

Nut consumption for the prevention of cardiovascular diseases

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INC XL WORLD NUT AND
DRIED FRUIT CONGRESS
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NUTRITION RESEARCH
SEMINAR

Overview

➤ Background

- Nuts and blood lipids: results from clinical trials
- Nuts and CVD in cohort studies
- Conclusions, key points, and future directions

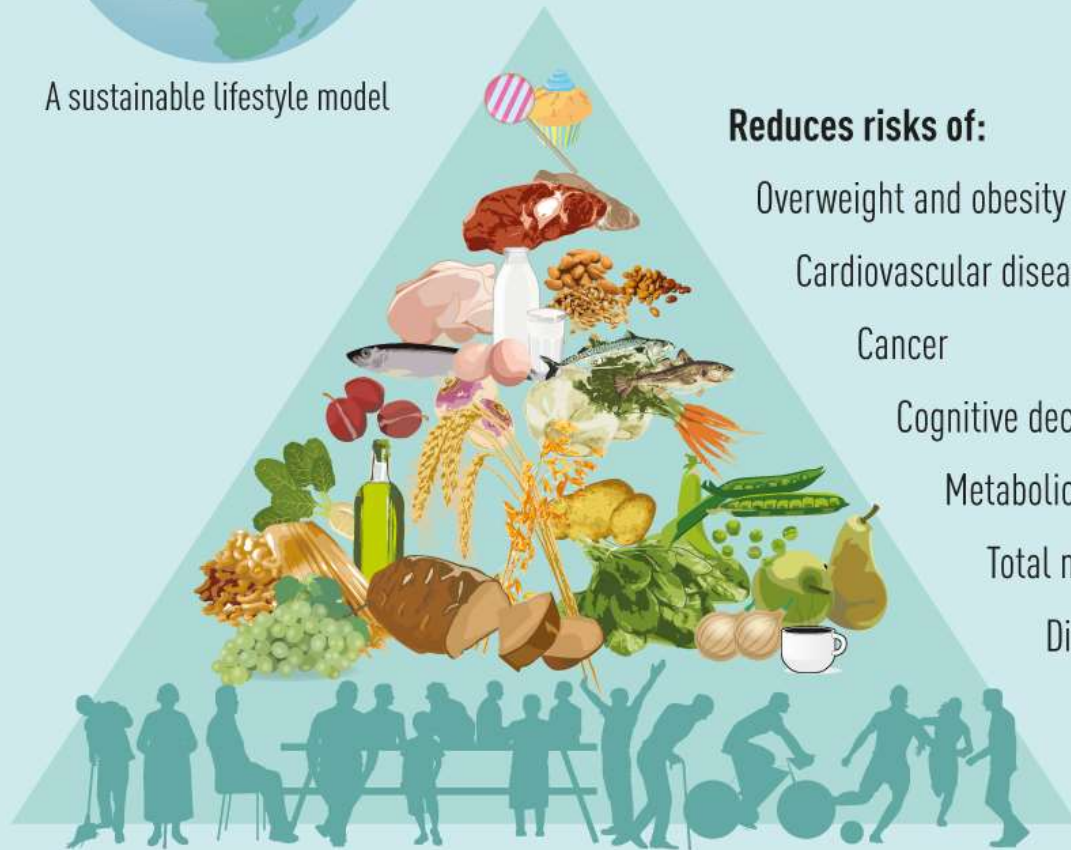
➤ Gaps in knowledge and future directions

- Limitations of current studies and gaps in knowledge
- NUTPOOL project



The mediterranean diet: A healthy diet for humans and the planet

A sustainable lifestyle model



Reduces risks of:

- Overweight and obesity
- Cardiovascular disease
- Cancer
- Cognitive decline
- Metabolic syndrome
- Total mortality
- Diabetes

The JIM Graphical Abstract is a concise visual summary of the main concept of the article. Please read the article for the full story.

