Rijksinstituut voor Volksgezondheid
en Milieu
*Ministerie van Volksgezondheid,
Welzijn en Sport*

Fruit, vegetables and prevention of cardiovascular diseases

Monique Verschuren

Head Department Life Course and Health,
National Institute for Public Health and the Environment, Bilthoven, the Netherlands

Professor of Healthy Vascular Ageing
Julius Center, University Medical Center Utrecht, the Netherlands

Fruit and vegetables

- Fruit and vegetables (solid)
  - Fruit
    - Nuts
    - Fruit
  - Vegetables
    - Leafy vegetables
    - Fruiting vegetables
    - Root vegetables
    - Cabbages
    - Mushrooms
    - Allium (e.g. onions)
  - Legumes
  - Juices (fruit and vegetables)

European Heart Journal
doi:10.1093/eurheartj/ehw106

2016 European Guidelines on cardiovascular disease prevention in clinical practice

The Sixth Joint Ta ology and Other Societi n Clinical Practice (ies and by invited exp

Recommendation on nutrition

Recommendation	Class [a]	Level [b]	Ref [c]
A healthy diet is recommended as a cornerstone of CVD prevention in all individuals.	I	B	311

CVD = cardiovascular disease.
[a]Class of recommendation.
[b]Level of evidence.
[c]Reference(s) supporting recommendations.

Level of evidence

- Few randomized controlled trials, especially with hard endpoints
- Intervention studies on intermediate endpoints
- Evidence from observational cohort studies
  - Dietary factors are strongly correlated, with each other but also with other life style factors
  - Issues of measurement error
- Second best to RCTs is a meta-analysis of prospective cohort studies

Table 12 Healthy diet characteristics

• Saturated fatty acids to account for <10% of total energy intake, through replacement by polyunsaturated fatty acids.
• Trans unsaturated fatty acids: as little as possible, preferably no intake from processed food, and <1% of total energy intake from natural origin.
• <5 g of salt per day.
• 30–45 g of fibre per day, preferably from wholegrain products.
• ≥200 g of fruit per day (2–3 servings).
• ≥200 g of vegetables per day (2–3 servings).
• Fish 1–2 times per week, one of which to be oily fish.
• 30 grams unsalted nuts per day.
• Consumption of alcoholic beverages should be limited to 2 glasses per day (20 g/d of alcohol) for men and 1 glass per day (10 g/d of alcohol) for women.
• Sugar-sweetened soft drinks and alcoholic beverages consumption must be discouraged.

What's the evidence for a protective effect of fruits and vegetables on cardiovascular diseases?

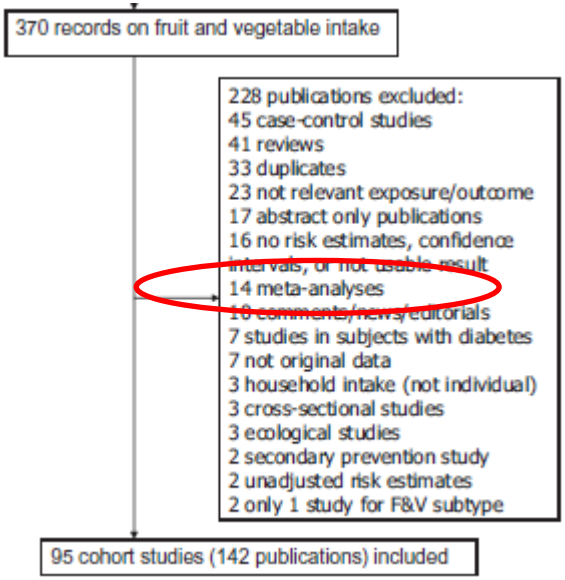
Last year a new very extensive meta analysis has been published

International Journal of Epidemiology, 2017, 1029–1056
doi: 10.1093/ije/dyw319
Advance Access Publication Date: 22 February 2017
Original article

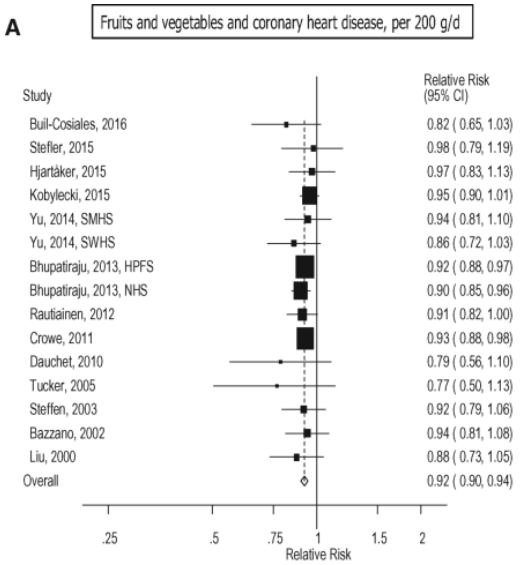
Miscellaneous

Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality—a systematic review and dose-response meta-analysis of prospective studies

Dagfinn Aune[1,2,3]*, Edward Giovannucci[4,5,6], Paolo Boffetta[7], Lars T Fadnes[8], NaNa Keum[5,6], Teresa Norat[2], Darren C Greenwood[9], Elio Riboli[2], Lars J Vatten[1] and Serena Tonstad[10]



Coronary heart disease



Aune D. et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause Int J Epidemiol. 2017;46(3):1029-1056.

