

Meeting with ARTORG (GoCarb)

# Mediterranean Diet

From theory to App

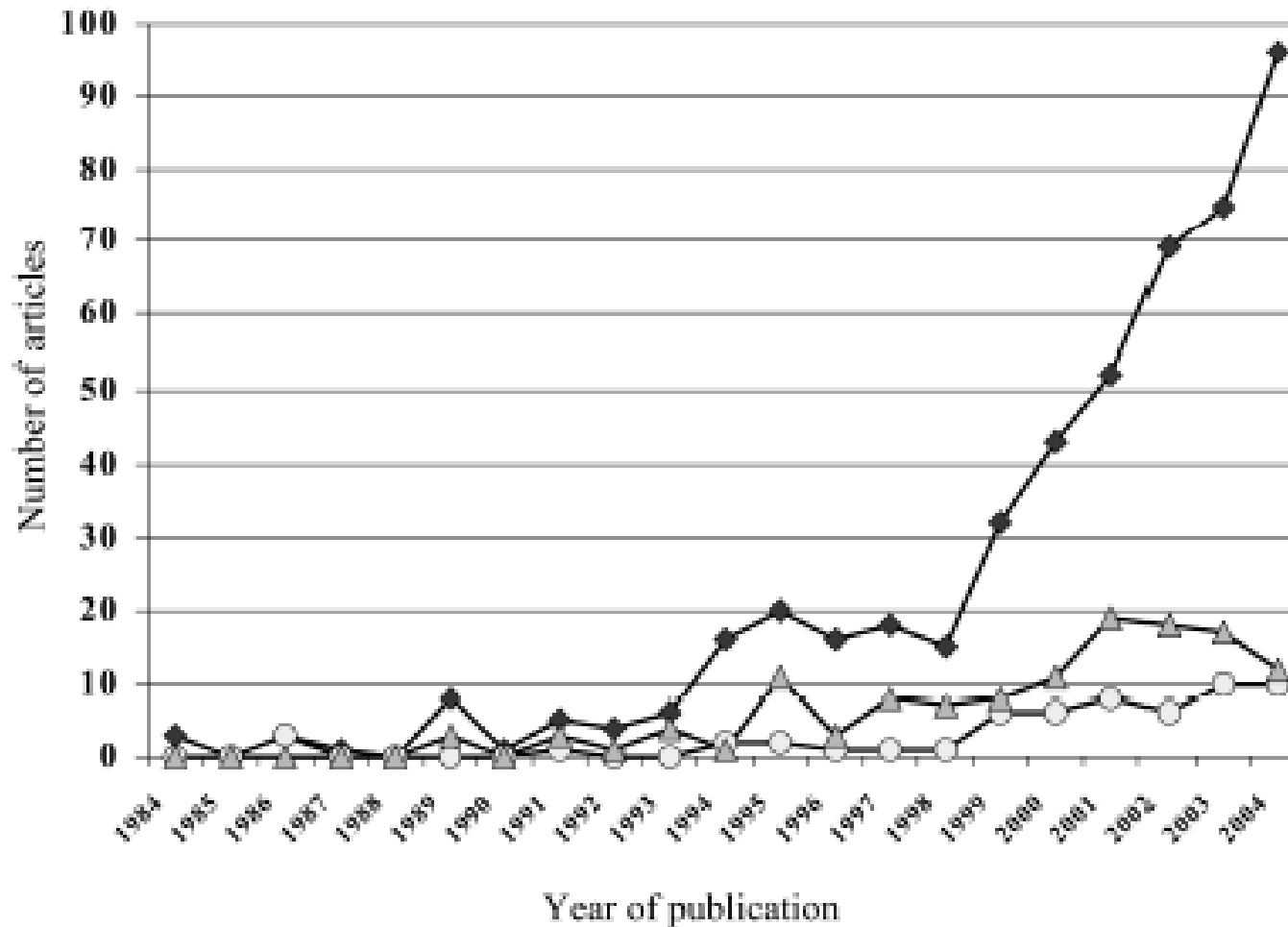
David Fäh

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# Mediterranean Diet: publications



♦, Publications; Δ, reviews; ○, clinical trials.

# Mediterranean Diet



What is this?



# Mediterranean Diet

- Mainly plant foods: vegetables, fruits, grains, nuts, seeds
- Starchy food rich in fibres: legumes, quinoa, amaranth
- Extra Vergine olive oil as the principal source of fat
- Dairy, poultry, and fish in low to moderate amounts
- Red meat in low frequency and amounts
- Wine in low to moderate amounts
- Low consumption of sweets and sweetened drinks



	Frequency <sup>1</sup>
1. Do you use olive oil as the principal source of fat for cooking?	Yes
2. How much olive oil do you consume per day (including that used in frying, salads, meals eaten away from home, etc.)?	≥4 Tbsp <sup>5</sup>
3. How many servings of vegetables do you consume per day? Count garnish and side servings as 1/2 point; a full serving is 200 g.	≥2
4. How many pieces of fruit (including fresh-squeezed juice) do you consume per day?	≥3
5. How many servings of red meat, hamburger, or sausages do you consume per day? A full serving is 100–150 g.	<1
6. How many servings (12 g) of butter, margarine, or cream do you consume per day?	<1
7. How many carbonated and/or sugar-sweetened beverages do you consume per day?	<1
8. Do you drink wine? How much do you consume per week?	≥7 cups <sup>6</sup>
9. How many servings (150 g) of pulses do you consume per week?	≥3
10. How many servings of fish/seafood do you consume per week? (100–150 g of fish, 4–5 pieces or 200 g of seafood)	≥3
11. How many times do you consume commercial (not homemade) pastry such as cookies or cake per week?	<2
12. How many times do you consume nuts per week? (1 serving = 30 g)	≥3
13. Do you prefer to eat chicken, turkey or rabbit instead of beef, pork, hamburgers, or sausages?	Yes
14. How many times per week do you consume boiled vegetables, pasta, rice, or other dishes with a sauce of tomato, garlic, onion, or leeks sautéed in olive oil?	≥2
Mean	—



<sup>1</sup> Criterion to score 1 point. Otherwise, 0 recorded.

Schröder et al. *J Nutr.*  
2011 Jun;141(6):1140-5.



**Table 1** KIDMED test to assess the Mediterranean diet quality

Scoring	
+1	Takes a fruit or fruit juice every day
+1	Has a second fruit every day
+1	Has fresh or cooked vegetables regularly once a day
+1	Has fresh or cooked vegetables more than once a day
+1	Consumes fish regularly (at least 2–3 times per week)
–1	Goes more than once a week to a fast-food (hamburger) restaurant
+1	Likes pulses and eats them more than once a week
+1	Consumes pasta or rice almost every day (5 or more times per week)
+1	Has cereals or grains (bread, etc.) for breakfast
+1	Consumes nuts regularly (at least 2–3 times per week)
+1	Uses olive oil at home
–1	Skips breakfast
+1	Has a dairy product for breakfast (yoghurt, milk, etc.)
–1	Has commercially baked goods or pastries for breakfast
+1	Takes two yoghurts and/or some cheese (40 g) daily
–1	Takes sweets and candy several times every day



KIDMED – Mediterranean Diet Quality Index in children and adolescents.

# Mediterranen also means.....

- Traditional
- Natural
- Varied
- Fresh, seasonal and regional products
- Minimally processed (between field and plate)
- Prepared gently with fresh herbs and spices
- Sit down – take time – enjoy