Nuts and seeds as a key component of Mediterranean diet and healthy plant-based diets

The mediterranean diet:
A healthy diet for humans and the planet

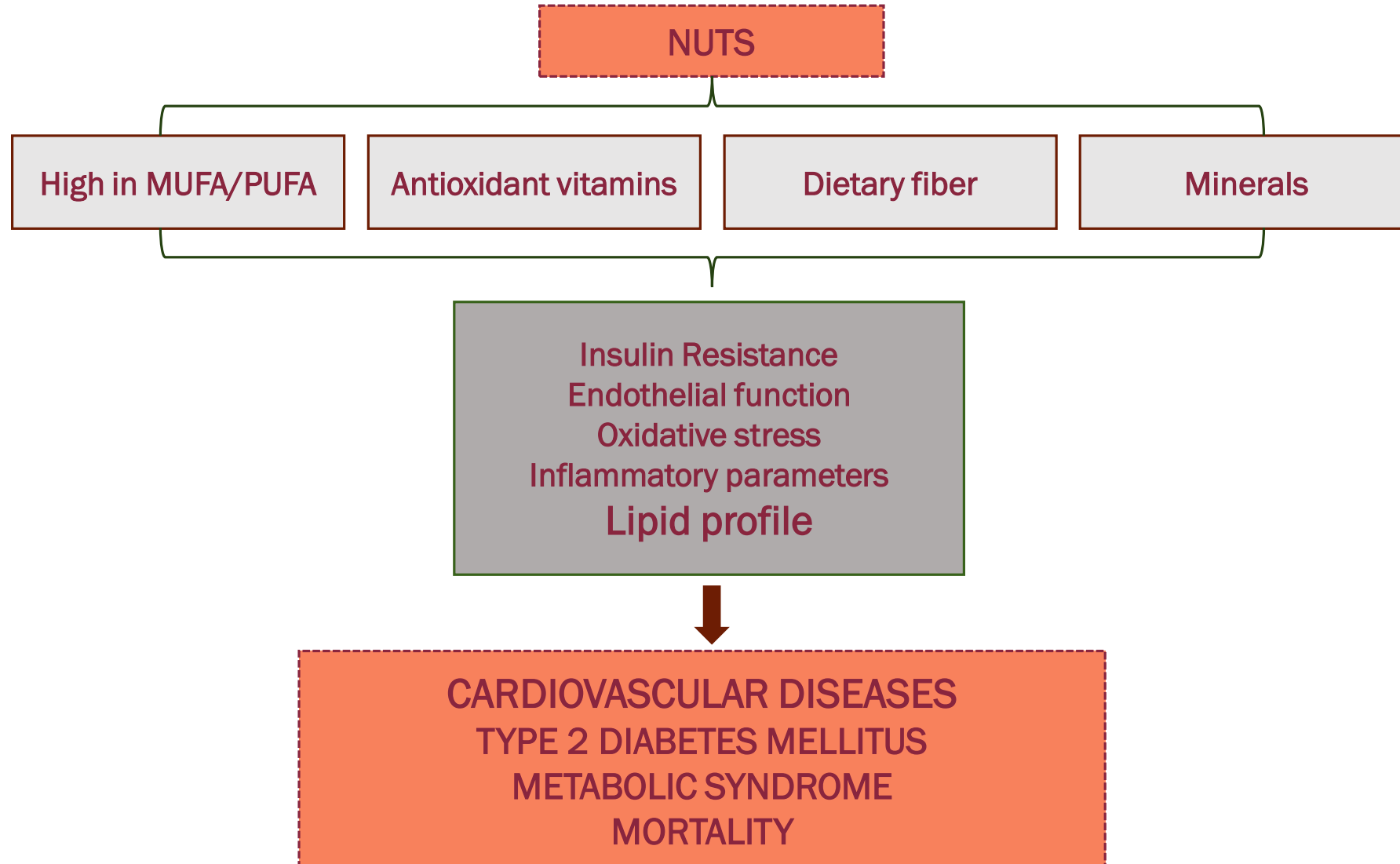
A sustainable lifestyle model

Reduces risks of:
Overweight and obesity

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Beneficial effects of nut consumption

