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ASSOCIATIONS BETWEEN DIETARY PULSES ALONE OR WITH OTHER LEGUMES AND CARDIOMETABOLIC DISEASE OUTCOMES: AN UMBRELLA REVIEW AND UPDATED SYSTEMATIC REVIEW AND META-ANALYSIS OF PROSPECTIVE COHORT STUDIES

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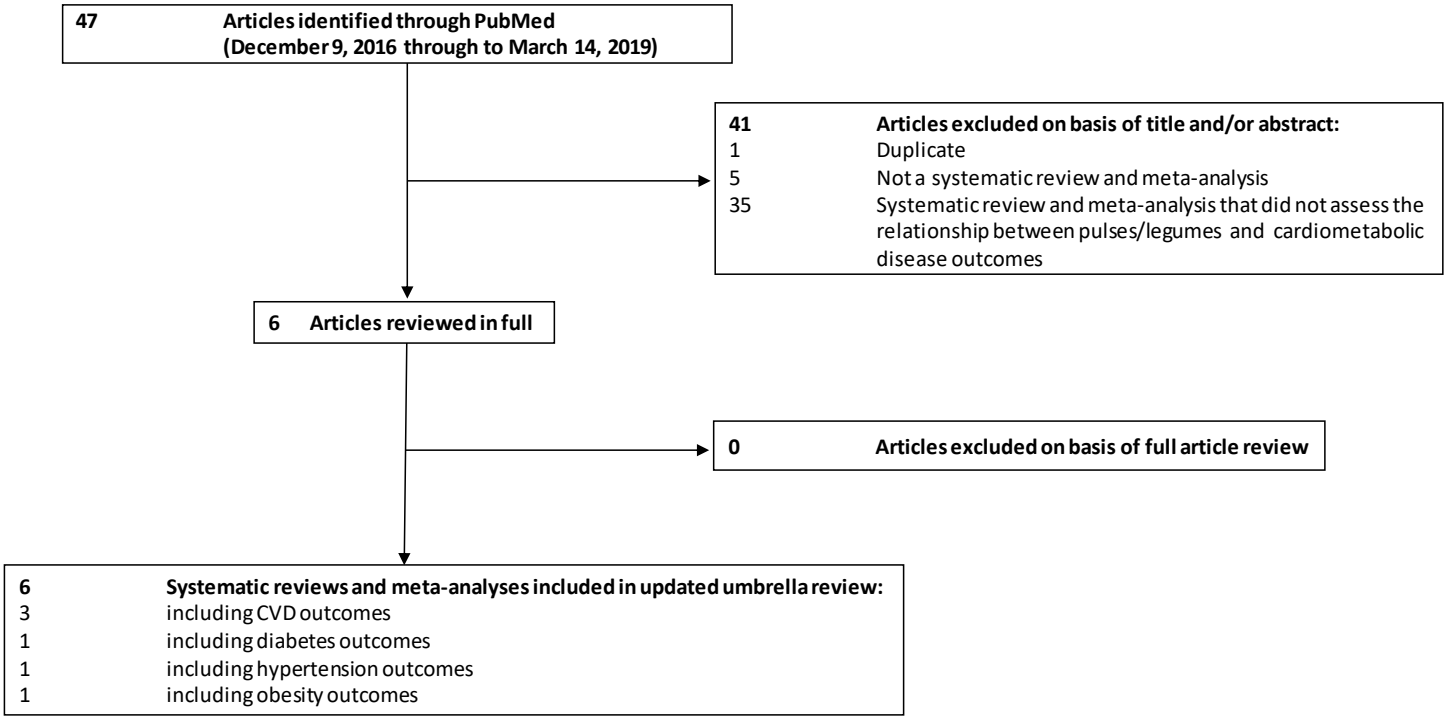
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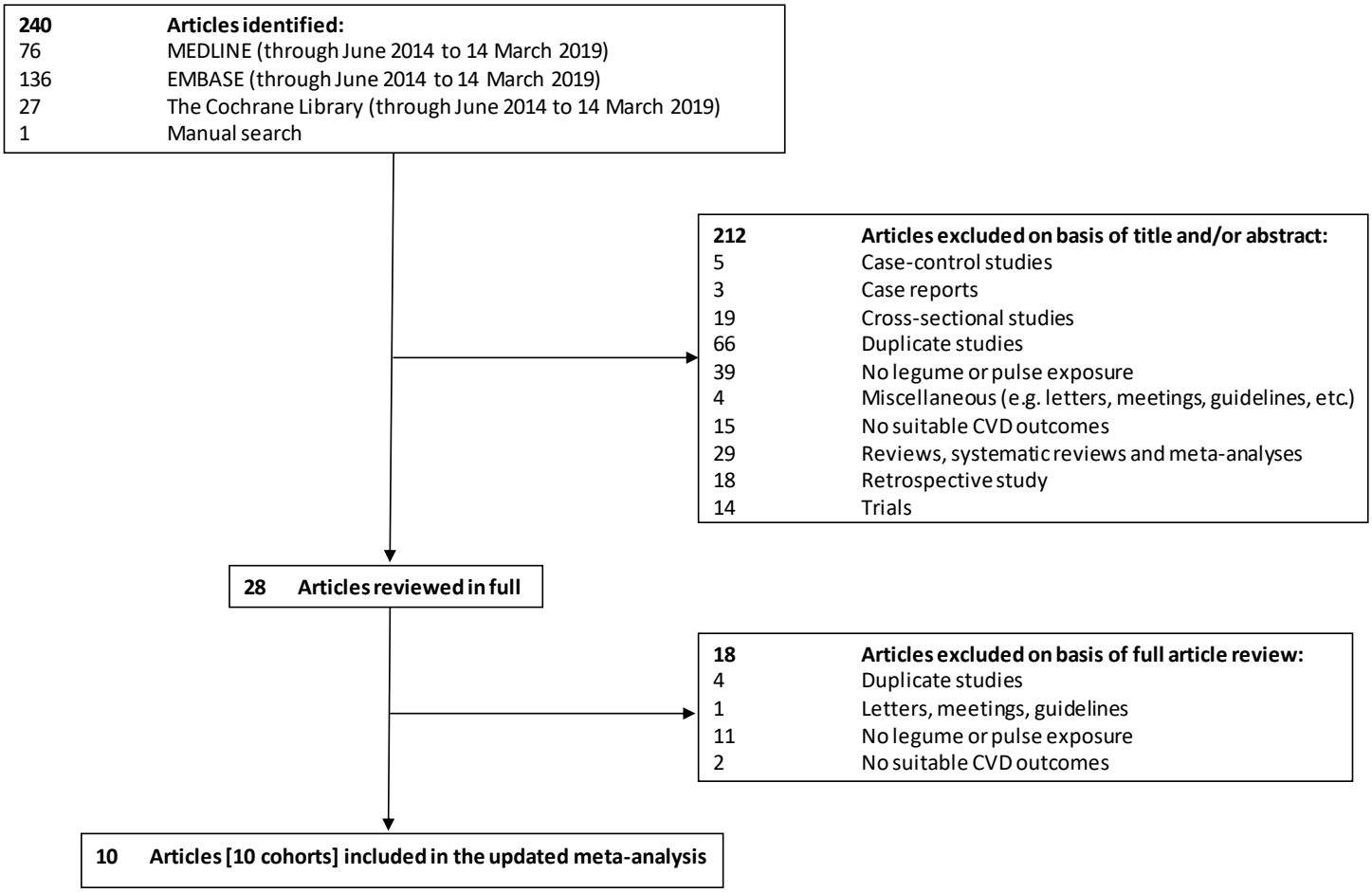
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Supplemental Figure 1 – Summary of evidence search and selection for the umbrella review



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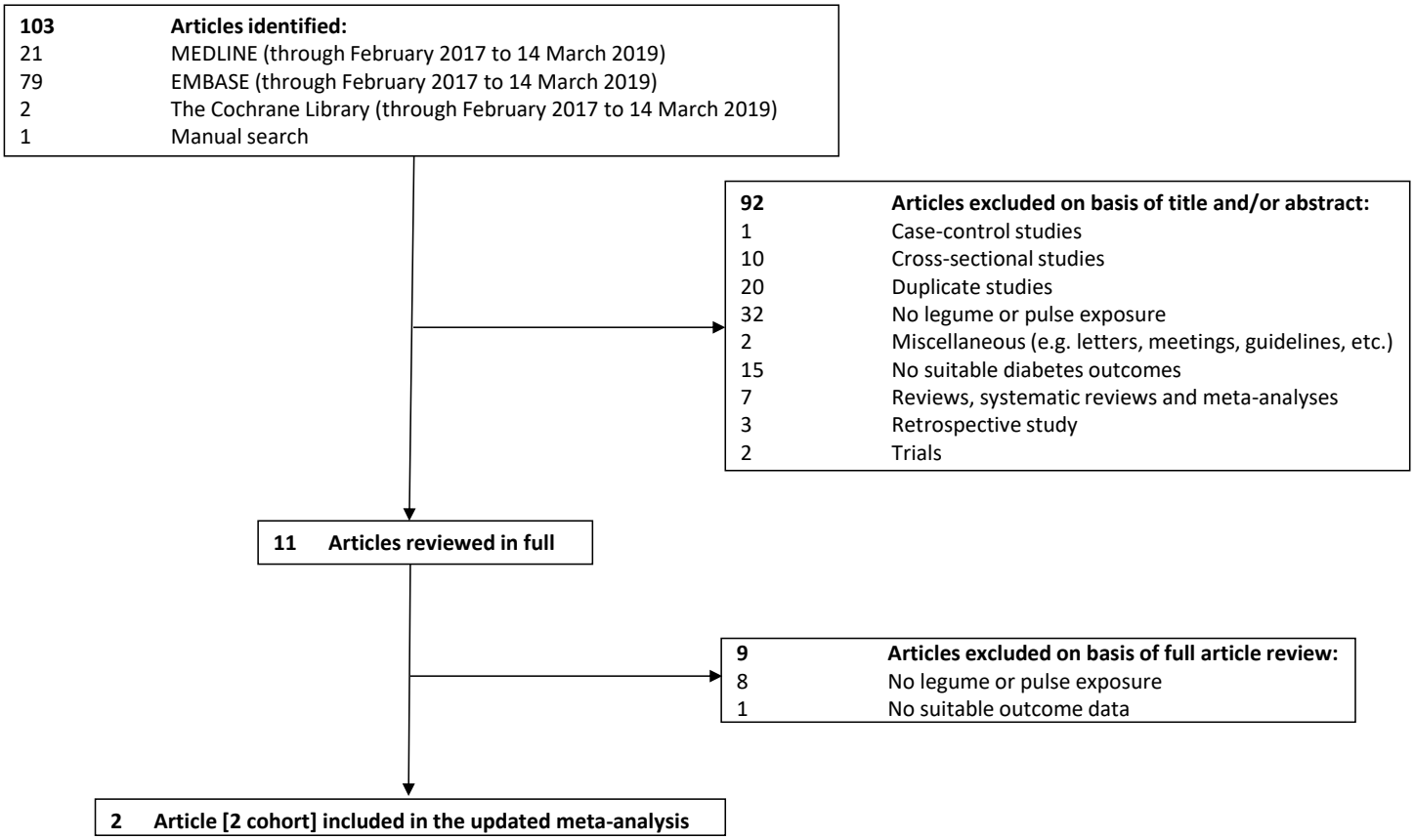
Supplemental Figure 2 – Summary of evidence search and selection for cardiovascular disease outcomes (update of Bechthold et al. 2019 (1), Grosso et al. 2017 (2) and Marvento et al. 2017 (3))*



*The systematic review and meta-analysis with the earliest census date was used for the updated search.

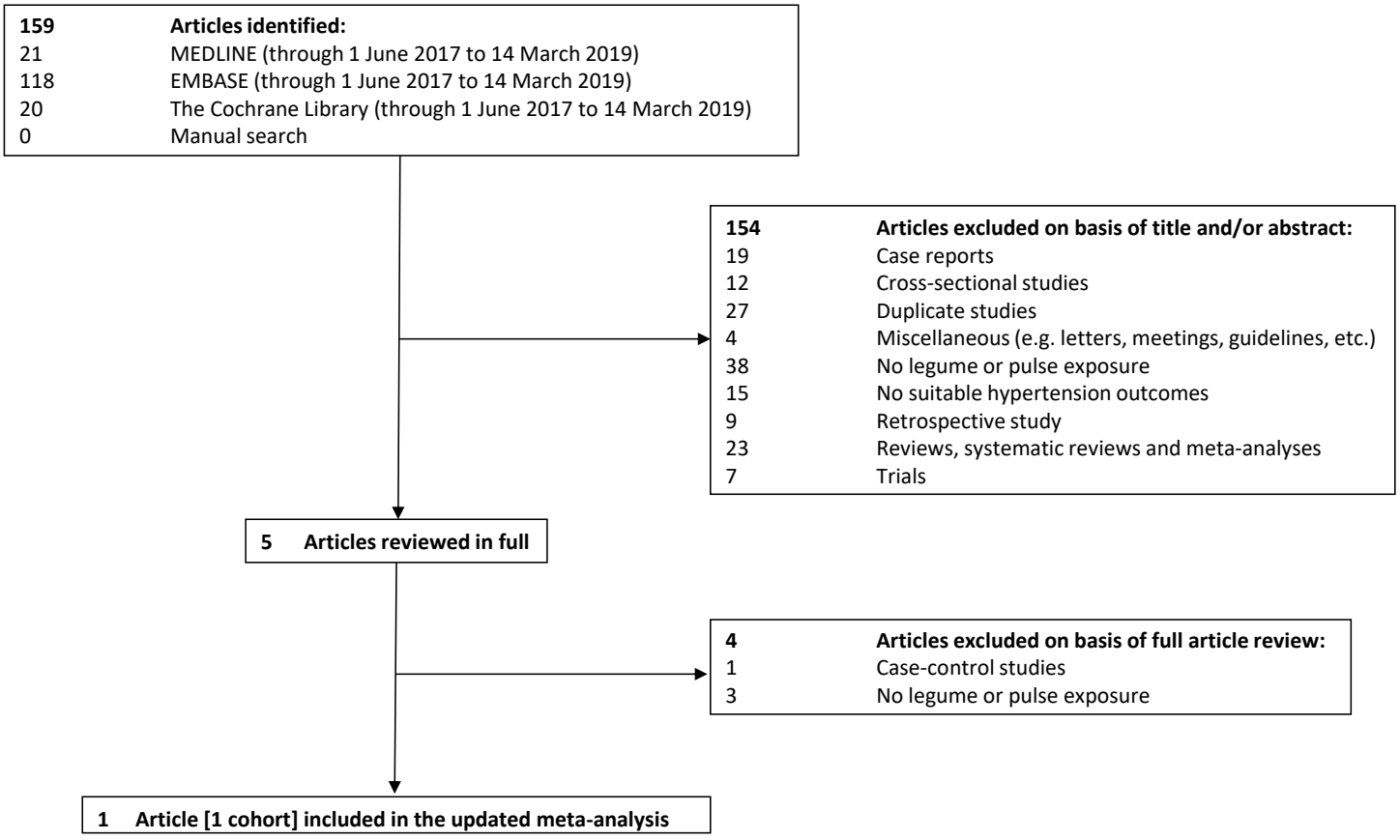
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Supplemental Figure 3 – Summary of evidence search and selection for diabetes outcomes (update of Schwingshackl et al. 2017 (4))