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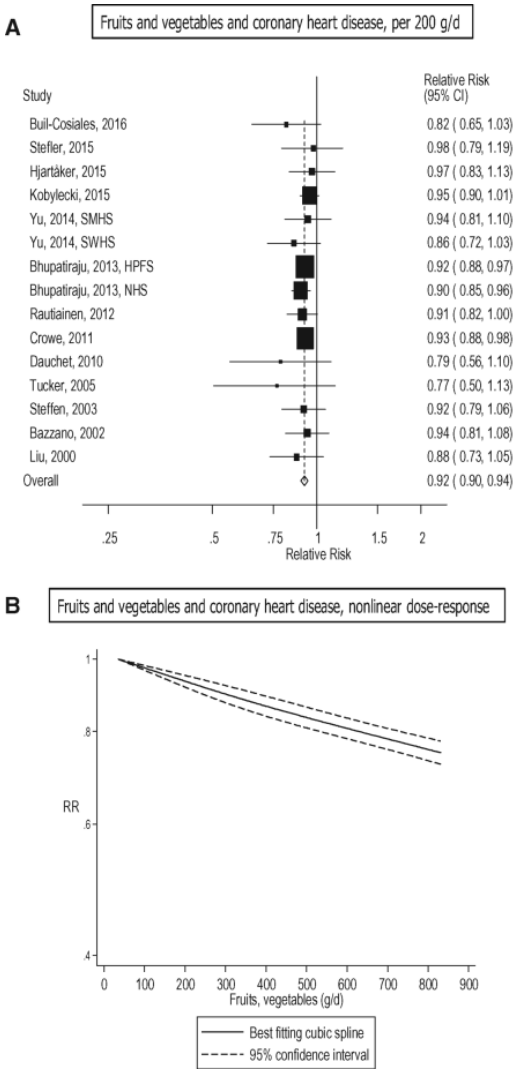

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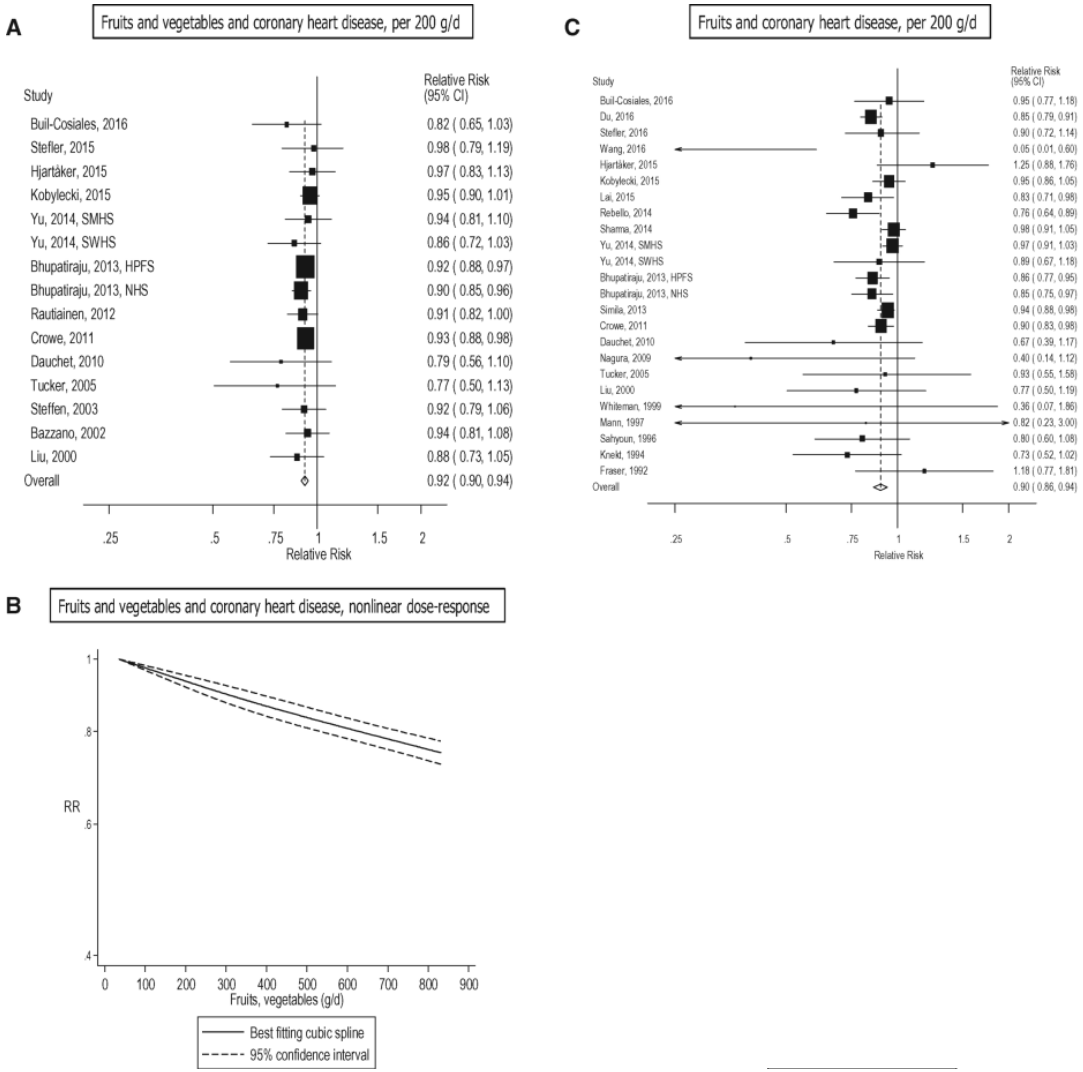