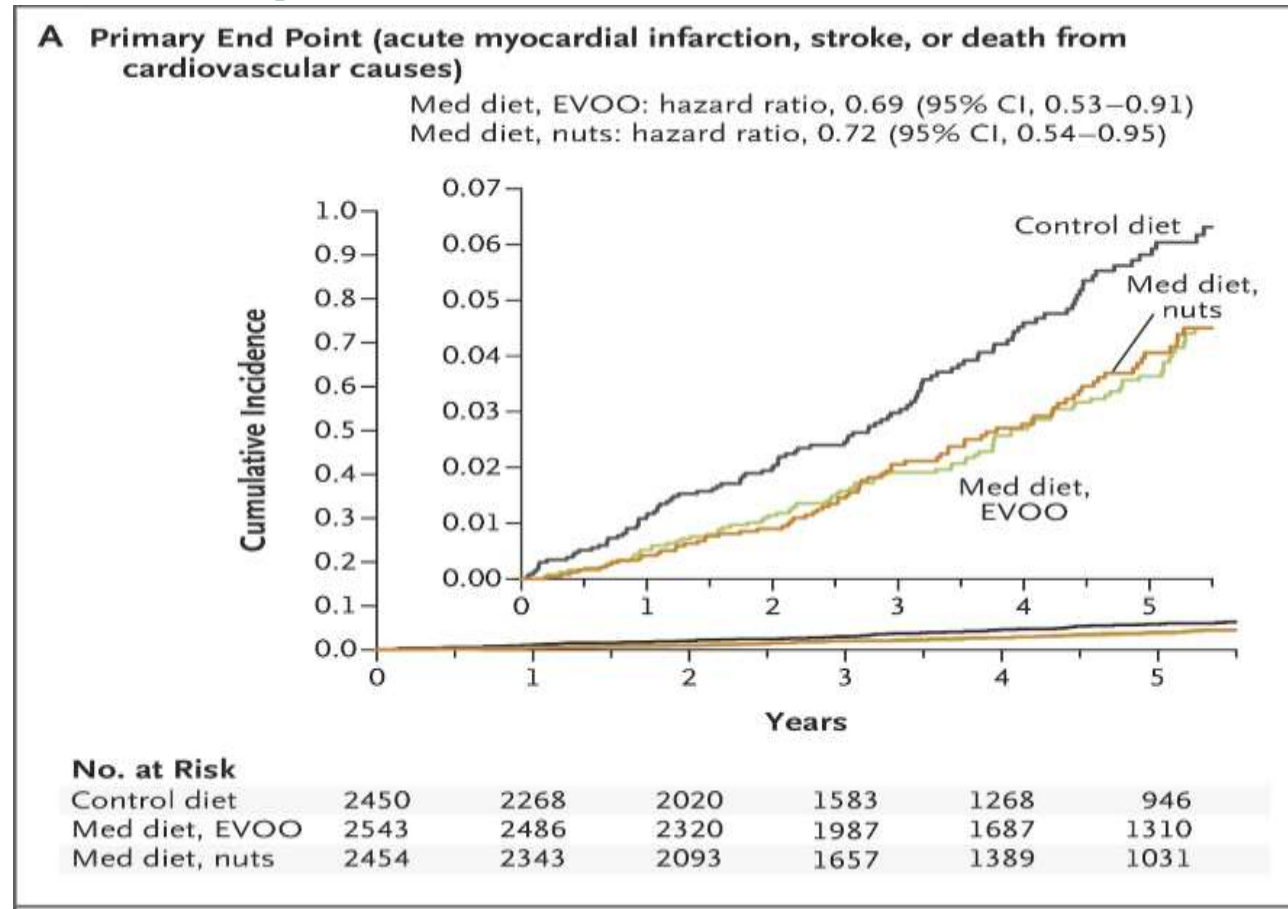


NUTS and blood lipids: updated evidence from RCTs

Outcome	Randomized controlled trials			Nonrandomized trials			All trials		
	Trials, <i>n</i>	WMD (95% CI)	<i>I</i> ²	Trials, <i>n</i>	WMD (95% CI)	<i>I</i> ²	Trials, <i>n</i>	WMD (95% CI)	<i>P</i> value ²
Total cholesterol	38	-3.6 (-4.4, -2.9)	53.8	23	-6.7 (-7.8, -5.6)	76.8	61	-4.7 (-5.3, -4.0)	0.001
LDL cholesterol	38	-4.2 (-5.0, -3.4)	38.2	23	-6.0 (-7.1, -4.9)	62.9	61	-4.8 (-5.5, -4.2)	0.01
HDL cholesterol	38	-0.04 (-0.8, 0.7)	0	22	-0.7 (-1.7, 0.4)	35.9	60	-0.3 (-0.9, 0.4)	0.33
TG	37	-1.6 (-3.5, 0.24)	0	22	-4.6 (-8.4, -0.8)	0	59	-2.2 (-3.8, -0.5)	0.16
ApoA1	15	-0.8 (-2.1, 0.6)	12.8	8	1.0 (-2.7, 4.7)	0	23	-0.6 (-1.9, 0.7)	0.38
ApoB	13	-4.2 (-5.7, -2.6)	20.3	7	-1.1 (-5.1, 3.0)	0	20	-3.7 (-5.2, -2.3)	0.17

- Tree nut intake lowers total cholesterol, LDL cholesterol, ApoB, and triglycerides.
- Non-linear dose-response between nut intake and total and LDL cholesterol (stronger effects ≥60 g nuts/d)
- The major determinant of cholesterol lowering appears to be nut dose rather than nut type.

THE PREDIMED: largest trial demonstrating the benefits of mixed nuts on CVD prevention