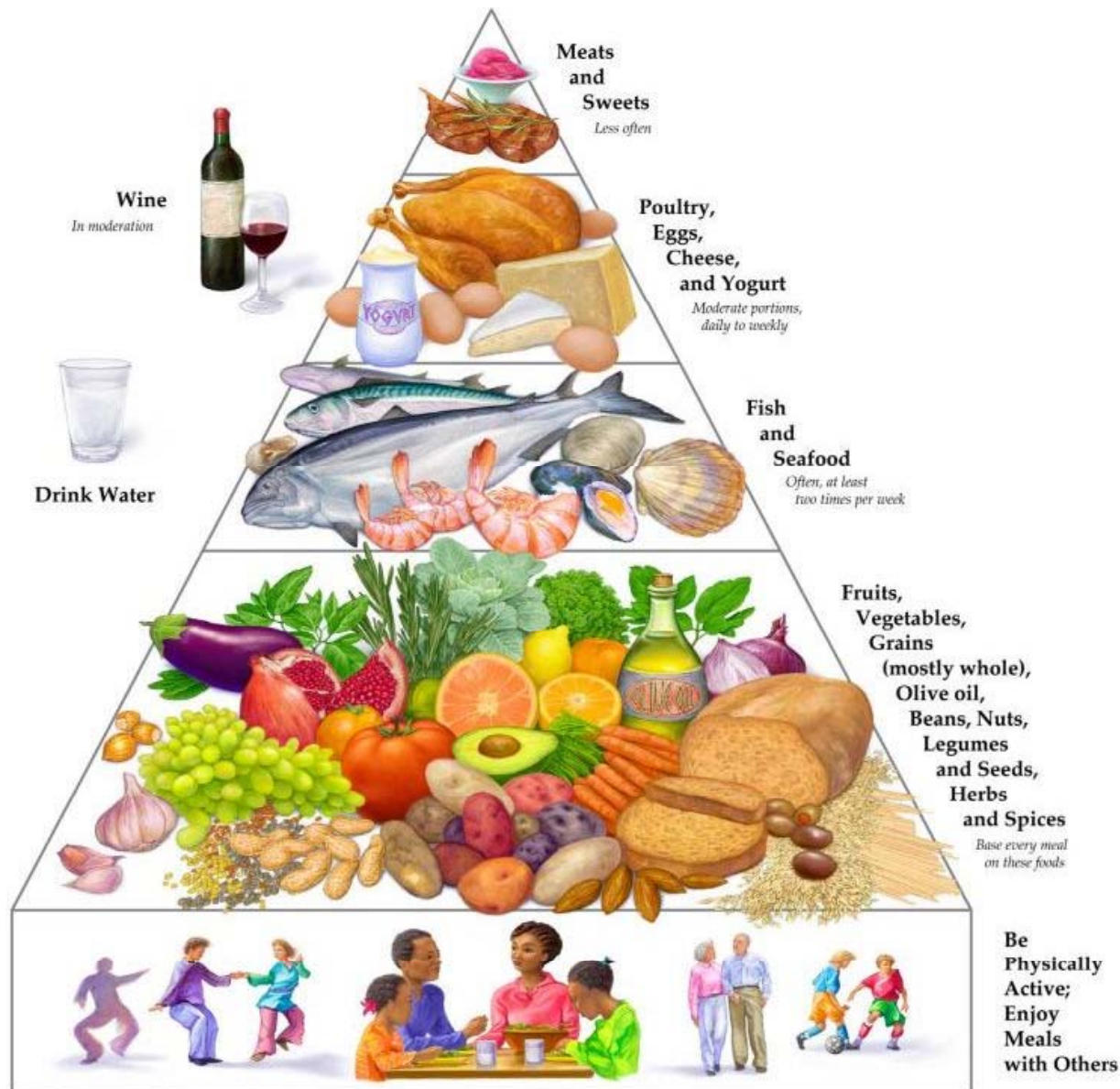


Illustration by George Middleton

© 2009 Oldways Preservation and Exchange Trust

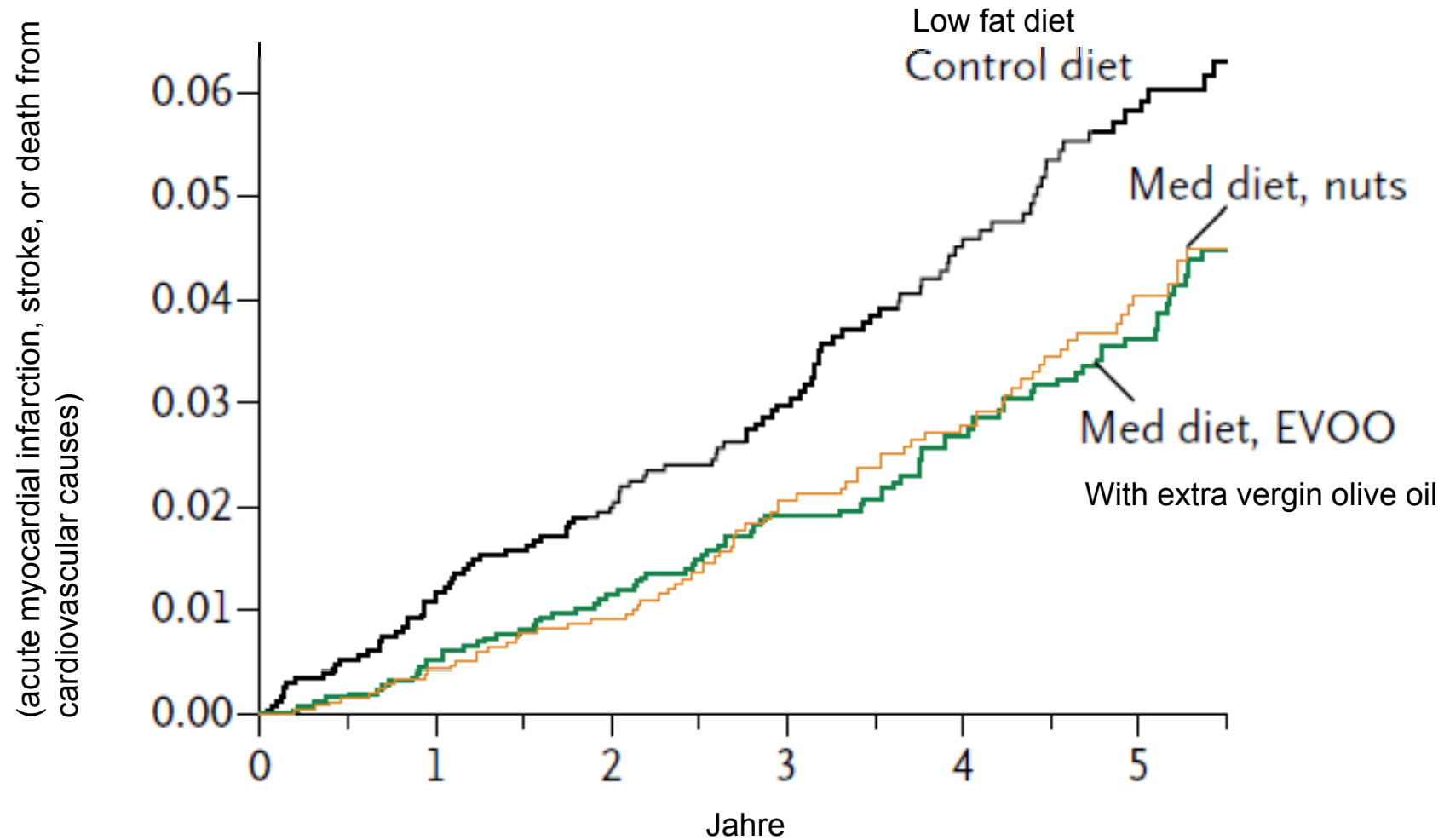
[www.oldwayspt.org](http://www.oldwayspt.org)

# Mediterranean Diet



Advantages for health in common

# Incidence of CVD in persons without preexisting CVD



N Engl J Med 2013; 368:1279-1290

David Fäh: Mediterranean Diet: from theory to App, 21.11.2014

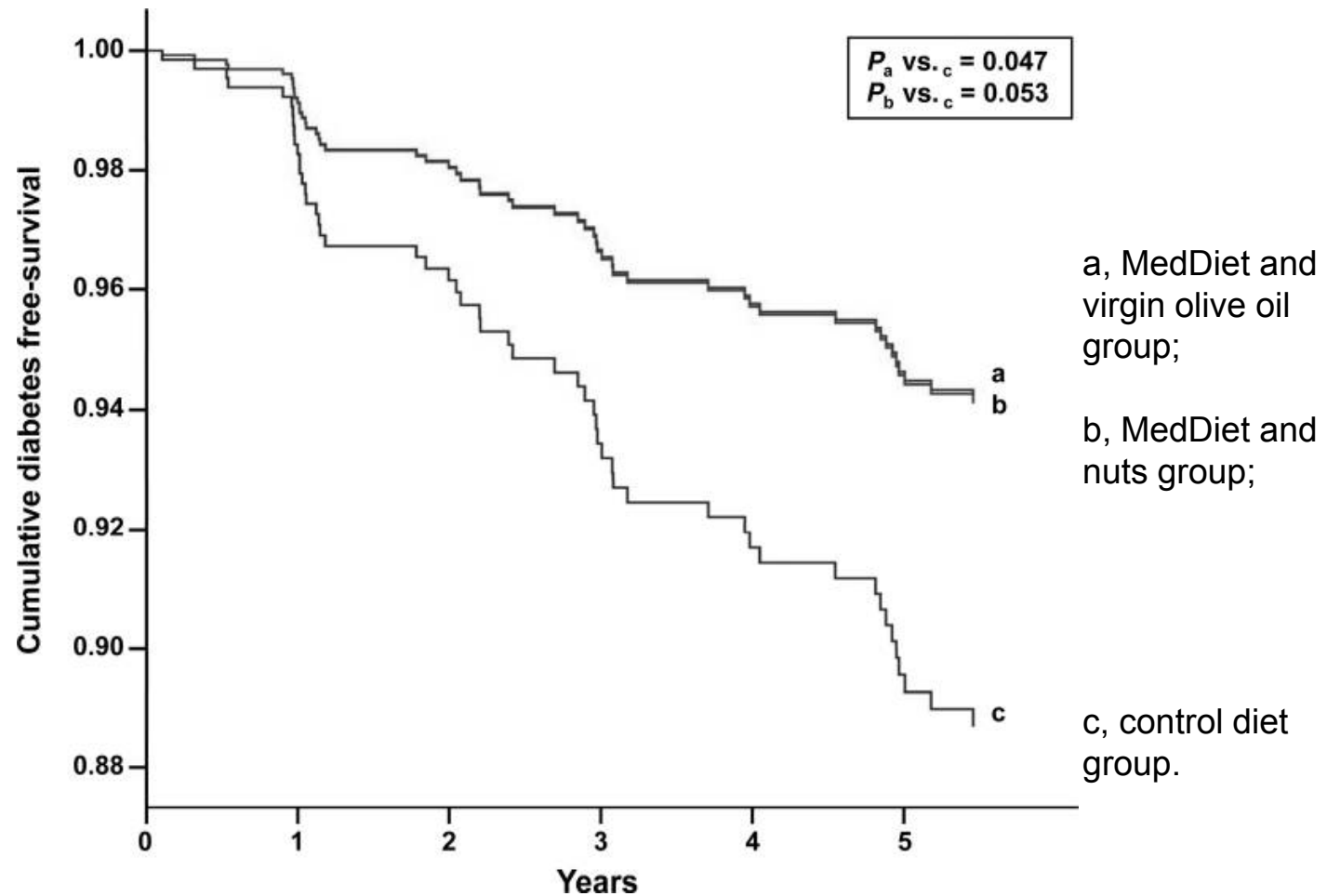
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# PREDIMED study: DM2

## Incidence of Type II diabetes



# Health benefits of the Mediterranean diet

Evidence supporting health benefit of Mediterranean diet	Magnitude of effect of Mediterranean diet on disease process	Type of study evidence
Reduction of CHD mortality	20–40 % ↓ in risk	Observational-longitudinal [1, 27], randomized controlled Trial [11, 30]
Reduction of CVD morbidity	25–45 % ↓ in risk	Observational-longitudinal [1, 32, 36], randomized controlled trial [30]
Reduction in the incidence of diabetes mellitus	25–30 % ↓ in risk	Observational-longitudinal [27], randomized controlled trial [11, 48]
Decrease in body weight, BMI, and abdominal circumference	Up to 40 % reduction	Cross-sectional [1, 45], observational-longitudinal [23, 41], randomized controlled trial [42, 48]
Improvement of metabolic syndrome components	Variable, 30–40 % reduction	Uncontrolled interventions [41], cross-sectional [45], observational-longitudinal [36], randomized controlled trial [46, 48]
Reduction of cancer mortality	20–30 % ↓ in risk	Observational-longitudinal [56, 57], randomized controlled trial [12]
Reduction of all-cause mortality	17–25 % ↓ in risk	Observational-longitudinal [56, 58, 59]