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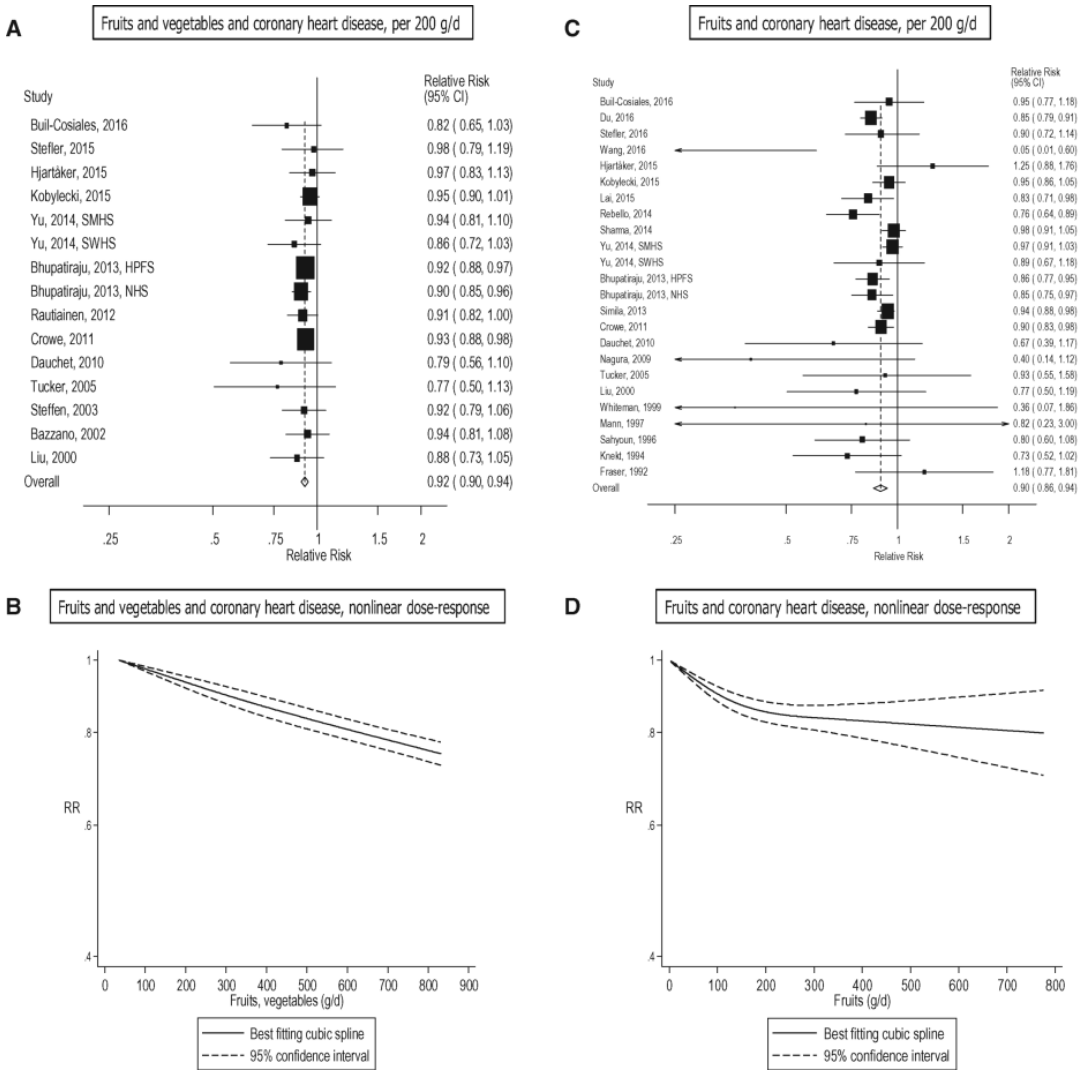

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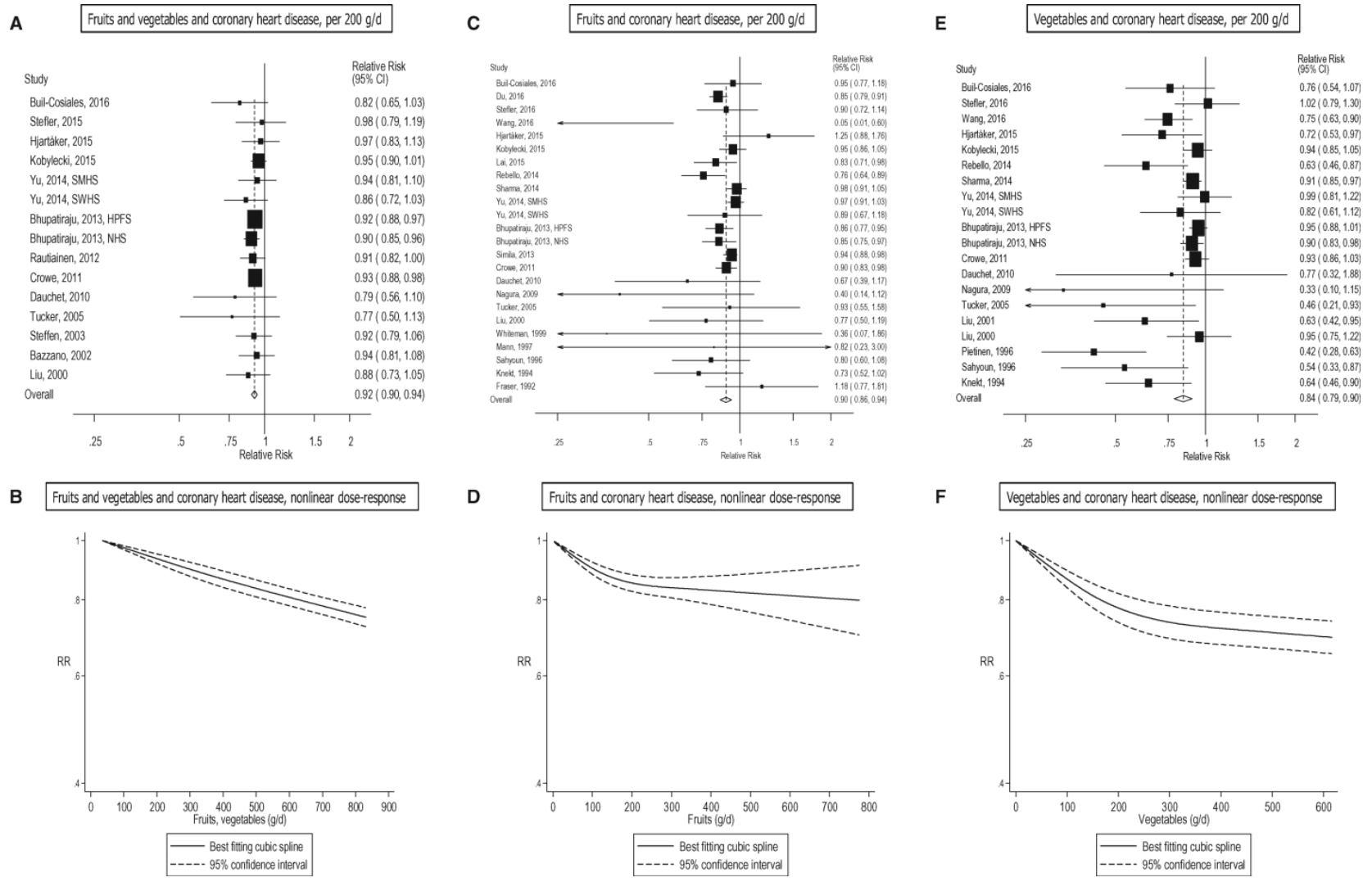