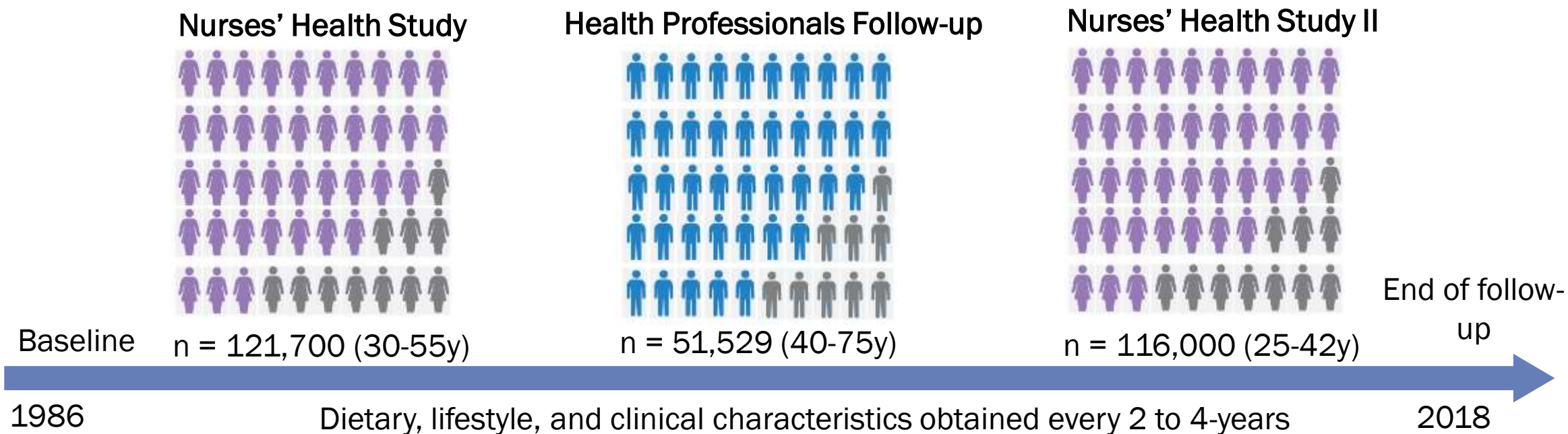


↓ 31%
↓ 28%

Follow-up: 4.8y
 Total CVD cases:
 96 in EVOO
 83 in nuts
 109 in control

- The incidence of major **cardiovascular events was lower** among those assigned to a **Mediterranean diet** supplemented with extra-virgin olive oil or nuts than among those assigned to a reduced-fat diet.

Study design, participants, methods



Diet



CVD outcomes



Covariates



Statistical Analysis



Food frequency questionnaire – nut intake

SWEETS, BAKED GOODS, MISCELLANEOUS		Never, or less than once per month	1–3 per month	1 per week	2–4 per week	5–6 per week	1 per day	2–3 per day	4–5 per day	6+		
Milk chocolate (bar or pack), e.g., Hershey's, M&M's		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	P
Dark chocolate, e.g., Hershey's Dark or Dove Dark		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	a
Candy bars, e.g., Snickers, Milky Way, Reeses		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	b
Candy without chocolate (1 oz.)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	c
Cookies (1)	Fat free or reduced fat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	A
	Other ready made	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
	Home baked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Brownies (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Doughnuts (1)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Cake, homemade or ready made (slice)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Pie, homemade or ready made (slice)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Jams, jellies, preserves, syrup, or honey (1 Tbs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Peanut butter (1 Tbs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Popcorn (3 cups)	Fat free or light	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
	Regular	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Sweet roll, coffee cake or other pastry (serving)	Fat free or reduced fat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
	Other ready made	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
	Home baked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Pretzels (1 small bag or serving)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Peanuts (small packet or 1 oz.)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Walnuts (1 oz.)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Other nuts (small packet or 1 oz.)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Oat bran, added to food (1 Tbs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Other bran, added to food (1 Tbs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Chowder or cream soup (1 cup)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Ketchup or red chili sauce (1 Tbs)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Splenda (1 packet)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/> W	<input type="radio"/>	<input type="radio"/>	<input type="radio"/> D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	0

