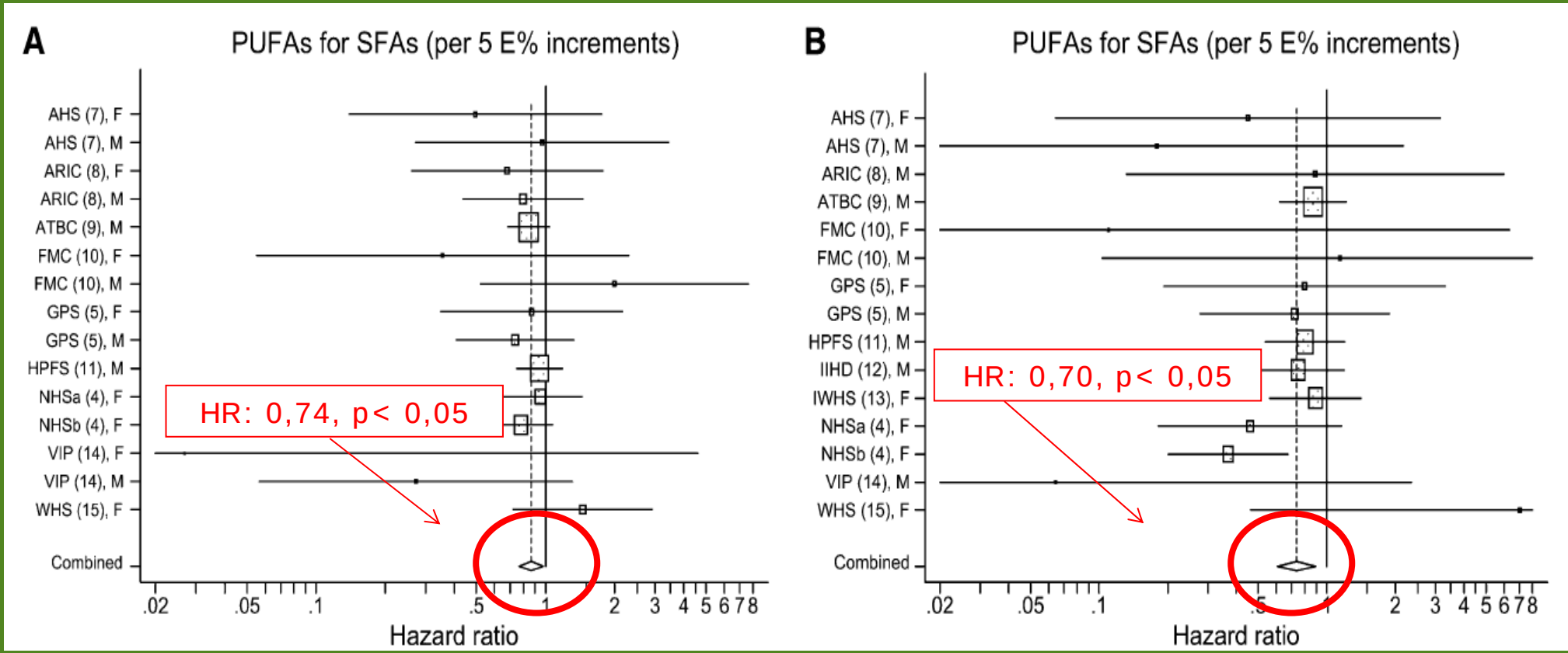
	Multivariate regression coefficient (SE)
Polyunsaturated fat:	
Crossover design	-0.022 (0.009)
Parallel square	-0.025 (0.011)
Latin design	-0.010 (0.008)
Design	-0.033 (0.005)
All solid food	**-0.026 (0.004)**

Multivariate regression coefficient (99% confidence interv.)



Clarke, 1997

Effetto della sostituzione di SFA con PUFA (5% delle calorie) sulle morti coronariche (A) e sugli eventi CV totali (B)



Jakobsen MU, Am J Clin Nutr 2009

Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies

Combined hazard ratios (HRs) for coronary events and coronary deaths per 5% increments in energy intake from polyunsaturated fatty acids (PUFAs) or carbohydrates (CHs) in the Pooling Project of Cohort Studies on Diet and Coronary Disease[1]

	All		Women		Men		
	HR (95% CI)	*P* value, test for between-studies heterogeneity	HR (95% CI)	*P* value, test for between-studies heterogeneity	HR (95% CI)	*P* value, test for between-studies heterogeneity	*P* value, test for effect modification by sex
Coronary events[2]							
MUFAs for SFAs							
Model 1[3]	1.39 (1.20, 1.61)		1.33 (1.01, 1.74)		1.47 (1.25, 1.73)		
Model 2[4]	1.19 (1.00, 1.42)	0.32	1.15 (0.84, 1.58)	0.30	1.23 (0.98, 1.55)	0.32	0.49
PUFAs for SFAs							
Model 1[3]	0.69 (0.59, 0.81)		0.66 (0.54, 0.81)		0.68 (0.52, 0.87)		
Model 2[4]	0.87 (0.77, 0.97)	0.70	0.85 (0.68, 1.06)	0.51	0.87 (0.76, 1.01)	0.61	0.84
CHs for SFAs							
Model 1[3]	1.06 (1.01, 1.12)		0.98 (0.90, 1.06)		1.10 (1.05, 1.16)		
Model 2[4]	1.07 (1.01, 1.14)	0.51	1.00 (0.89, 1.12)	0.72	1.11 (1.02, 1.20)	0.37	0.13

Jakobsen MU, Am J Clin Nutr 2009

Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies

Conclusion:

The associations observed suggest that replacing SFAs with PUFAs rather than MUFAs or carbohydrates prevents CHD over a wide range of intakes.

Jakobsen MU, Am J Clin Nutr 2009

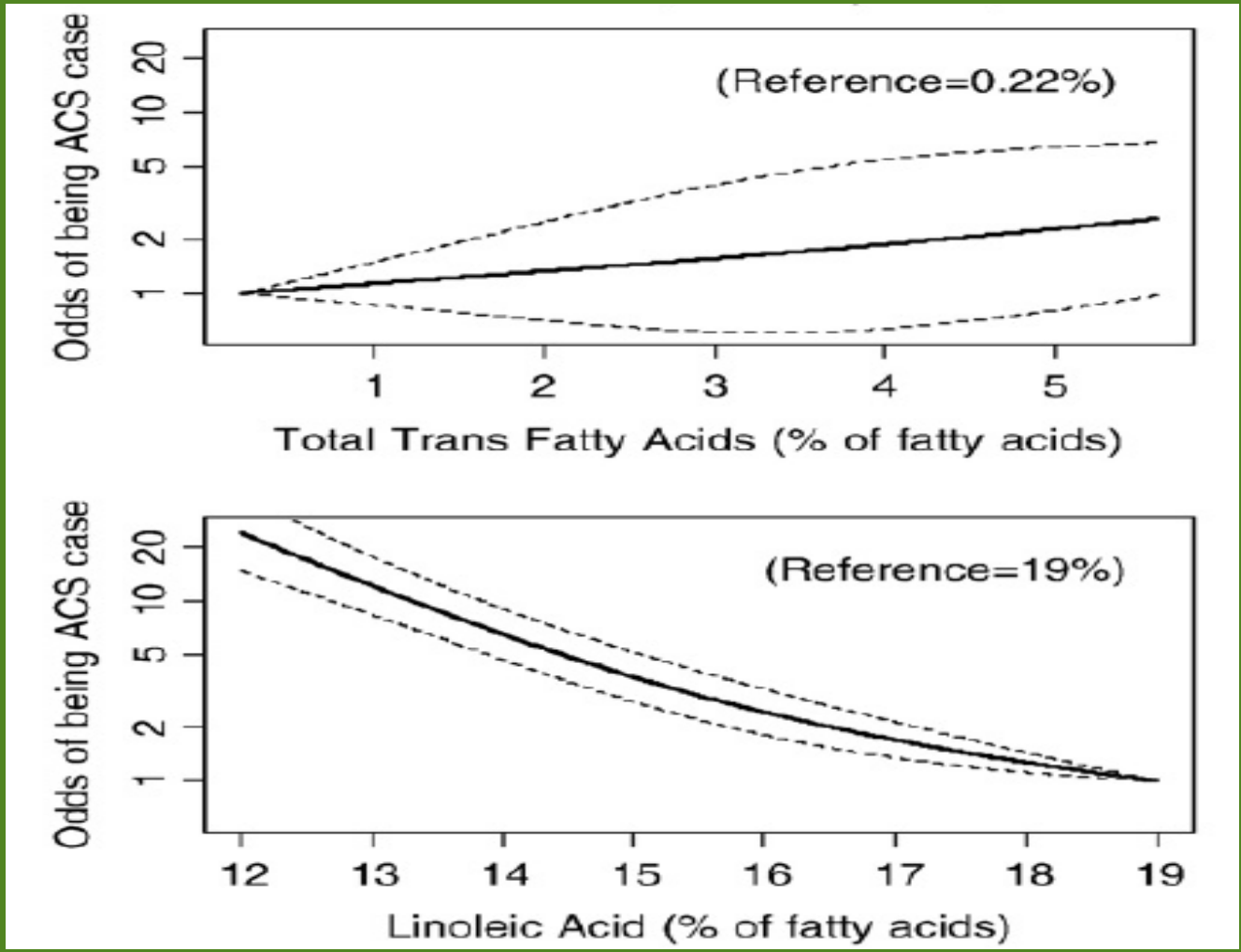
Omega-6 and trans fatty acids in blood cell membranes: A risk factor for acute coronary syndromes?