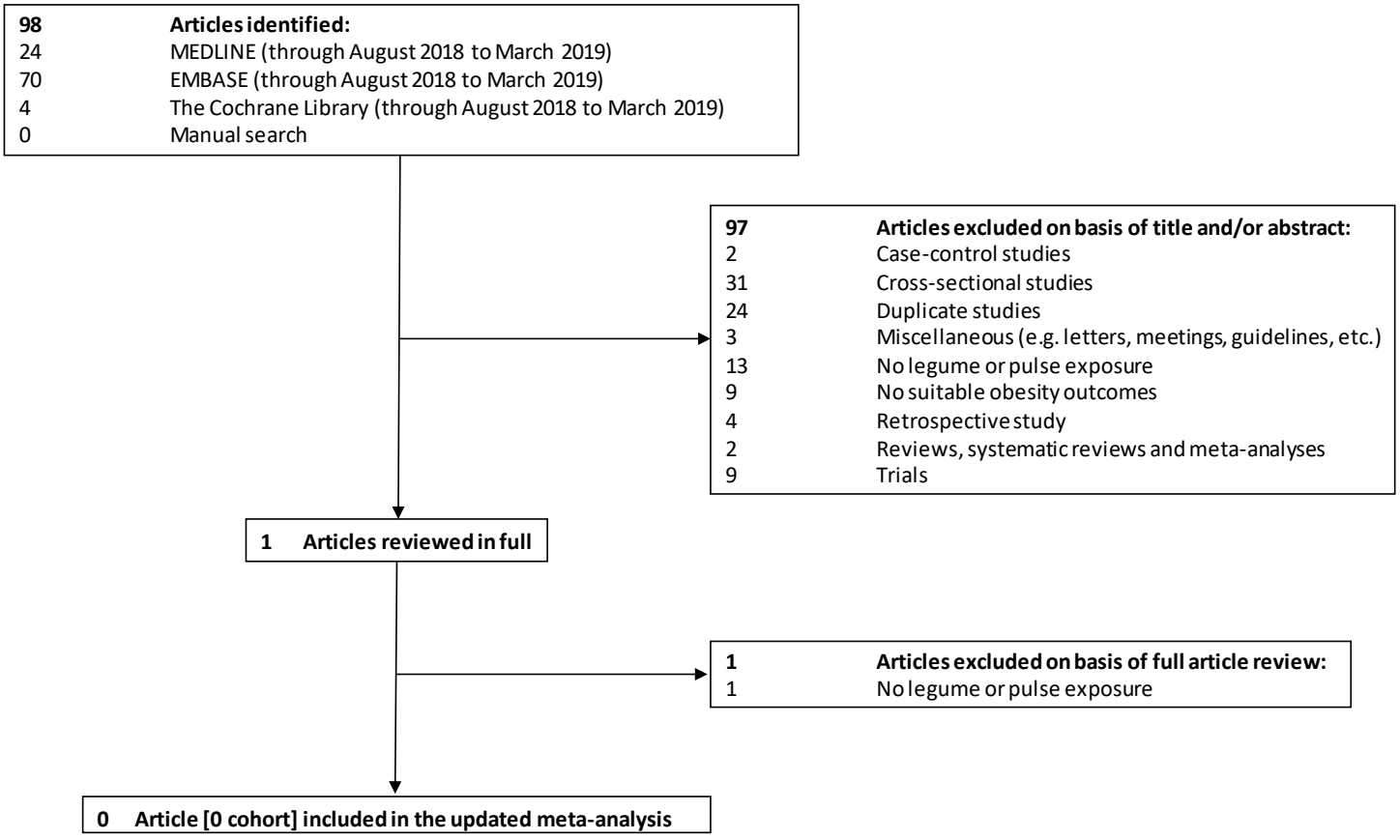
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Supplemental Figure 4 – Summary of evidence search and selection for hypertension outcomes (update of Schwingshackl et al. 2017 (5))



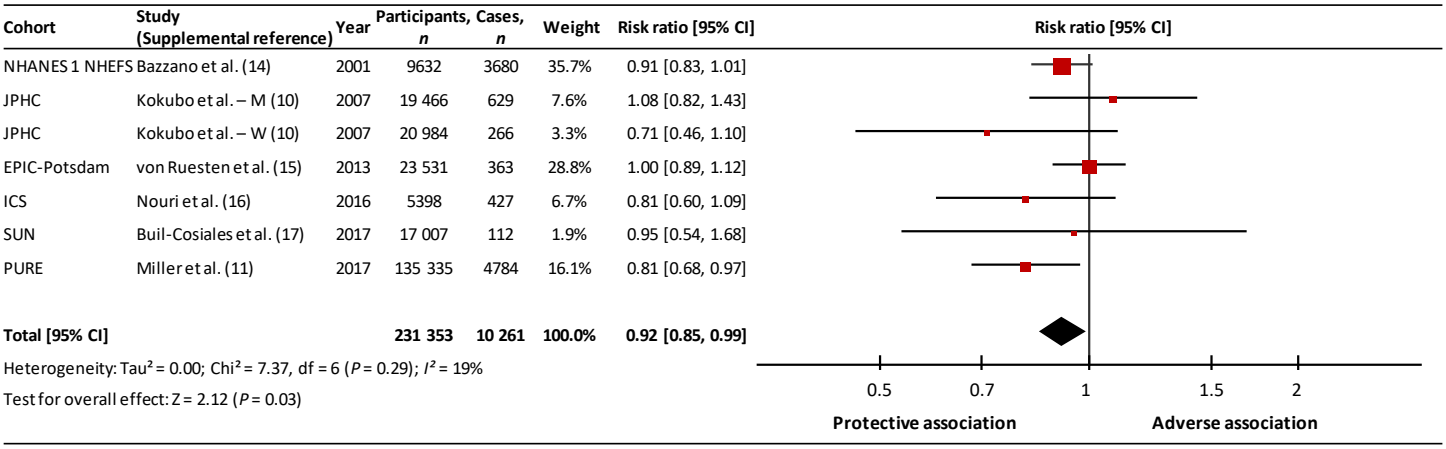
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Supplemental Figure 5 – Summary of evidence search and selection for obesity outcomes (update of Schlesinger et al. 2019 (6))



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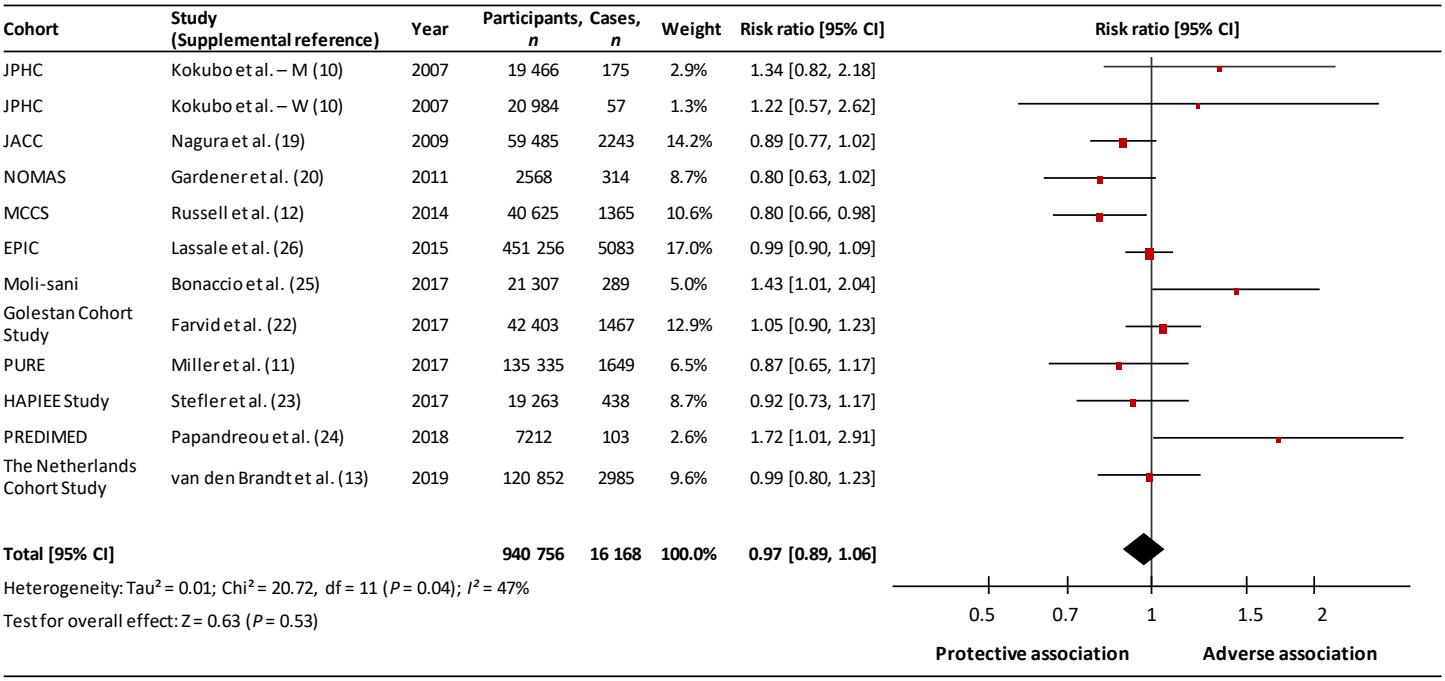
Supplemental Figure 6 – Association between dietary pulses with or without other legumes and CVD incidence (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. CVD=cardiovascular disease; CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; ICS=Isfahan Cohort Study; JPHC=Japan Public Health Center; M=men; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; PURE=Prospective Urban Rural Epidemiology; SUN=Seguimiento Universidad de Navarra; W=women

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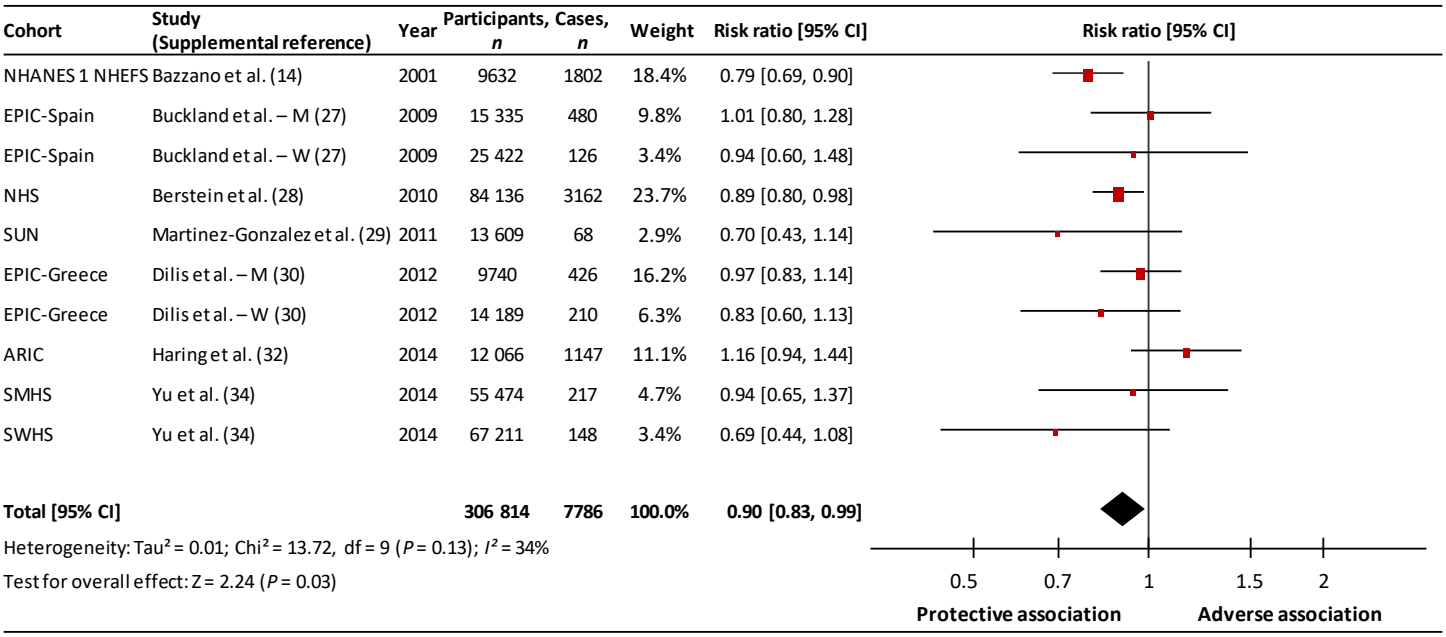
Supplemental Figure 7 – Association between dietary pulses with or without other legumes and CVD mortality (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. CVD=cardiovascular disease; CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; JPHC=Japan Public Health Center; M=men; MCCS=Melbourne Collaborative Cohort Study; NOMAS=Northern Manhattan Study; PREDIMED=PREvencion con DIeta MEDiterranea study; PURE=Prospective Urban Rural Epidemiology; W=women

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Supplemental Figure 8 – Association between dietary pulses with or without other legumes and CHD incidence (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of I^2≥50% and P<0.10 indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. ARIC=Atherosclerosis Risk in Communities; CHD=coronary heart disease; CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; M=men; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; NHS=Nurses' Health Study; SMHS=Shanghai Men's Health Study; SUN=Seguimiento Universidad de Navarra; SWHS=Shanghai Women's Health Study; W=wome

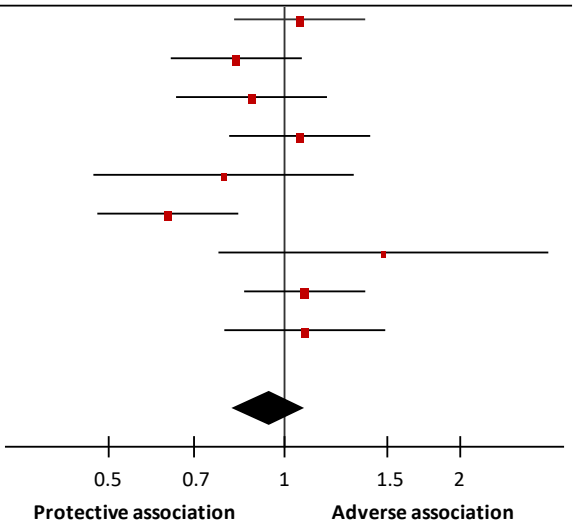
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Supplemental Figure 9 – Association between dietary pulses with or without other legumes and CHD mortality (highest vs. lowest level of intake)