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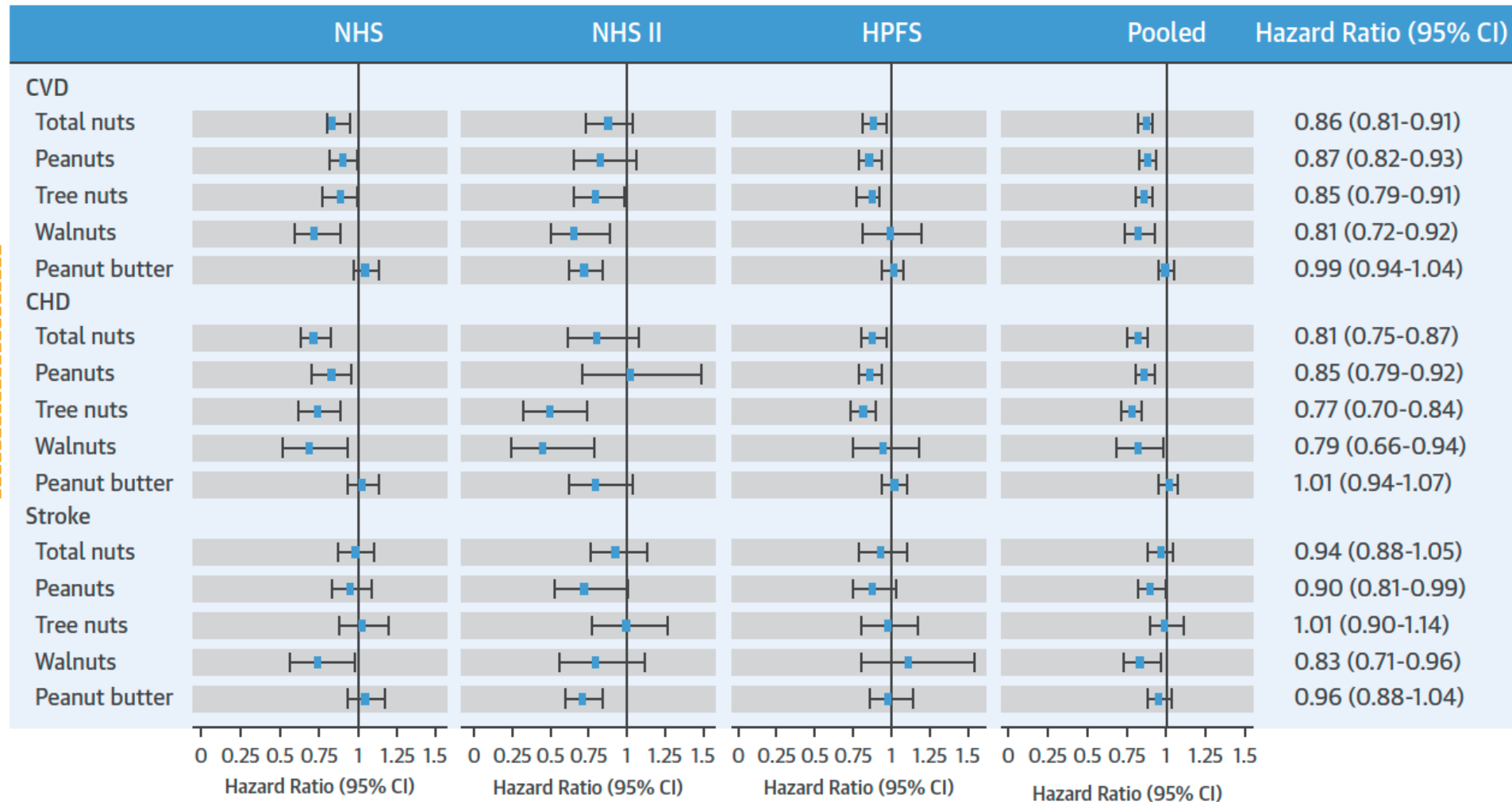
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Nut intake is associated with lower risk of CVD