Table I. Description of cases and controls

Variable	Cases (n = 768)	Controls (n = 768)	P
Linoleic acid (% total FA)	14.26 ± 2.51	16.45 ± 2.57	<.0001
Arachidonic acid (% total FA)	14.21 ± 3.70	13.72 ± 2.39	.0007
Total *trans*-fats (% total FA)*	3.78 ± 1.40	3.34 ± 1.29	<.0001
Oleic acid (% total FA)	18.00 ± 3.67	17.29 ± 2.63	<.0001
α-Linoleic acid (% total FA)	0.31 ± 0.17	0.48 ± 0.25	<.0001
Eicosapentaenoic acid (% total FA)	0.46 ± 0.29	0.72 ± 0.53	<.0001
Docosahexaenoic acid (% total FA)	2.93 ± 1.40	3.53 ± 1.57	<.0001

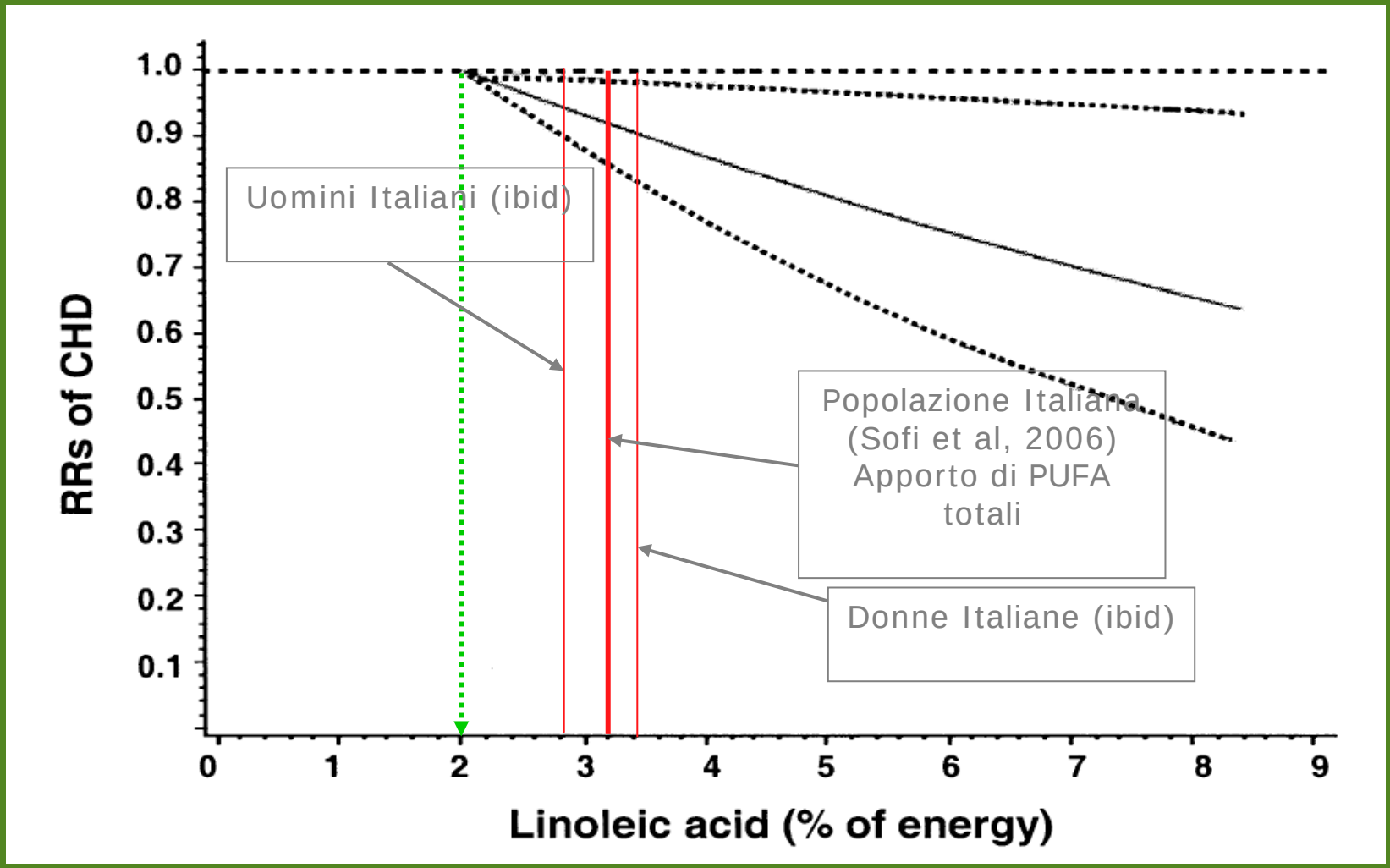
Block RC et al, Am Heart J 2008

Omega-6 and trans fatty acids in blood cell membranes: A risk factor for acute coronary syndromes?