Cohort	Study (Supplemental reference)	Year	Participants, *n*	Cases, *n*	Weight	Risk ratio [95% CI]
AHS	Fraser et al. (9)	1992	26 743	463	13.6%	1.06 [0.82, 1.37]
IWHS	Kelemen et al. (35)	2005	29 017	739	13.6%	0.83 [0.64, 1.07]
JACC	Nagura et al. (19)	2009	59 485	452	11.9%	0.88 [0.65, 1.18]
EPIC-Greece	Dilis et al. – M (30)	2012	9740	150	12.7%	1.06 [0.81, 1.40]
EPIC-Greece	Dilis et al. – W (30)	2012	14 189	90	5.9%	0.79 [0.47, 1.31]
LINXIAN NIT	Wang et al. (36)	2016	2445	355	12.7%	0.63 [0.48, 0.83]
Moli-sani	Bonaccio et al. (25)	2017	21 307	92	4.0%	1.48 [0.77, 2.82]
Golestan Cohort Study	Farvid et al. (22)	2017	42 403	764	14.5%	1.08 [0.86, 1.37]
HAPIEE Study	Stefler et al. (23)	2017	19 263	226	11.1%	1.08 [0.79, 1.48]
Total [95% CI]			**224 592**	**3331**	**100.0%**	**0.94 [0.82, 1.08]**

Heterogeneity: $Tau^2 = 0.02$; $Chi^2 = 15.43$, df = 8 ($P = 0.05$); $I^2 = 48\%$

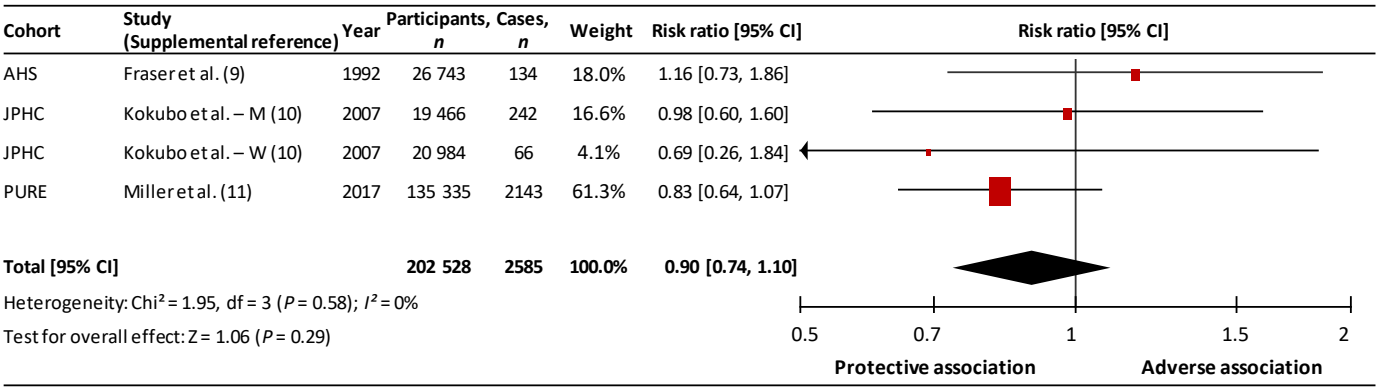
Test for overall effect: Z = 0.86 ($P = 0.39$)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic (9-11) inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. AHS=Adventists Health Study; CHD=coronary heart disease; CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; IWHS=Iowa Women's Health Study; JACC=Japan Collaborative Cohort; M=men; NIT=Nutrition Intervention Trials; W=women

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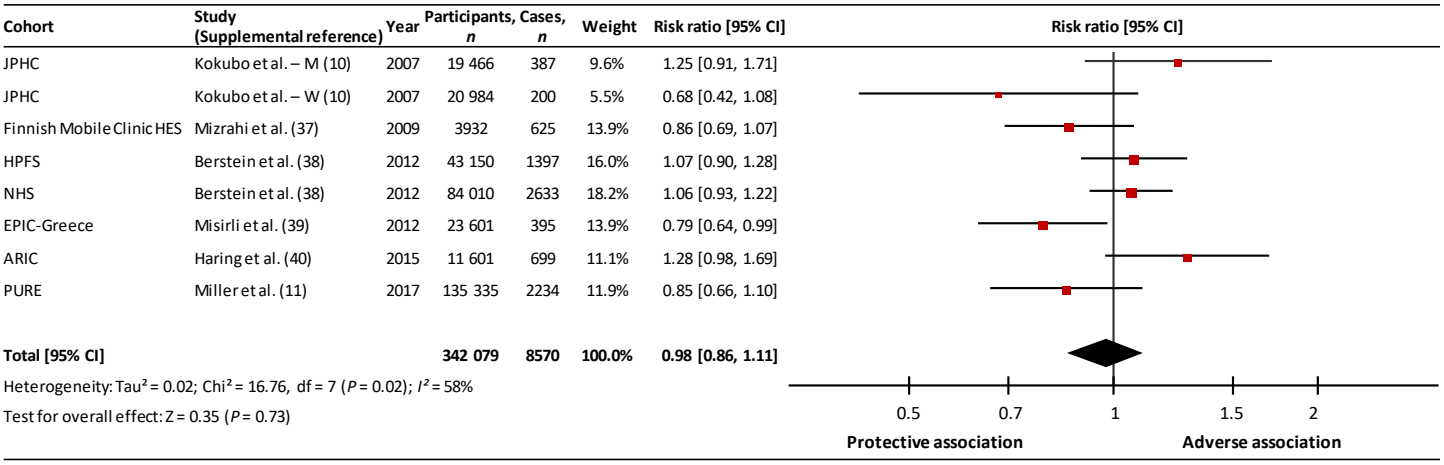
Supplemental Figure 10 – Association between dietary pulses with or without other legumes and MI incidence (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by fixed effects. Values of I^2≥50% and P<0.10 indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. AHS=Adventists Health Study; CI=confidence interval; JPHC=Japan Public Health Center; M=men; MI=myocardial infarction; PURE=Prospective Urban Rural Epidemiology; W=women

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Supplemental Figure 11 – Association between dietary pulses with or without other legumes and stroke incidence (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. ARIC=Atherosclerosis Risk in Communities; CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; HES=Health Examination Survey; HPFS=Health Professionals Follow-Up Study; JPHC=Japan Public Health Center; M=men; NHS=Nurses' Health Study; PURE=Prospective Urban Rural Epidemiology; W=women

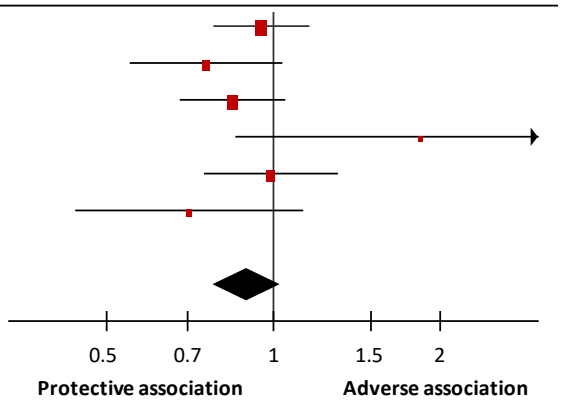
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Supplemental Figure 12 – Association between dietary pulses with or without other legumes and stroke mortality (highest vs. lowest level of intake)

Cohort	Study (Supplemental reference)	Year	Participants, *n*	Cases, *n*	Weight	Risk ratio [95% CI]
JACC	Nagura et al. (19)	2009	59 485	1053	29.0%	0.95 [0.78, 1.16]
EPIC-Greece	Misirli et al. (39)	2012	23 601	196	15.4%	0.76 [0.55, 1.03]
LINXIAN NIT	Wang et al. (36)	2016	2445	452	25.9%	0.84 [0.68, 1.05]
Moli-sani	Bonaccio et al. (25)	2017	21 307	67	3.2%	1.84 [0.86, 3.95]
Golestan Study	Farvid et al. (22)	2017	42 403	507	18.7%	0.99 [0.75, 1.30]
HAPIEE Study	Stefler et al. (23)	2017	19 263	109	7.8%	0.70 [0.44, 1.13]
Total [95% CI]			**168 504**	**2384**	**100.0%**	**0.89 [0.78, 1.03]**

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 6.70$, df = 5 ($P = 0.24$); $I^2 = 25\%$

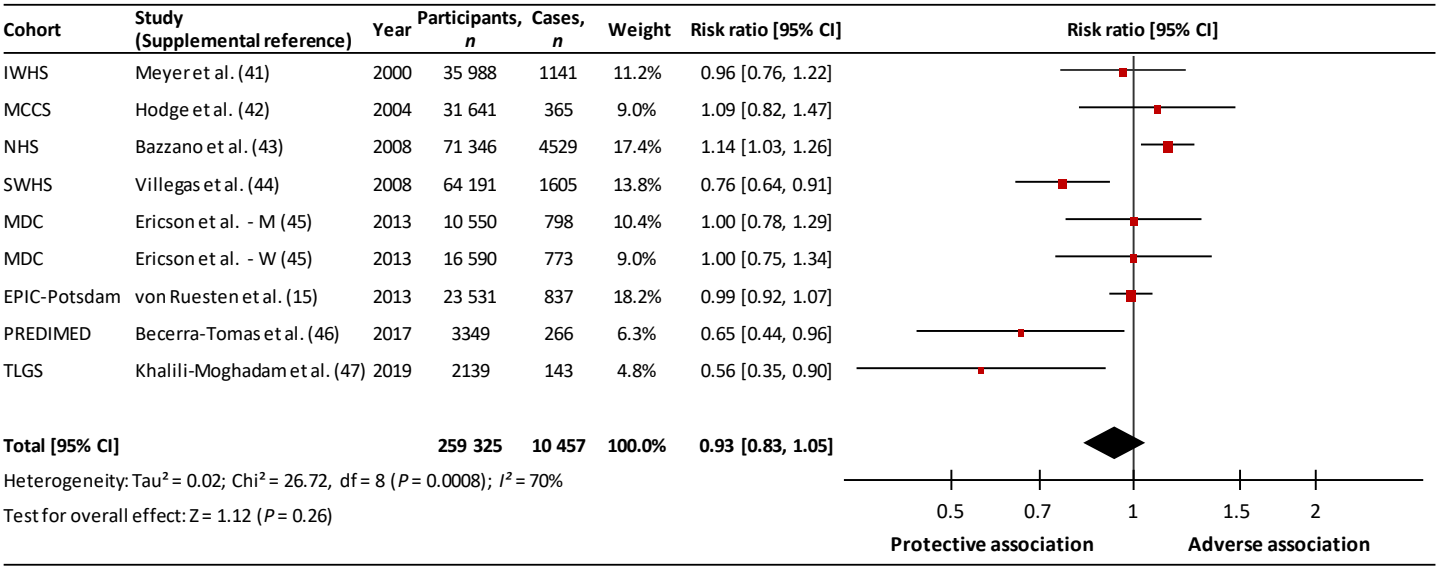
Test for overall effect: $Z = 1.56$ ($P = 0.12$)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; NIT=Nutrition Intervention Trials

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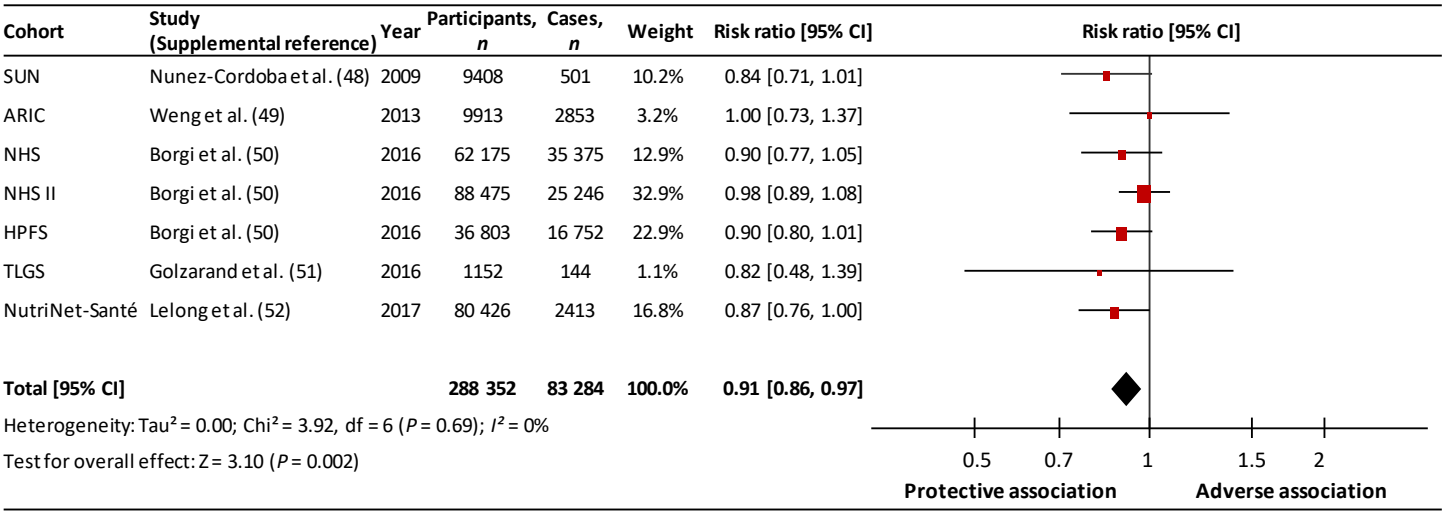
Supplemental Figure 13 – Association between dietary pulses with or without other legumes and diabetes incidence (highest vs. lowest level of intake)



Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of I^2≥50% and P<0.10 indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. CI=confidence interval; EPIC=European Prospective Investigation into Cancer and Nutrition; IWHS=Iowa Women's Health Study; M=men; MCCS=Melbourne Collaborative Cohort Study; MDC=Malmo Diet and Cancer; NHS=Nurses' Health Study; PREDIMED=PREvencion con DIeta MEDiterranea study; SWHS=Shanghai Women's Health Study; TLGS=Tehran Lipid and Glucose Study; W=women

SUPPLEMENTAL DATA

Supplemental Figure 14 – Association between dietary pulses with or without other legumes and hypertension incidence

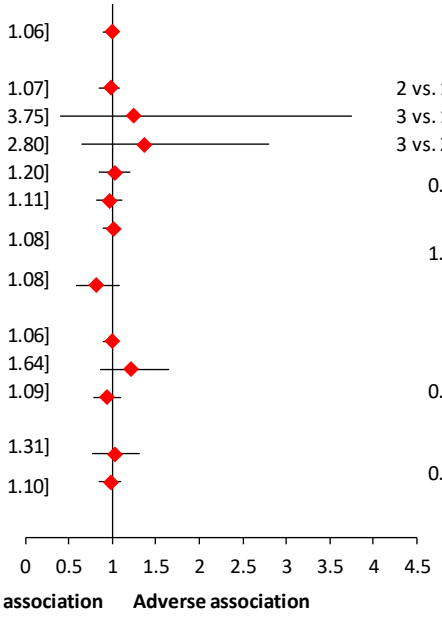


Pooled risk estimate is represented by the diamond. Data are expressed as weighted risk ratios with 95% CIs using the generic inverse-variance method modelled by random effects. Values of $I^2 \geq 50\%$ and $P<0.10$ indicate substantial heterogeneity (7, 8). Values greater than 1.0 indicate an adverse association. ARIC=Atherosclerosis Risk in Communities; HPFS=Health Professionals Follow-Up Study; NHS=Nurses' Health Study; SUN=Seguimiento Universidad de Navarra; TLGS=Tehran Lipid and Glucose Study