# More advantages

- Mediterranean Diet...
  - ...improves cognitive function
  - ...lowers risk for depression in diabetics
  - ...improves atrial fibrillation
  - ...ameliorates renal function
  - ...prevents metabolic syndrome
  - ...lowers risk for rheumatoide arthritis

J Neurol Neurosurg Psychiatry. 2013 Dec;84(12):1318-25; BMC Med. 2013 Sep 20;11:208; Circulation. 2014 Jul 1;130(1):18-26; Nutr Rev. 2006 Feb;64(2 Pt 2):S27-47.; Maturitas. 2010 Feb;65(2):122-30

David Fäh: Mediterranean Diet: from theory to App, 21.11.2014

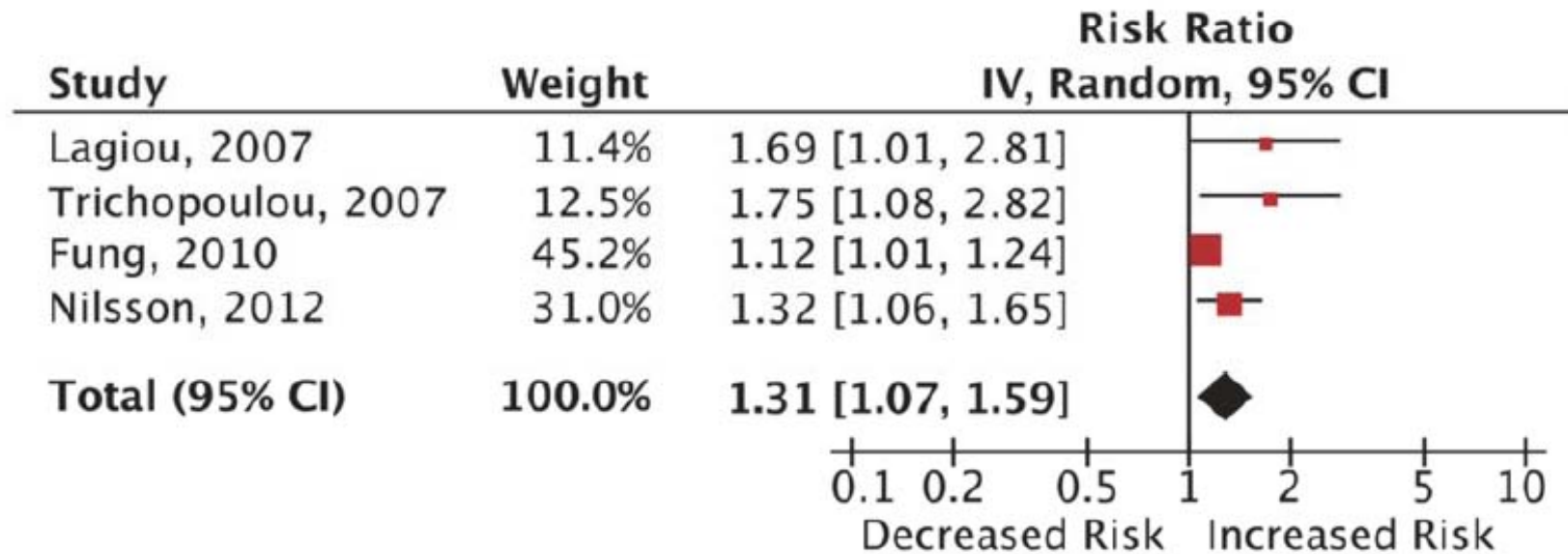
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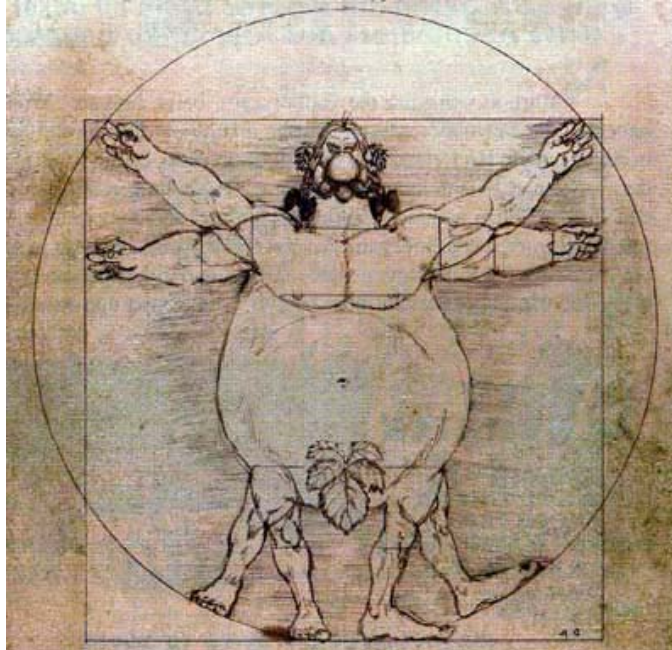
# Low-carb and mortality risk\*

(A) Low-carbohydrate score



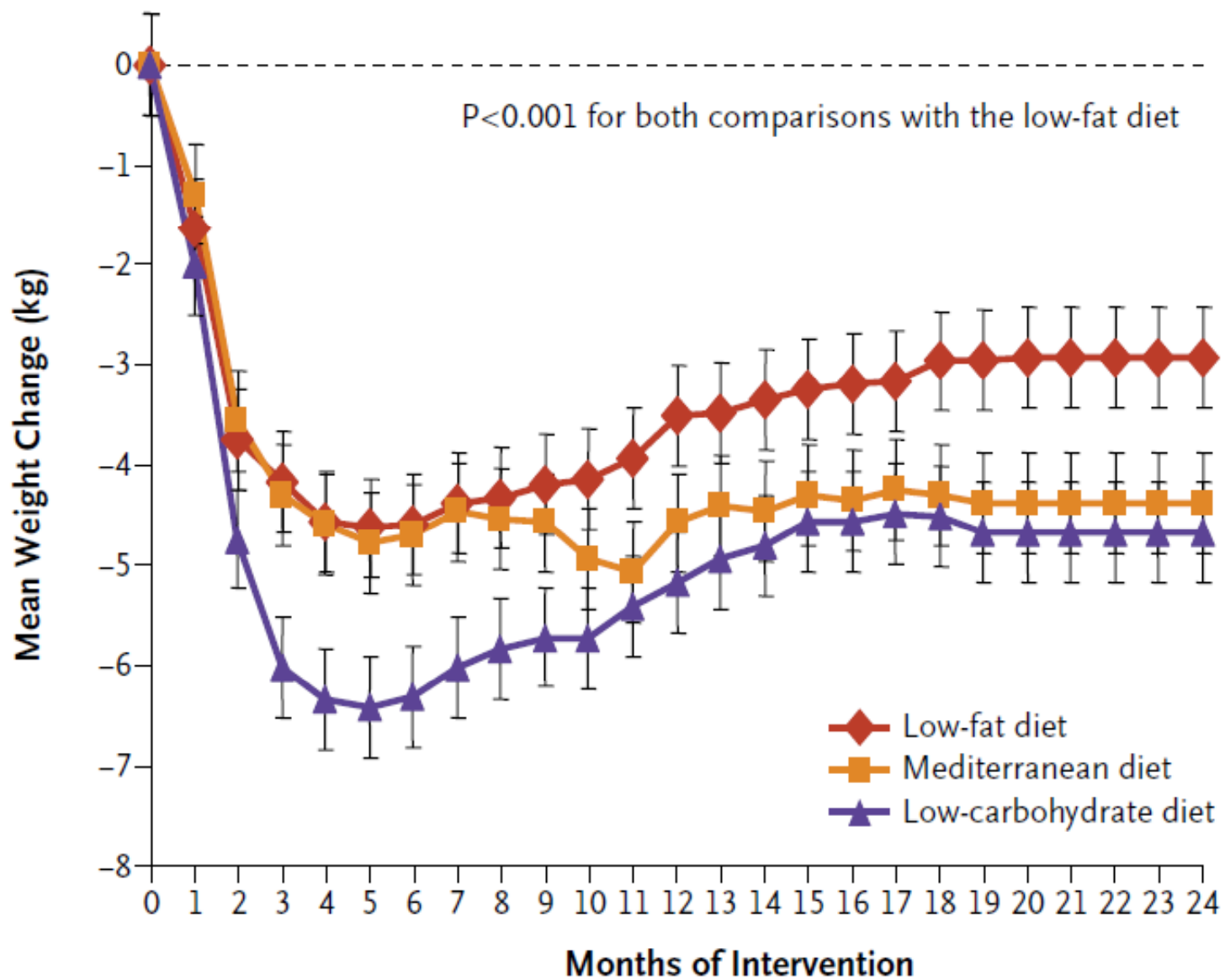
\*alle Ursachen (all-cause)