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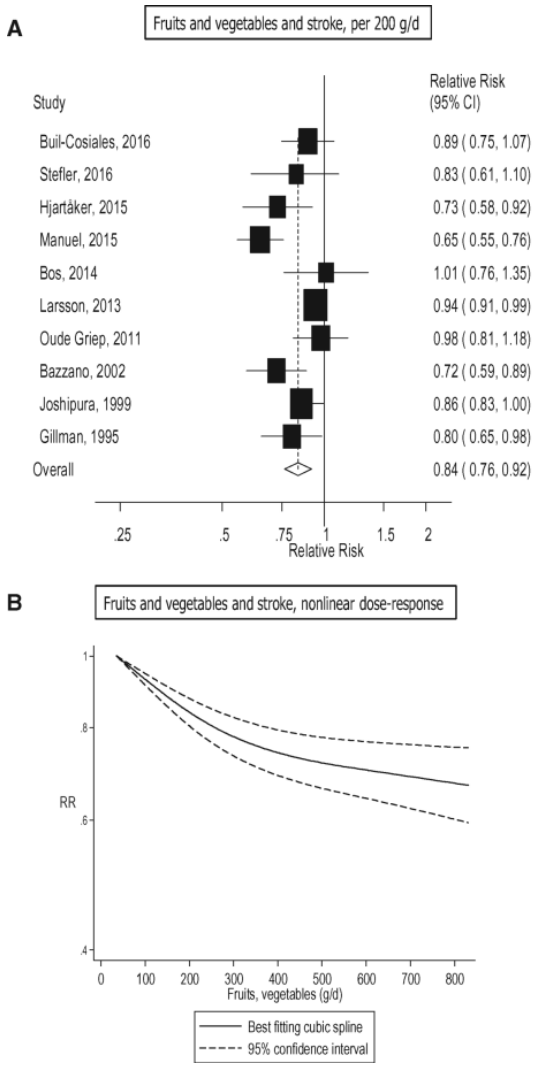

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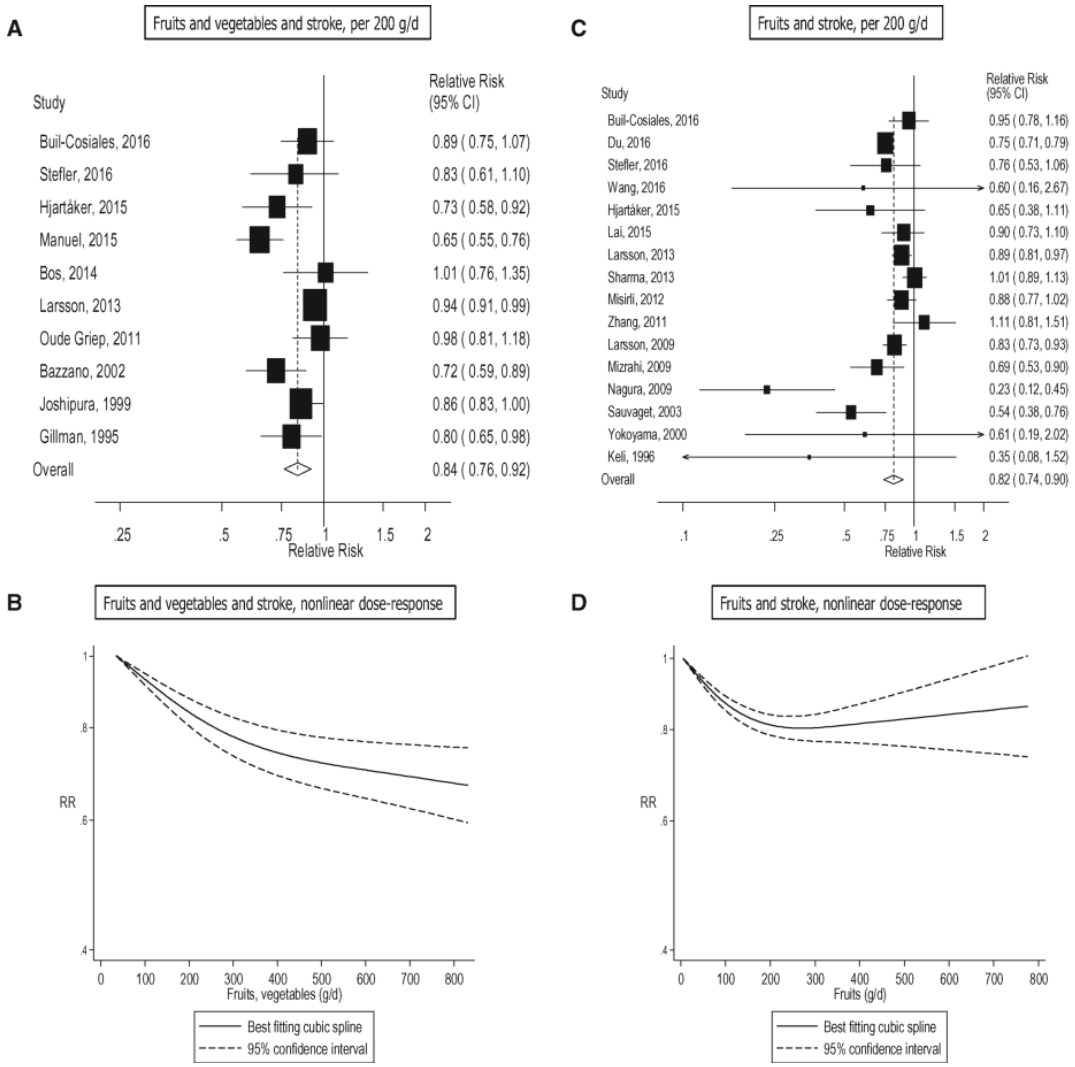