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Supplemental Figure 15 – Subgroup analyses for the association between dietary pulses with or without other legumes and CVD mortality

Subgroup	Level	Cohort comparisons, *n*	Participants, *n*	Risk ratio [95% CI] Within subgroups	Between subgroups	Residual I^2	*P*-value
Total	-	12	940 756	0.97 [0.89, 1.06]	-	-	-
Sex	Both	10	900 306	0.96 [0.85, 1.07]	2 vs. 1: 1.28 [0.41, 3.94]		
	Women	1	20 984	1.22 [0.40, 3.75]	3 vs. 1: 1.40 [0.66, 2.95]	51.3%	0.55
	Men	1	19 466	1.34 [0.64, 2.80]	3 vs. 2: 1.10 [0.29, 4.21]		
Follow-up	<10 years	6	228 088	1.01 [0.84, 1.20]	0.94 [0.74, 1.19]	49.8%	0.57
	≥10 years	6	712 668	0.94 [0.81, 1.11]			
Validation of dietary assessment method	Yes	11	900 131	0.98 [0.89, 1.08]	1.23 [0.89, 1.69]	40.9%	0.18
	No	1	40 625	0.80 [0.59, 1.08]			
NOS	<6	0	0	-	-	-	-
	≥6	12	940 756	0.97 [0.89, 1.06]			
Funding source*	Both	3	163 854	1.19 [0.86, 1.64]			
	Agency	7	204 794	0.92 [0.78, 1.09]	0.78 [0.54, 1.13]	50.4%	0.16
	Industry	0	0	-			
Exposure	Pulses	4	296 637	1.01 [0.77, 1.31]			
	Pulses + other legumes	8	644 119	0.96 [0.84, 1.10]	0.96 [0.71, 1.29]	51.2%	0.76

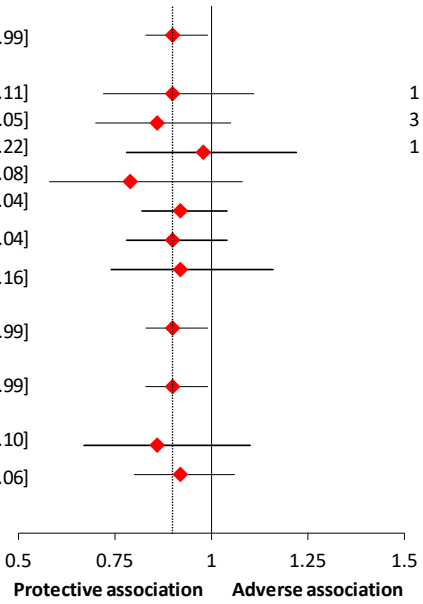


NOS=Newcastle-Ottawa Scale. Point estimates for each subgroup level (diamonds) are the pooled effect estimates. The dashed line represents the pooled effect estimate for the overall (total) analysis. The residual I^2 value represents unexplained heterogeneity for each subgroup. For the "Exposure" subgroup, studies included under the "Pulses" level included those reporting only chickpeas, lentils, beans, and/or peas in the exposure, whereas studies included under "Pulses + other legumes" included those reporting "legumes" without differentiating the legume type or included other types of legumes in the exposure in addition to pulses (i.e. soybeans, soy products, peanuts, fresh peas and/or fresh beans). (Note: if beans and peas were included in the exposure and did not specify whether they were fresh and/or dry, the study was categorized under "Pulses"). *Source of funding for two studies were unknown (12, 13)

SUPPLEMENTAL DATA

Supplemental Figure 16 – Subgroup analyses for the association between dietary pulses with or without other legumes and CHD incidence

Subgroup	Level	Cohort comparisons, *n*	Participants, *n*	Risk ratio [95% CI] Within subgroups	Between subgroups	Residual I^2	*P*-value
Total	-	10	306 814	0.90 [0.83, 0.99]	-	-	-
Sex	Both	3	35 307	0.90 [0.72, 1.11]	1 vs. 2: 1.04 [0.77, 1.41]		
	Women	4	179 221	0.86 [0.70, 1.05]	3 vs. 2: 1.14 [0.84, 1.55]	38.0%	0.60
	Men	3	92 286	0.98 [0.78, 1.22]	1 vs. 3: 0.92 [0.67, 1.25]		
Follow-up	<10 years	3	136 294	0.79 [0.58, 1.08]	1.17 [0.84, 1.64]	36.7%	0.31
	≥10 years	7	170 520	0.92 [0.82, 1.04]			
Validation of dietary assessment method	Yes	8	285 116	0.90 [0.78, 1.04]	0.97 [0.74, 1.27]	40.6%	0.82
	No	2	21 698	0.92 [0.74, 1.16]			
NOS	<6	0	0	-	-	-	-
	≥6	10	306 814	0.90 [0.83, 0.99]			
Funding source	Both	0	0	-			
	Agency	10	306 814	0.90 [0.83, 0.99]	-	-	-
	Industry	0	0	-			
Exposure	Pulses	2	97 745	0.86 [0.67, 1.10]	1.08 [0.81, 1.43]	40.5%	0.57
	Pulses + other legumes	8	209 069	0.92 [0.80, 1.06]			

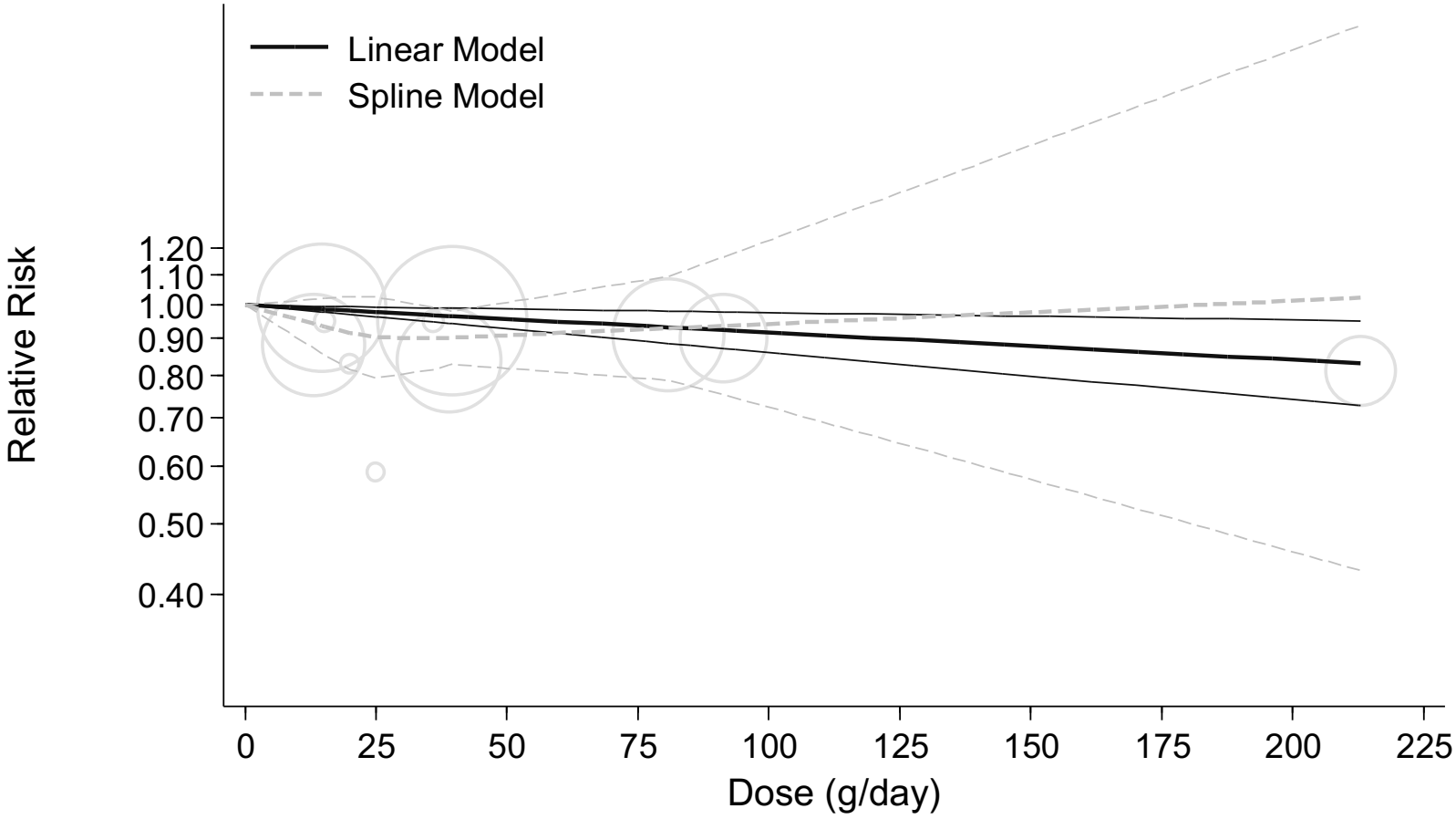


NOS=Newcastle-Ottawa Scale. Point estimates for each subgroup level (diamonds) are the pooled effect estimates. The dashed line represents the pooled effect estimate for the overall (total) analysis. The residual I^2 value represents unexplained heterogeneity for each subgroup. For the "Exposure" subgroup, studies included under the "Pulses" level included those reporting only chickpeas, lentils, beans, and/or peas in the exposure, whereas studies included under "Pulses + other legumes" included those reporting "legumes" without differentiating the legume type or included other types of legumes in the exposure in addition to pulses (i.e. soybeans, soy products, peanuts, fresh peas and/or fresh beans). (Note: if beans and peas were included in the exposure and did not specify whether they were fresh and/or dry, the study was categorized under "Pulses").

SUPPLEMENTAL DATA

Supplemental Figure 17a-h – Dose response relationship between dietary pulses with or without other legumes and cardiometabolic disease outcomes

A – CVD Incidence



Linear RR per 100 grams of intake of pulses: 0.92 [95% CI, 0.86 to 0.98]; p= 0.007
Departure from linearity= 0.359

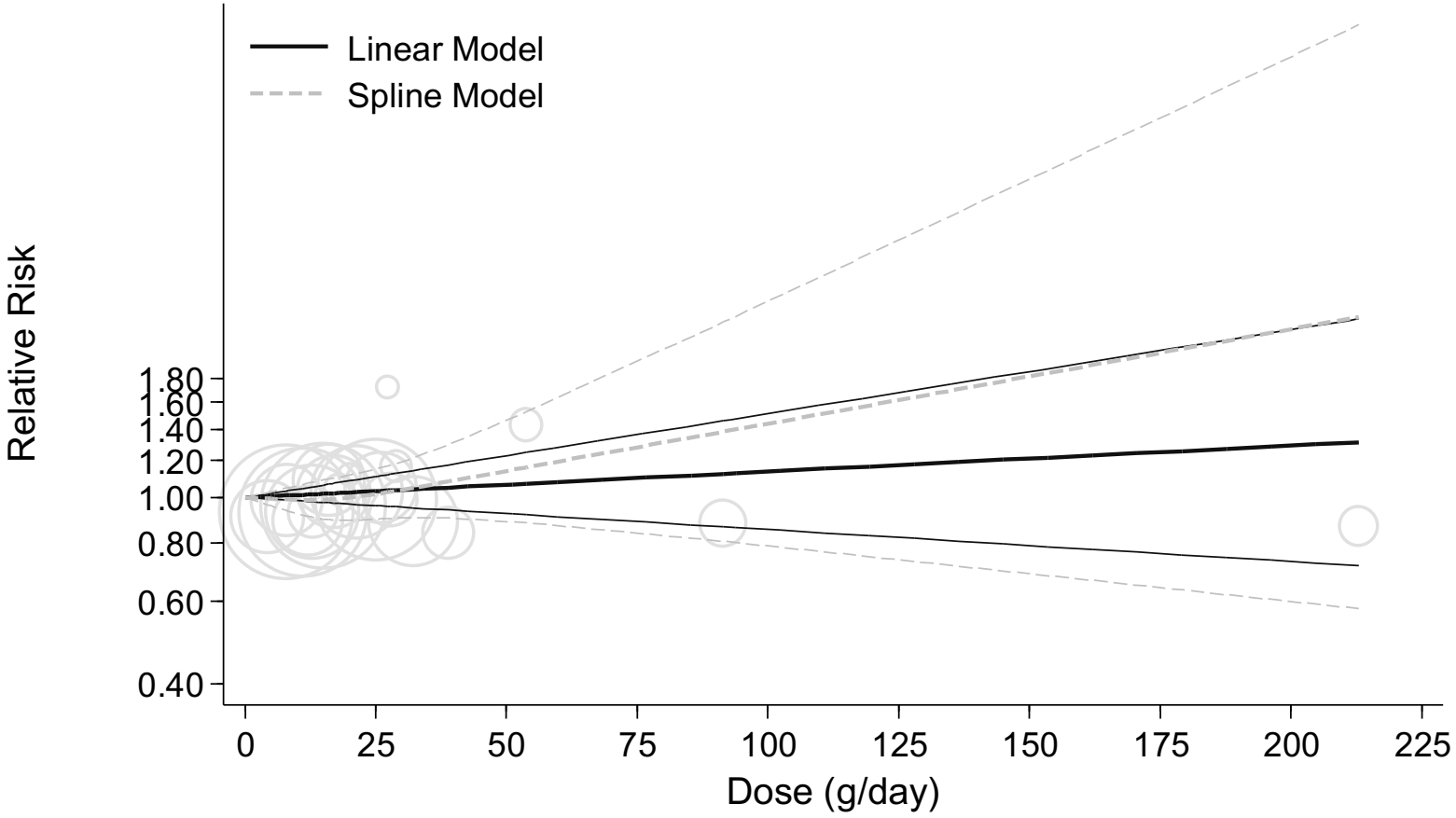
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Three cohort comparisons were available for dose-response analyses for CVD incidence.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