Block RC et al, Am Heart J 2008

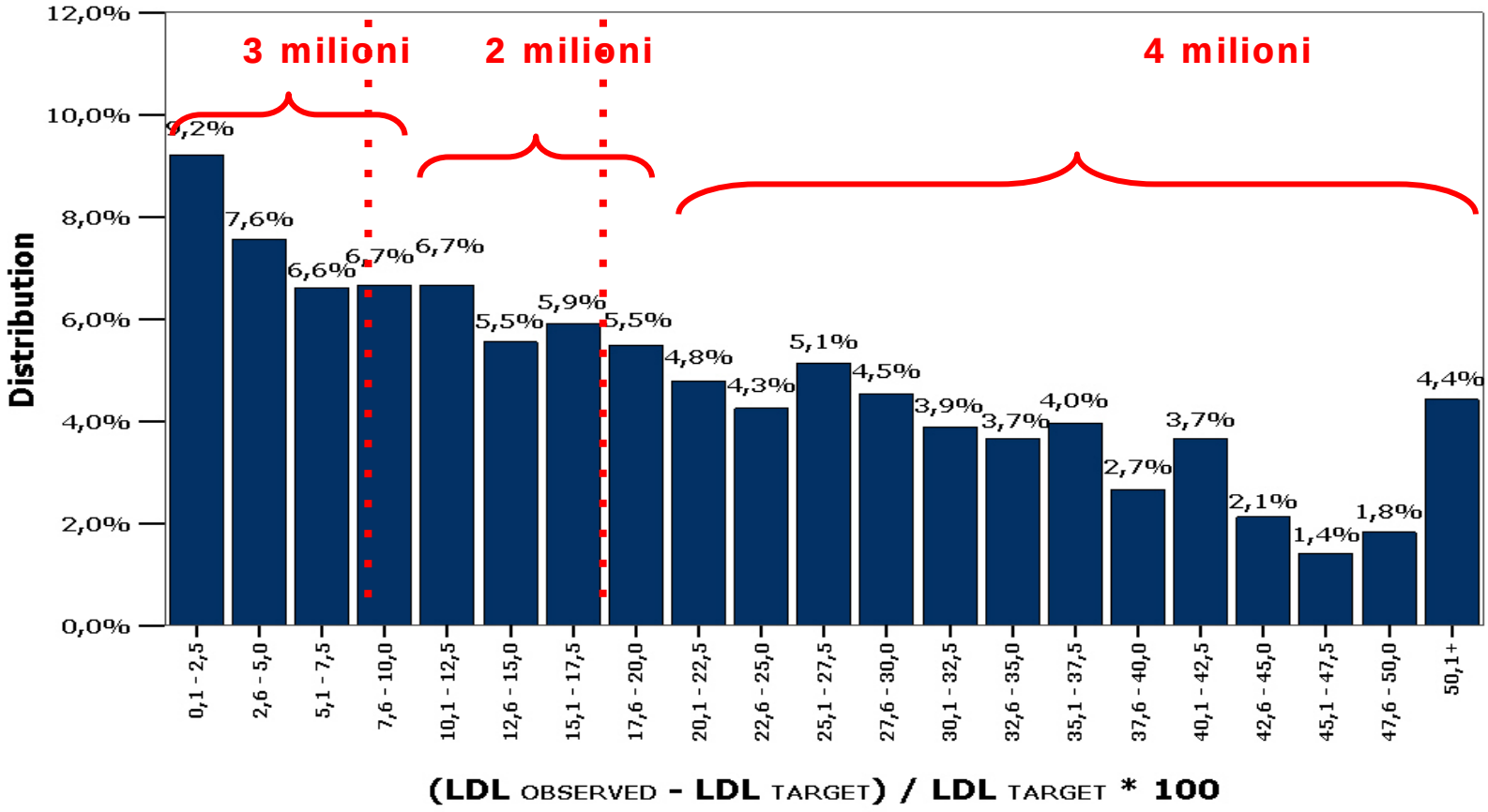
Rischio di eventi coronarici ed apporto alimentare di acido linoleico nel Nurses' Health Study



Oh K, Am J Epidemiol 2005

Distanza dal proprio target (%) dei soggetti “non a target” del campione CHECK, e classificazione in gruppi di possibile intervento

Totale soggetti “non a target” (40-79 anni): 9 milioni



CHECK study group, 2009

Steroli plasmatici utilizzati come indicatori di assorbimento o sintesi del colesterolo

Markers di sintesi

- Latosterolo
- Colestenolo
- Desmosterolo
- Squalene

Markers di assorbimento

- Colestanolo
- Campesterolo
- Sitosterolo
- Avenasterolo

Markers di assorbimento e sintesi del colesterolo in diverse diete sperimentali

	Diets								
	HD (*n* 29)		LCLF (*n* 29)		HCLF (*n* 29)		LCHF (*n* 18)		
Variables	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	*P*
Total cholesterol§ (mmol/l)	6·01	0·21	5·07*	0·18	5·61*†	0·20	5·55*†	0·27	<0·001
HDL-cholesterol (mmol/l)	1·41	0·06	1·30	0·05	1·44	0·06	1·41	0·08	0·090
LDL-cholesterol (mmol/l)	3·87	0·22	3·04*	0·17	3·46*†	0·20	3·32*†	0·23	<0·001
TAG (mmol/l)	1·63	0·16	1·62	0·12	1·58	0·13	1·82	0·27	0·460

HCLF, high-cholesterol low-fat diet; HD, baseline home diet; LCHF, low-cholesterol high-fat diet; LCLF, low-cholesterol low-fat diet.

	HD (*n* 29)		LCLF (*n* 29)		HCLF (*n* 29)		LCHF (*n* 18)		
Variables	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	*P*
Lathosterol§	145	10	134	9	128*	10	236*†‡	22	<0·001
Cholestanol§	85	6	119*	6	117*	5	133*†	7	<0·001
Campesterol§	170	14	183	15	169†	15	247*†‡	20	<0·001
Sitosterol§	113	8	131*	7	119†	8	137*	8	0·041

HCLF, high-cholesterol low-fat diet; HD, baseline home diet; LCHF, low-cholesterol high-fat diet; LCLF, low-cholesterol low-fat diet.

[a]: ratio su Chol

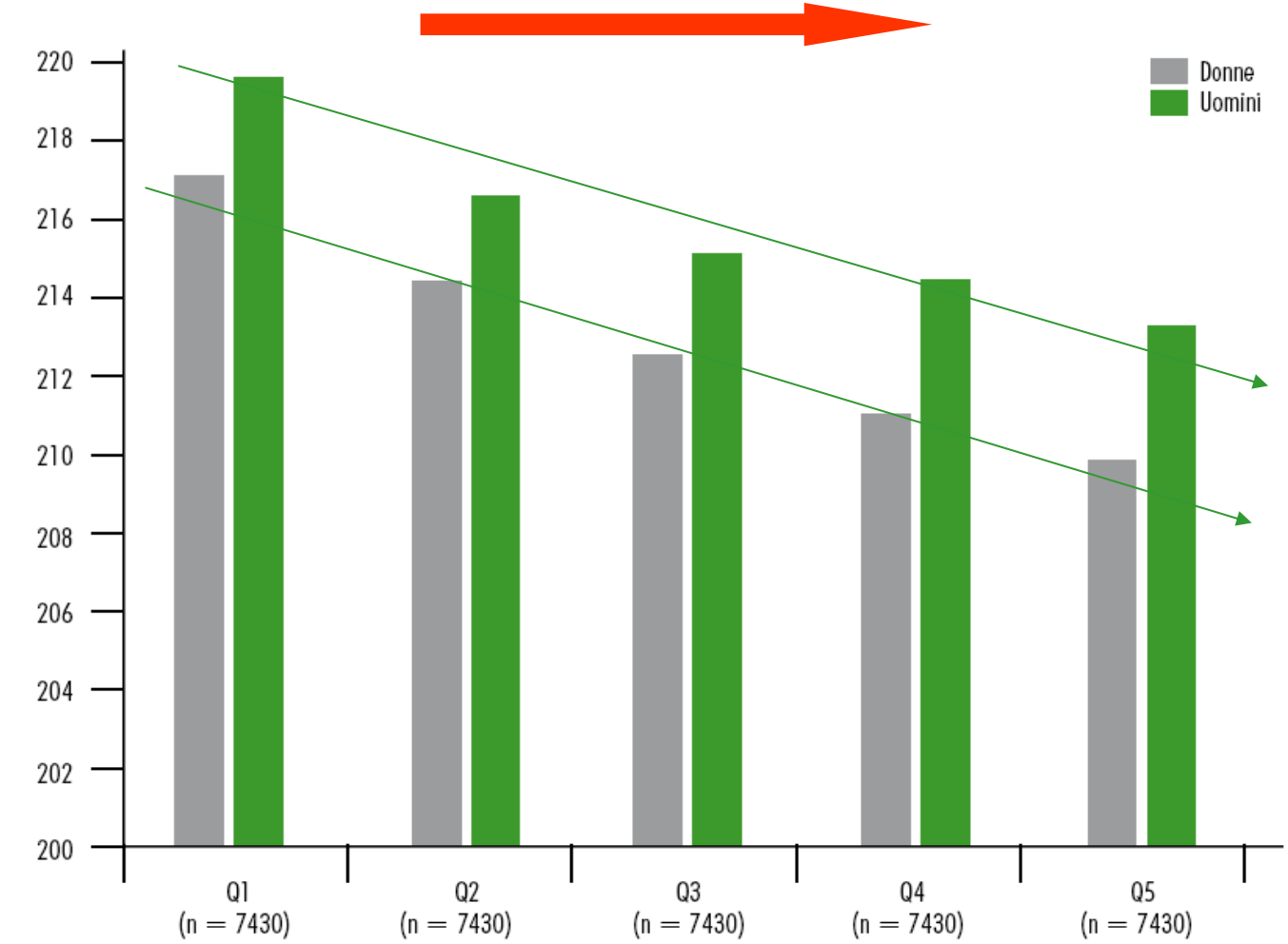
Nissinen MJ et al. Brit J Nutr 2008

Effects of a phytosterol-enriched dairy product on lipids, sterols and 8-isoprostane in hypercholesterolemic patients: A multicenter Italian study