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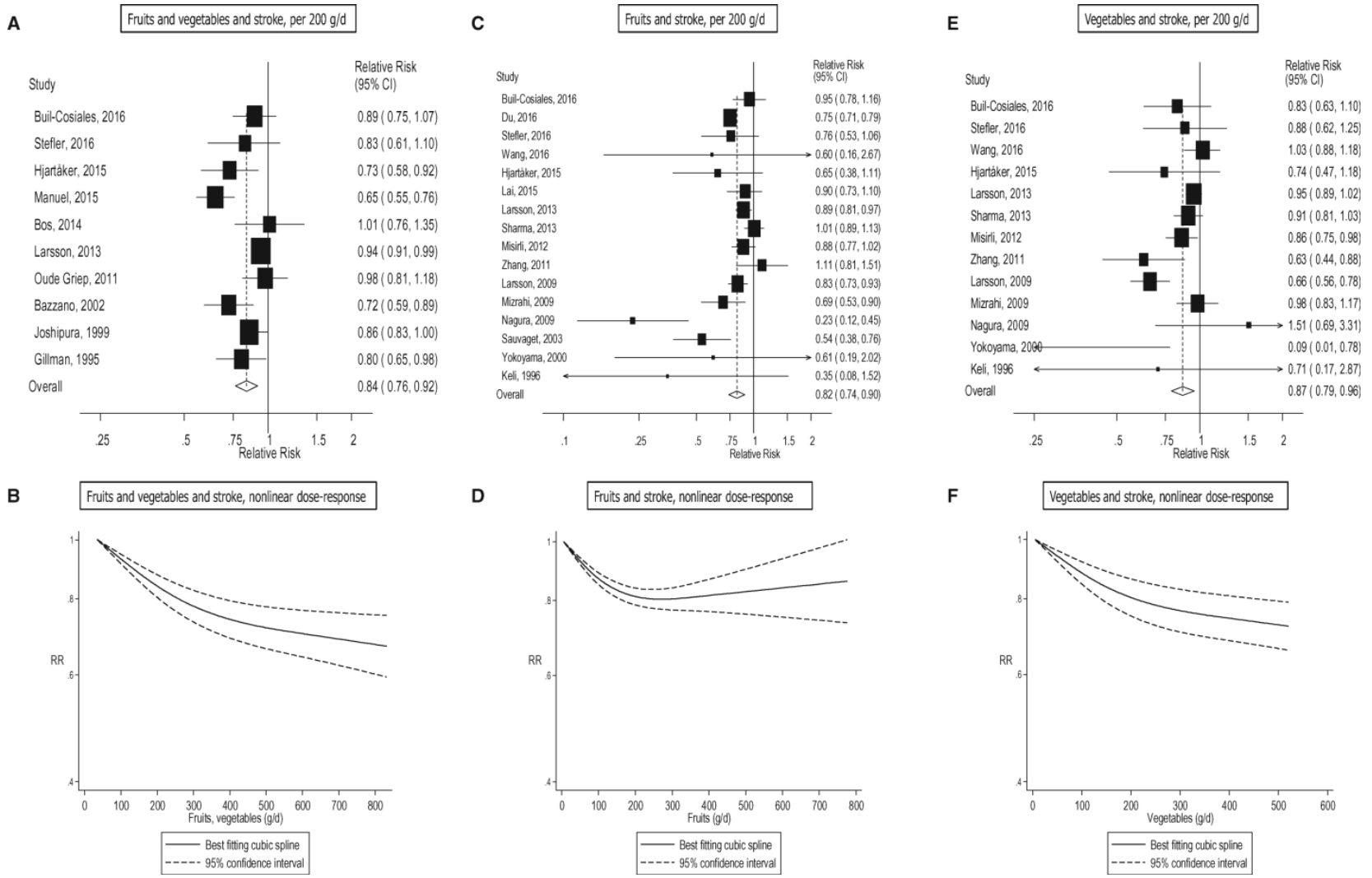