B – CVD Mortality



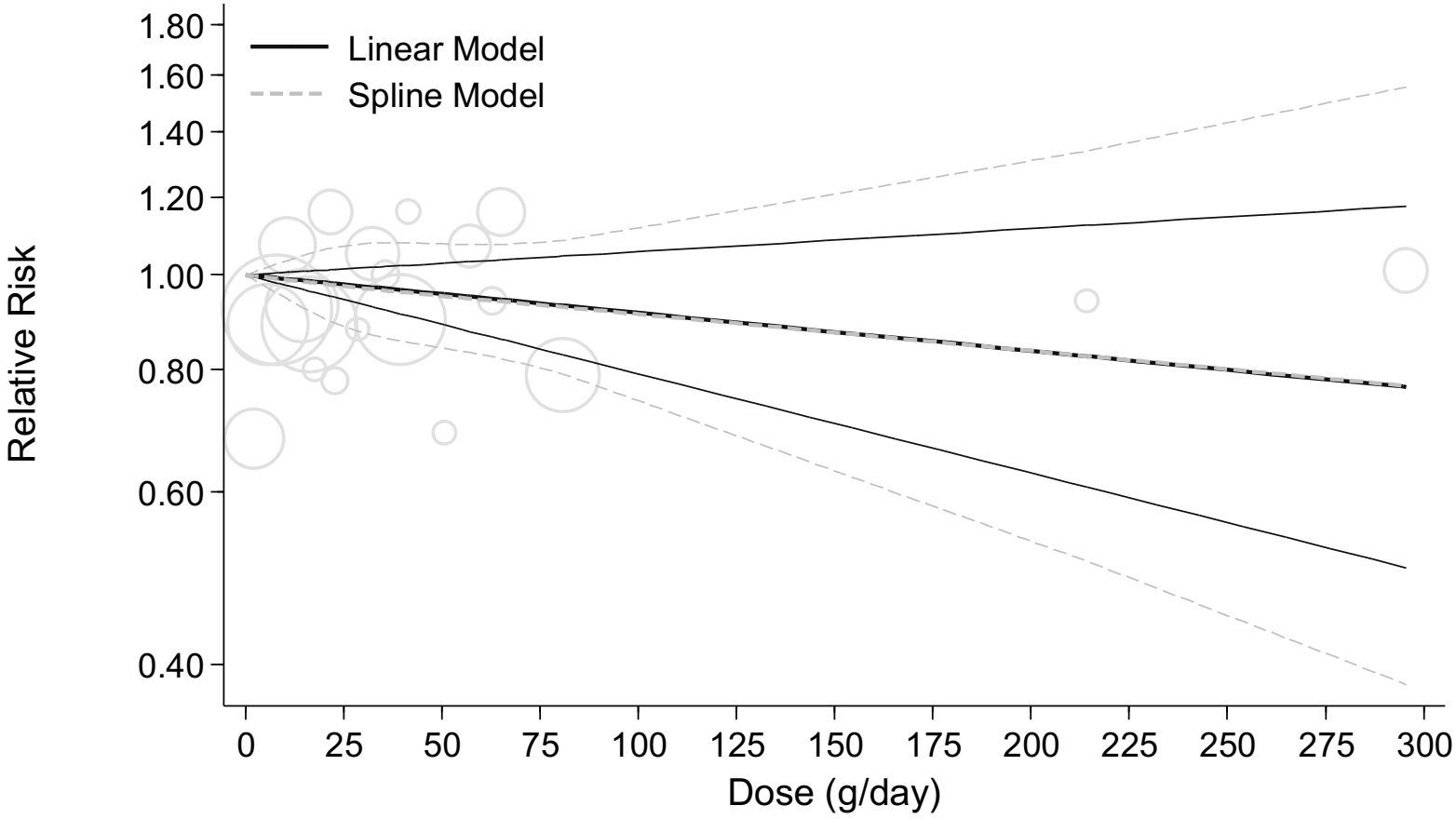
Linear RR per 100 grams of intake of pulses: 1.14 [95% CI, 0.85 to 1.51]; p= 0.379
Departure from linearity= 0.317
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Seven cohort comparisons were available for dose-response analyses for CVD mortality.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

C – CHD Incidence



Linear RR per 100 grams of intake of pulses: 0.91 [95% CI, 0.79 to 1.06]; p= 0.223
Departure from linearity= 0.943

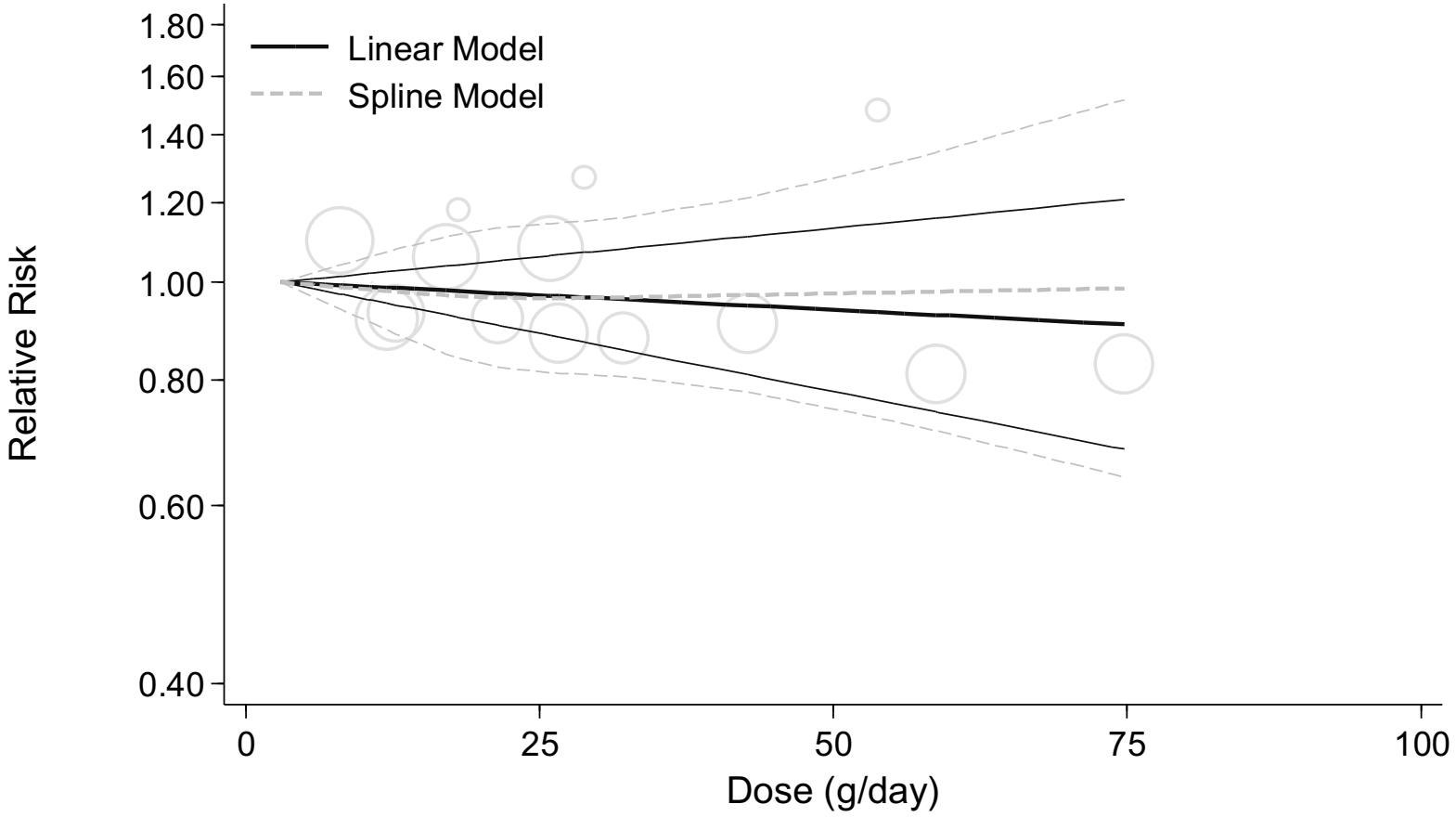
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Seven cohort comparisons were available for dose-response analyses for CHD incidence.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

D – CHD Mortality



Linear RR per 100 grams of intake of pulses: 0.87 [95% CI, 0.59 to 1.30]; p= 0.508
Departure from linearity= 0.704

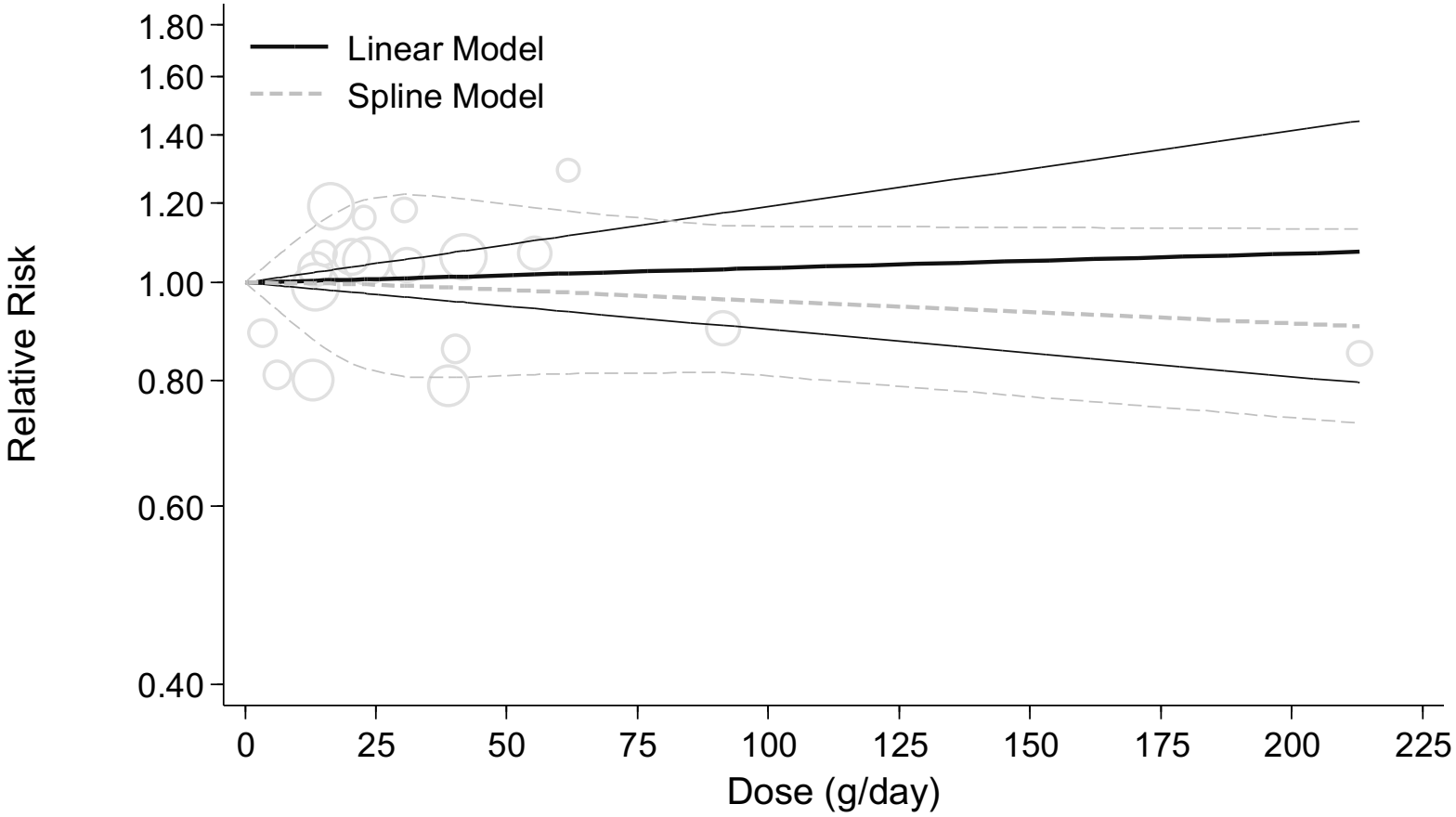
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Four cohort comparisons were available for dose-response analyses for CHD mortality.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

E – Stroke Incidence



Linear RR per 100 grams of intake of pulses: 1.03 [95% CI, 0.90 to 1.19]; p= 0.644
Departure from linearity= 0.945

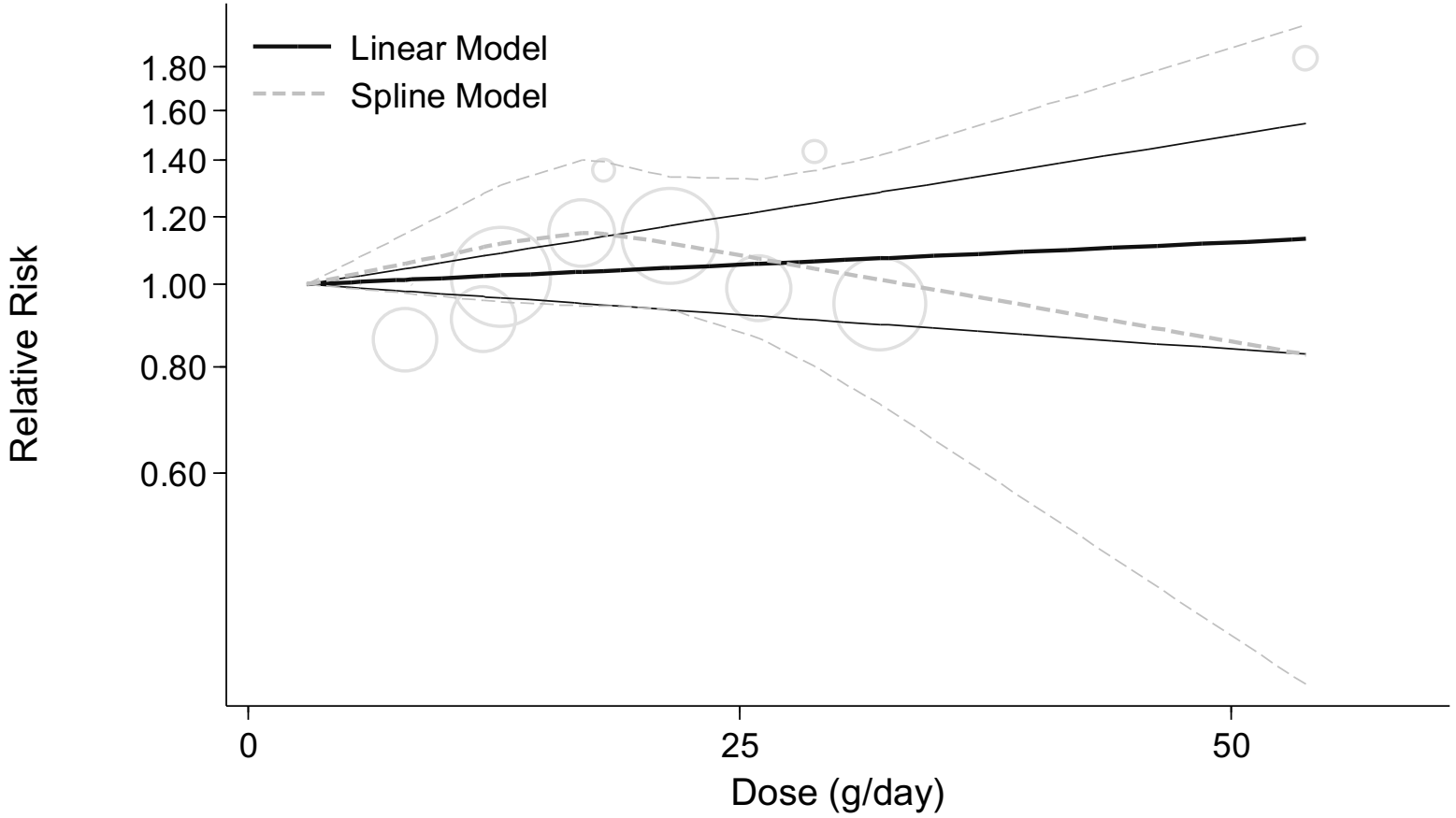
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Five cohort comparisons were available for dose-response analyses for stroke incidence.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