	PS-enriched fermented milk $N = 60$	Control fermented milk $N = 56$
Total cholesterol mg/dl		
Baseline	263.5 ± 2.6	260.0 ± 3.2
3 weeks	226.9 ± 3.3*	242.5 ± 3.5
6 weeks	231.0 ± 3.2*	243.1 ± 4.2
Triglicerydes mg/dl		
Baseline	126.8 ± 6.8	125.4 ± 7.1
3 weeks	117.0 ± 5.5	125.6 ± 7.0
6 weeks	131.6 ± 9.1	128.5 ± 7.6
LDL cholesterol mg/dl		
Baseline	166.2 ± 2.0	163.7 ± 2.1
3 weeks	148.7 ± 3.1*	160.1 ± 2.8
6 weeks	147.4 ± 2.8*	160.5 ± 3.1
HDL cholesterol, mg/dl		
Baseline	51.6 ± 1.9	50.7 ± 1.9
3 weeks	51.9 ± 1.9	52.7 ± 2.1
6 weeks	53.4 ± 2.2	52.7 ± 2.1

Mannarino E, NMCD, 2008

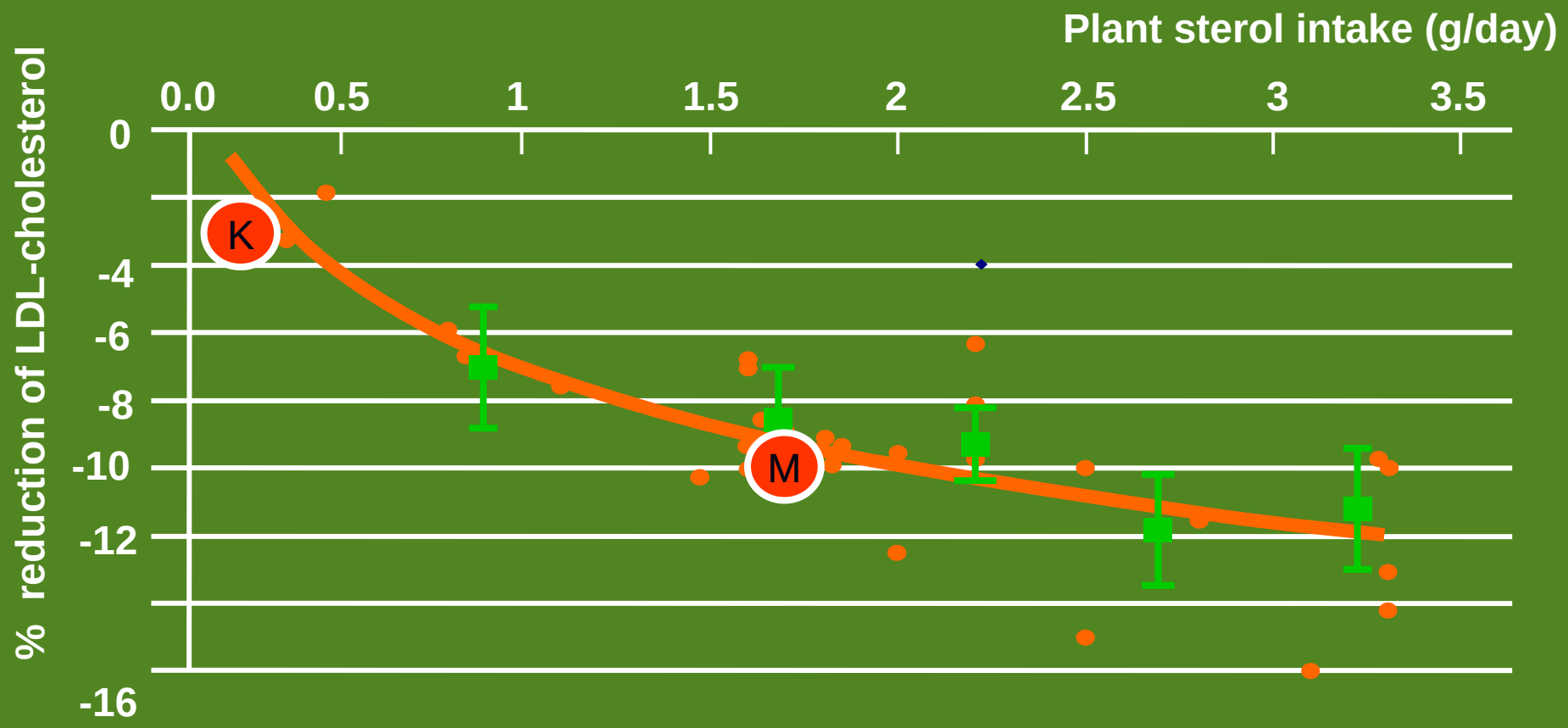
Fitosteroli naturalmente contenuti negli alimenti e colesterolemia: uno studio epidemiologico scandinavo



Colesterolemia totale nei differenti quintili di apporto alimentare di fitosteroli.

Klingberg S et al, Am J Clin Nutr, 2008

Cholesterol lowering with plant sterols in fat-based foods: dose-response relationship



data of ~ 30 placebo-controlled initiated studies with phytosterol-enriched spreads

data (mean plus 95% confidence interval) from meta-analysis of 41 studies with phytosterols or stanols (Katan et al, Mayo Clin Proc. 2003)

Dose effects of dietary phytosterols on cholesterol metabolism: a controlled study

	Phytosterol intake		
	59 mg/d (control)	459 mg/d (moderate)	2059 mg/d (high)
Cholesterol absorption			
Percentage cholesterol absorbed (%)	69.9 ± 2.1	62.8 ± 2.1[2]	52.7 ± 2.1[2,3]
Dietary cholesterol absorbed (mg/d)	139 ± 8	121 ± 8[4]	105 ± 8[2,5]
Biliary cholesterol absorbed (mg/d)	1418 ± 167	1390 ± 167	1244 ± 167
Plasma sterol ratios			
Phytosterols/total cholesterol (μg/mg)	7.4 ± 1.3	14.1 ± 1.3[2]	25.8 ± 1.3[2,3]
Cholestanol/total cholesterol (μg/mg)[6]	1.09 ± 0.08	0.95 ± 0.08[2]	0.85 ± 0.08[2,5]
Lathosterol/total cholesterol (μg/mg)[7]	1.22 ± 0.13	1.51 ± 0.14[2]	1.71 ± 0.14[2,3]
Serum lipid concentrations			
Total cholesterol (mg/dL)	211 ± 6	204 ± 6	198 ± 6[2]
LDL cholesterol (mg/dL)	139 ± 4	132 ± 4	126 ± 4[2]
HDL cholesterol (mg/dL)	50 ± 3	50 ± 3	51 ± 3
Triglycerides (mg/dL)	112 ± 9	112 ± 9	104 ± 9
Non-HDL cholesterol (mg/dL)	161 ± 5	154 ± 5	146 ± 5[2]
LDL cholesterol/HDL cholesterol	2.92 ± 0.16	2.75 ± 0.16[4]	2.58 ± 0.16[2,5]