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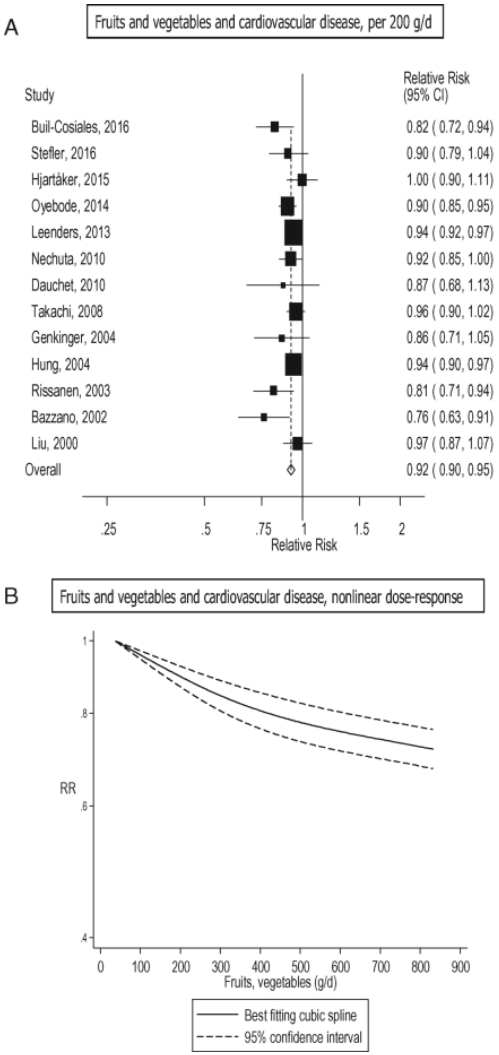
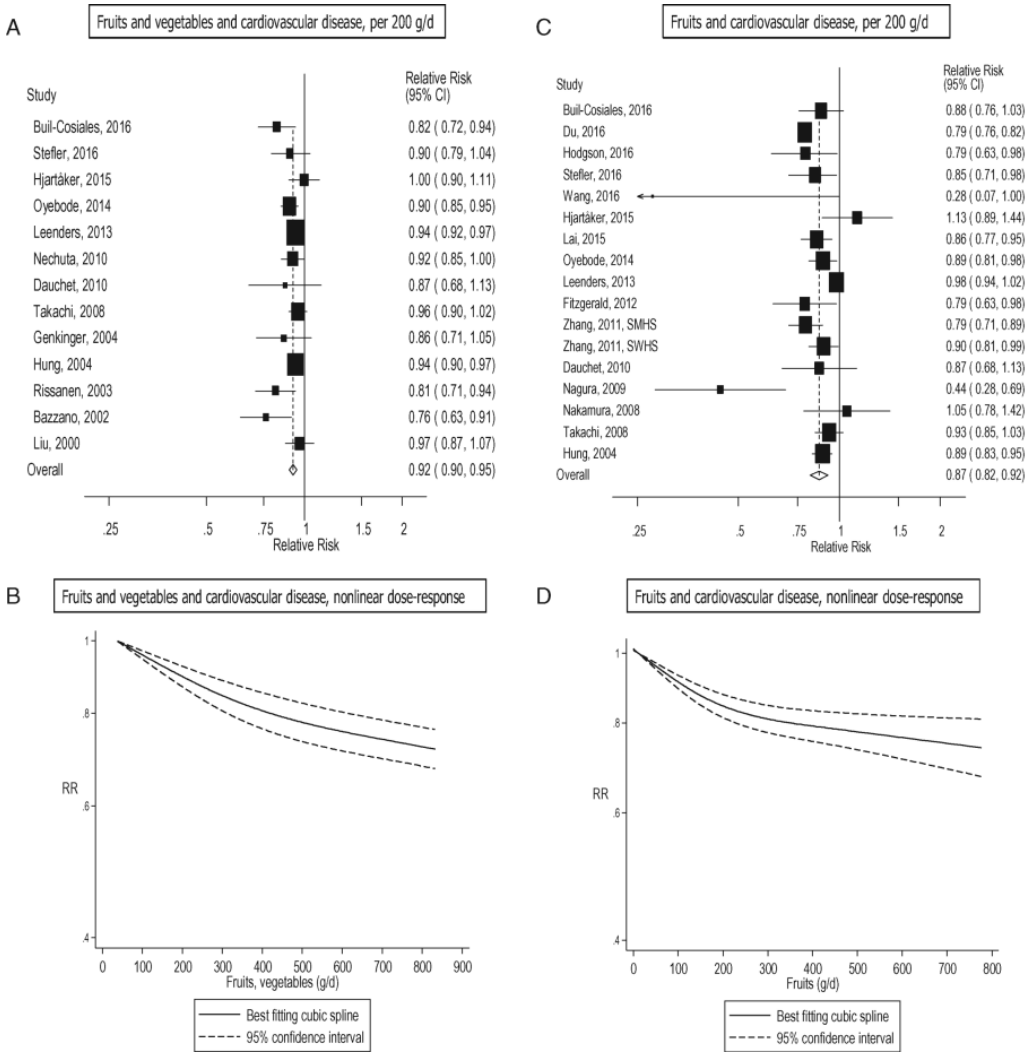
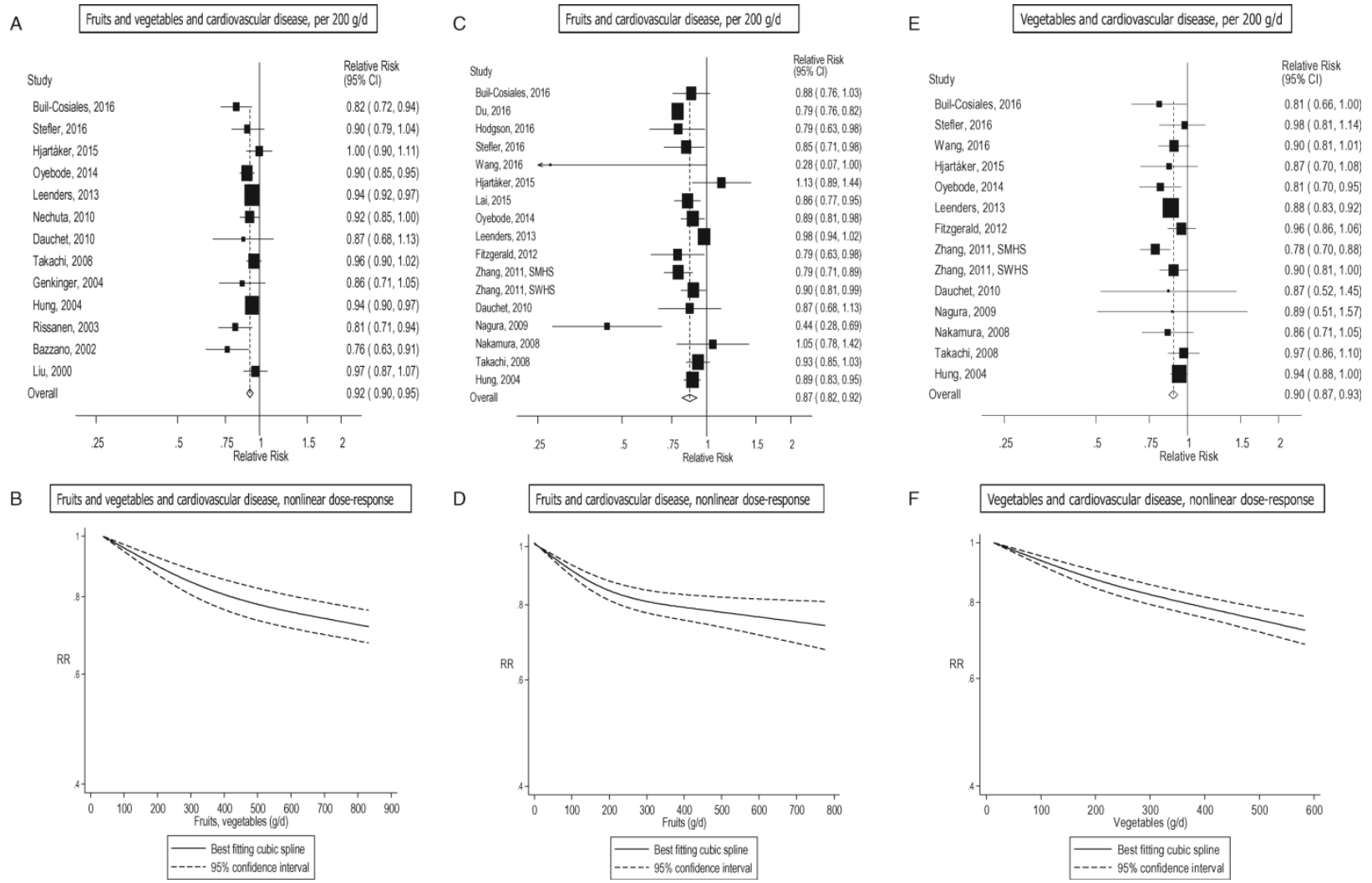
Total cardiovascular disease