F – Stroke Mortality



Linear RR per 100 grams of intake of pulses: 1.27 [95% CI, 0.69 to 2.35]; p= 0.441
Departure from linearity= 0.300

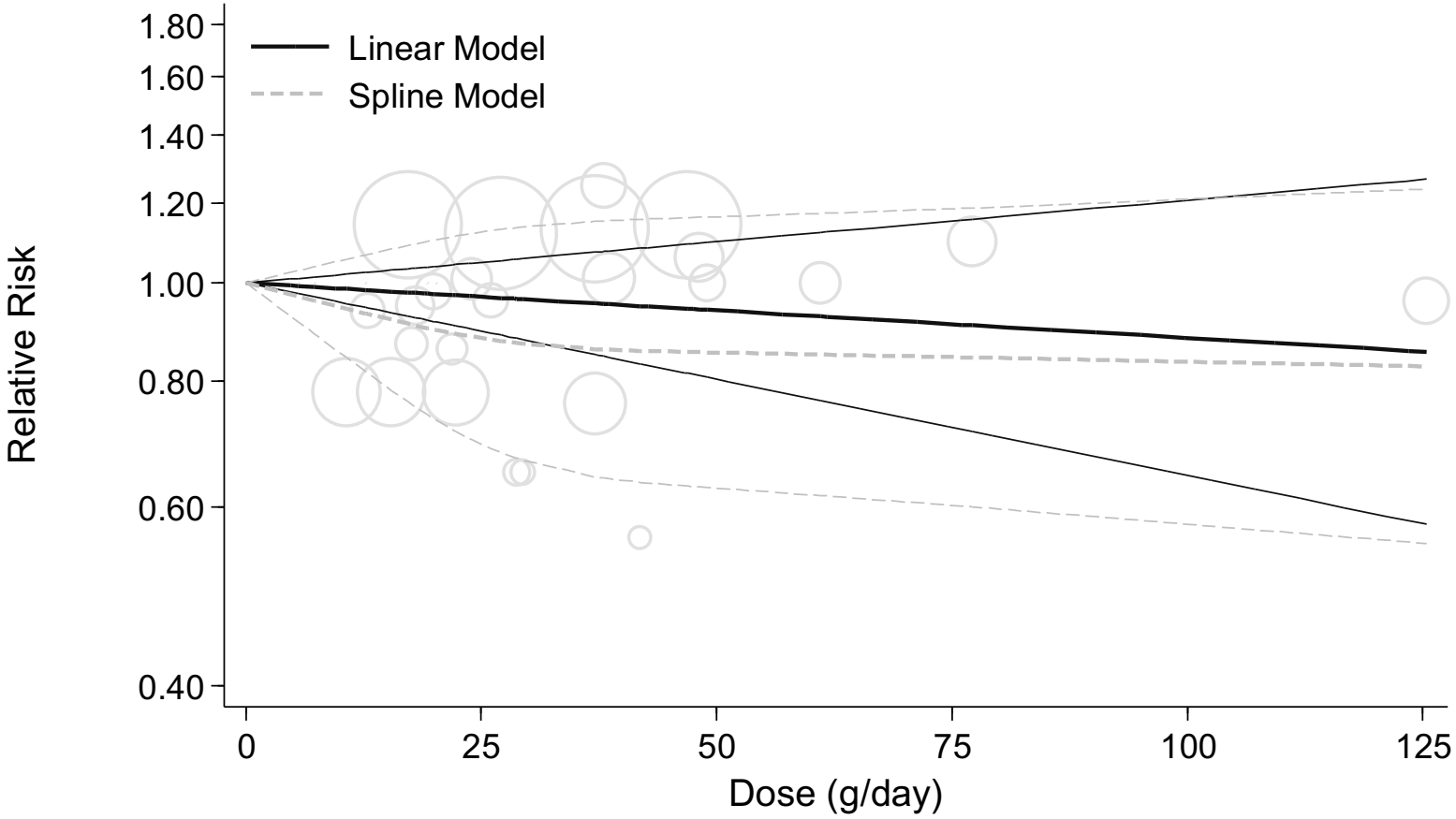
Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Three cohort comparisons were available for dose-response analyses for stroke mortality.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

G – Diabetes Incidence

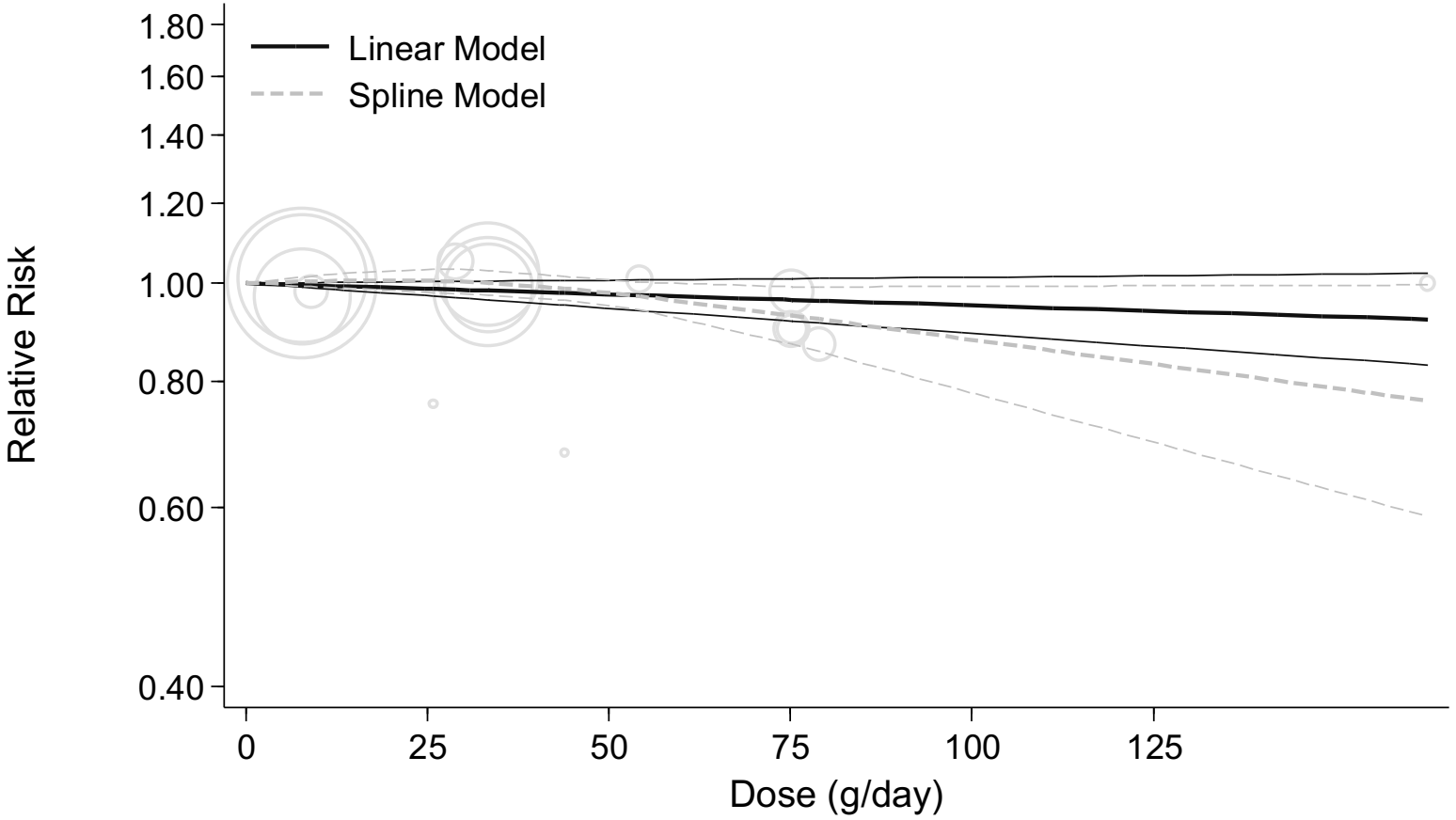


Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Seven cohort comparisons were available for dose-response analyses for diabetes incidence.

SUPPLEMENTAL DATA

Supplemental Figure 17a-h *(continued)*

H – Hypertension Incidence



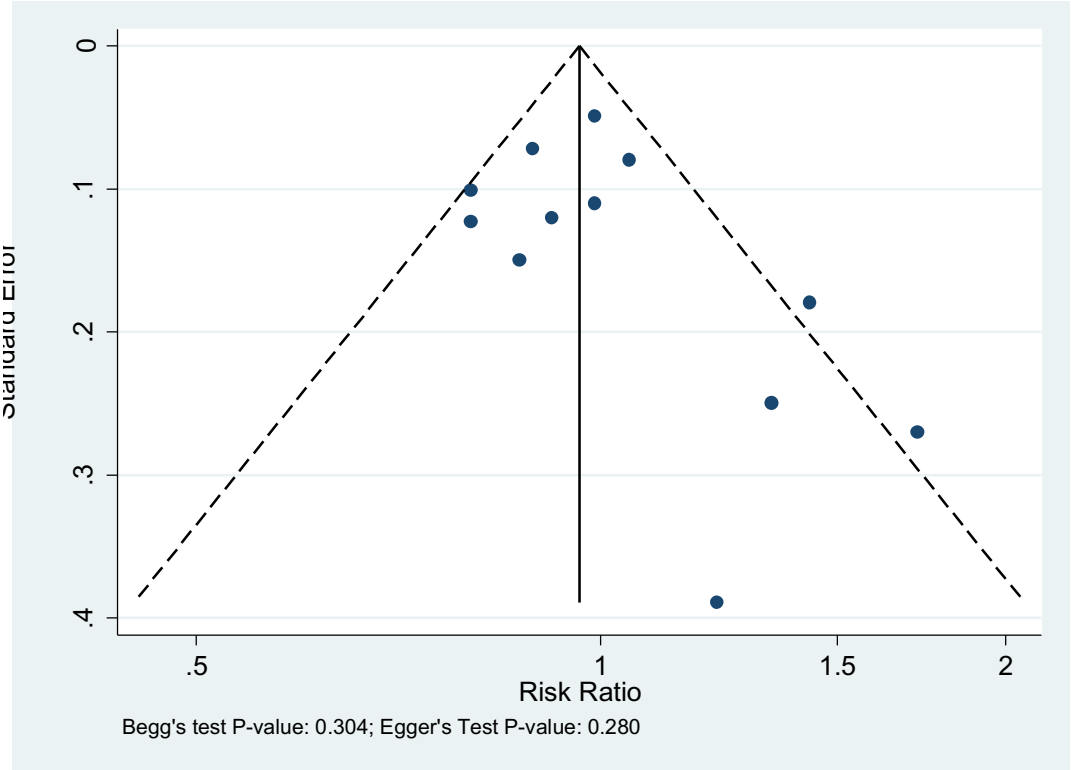
Linear RR per 100 grams of intake of pulses: 0.95 [95% CI, 0.89 to 1.01]; p= 0.122
Departure from linearity= 0.127

Random effects dose-response model

Black solid and grey dashed lines represent the linear and non-linear spline models respectively along with their confidence intervals. The light grey circles represent the relative risk point estimates for the different doses from each study; the size of the circle is related to inverse of the variance. Six cohort comparisons were available for dose-response analyses for hypertension incidence.

SUPPLEMENTAL DATA

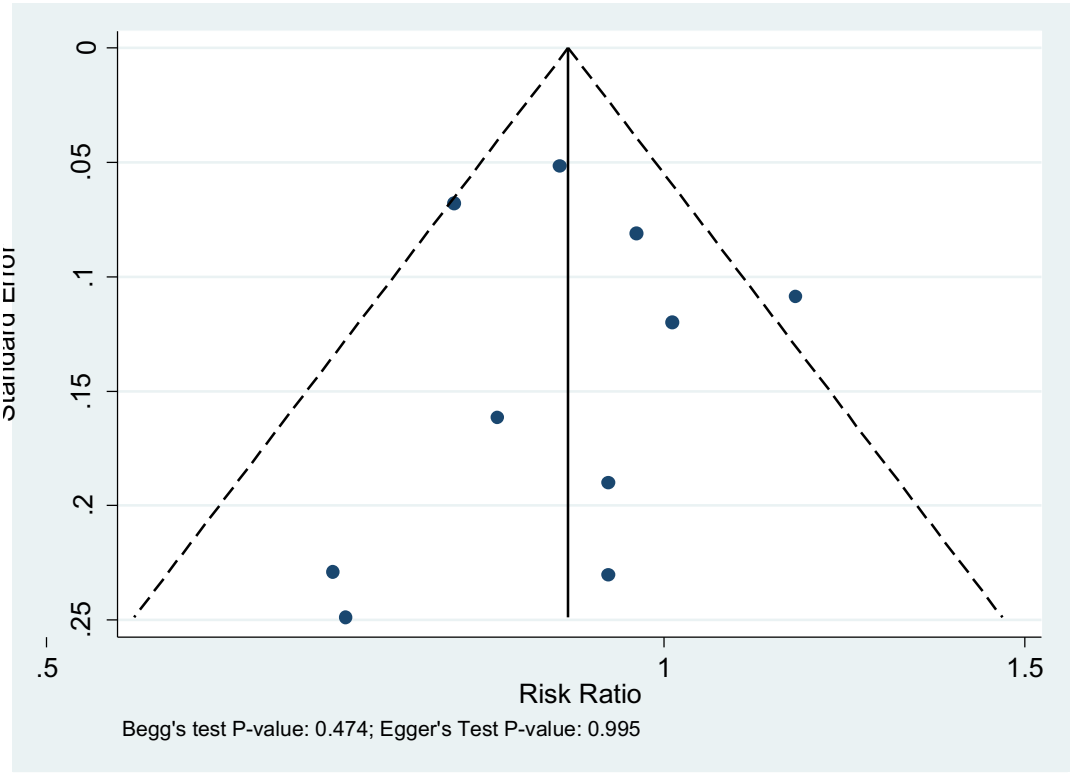
Supplemental Figure 18 – Publication bias analyses for the association between dietary pulses with or without other legumes and CVD mortality



The vertical line represents the pooled effect estimate expressed as a RR. Dashed lines represent pseudo-95% confidence intervals (CI). The circles represent risk estimates for each cohort, and the horizontal lines represent standard errors of the RR.

SUPPLEMENTAL DATA

Supplemental Figure 19 – Publication bias analyses for the association between dietary pulses with or without other legumes and CHD incidence



The vertical line represents the pooled effect estimate expressed as a RR. Dashed lines represent pseudo-95% confidence intervals (CI). The circles represent risk estimates for each cohort, and the horizontal lines represent standard errors of the RR.