Racette BS, AJCN, 2010

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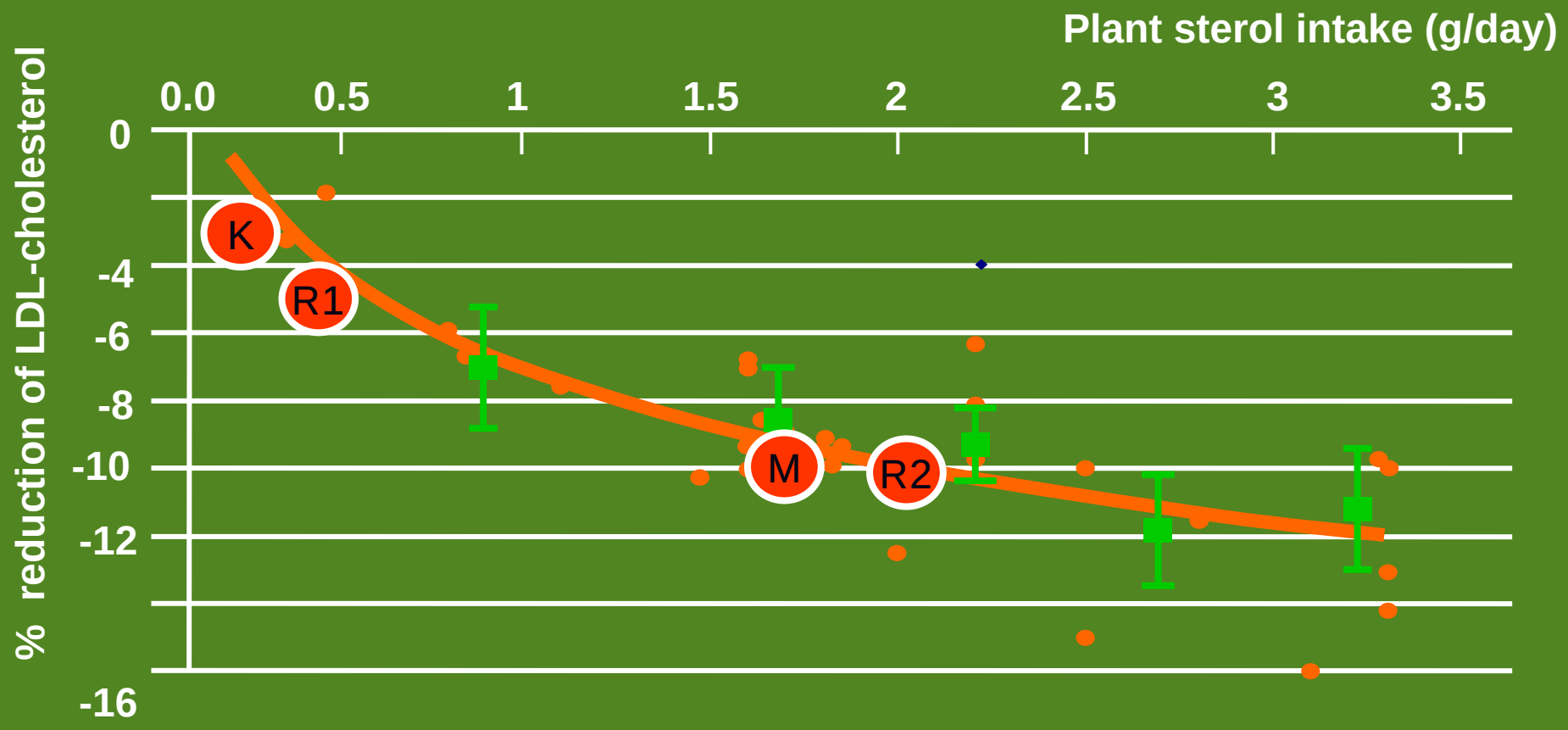
Racette BS, AJCN, 2010

Cholesterol lowering with plant sterols in fat-based foods: dose-response relationship



data of ~ 30 placebo-controlled initiated studies with phytosterol-enriched spreads

data (mean plus 95% confidence interval) from meta-analysis of 41 studies with phytosterols or stanols (Katan et al, Mayo Clin Proc. 2003)

Mean serum concentrations of total and LDL cholesterol following a 3 week treatment with 5 g/day of oat beta-glucan

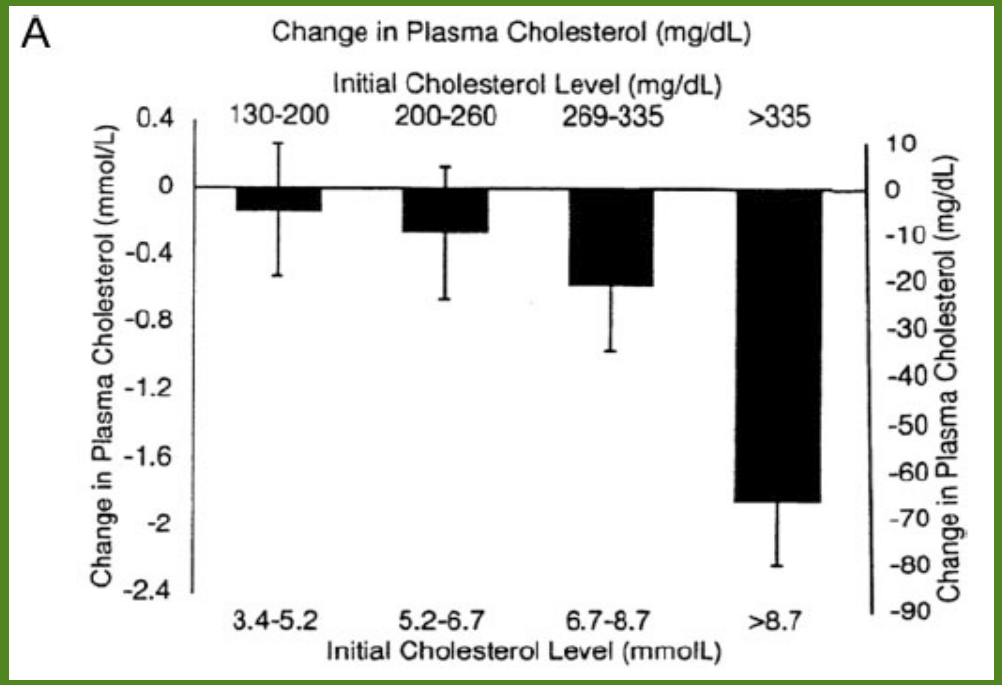
Total cholesterol	**Control group**	**Beta-glucan group**	p
Run-in period (mmol/L)	5.57 ± 0.66	5.94 ± 0.76	
Test period (mmol/L)	5.67 ± 0.66	5.75 ± 0.58	
Change (mmol/L)	0.11 ± 0.37	–0.19 ± 0.39	0.012
Change (%)	2.14 ± 6.81	–2.70 ± 6.06	
LDL cholesterol			
Run-in period (mmol/L)	3.45 ± 0.68	3.87 ± 0.80	
Test period (mmol/L)	3.54 ± 0.71	3.67 ± 0.61	
Change (mmol/L)	0.10 ± 0.34	–0.21 ± 0.37	0.005
Change (%)	3.23 ± 9.99	–4.51 ± 8.50	