# Mediterranean Diet



Advantages for body weight





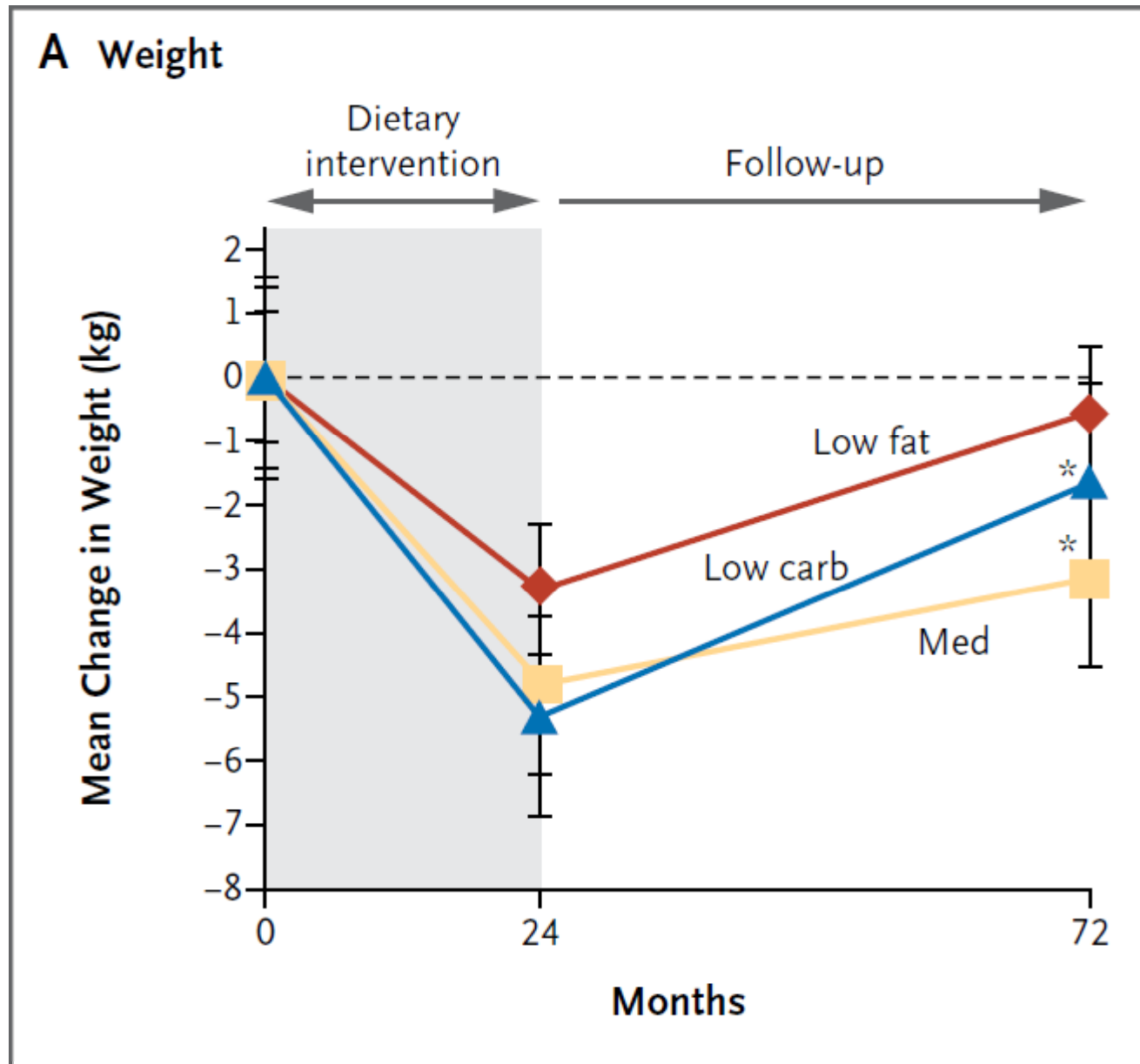
N Engl J Med 2008; 359:229-241

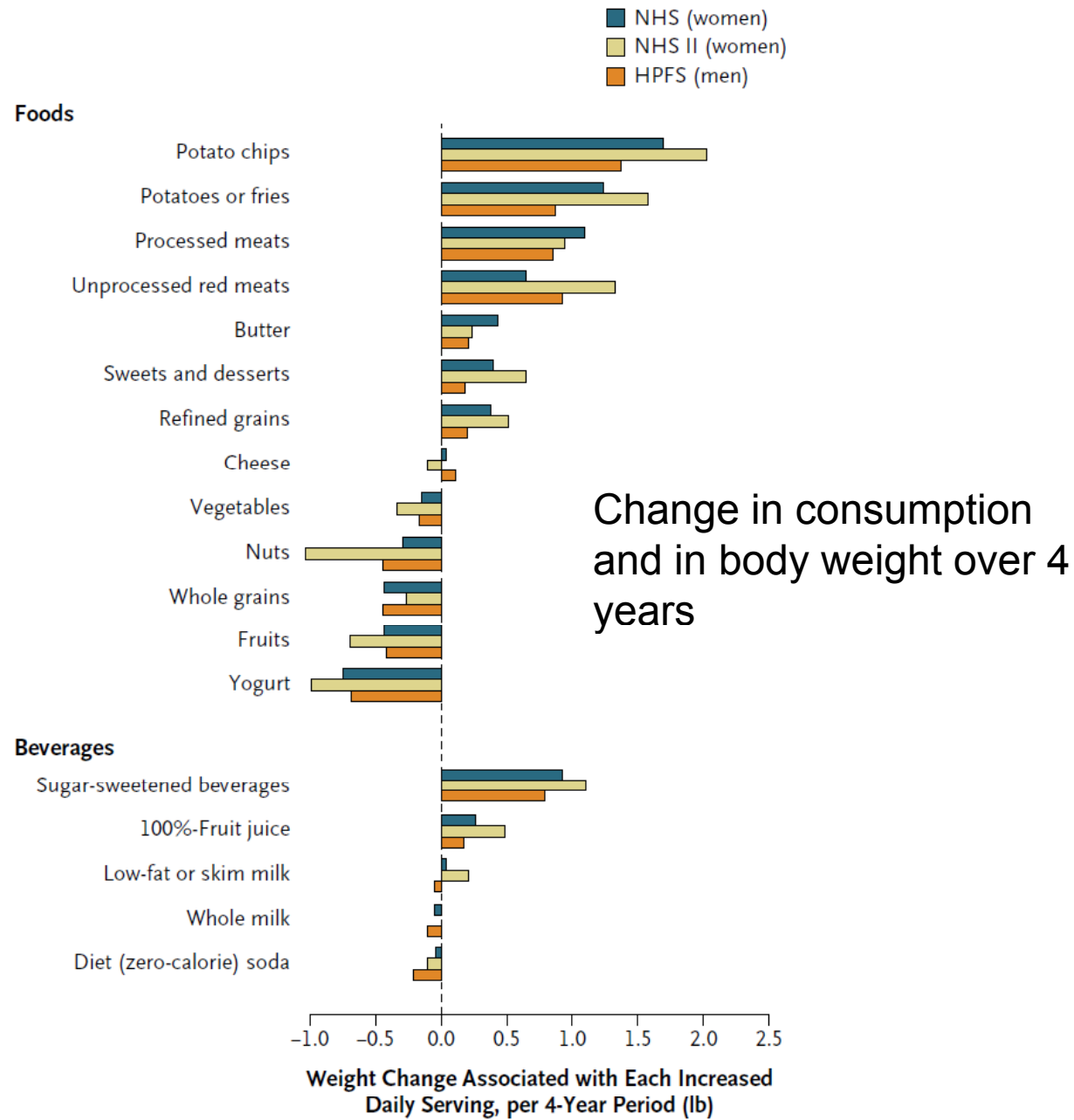
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N Engl J Med 2011;364:2392-404

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# Mediterranean Diet



From concept to App

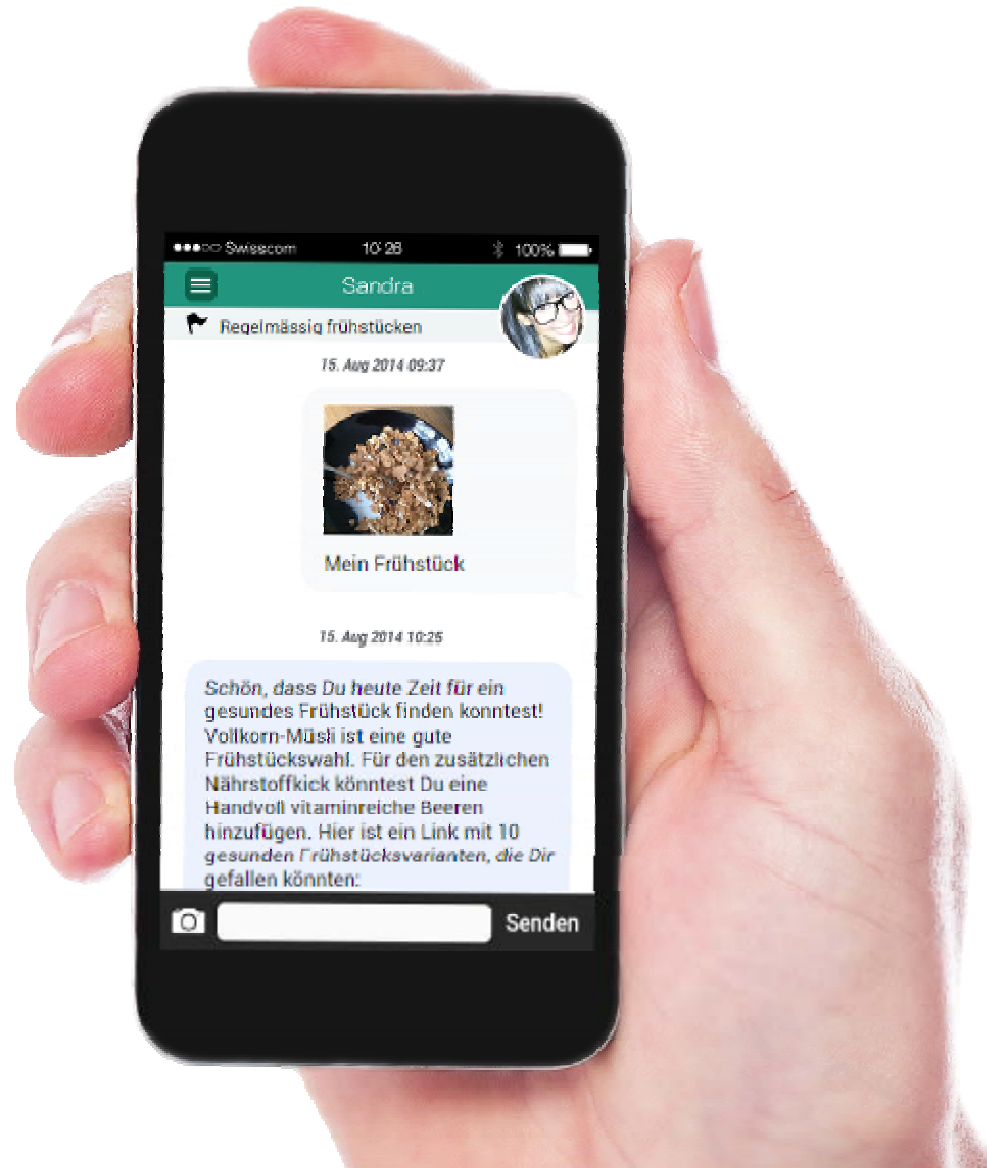


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# Determine adherence of a meal

- Or...