Total cardiovascular disease



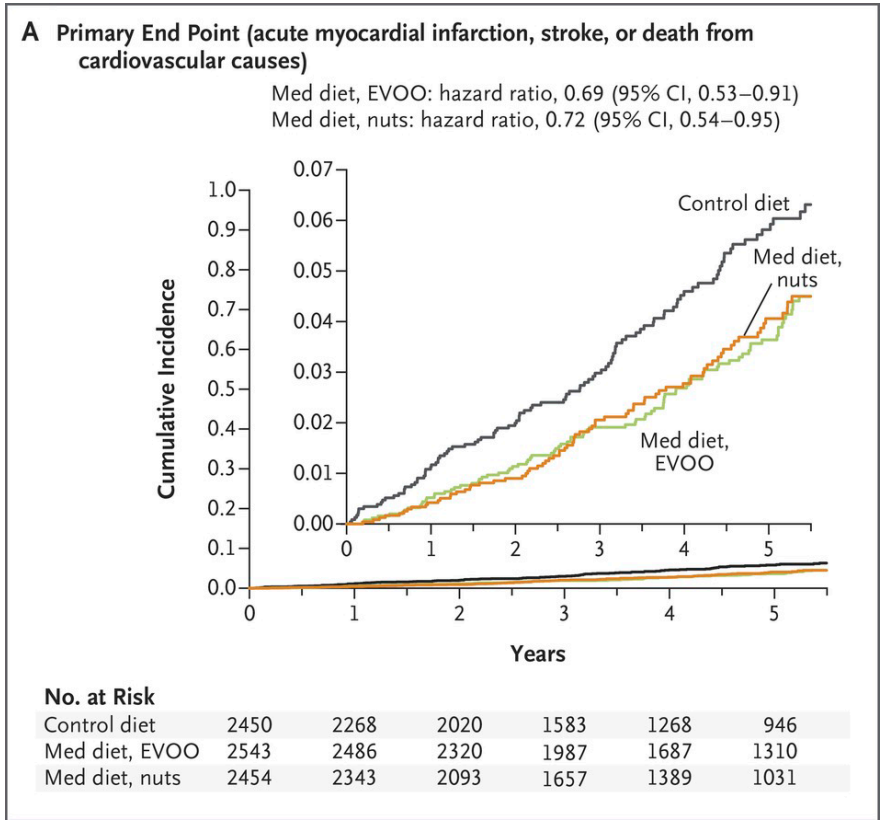
Total cardiovascular disease



Nuts as part of the fruit and vegetable family

Cumulative survival in the PREDIMED Study (primary prevention)

- N = 7447
- 55-80 years of age
- Multi-center Spain
- Mean follow-up 4.8 yr
- 288 events
- Control diet versus
- Olive oil supplement
- Nuts supplement



Estruch et al. NEJM 2018

Mechanism ?

Fuit and vegetables are rich sources of many different micronutrients and bioactive compounds, such as

- Vitamin C
- Carotenoids
- Dietary fiber
- Polyphenols
- Potassium
- …….

Mechanism ?

Fruit and vegetables may be cardioprotective through various pathways:

- Lowering of blood pressure (potassium, fiber)
- Reduction of
  - Inflammation
  - Oxidative stress
  - Endothelial dysfunction
  - Platelet aggregation
- Improve gut microbiome

Mechanism ?

Possibly :