SUPPLEMENTAL DATA

SUPPLEMENTAL TABLES

Supplemental Table 1 – Search strategy for cardiovascular disease outcomes

	MEDLINE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	cardiovascular disease.mp.
21	cvd.mp.
22	(coronary adj2 disease).mp.
23	exp coronary disease/
24	cerebrovascular.mp.
25	cerebral vascular.mp.
26	exp brain ischemia/
27	exp stroke/
28	exp cerebrovascular disorders/
29	exp intracranial arterial diseases/
30	exp myocardial infarction/
31	myocardial infarction.mp.
32	exp myocardial ischemia/
33	myocardial ischemia.mp.
34	or/20-33
35	10 and 19 and 34

	EMBASE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp multivariate analysis/
15	exp proportional hazards models/
16	follow up study.mp.
17	(longitudinal adj2 study).mp.
18	or/11-17
19	cardiovascular disease.mp.
20	cvd.mp.
21	(coronary adj2 disease).mp.
22	exp coronary disease/
23	cerebrovascular.mp.
24	cerebral vascular.mp.
25	exp brain ischemia/
26	exp stroke/
27	exp cerebrovascular disorders/
28	exp intracranial arterial diseases/
29	exp myocardial infarction/
30	myocardial infarction.mp.
31	exp myocardial ischemia/
32	myocardial ischemia.mp.
33	or/19-32
34	10 and 18 and 33

	COCHRANE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp Prospective Studies/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	cardiovascular disease.mp.
21	cvd.mp.
22	(coronary adj2 disease).mp.
23	exp coronary disease/
24	cerebrovascular.mp.
25	cerebral vascular.mp.
26	exp brain ischemia/
27	exp stroke/
28	exp cerebrovascular disorders/
29	exp intracranial arterial diseases/
30	exp myocardial infarction/
31	myocardial infarction.mp.
32	exp myocardial ischemia/
33	myocardial ischemia.mp.
34	or/20-33
35	10 and 19 and 34

SUPPLEMENTAL DATA

Supplemental Table 2 – Search strategy for diabetes outcomes

MEDLINE	
1	pulses.mp.
2	fabaceae.mp.
3	bean*.mp.
4	pea.mp.
5	peas.mp.
6	chickpea*.mp.
7	lentil*.mp.
8	legume*.mp.
9	leguminous.mp.
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	exp Diabetes Mellitus/
21	"Type 2 Diabetes*".mp.
22	20 or 21
23	10 and 19 and 22

EMBASE	
1	pulses.mp.
2	fabaceae.mp.
3	bean*.mp.
4	pea.mp.
5	peas.mp.
6	chickpea*.mp.
7	lentil*.mp.
8	legume*.mp.
9	leguminous.mp.
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
19	exp diabetes mellitus/
20	"Type 2 Diabetes".mp.
21	22. 20 or 21
22	10 and 19 and 22

COCHRANE	
1	pulses.mp.
2	fabaceae.mp.
3	bean*.mp.
4	pea.mp.
5	peas.mp.
6	chickpea*.mp.
7	lentil*.mp.
8	legume*.mp.
9	leguminous.mp.
10	or/1-9
11	cohort.mp.
12	exp Prospective Studies/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	Diabetes Mellitus/
21	Diabetes Mellitus, Type 2/
22	"Type 2 Diabetes".mp.
23	20 or 21 or 22
24	10 and 19 and 23

SUPPLEMENTAL DATA

Supplemental Table 3 – Search strategy for hypertension outcomes

MEDLINE	
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	hypertensive*.mp.
21	exp Hypertension/
22	hypertension*.mp.
23	HTN.mp.
24	blood pressure.mp.
25	exp Blood Pressure/
26	systolic blood pressure.mp.
27	SBP.mp.
28	diastolic blood pressure.mp.
29	DBP.mp.
30	or/20-29
31	10 and 19 and 30

EMBASE	
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp multivariate analysis/
15	exp proportional hazards models/
16	follow up study.mp.
17	(longitudinal adj2 study).mp.
18	or/11-17
19	hypertensive*.mp.
20	exp Hypertension/
21	hypertension*.mp.
22	HTN.mp.
23	blood pressure.mp.
24	exp Blood Pressure/
25	systolic blood pressure.mp.
26	SBP.mp.
27	diastolic blood pressure.mp.
28	DBP.mp.
29	or/19-28
30	10 and 18 and 29

COCHRANE	
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp Prospective Studies/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	hypertensive*.mp.
21	exp Hypertension/
22	hypertension*.mp.
23	HTN.mp.
24	blood pressure.mp.
25	exp Blood Pressure/
26	systolic blood pressure.mp.
27	SBP.mp.
28	diastolic blood pressure.mp.
29	DBP.mp.
30	or/20-29
31	10 and 19 and 30

SUPPLEMENTAL DATA

Supplemental Table 4 – Search strategy for obesity outcomes

	MEDLINE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	exp Body Weight/
21	body weight*.mp.
22	exp Body Mass Index/
23	body mass index.mp.
24	BMI.mp.
25	exp Waist Circumference/
26	waist circumference.mp.
27	exp Waist-Hip Ratio/
28	waist-hip ratio.mp.
29	exp Overweight/
30	overweight.mp.
31	exp Obesity/
32	exp Obesity, Abdominal/
33	exp Obesity, morbid/
34	obesity.mp.
35	body fat.mp.
36	fat mass.mp.
37	or/20-36

	EMBASE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp prospective study/
13	(prospective adj2 (cohort or study)).mp.
14	exp multivariate analysis/
15	exp proportional hazards models/
16	follow up study.mp.
17	(longitudinal adj2 study).mp.
18	or/11-17
19	exp Body Weight/
20	body weight*.mp.
21	exp Body Mass Index/
22	body mass index.mp.
23	BMI.mp.
24	exp Waist Circumference/
25	waist circumference.mp.
26	exp Waist-Hip Ratio/
27	waist-hip ratio.mp.
28	exp Overweight/
29	overweight.mp.
30	exp Obesity/
31	exp Obesity, Abdominal/
32	exp Obesity, morbid/
33	obesity.mp.
34	body fat.mp.
35	fat mass.mp.
36	or/18-35

	COCHRANE
1	pulses.mp
2	fabaceae.mp
3	bean*.mp
4	pea.mp
5	peas.mp
6	chickpea*.mp
7	lentil*.mp
8	legume*.mp
9	leguminous.mp
10	or/1-9
11	cohort.mp.
12	exp Prospective Studies/
13	(prospective adj2 (cohort or study)).mp.
14	exp follow-up studies/
15	exp multivariate analysis/
16	exp proportional hazards models/
17	follow up study.mp.
18	(longitudinal adj2 study).mp.
19	or/11-18
20	body weight/
21	body weight*.mp.
22	exp body mass index/
23	body mass index.mp.
24	BMI.mp.
25	exp waist circumference/
26	waist circumference.mp.
27	exp waist-hip ratio/
28	waist-hip ratio.mp.
29	exp Overweight/
30	overweight.mp.
31	Obesity/
32	exp Obesity, Abdominal/
33	"body weights and measures"/
34	exp body fat distribution/
35	exp skinfold thickness/
36	obesity.mp.
37	exp adipose tissue/
38	body fat.mp.
39	fat mass.mp.
40	or/20-39

SUPPLEMENTAL DATA

38	10 and 19 and 37

37	10 and 18 and 36

41	10 and 19 and 40

SUPPLEMENTAL DATA

Supplemental Table 5 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and CVD incidence (7 cohort comparisons, N=231 353)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Bazzano et al. 2001 (14)	NHANES 1 NHEFS	USA	9632 M, W	25-74	19	3680	Medical records	Pinto beans, red beans, black-eye peas, peanuts, peanut butter	FFQ + 24-hr recall	Quartiles	~5.9	~80.9	Agency
Kokubo et al. 2007 – M (10)	JPHC	Japan	19 466 M	40-59	12.5	629	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Kokubo et al. 2007 – W (10)	JPHC	Japan	20 984 W	40-59	12.5	266	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
von Ruesten et al. 2013 (15)	EPIC-Potsdam	Germany	9098 M, 14 433 W	35-65	8	363	Medical records	Green beans, green peas, lentil/pea/ bean stew	SFFQ, validated	per 100 g/d	NR	NR	Agency
Nouri et al. 2016 (16)	ICS	Iran	2629 M, 2769 W	≥35	6.8	427	Medical records	Legumes	SFFQ, validated	Tertiles	NR	NR	NR
Buil-Cosailes et al. 2017 (17)	SUN	Spain	6633 M, 10 374 W	18–101	9.6	112	Medical records	Lentils, chickpeas, beans, peas (18)	SFFQ, validated	Quintiles	8.4	36	Agency
Miller et al. 2017 (11)	PURE	18 countries [4]	56 422 M, 78 913 W	35-70	7.4	4784	Medical records	Beans, black beans, lentils, peas, chickpeas, black-eyed peas	FFQ, validated	Quintiles	~0	~213	Agency-Industry

CVD=cardiovascular disease; EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; ICS=Isfahan Cohort Study; JPHC=Japan Public Health Center; M=men; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; NR=not reported; PURE= Prospective Urban Rural Epidemiology; SFFQ=semi-quantitative food frequency questionnaire; SUN=Seguimiento Universidad de Navarra; W=women; y=years

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

[4] Canada, Sweden, United Arab Emirates, Argentina, Brazil, Chile, Malaysia, Poland, South Africa, Turkey, China, Colombia, Iran, occupied Palestinian territory, Bangladesh, India, Pakistan, and Zimbabwe.

SUPPLEMENTAL DATA

Supplemental Table 6 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and CVD mortality (12 cohort comparisons, N=940 756)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Kokubo et al. 2007 – M (10)	JPHC	Japan	19 466 M	40-59	12.5	175	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Kokubo et al. 2007 – W (10)	JPHC	Japan	20 984 W	40-59	12.5	57	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Nagura et al. 2009 (19)	JACC	Japan	25 206 M, 34 279 W	40-79	12.7	2243	Medical records	Tofu, boiled beans	FFQ, validated	Quartiles	~5.7	~32.1	Agency
Gardener et al. 2011 (20)	NOMAS	USA	1637 M, 931 W	>40	9	314	Medical records	Legumes	FFQ, validated, interviewer administered	Median	NR	NR	Agency
Russell et al. 2014 (12)	MCCS	Australia	40 625 M, W	40-69 [4]	15.9	1365	Medical records	Lentils, chickpeas, dry beans, dry peas, baked beans, green beans, green peas (21)	FFQ	Tertiles	NR	NR	Agency
Lassale et al. 2015 (22)	EPIC	10 countries [5]	130 370 M, 320 886 W	35-70	12.8	5083	Medical records	Legumes	Several methods, validated [6]	Quintiles	5	25	NR
Bonaccio et al. 2017 (23)	Moli-sani	Italy	9931 M, 11 376 W	35-98	8.3	289	Medical records	Lentils, beans, chickpeas, fava beans, green peas	SFFQ, validated, interviewer administered	Quartiles	8.3	53.8	Agency-Industry
Farvid et al. 2017 (24)	Golestan Cohort Study	Iran	18 261 M, 24 142 W	36-85	8.1	1467	Medical records	Soybeans, beans, lentils, peas, split peas	SFFQ, validated, interviewer administered	Quintiles	~3	~26	Agency
Miller et al. 2017 (11)	PURE	18 countries [7]	56 422 M, 78 913 W	35-70	7.4	1649	Medical records	Beans, black beans, lentils, peas, chickpeas, black-eyed peas	FFQ, validated	Quintiles	~0	~213	Agency-Industry
Stefler et al. 2017 (25)	HAPIEE Study	Czech Republic, Poland, Russia	19 263 M,W	57	7	438	Medical records	Legumes	SFFQ, validated	per 1 point increase in component score	NR	NR	Agency
Papandreou et al. 2018 (26)	PREDIMED	Spain	3068 M, 4144 W	55-80 M 60-80 W	6	103	Medical records	Lentils, chickpeas, dry beans, fresh peas	SFFQ, validated, interviewer administered	Tertiles	14.0	27.3	Agency-Industry
van den Brandt et al. 2019 (13)	The Netherlands Cohort Study	Netherlands	58 279 M, 62 573 W	55-69	10	2985	Medical records	Pulses	SFFQ, validated	Quartiles	0	27.8	NR

CVD=cardiovascular disease; EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; JPHC=Japan Public Health Center; M=men; MCCS=Melbourne Collaborative Cohort Study; NOMAS=Northern Manhattan Study; NR=not reported; PREDIMED=PREvencion con DIeta MEDiterranea study; PURE= Prospective Urban Rural Epidemiology; SFFQ=semi-quantitative food frequency questionnaire; W=women; y=years

SUPPLEMENTAL DATA

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

[4] Participants age range at baseline was 27-75 years, where 99% of participants age ranged 40-69 years.

[5] Norway, Sweden, Denmark, UK, Netherlands, Germany, France, Spain, Italy, Greece.

[6] SFFQ, FFQ, interviewer administered quantitative dietary questionnaires, and/or food records.

[7] Canada, Sweden, United Arab Emirates, Argentina, Brazil, Chile, Malaysia, Poland, South Africa, Turkey, China, Colombia, Iran, occupied Palestinian territory, Bangladesh, India, Pakistan, and Zimbabwe.