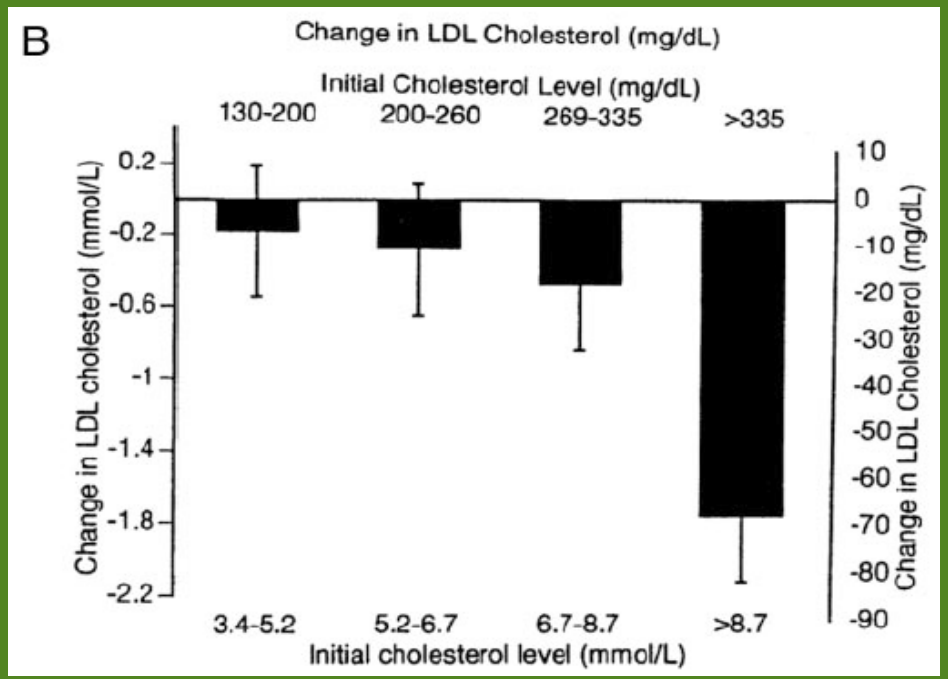
Naumann E et al, Am J Clin Nutr 2006

La nuova normativa EFSA sul beta-glucano

- La dose giornaliera efficace è fissata in almeno 3 grammi
- Il prodotto deve essere in grado di fornire l'intera dose giornaliera
- Il wording suggerito è "aiuta a mantenere normali valori della colesterolemia"
- La normativa non è ancora entrata in vigore

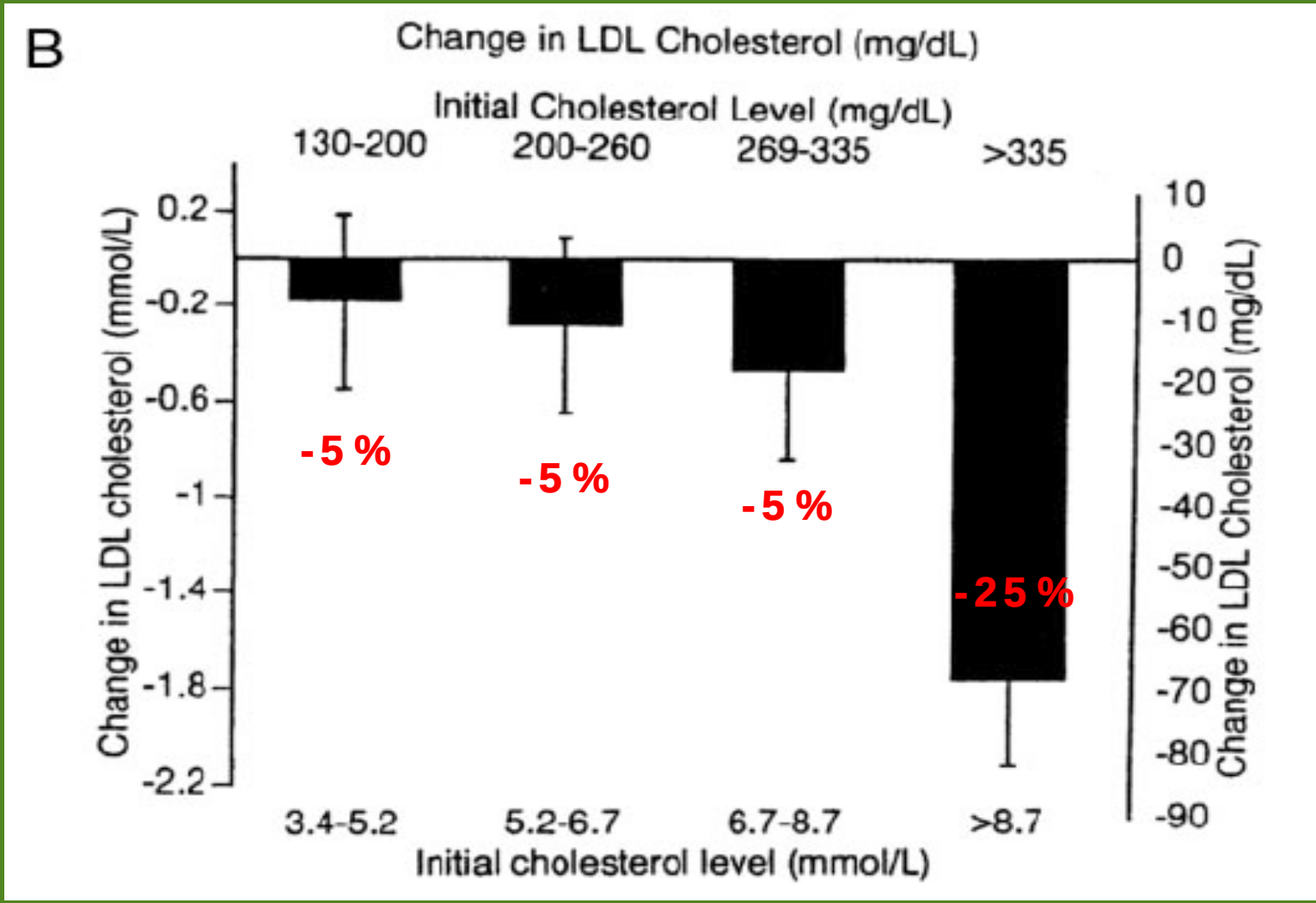
Changes in Tot Chol (A) and LDL-c (B) and initial cholesterol levels in a meta-analysis of clinical trials with soy protein.