- Amazon Mechanical Turk?



- Collect and process data (pictures of his meals) from the user

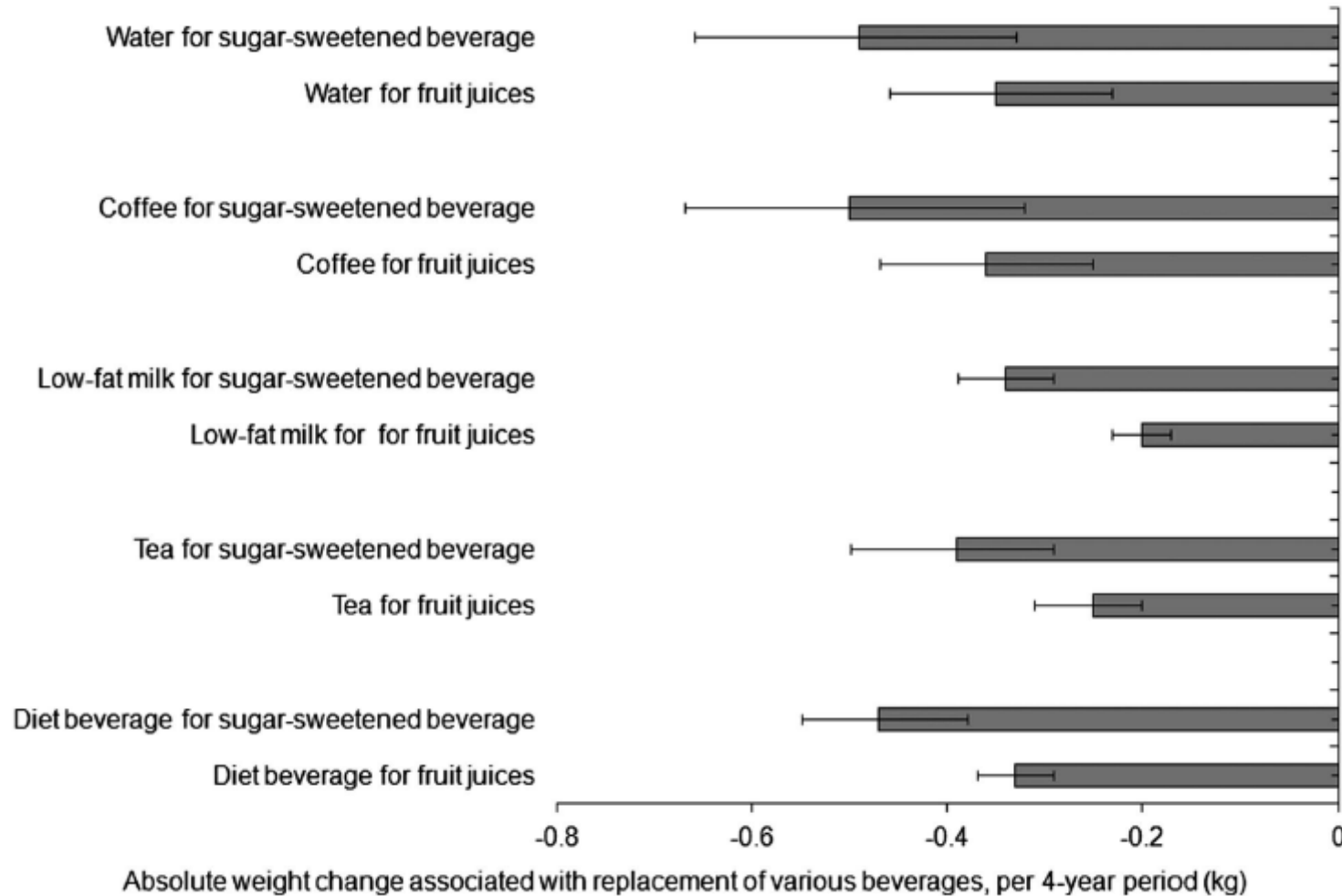


- Let the system „learn“ what a typical MD meal looks like





# Changes in bodyweight (kg) related with changes in beverage intake (per serving)



International Journal of Obesity (2013) 37, 1378–1385

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# Mediterrane Ernährungsweise



## Wirksame Elemente

# Olivenöl

- **Starker sättigender Effekt**
  - ausgeprägter als bei Rapsöl
  - durch Geschmacksstoffe
  - verringert glykämischen Index
  - beste Eigenschaften: Öl aus Italien
- **Verstärkt postprandiale Thermogenese und Fettoxidation**
- **Einfach ungesättigte Fettsäuren**



Fettwahrnehmung und Sättigungsregulation:  
Ansatz zur Entwicklung fettreduzierter Lebensmittel

British Journal of Nutrition (2004), 91, 245–252  
DOI: 10.1079/BJN20031047

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Pelkman et. al. Am J Clin Nutr. 2004 Feb;79(2):204-12.

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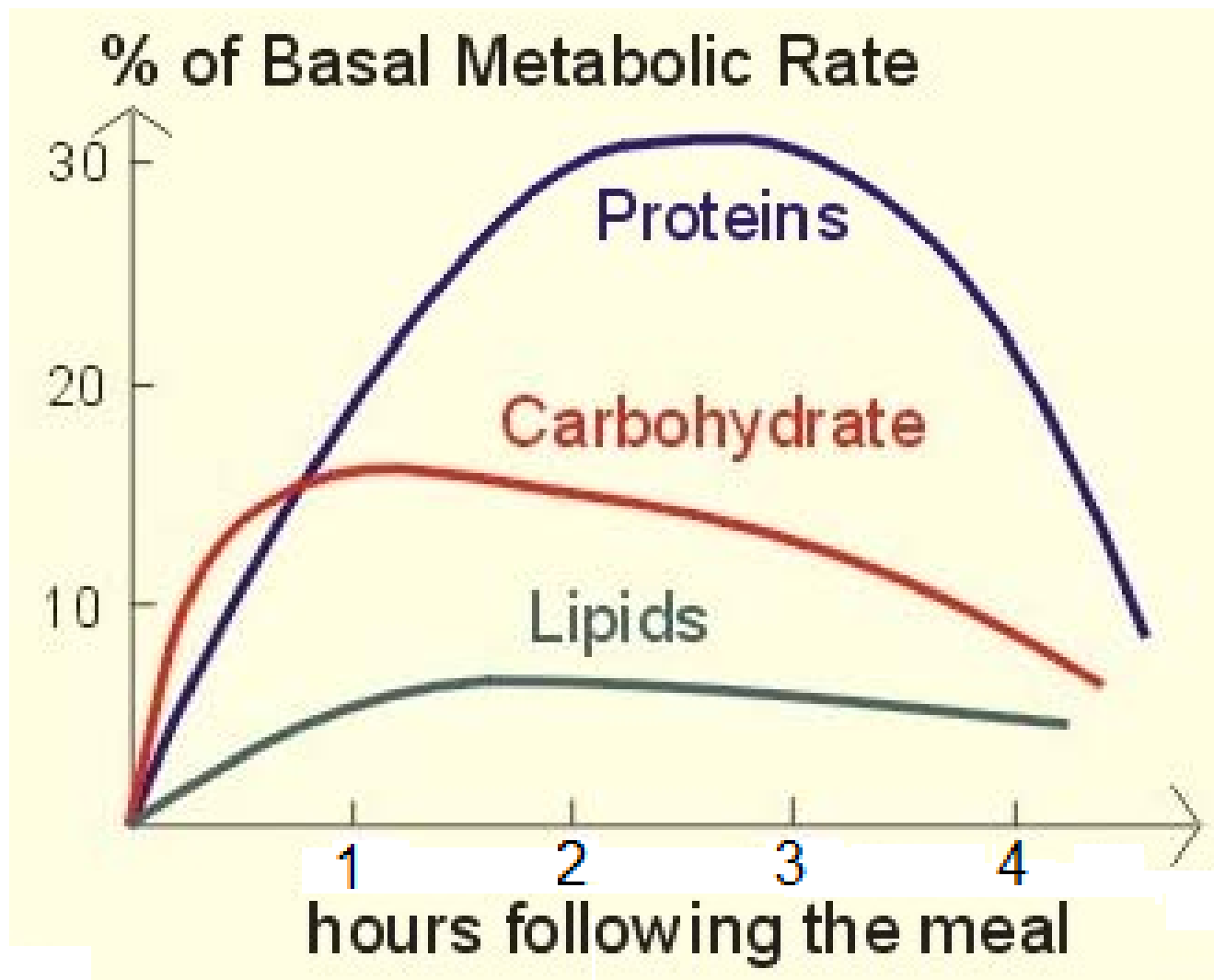


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# Nüsse

- Physiologischer Brennwert  $\neq$  physikalischer Brennwert
  - Nur ein Teil des Fetts wird aufgenommen
- Hochwertige Fette
- Hoher Faseranteil
  - gute Sättigung
- Reich an Eiweiss
  - verstärkte Thermogenese





# Faserreiche Stärkeprodukte

- Hafer
  - Lösliche Fasern: Blutzuckersenkend
- Hülsenfrüchte
  - Alpha-Amylase-Hemmer
  - Hoher Eiweissanteil
- Amarant, Quinoa
  - deutlich hochwertiger als Süssgräser





# Fleisch(producte)



- Mögliche Erklärungen für Gesundheitsrisiko:
  - Salz in verarbeitetem Fleisch: Blutdruck↑
  - Pökelsalz (Nitrat/Nitrite): stören die Funktion von Gefäßen und von Insulin; Atherosklerose, Krebs
  - Fette, die Cholesterinwerte und Blutgerinnung negativ beeinflussen
  - Zu viel Eisen: kann wichtige Moleküle, Zellen oder die Erbsubstanz beschädigen
  - Stoffe, die durch Darmbakterien verändert werden