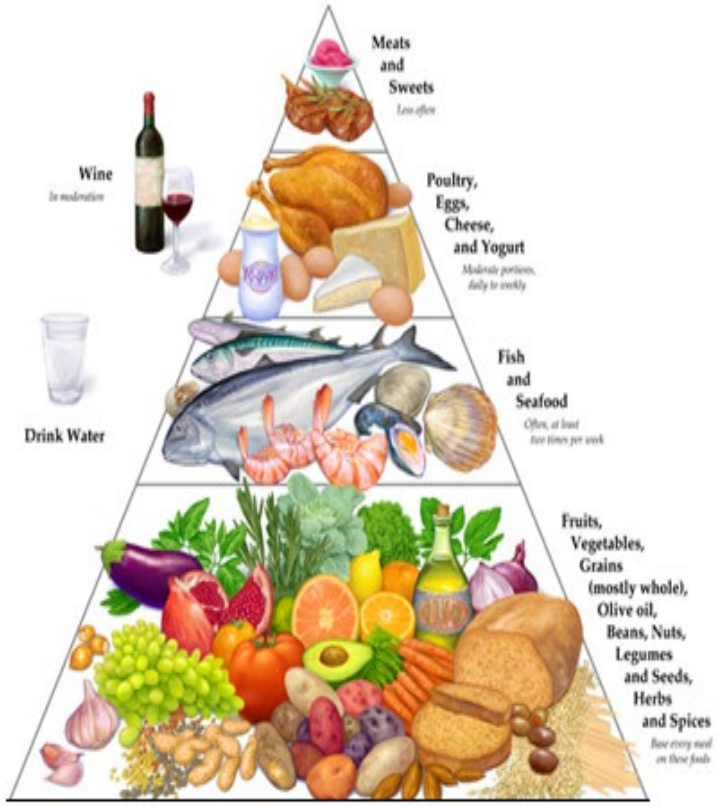
- Prevent development of obesity

- Take the place of unhealthy foods (high in fat,salt,sugar)

There is still a lot to be learned

- On the one hand research has shifted from studying single nutrients to dietary patterns

To translate guidelines to meals:
focus on foods and food patterns Mediterranean type diet



Low in meat (especially red)

Relatively low other animal products; moderate alcohol

Relatively high in fish

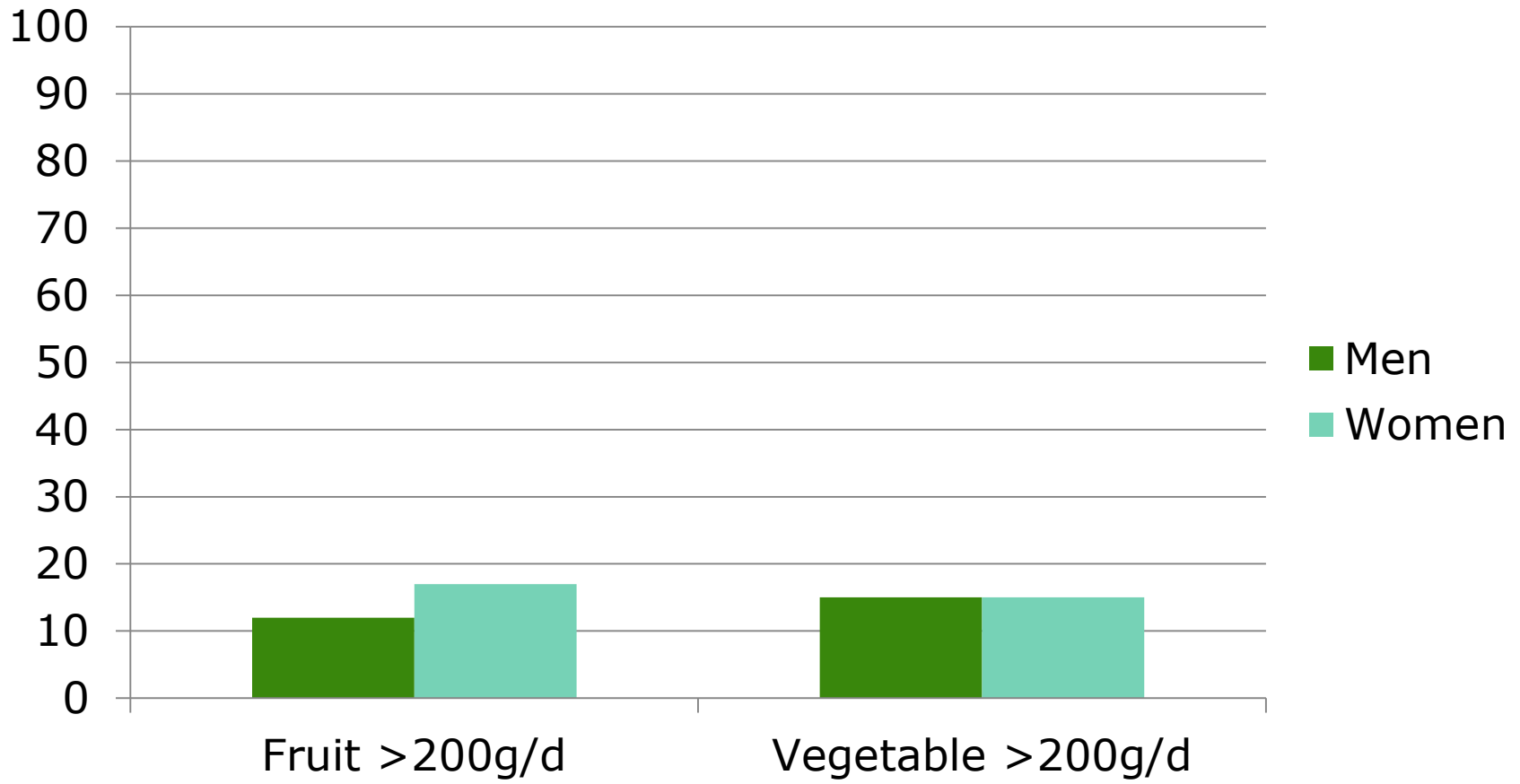
High in plant based foods: fruits, vegetables, whole grain, legumes,

There is still a lot to be learned

- On the other hand, we want to tease out the effects:
  - Which fruit or vegetable has an especially strong impact
  - Which component of a fruit or a vegetable has which mechanistic effect
- What is the effect of processing?
  - Raw of processed foods?
  - Fruits or are juices just as good?
    - › For example the Dutch and US guidelines differ

Ample room for improvement:

Percentage men and women adhering to Guideline - Netherlands



But: there is not one magic bullet

- Components act synergistically
- Eat a plant based diet
- Ample fruits and vegetables
- Up to 800 g/day risk reduction continues:
- Risk reduction at highest intake level is

  24-33% (from F+V,for CHD, stroke and CVD)

Thank you for your attention !