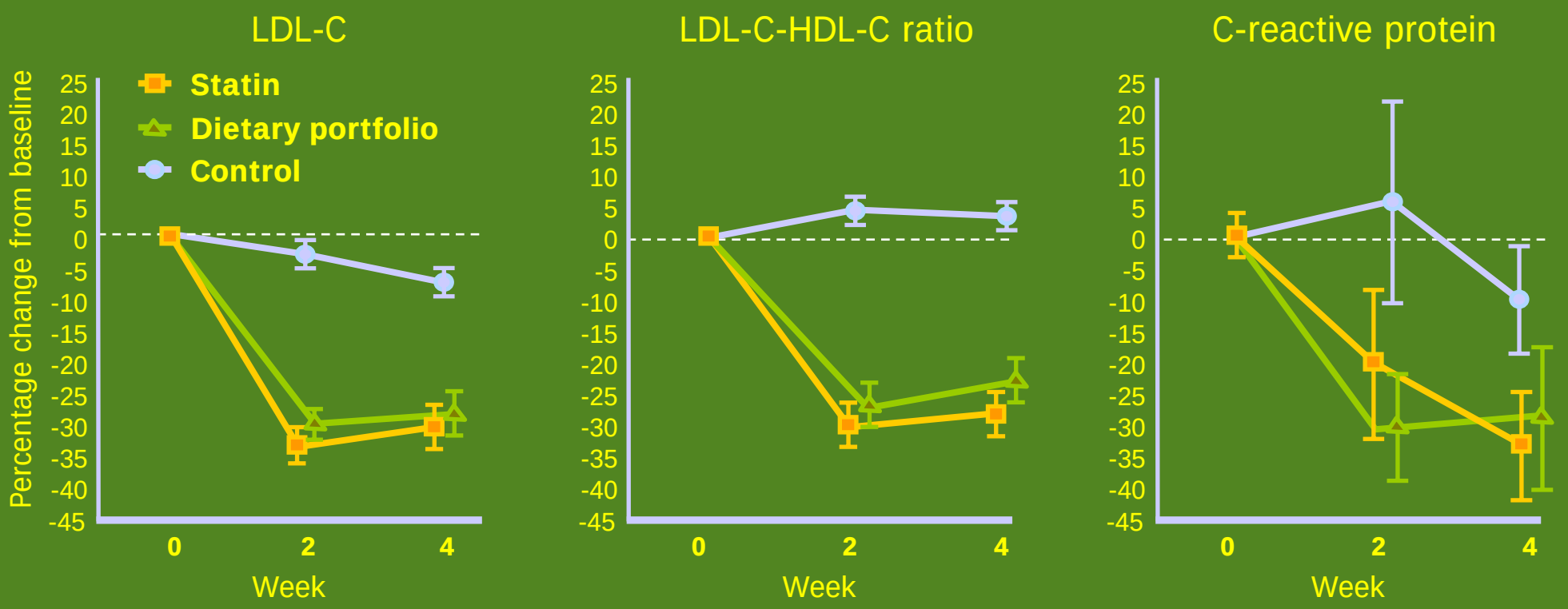
Anderson JW et al, N Engl J Med 1995

Hypocholesterolaemic effects of soy proteins: effect of basal cholesterol levels



Anderson JW et al, N Engl J Med 1995

Effects of a “Dietary Portfolio” vs Lovastatin on Serum Lipid and CRP



.density lipoprotein cholesterol-high=C-HDL ;density lipoprotein Cholesterol-low=C-LDL
approximately twice the SE represents ,with the number of participants involved ,because)SE(Values are expressed as mean
a significant difference

J Am Med Assoc ,.Jenkins et al 2003

Assessment of the long term effects of a dietary portfolio of cholesterol-lowering foods in patients with hypercholesterolemia

Blood lipid measurements at baseline and after 1 y of the ad libitum dietary portfolio study in 66 participants[1]

	Total C	LDL-C	HDL-C	Triacylglycerol	Total:HDL-C	LDL-C:HDL-C
Prestudy	6.75 ± 0.10	4.48 ± 0.09	1.24 ± 0.04	2.29 ± 0.14	5.76 ± 0.16	3.82 ± 0.12
1 y	6.05 ± 0.11	3.87 ± 0.10	1.28 ± 0.05	1.98 ± 0.11	5.03 ± 0.16	3.23 ± 0.12
Change	−0.70 ± 0.09	−0.61 ± 0.09	0.04 ± 0.02	−0.31 ± 0.11	−0.73 ± 0.10	−0.59 ± 0.08
P^2	< 0.0001	< 0.0001	0.0256	0.0051	< 0.0001	< 0.0001

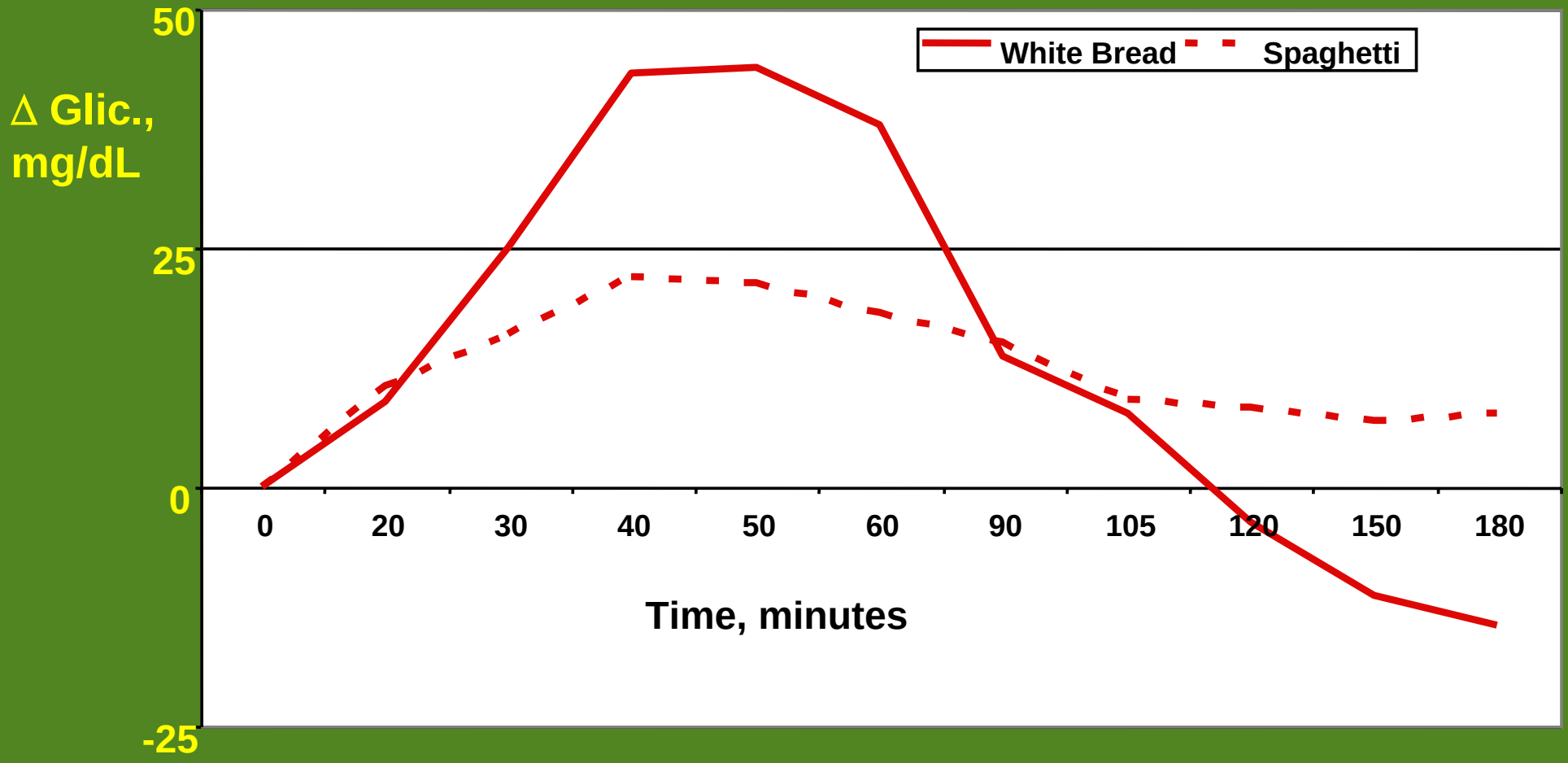
[1] All values are $\bar{x}$ ± SE. Total C, total cholesterol; LDL-C, LDL cholesterol; HDL-C, HDL cholesterol. A last-observation-carried-forward analysis was performed for 11 participants for weeks 0 (n = 1), 2 (n = 1), 12 (n = 3), 24 (n = 2), 32 (n = 3), and 42 (n = 1).

[2] Significance of change was determined with Student's paired t test (2-tailed, PROC MEANS) (28).