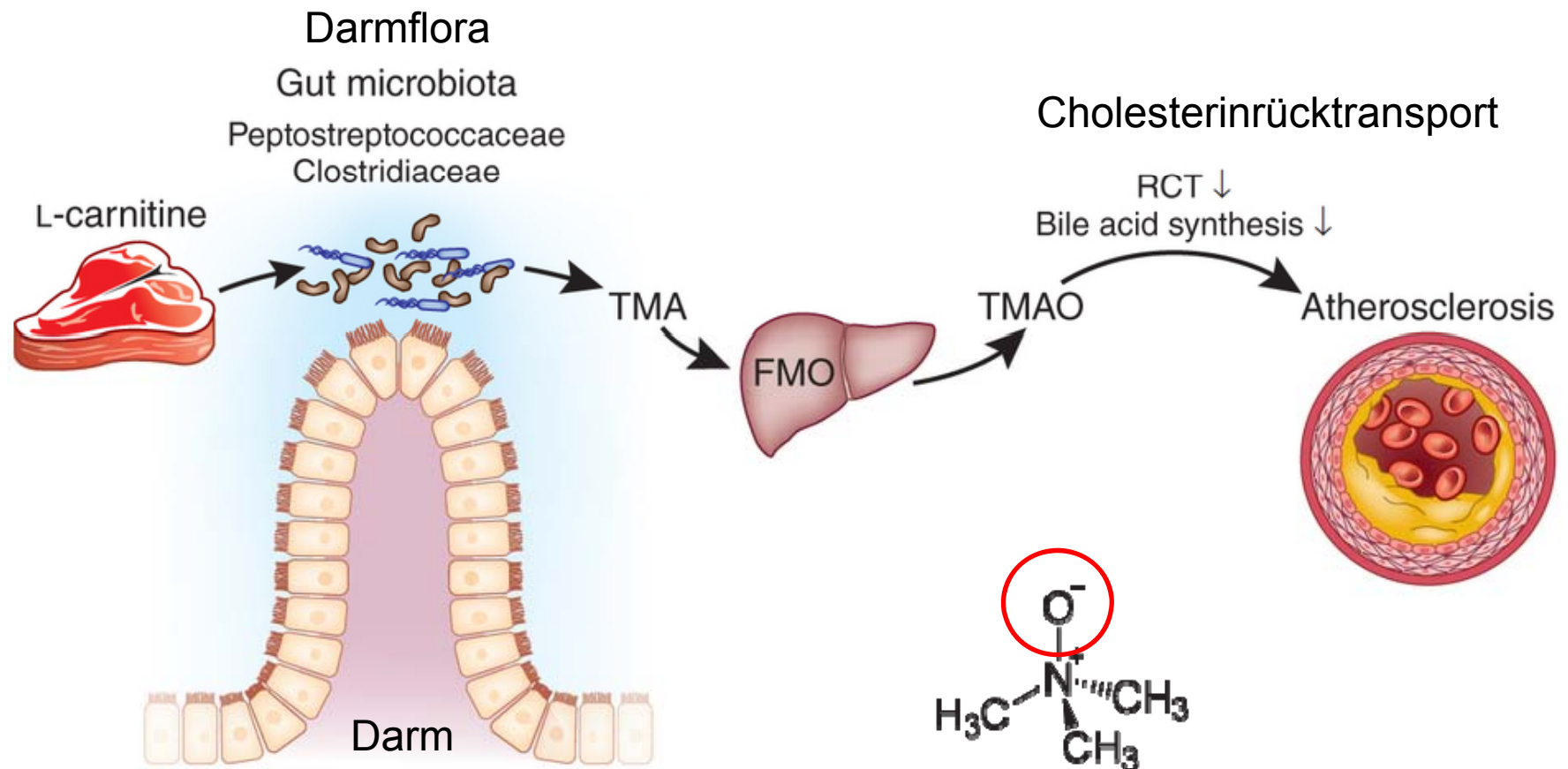
Curr Atheroscler Rep. 2012 Dec;14(6):515-24; Public Health Nutr. 2012 Dec;15(12):2287-94; Circulation. 2010 Jun 1;121(21):2271-83

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TMA: Trimethylamine  
 FMOs: Flavin-containing MonoOxygenase  
 TMAO: Trimethylamin-N-oxid:

Nat Med. 2013 May;19(5):576-85

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# Konsum von rotem und verarbeitetem Fleisch und Herz-Kreislauf-Mortalität



	<b>Red meat*</b>	<b>Processed meat*</b>
NIH-AARP men	1.27 (1.20-1.35)	1.09 (1.03-1.15)
NIH-AARP women	1.50 (1.37-1.65)	1.38 (1.26-1.51)
„Harvard“ cohorts	1.18 (1.13-1.23)	1.21 (1.13-1.31)
Iowa Women's Health study	1.44 (1.06-1.94)	
NHANES III	1.69 (0.84-3.43)	0.86 (0.59-1.26)
EPIC	1.09 (1.00-1.18)	1.30 (1.17-1.45)
OXCHECK	0.55 (0.31-0.99)	1.28 (0.46-3.54)
Asian cohorts men ( <i>meta</i> )	0.87 (0.78-0.98)	
<u>Asian cohorts women</u>	<u>1.03 (0.85-1.25)</u>	

\* Comparing top with bottom intake category or per 100 g (red) or per 50 g (processed) serving

# Mediterranean diet and mortality in Switzerland: an alpine paradox?

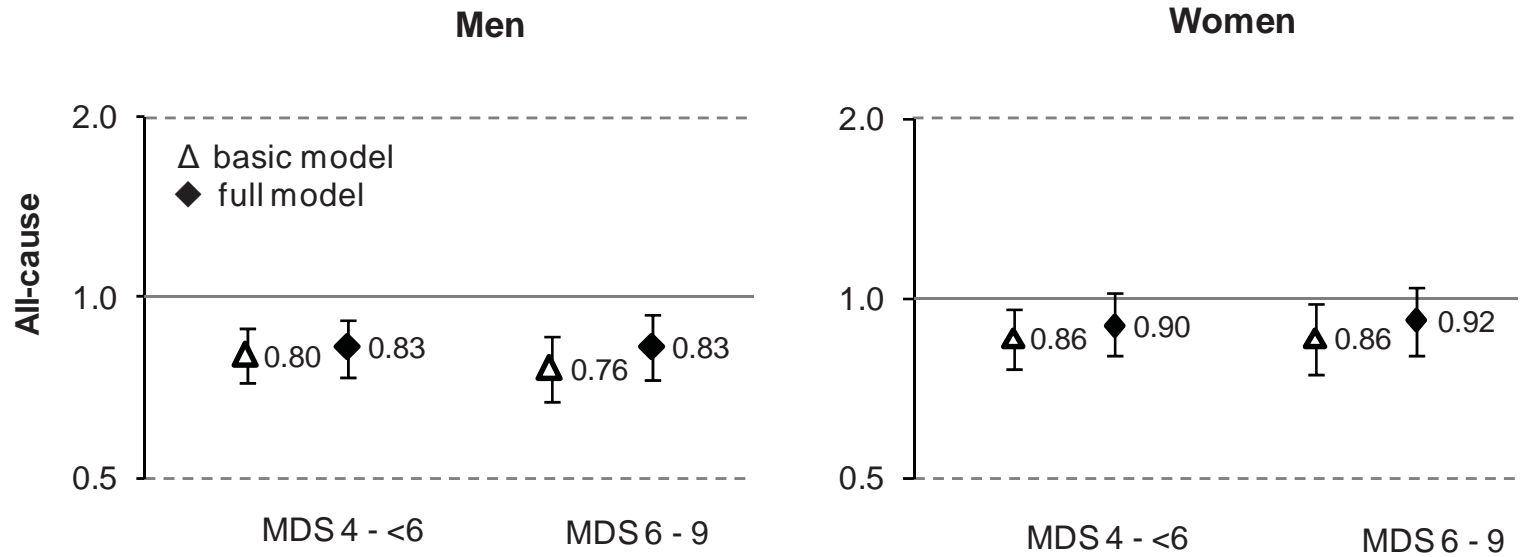
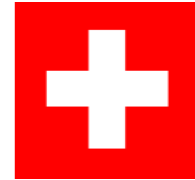
Kerstin Vormund · Julia Braun · Sabine Rohrmann ·  
Matthias Bopp · Peter Ballmer · David Faeh

Received: 13 October 2013 / Accepted: 27 March 2014  
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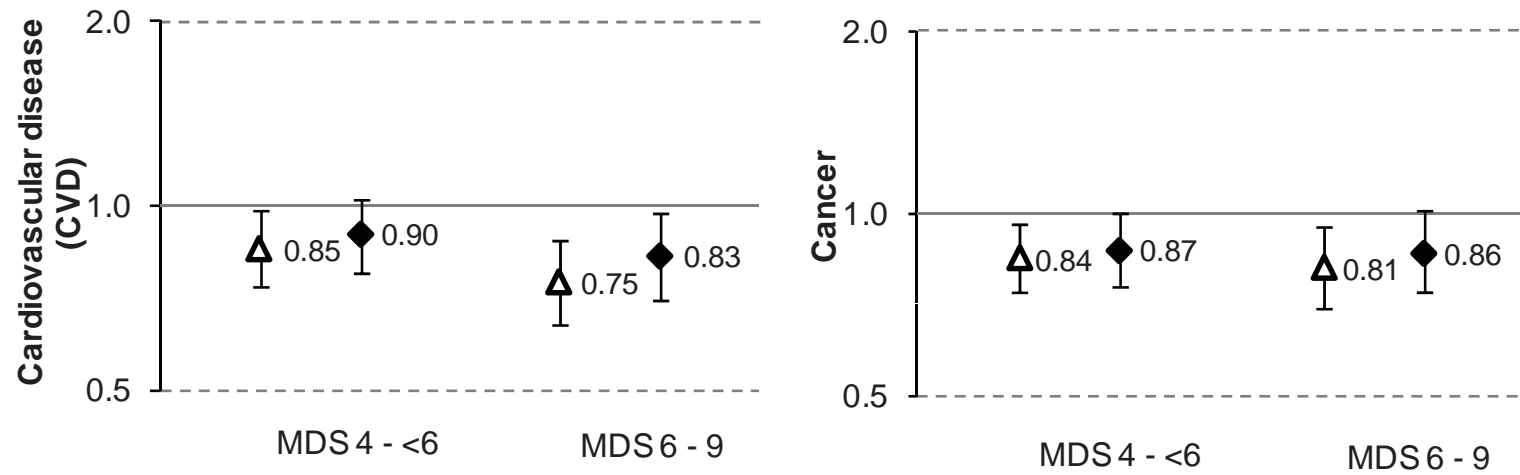
## Abstract