N of participants: 210,836

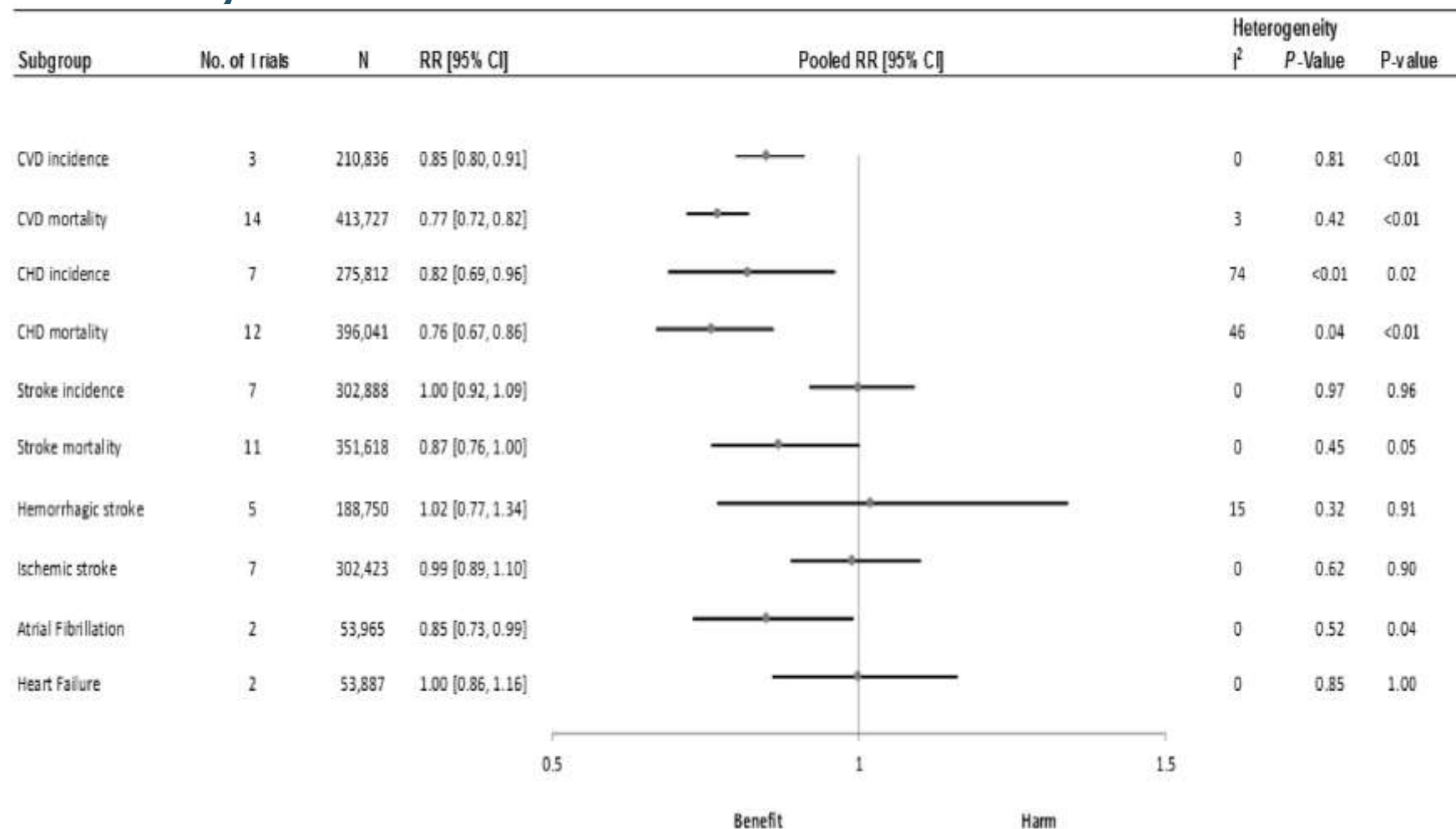
Cases: 14,136

Follow-up: 32 years



↓ 23-13%
nuts ≥ 2
times/week
vs never

Meta-analysis of nut intake and CVD



- Nut consumption is associated with a lower incidence of, and mortality from, different CVD outcomes in prospective cohort studies.

Conclusions and key points

- The intake of total nuts and specific types of nuts improves blood lipid profiles and other cardiovascular risk factors in clinical trials.
- The intake of total nuts and specific types of nuts has been associated with a lower risk of cardiovascular diseases in prospective cohort studies.

Gaps in knowledge

- Results have been controversial for some health outcomes, for example type 2 diabetes
- Outcomes related to neurodegenerative diseases
- Heterogeneity in study designs, approaches, covariables in the models, population included (inclusion and exclusion criteria)
- Types of nuts included
- Lack of data in other regions such as Asia or India – limiting the generalizability of the results
- Stratification, if certain people would benefit most from consuming nuts for particular outcomes

Future directions in nuts research – NUTPOOL

- **AIM:** To conduct an individual participant data (IPD) meta-analysis pooling results of worldwide representative large prospective cohort studies on the associations of total and specific types of nut consumption and risk of chronic diseases, namely type 2 diabetes, cardiovascular diseases, cancer, neurodegenerative diseases and mortality



EXPOSURE: Total nuts, tree nuts, specific types of nuts



OUTCOMES: Type 2 diabetes, total CVD (CHD and stroke), total and cause-specific mortality, cancer incidence and mortality, neurodegenerative diseases



PARTICIPANTS: 15-20 prospective cohorts worldwide with >1million participants

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Questions & comments?