-15 %

Jenkins DJA et al, Am J Clin Nutr 2006

GLYCEMIC RESPONSE AFTER A WHITE BREAD OR A SPAGHETTI MEAL

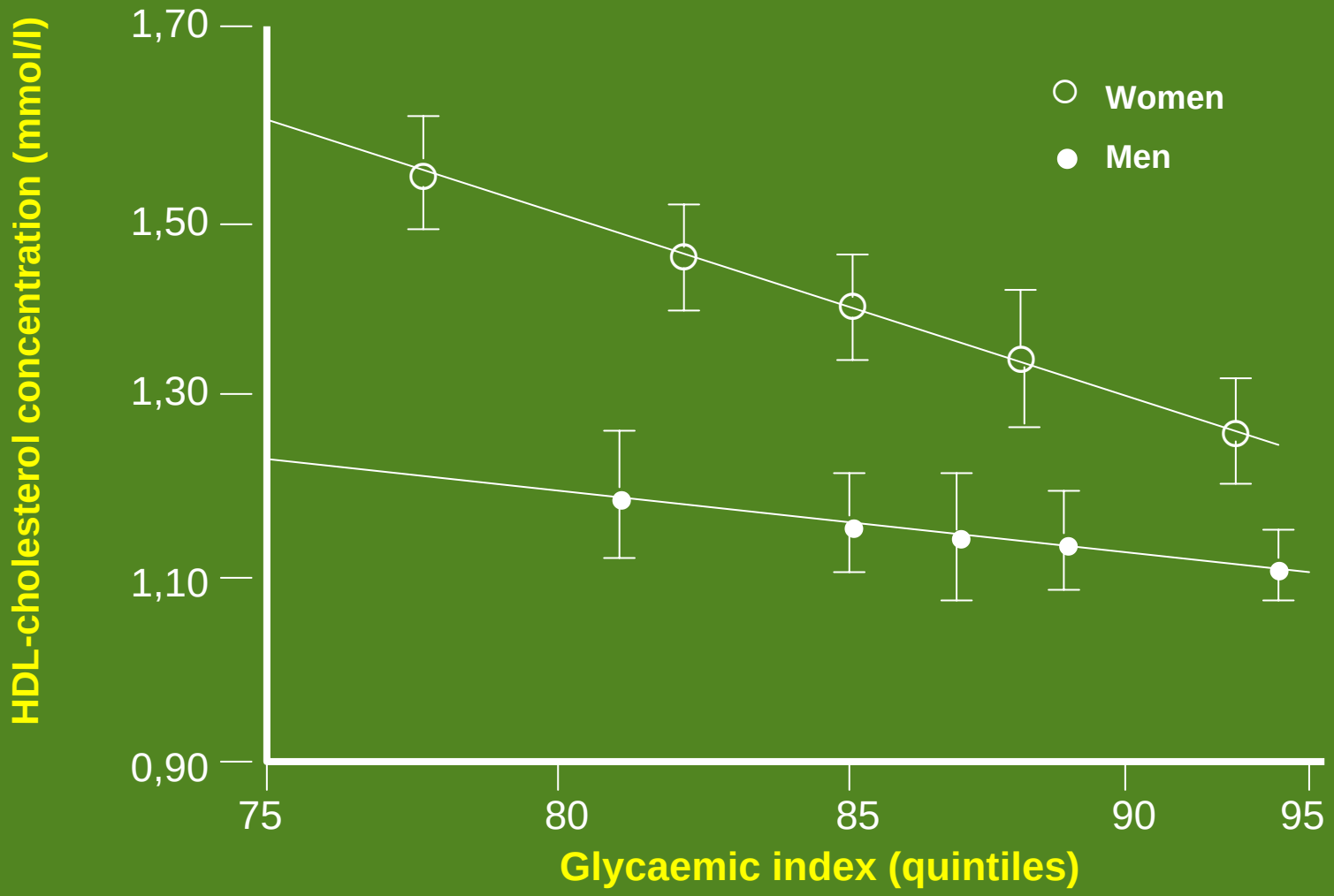


Ludwig, J Am Med Assoc, 2002

Indice Glicemico (IG), relativo al Pane Bianco, di alcuni alimenti

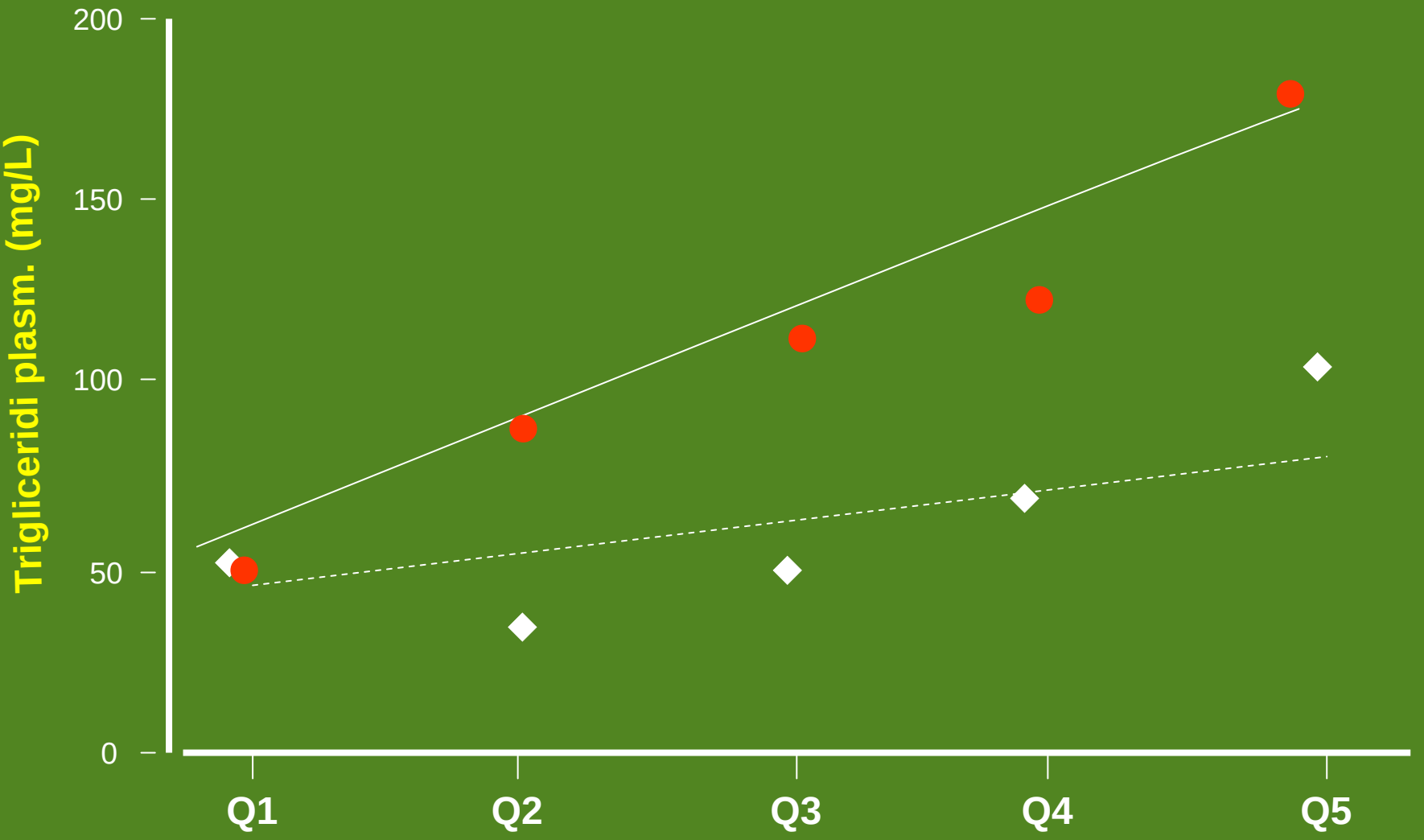
Cibo	Indice glicemico (%)
Pane bianco	100
Pomodori	13
Ciliegie	32
Fagioli	40-60
Mele	52
Pasta (spaghetti)	52
Pasta (maccheroni)	68
Pizza	86
Saccarosio	92
Polenta	106
Cornflakes	100-120
Miele	120
Patate bollite	120
Glucosio	138

Relation Between HDL-Cholesterol Concentration and Glycaemic Index of the Diet in Men and Women



Frost 1999

Carico Glicemico medio della dieta e trigliceridemia in donne con (●) e senza (◆) sovrappeso (BMI >25)



Liu, Am J Clin Nutr 2001

Effetto dell'attività fisica sul profilo dei lipidi plasmatici: lo studio "Heritage"

- Soggetti studiati: 200 uomini, di età <65 anni, sani e sedentari
- Training: 60 sessioni di training aerobico in 21 settimane (da 1 a 4 sessioni per settimana)
- Effetto del training sul profilo lipidico:

	Δ HDL2c	Δ TG	Δ TC/HDLc
Normolipemici	+ 3 %	+ 2 %	- 2 %
TG alti	+ 9 %	- 13 %	- 4 %
HDL basse, TG alti	+ 18 %	- 17 %	- 9 %

Le variazioni indotte da un training di tipo aerobico sono *tanto maggiori* quanto *meno favorevoli* sono le condizioni di partenza del profilo lipidico.

Couillard, ATVB 2001