*Purpose* Reports on the protective effect of a Mediterranean diet on mortality usually refer to populations from Mediterranean countries, leaving uncertain whether really diet is the fundamental cause. Our aim was to examine the effect of a Mediterranean diet on mortality in Switzerland,

*Results* In all language regions, MDS was inversely associated with mortality. Consumption of dairy products was also consistently associated with lower mortality. When categorizing dairy food consumption as beneficial instead of harmful, this association between MDS and mortality increased in strength and was partly statistically



**Both sexes combined (by cause of death)**



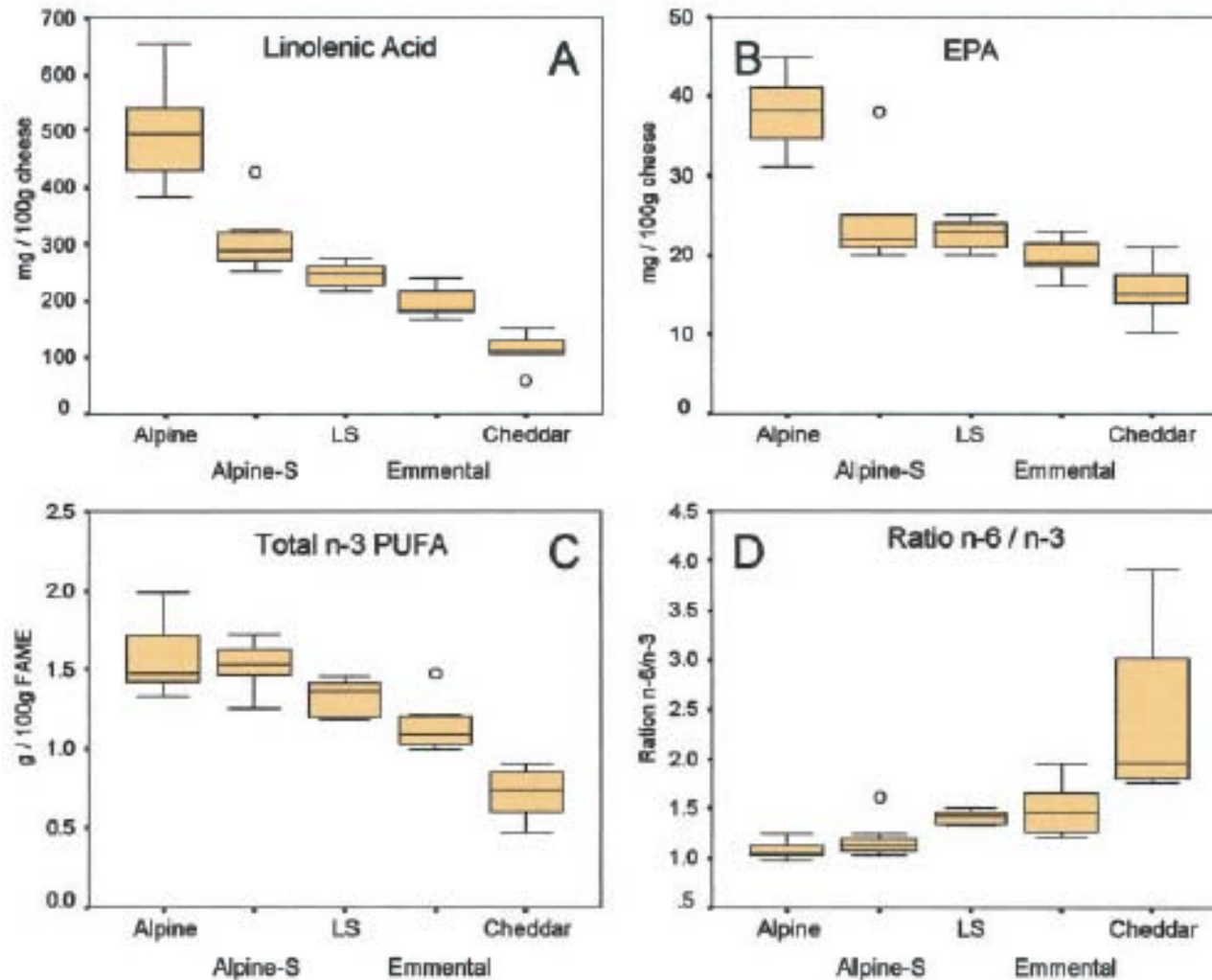


# Konsum von Milchprodukten: Gesamtsterberisiko



	All
	HR (95% CI)
<b>All cause</b>	
Basic model	
Milk products in general	<b>0.82 (0.75-0.91)</b>
Whole milk products	<b>0.84 (0.76-0.92)</b>
Low-fat milk products	<b>0.78 (0.70-0.87)</b>
Full model	
Milk products in general	<b>0.88 (0.80-0.96)</b>
Whole milk products	<b>0.89 (0.80-0.98)</b>
Low-fat milk products	<b>0.84 (0.76-0.94)</b>

# Fettsäure-Zusammensetzung von Käsen



Circulation. 2004;109:103-107

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# Salz



- Traditionell kein Element der Mediterranen Ernährungsweise
- Salzreduktion bewirkt eine Reduktion des Blutdrucks
  - Reduktion des Hirnschlag/Herzinfarkt-Risikos?
- Salz beeinflusst auch das Essverhalten
- BAG Strategie: Salzreduktion im Brot
- Jod-Zufuhr?  $K^+$ -Erhöhung sinnvoller?

N Engl J Med 2014; 371:601-679

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# Alkohol, moderater Konsum

- Gefässerweiternd:
  - Thermogenese
- Beeinflusst Blutfette und Blutzucker/Insulin günstig. Blutdruck abhängig von Menge
- Senkt Risiko für Herzinfarkt (und Diabetes?)
- Alkohol-Energie bei regelmässigem aber mässigem Konsum schlechter nutzbar?



Crit Rev Clin Lab Sci. 2005;42(3):197-227.; Nutr Metab Cardiovasc Dis. 2013 Jun;23(6):487-504;  
Mayo Clin Proc. 2014 Mar;89(3):382-93

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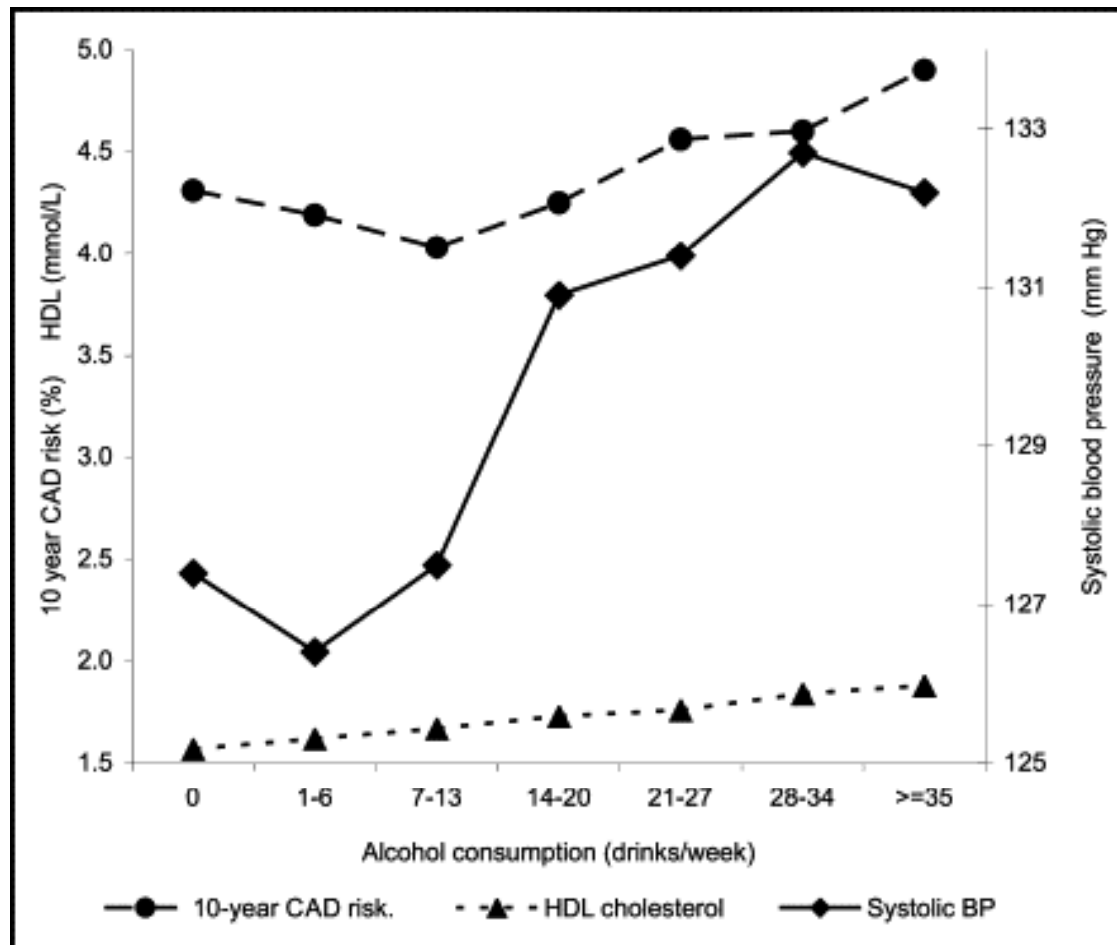
Sterberisiko, das mit der Mediterranen Ernährungsweise (ME) assoziiert ist: Was bleibt nach Abzug einzelner ME-Komponenten?

Variable	Relatives Sterberisiko	P-Wert	Reduktion des Effektes (%)
ME gesamt	0.864	<0.001	0
ME minus Gemüse	0.886	0.002	16.2
ME minus Hülsenfrüchte	0.877	<0.001	9.7
ME minus Früchte und Nüsse	0.879	0.001	11.2
ME minus Nahrungsfasern	0.872	<0.001	6.1
ME minus einfach ungesättigte / gesättigte Fettsäuren (Quotient)	0.878	0.003	10.6
ME minus Verzicht auf Milchprodukte	0.870	<0.001	4.5
ME minus Verzicht auf Fleisch / -produkte	0.887	0.001	16.6
<b>ME minus Alkohol</b>	<b>0.896</b>	<b>0.002</b>	<b>23.5</b>

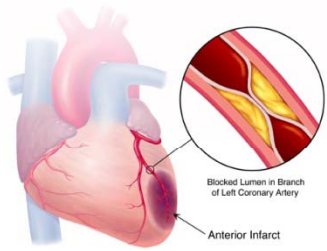




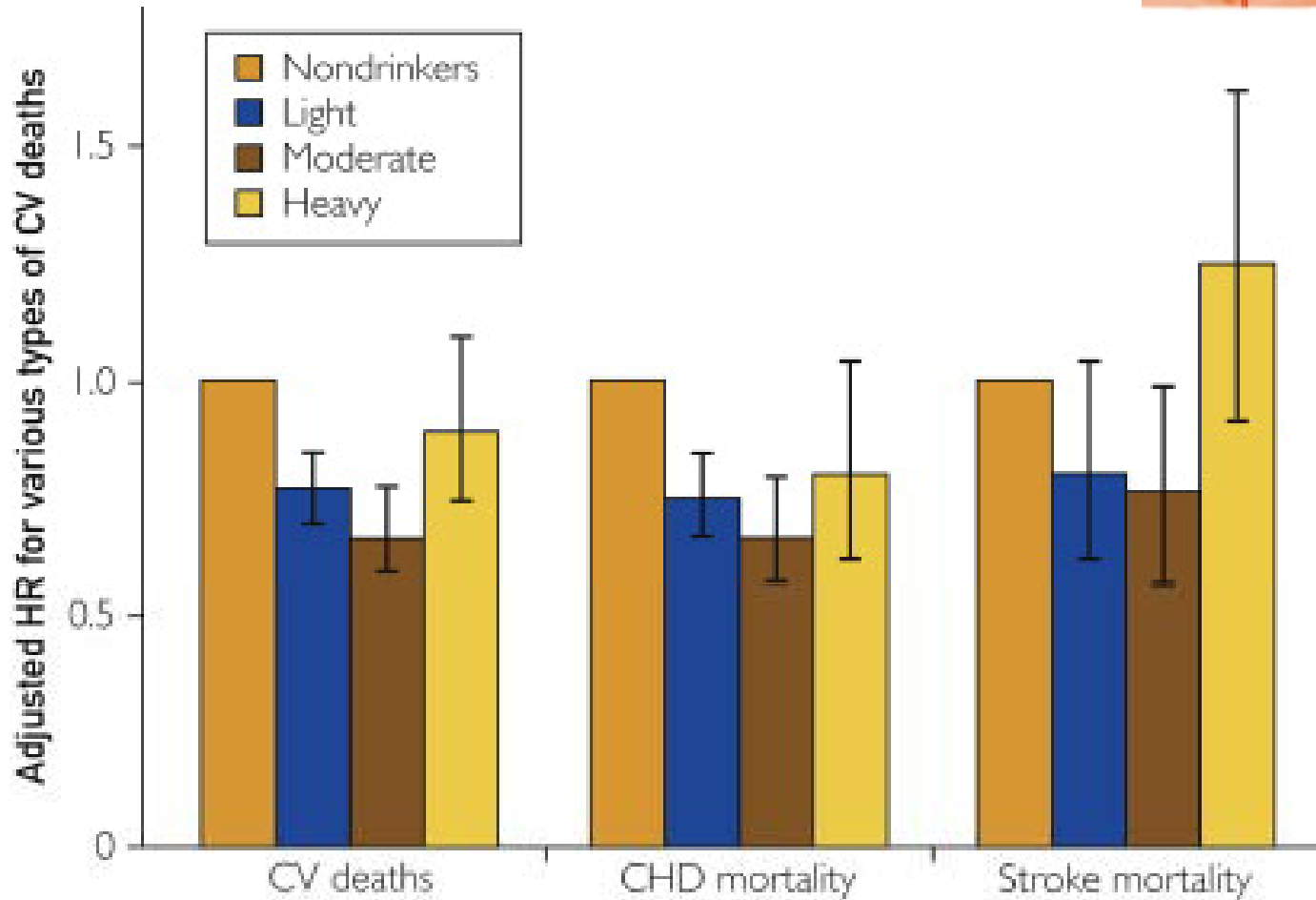
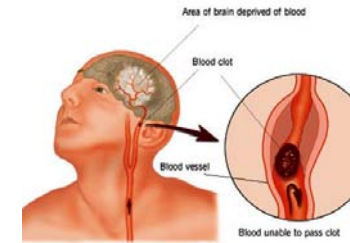
# Zusammenhang Alkoholkonsum und Herz-Kreislauf-Risiko, Lausanne



HDL cholesterol, systolic blood pressure (BP), and 10-year CAD risk according to last week alcohol consumption.



# Alkoholkonsum und Herz-Kreislauf-Sterberisiko



Mayo Clin Proc. 2014 Mar;89(3):382-93

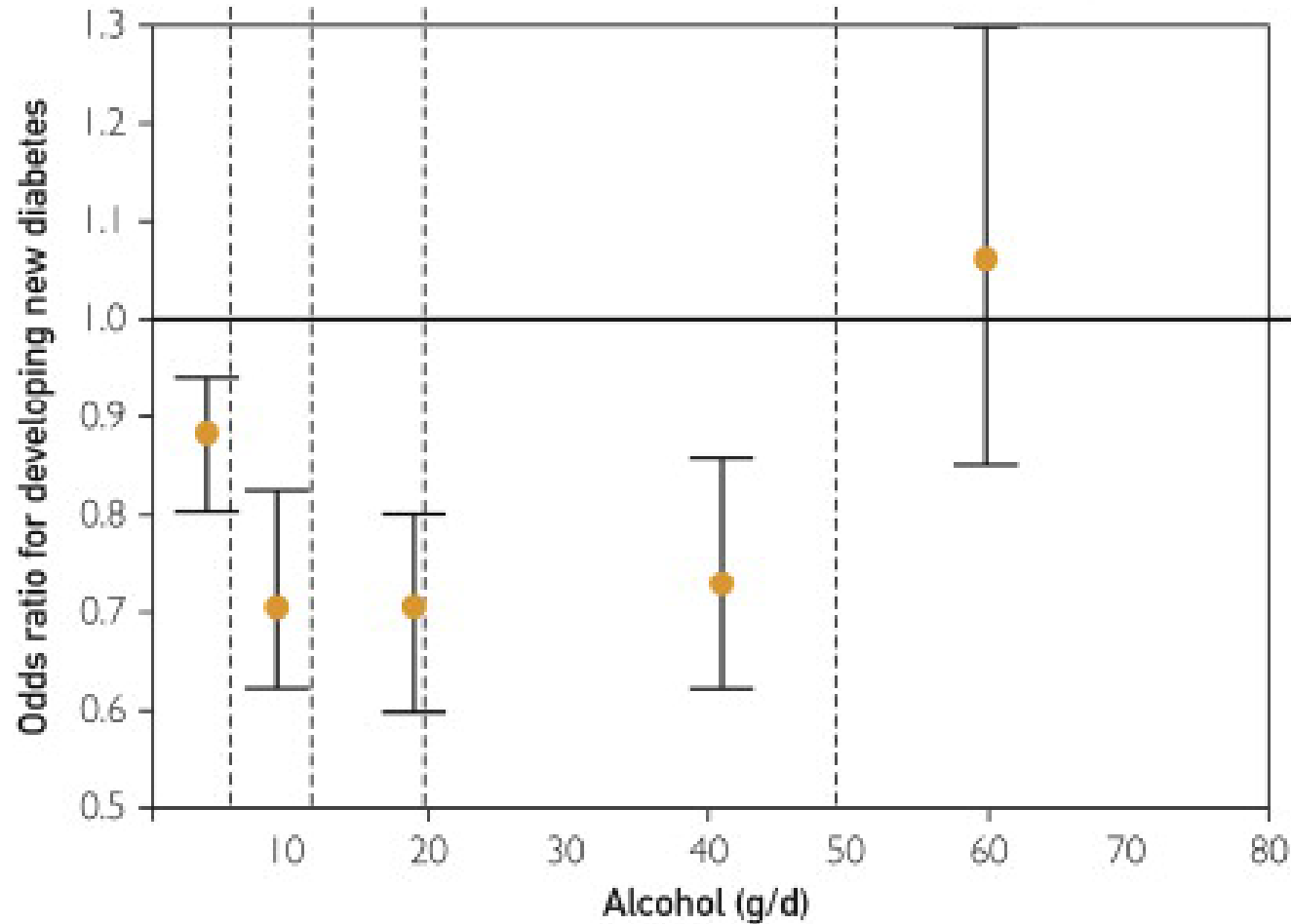
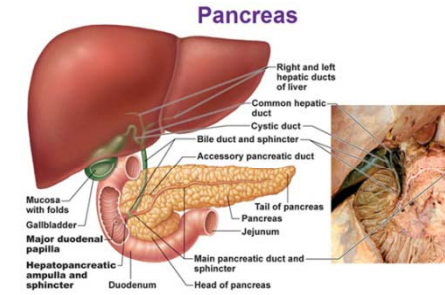
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# Alkoholkonsum und Diabetes-Risiko



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