SUPPLEMENTAL DATA

Supplemental Table 7 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and CHD incidence (10 cohort comparisons, N=306 814)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Bazzano et al. 2001 (14)	NHANES 1 NHEFS	USA	9632 M, W	25-74	19	1802	Medical records	Pinto beans, red beans, black-eye peas, peanuts, peanut butter	FFQ + 24-hr recall	Quartiles	~5.9	~80.9	Agency
Buckland et al. 2009 – M (27)	EPIC- Spain	Spain	15 335 M	29-69	10.4	480	Medical records	Legumes	SFFQ, validated, interviewer administered	Tertiles	~20.9	~295.6	Agency
Buckland et al. 2009 – W (27)	EPIC- Spain	Spain	25 422 W	29-69	10.4	126	Medical records	Legumes	SFFQ, validated, interviewer administered	Tertiles	~15.1	~214.2	Agency
Bernstein et al. 2010 (28)	NHS	USA	84 136 W	30-55	26	3162	Medical records	Beans	SFFQ, validated	Quintiles	~0	~16.4	Agency
Martinez-Gonzalez et al. 2011 (29)	SUN	Spain	5444 M, 8165 W	18-101	4.9	68	Medical records	Lentils, chickpeas, beans, peas (18)	SFFQ, validated	Median	NR	NR	Agency
Dilis et al. 2012 – M (30)	EPIC-Greece	Greece	9740 M	20-86	10	426	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Dilis et al. 2012 – W (30)	EPIC-Greece	Greece	14 189 W	20-86	10	210	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Haring et al. 2014 (32)	ARIC	USA	5331 M, 6735 W	45-64	22	1147	Medical records	String beans or green beans, peas or lima beans, beans or lentils (dried cooked, or canned) (33)	SFFQ, interviewer administered	Quintiles	~10.9	~65.1	Agency
Yu et al. 2014 (34)	SMHS	China	55 474 M	40-74	5.4	217	Medical records	Fresh peas, fresh soyabeans, broad beans, Chinese long beans, green beans, snow peas	SFFQ, validated, interviewer administered	Quartiles	10.8	62.8	Agency
Yu et al. 2014 (34)	SWHS	China	67 211 W	40-70	9.8	148	Medical records	Fresh peas, fresh soyabeans, broad beans, Chinese long beans, green beans,snow peas	SFFQ, validated, interviewer administered	Quartiles	8.5	50.7	Agency

AHS=Adventists Health Study; ARIC=Atherosclerosis Risk in Communities; CHD=coronary heart disease; EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; JPHC=Japan Public Health Center; M=men; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; NHS= Nurses' Health Study; NR=not reported; PURE= Prospective Urban Rural Epidemiology; SD=standard deviation; SFFQ=semi-quantitative food frequency questionnaire; SMHS=Shanghai Men's Health Study; SUN=Seguimiento Universidad de Navarra; SWHS=Shanghai Women's Health Study; W=women; y=years

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

SUPPLEMENTAL DATA

Supplemental Table 8 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and CHD mortality (9 cohort comparisons, N=224 592)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Fraser et al. 1992 (9)	AHS	USA	10 003 M, 16 740 W	≥25	6	463	Medical records	Beans, peas	SFFQ, validated	Tertiles	NR	NR	Agency
Kelemen et al. 2005 (35)	IWHS	USA	29 017 W	55-69	15	739	Medical records	Tofu, dried beans, nuts, peanut butter	SFFQ, validated	Quintiles	~10.7	~74.7	Agency
Nagura et al. 2009 (19)	JACC	Japan	25 206 M, 34 279 W	40-79	12.7	452	Medical records	Tofu, boiled beans	FFQ, validated	Quartiles	~5.7	~32.1	Agency
Dilis et al. 2012 – M (30)	EPIC-Greece	Greece	9740 M	20-86	10	150	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Dilis et al. 2012 – W (30)	EPIC-Greece	Greece	14 189 W	20-86	10	90	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Wang et al. 2016 (36)	LINXIAN NIT	China	1104 M, 1341 W	40-69	26	355	Medical records	Cooked dried soybean, cooked dried beans or peas, fresh bean curd, dried bean curd, fermented salted pickled bean curd, bean sprouts	FFQ	per 4 times/wk	NR	NR	Agency
Bonaccio et al. 2017 (23)	Moli-sani	Italy	9931 M, 11 376 W	≥35	8.3	92	Medical records	Lentils, beans, chickpeas, fava beans, green peas	SFFQ, validated, interviewer administered	Quartiles	8.3	53.8	Agency-Industry
Farvid et al. 2017 (24)	Golestan Cohort Study	Iran	18 261 M, 24 142 W	36-85	8.1	764	Medical records	Soybeans, beans, lentils, peas, split peas	SFFQ, validated, interviewer administered	Quintiles	~3	~26	Agency
Stefler et al. 2017 (25)	HAPIEE Study	Czech Republic, Poland, Russia	19 263 M,W	57	7	226	Medical records	Legumes	SFFQ, validated	per 1 point increase in component score	NR	NR	Agency

AHS=Adventists Health Study; CHD=coronary heart disease; EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; IWHS=Iowa Women's Health Study; JACC=Japan Collaborative Cohort; M=men; NIT=Nutrition Intervention Trials; NR=not reported; SD=standard deviation; SFFQ=semi-quantitative food frequency questionnaire; W=women; wk=week; y=years

SUPPLEMENTAL DATA

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

SUPPLEMENTAL DATA

Supplemental Table 9 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and MI incidence (4 cohort comparisons, N=202 528)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure	Diet assessment method	Quantile divisions	Lowest quantile [1], g/d	Highest quantile [1], g/d	Funding source [2]
Fraser et al. 1992 (9)	AHS	USA	10 003 M, 16 740 W	≥25	6	134	Medical records	Beans, peas	SFFQ, validated	Tertiles	NR	NR	Agency
Kokubo et al. 2007 – M (10)	JPHC	Japan	19 466 M	40-59	12.5	242	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Kokubo et al. 2007 – W (10)	JPHC	Japan	20 984 W	40-59	12.5	66	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Miller et al. 2017 (11)	PURE	18 countries [3]	56 422 M, 78 913 W	35-70	7.4	2143	Medical records	Beans, black beans, lentils, peas, chickpeas, black-eyed peas	FFQ, validated	Quintiles	~0	~213	Agency-Industry

AHS=Adventists Health Study; FFQ=food frequency questionnaire; JPHC=Japan Public Health Center; M=men; NR=not reported; PURE= Prospective Urban Rural Epidemiology; SFFQ=semi-quantitative food frequency questionnaire; W=women; y=years

[1] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[2] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

[3] Canada, Sweden, United Arab Emirates, Argentina, Brazil, Chile, Malaysia, Poland, South Africa, Turkey, China, Colombia, Iran, occupied Palestinian territory, Bangladesh, India, Pakistan, and Zimbabwe.

SUPPLEMENTAL DATA

Supplemental Table 10 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and stroke incidence (8 cohort comparisons, N=342 079)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Kokubo et al. 2007 – M (10)	JPHC	Japan	19 466 M	40-59	12.5	387	Medical records	Beans	FFQ, validated	Tertiles	NR	NR	Agency
Kokubo et al. 2007 – W (10)	JPHC	Japan	20 984 W	40-59	12.5	200	Medical records	Beans	FFQ. validated	Tertiles	NR	NR	Agency
Mizrahi et al. 2009 (37)	Finnish Mobile Clinic Health Examination Survey	Finland	3932 M,W	40-74	24	625	Medical records	Legumes	Diet history interview	Quartiles	~0.8	~40.3	Agency
Bernstein et al. 2012 (38)	HPFS	USA	43 150 M	40-75	22	1397	Medical records	Dry beans, peas, soy, tofu	SFFQ, validated	Quintiles	~6.8	~55.3	Agency
Bernstein et al. 2012 (38)	NHS	USA	84 010 W	30-55	26	2633	Medical records	Dry beans, peas, soy, tofu	SFFQ, validated	Quintiles	~6.8	~41.7	Agency
Misirli et al. 2012 (39)	EPIC-Greece	Greece	9617 M, 13 984 W	NR	10.6	395	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Haring et al. 2015 (40)	ARIC	USA	5120 M, 6481 W	45-64	22.7	699	Medical records	String beans or green beans, peas or lima beans, beans or lentils (dried cooked, or canned) (33)	SFFQ, interviewer administered	Quintiles	~7.6	~61.8	Agency
Miller et al. 2017 (11)	PURE	18 countries [4]	56 422 M, 78 913 W	35-70	7.4	2234	Medical records	Beans, black beans, lentils, peas, chickpeas, black-eyed peas	FFQ, validated	Quintiles	~0	~213	Agency-Industry

ARIC=Atherosclerosis Risk in Communities; EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; HPFS=Health Professionals Follow-Up Study; JPHC=Japan Public Health Center; M=men; NHS=Nurses' Health Study; NR=not reported; PURE=Prospective Urban Rural Epidemiology; SD=standard deviation; SFFQ=semi-quantitative food frequency questionnaire; W=women; y=years

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

[4] Canada, Sweden, United Arab Emirates, Argentina, Brazil, Chile, Malaysia, Poland, South Africa, Turkey, China, Colombia, Iran, occupied Palestinian territory, Bangladesh, India, Pakistan, and Zimbabwe.

SUPPLEMENTAL DATA

Supplemental Table 11 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and stroke mortality (6 cohort comparisons, N=168 504)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Nagura et al. 2009 (19)	JACC	Japan	25 206 M, 34 279 W	40-79	12.7	1053	Medical records	Tofu, boiled beans	FFQ, validated	Quartiles	~5.7	~32.1	Agency
Misirli et al. 2012 (39)	EPIC-Greece	Greece	9617 M, 13 984 W	NR	10.6	196	Medical records	Lentils, chickpeas, beans, green peas, green beans (31)	SFFQ, validated, interviewer administered	per SD	NR	NR	Agency
Wang et al. 2016 (36)	LINXIAN NIT	China	1104 M, 1341 W	40-69	26	452	Medical records	Beans	FFQ	per 4 times/wk	NR	NR	Agency
Bonaccio et al. 2017 (23)	Moli-sani	Italy	9931 M, 11 376 W	≥35	8.3	67	Medical records	Lentils, beans, chickpeas, fava beans, green peas	SFFQ, validated, interviewer administered	Quartiles	8.3	53.8	Agency-Industry
Farvid et al. 2017 (24)	Golestan Cohort Study	Iran	18 261 M, 24 142 W	36-85	8.1	507	Medical records	Soybeans, beans, lentils, peas, split peas	SFFQ, validated, interviewer administered	Quintiles	~3	~26	Agency
Stefler et al. 2017 (25)	HAPIEE Study	Czech Republic, Poland, Russia	19 263 M,W	57	7	109	Medical records	Legumes	SFFQ, validated	per 1 point increase in component score	NR	NR	Agency

EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; ; M=men; NIT=Nutrition Intervention Trials; NR=not reported; SD=standard deviation; SFFQ=semi-quantitative food frequency questionnaire; W=women; y=years; wk=week

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

SUPPLEMENTAL DATA

Supplemental Table 12 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and diabetes incidence (9 cohort comparisons, N=259 325)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Meyer et al. 2000 (41)	IWHS	USA	35 988 W	55-69	6	1141	Self-report	Mature beans	SFFQ, validated	Quintiles	~19.3	~125.4	Agency
Hodge et al. 2004 (42)	MCCS	Australia	31 641 M, W	40-69 [4]	4	365	Medical records	Lentils, chickpeas, dry beans, dry peas, baked beans, green beans, green peas (21)	FFQ	Quartiles	NR	NR	Agency
Bazzano et al. 2008 (43)	NHS	USA	71 346 W	38-63	18	4529	Self-report	Tofu, peas, beans	SFFQ, validated	Quintiles	~7.3	~46.9	Agency
Villegas et al. 2008 (44)	SWHS	China	64 191 W	40-70	4.6	1605	Self-report	All legumes excluding soybeans and peanuts	SFFQ, validated, interviewer administered	Quintiles	5.6	37.1	Agency
Ericson et al. 2013 – M (45)	MDC	Sweden	10 550 M	45-74	12	798	Medical records	Legumes	Modified diet history method [5], validated	Quintiles	0	61	Agency-Industry
Ericson et al. 2013 – W (45)	MDC	Sweden	16 590 W	45-74	12	773	Medical records	Legumes	Modified diet history method [5], validated	Quintiles	0	49	Agency-Industry
von Ruesten et al. 2013 (15)	EPIC-Potsdam	Germany	9098 M, 14 433 W	35-65	8	837	Medical records	Green beans, green peas, lentil/pea/ bean stew	SFFQ, validated	per 100 g/d	NR	NR	Agency
Becerra-Tomas et al. 2017 (46)	PREDIMED	Spain	1267 M, 2082 W	55-80 M 60-80 W	4.3	266	Medical records	Lentils, chickpeas, dry beans, fresh peas	SFFQ, validated, interviewer administered	Quartiles	12.7	28.8	Agency-Industry
Khalili-Moghadam et al. 2019 (47)	TLGS	Iran	971 M, 1168 W	20-70	5.8	143	NR	Legumes	SFFQ, validated, interviewer administered	Tertiles	~20.2	~41.9	NR

EPIC=European Prospective Investigation into Cancer and Nutrition; FFQ=food frequency questionnaire; IWHS=Iowa Women's Health Study; M=men; MCCS=Melbourne Collaborative Cohort Study; MDC=Malmo Diet and Cancer; NHS=Nurses' Health Study; NR=not reported; PREDIMED=PREvencion con DIeta MEDiterranea study; SFFQ=semi-quantitative food frequency questionnaire; SWHS=Shanghai Women's Health Study; TLGS=Tehran Lipid and Glucose Study; W=women; y=years

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[3] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

[4] Participants age range at baseline was 27-75 years, where 99% of participants age ranged 40-69 years.

[5] 7-day menu book + SFFQ + interview.

SUPPLEMENTAL DATA

Supplemental Table 13 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and hypertension incidence (7 cohort comparisons, N=288 352)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome Assessment method	Exposure [1]	Diet assessment method	Quantile divisions	Lowest quantile [2], g/d	Highest quantile [2], g/d	Funding source [3]
Nunez-Cordoba et al. 2009 (48)	SUN	Spain	3583 M, 5825 W	20-90	4.2	501	Medical records	Lentils, chickpeas, beans, peas (18)	SFFQ, validated	Median	NR	NR	Agency
Weng et al. 2013 (49)	ARIC	USA	4459 M, 5454 W	45-64	9	2853	Medical records	String beans or green beans, peas or lima beans, beans or lentils (dried cooked, or canned) (33)	SFFQ, interviewer administered	Tertiles	~0	~162.8	Agency
Borgi et al. 2016 (50)	NHS	USA	62 175 W	30-55	26	35375	Self-report	Beans or lentils	SFFQ, validated	Quartiles	~2	~75.2	Agency
Borgi et al. 2016 (50)	NHS II	USA	88 475 W	25-42	20	25246	Self-report	Beans or lentils	SFFQ, validated	Quartiles	~2	~75.2	Agency
Borgi et al. 2016 (50)	HPFS	USA	36 803 M	40-75	24	16752	Self-report	Beans or lentils	SFFQ, validated	Quartiles	~2	~75.2	Agency
Golzarand et al. 2016 (51)	TLGS	Iran	490 M, 662 W	20-84	3	144	Medical records	Kidney beans, pinto beans, white beans, chickpeas, cowpeas, lentils, split peas, soybeans	SFFQ, validated, interviewer administered	Tertiles	13.5	43.9	Agency
Lelong et al. 2017 (52)	NutriNet-Santé	France	16 166 M, 64 260 W	≥18	3.4	2413	Self-report	Legumes	24-hr diet records	Quartiles	0	79	Agency

ARIC=Atherosclerosis Risk in Communities; HPFS=Health Professionals Follow-Up Study; M=men; NHS=Nurses' Health Study; NR=not reported; SFFQ=semi-quantitative food frequency questionnaire; SUN=Seguimiento Universidad de Navarra; TLGS=Tehran Lipid and Glucose Study; W=women; y=years

[1] For studies that reported "legumes" as the exposure without differentiating the legume type, an attempt was made to access the diet assessment tool used by the study or other relevant publications in order to verify the legume type. A reference was provided for those studies where we were able to obtain more information regarding the legume type.

[2] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

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SUPPLEMENTAL DATA

Supplemental Table 14 – Characteristics of prospective cohort studies assessing the association between dietary pulses with or without other legumes and obesity incidence (1 cohort comparison, N=18 146)

Study (Supplemental reference)	Cohort	Country	No. participants	Age range, y	Follow-up, y	No. cases	Outcome Assessment method	Exposure	Diet assessment method	Quantile divisions	Lowest quantile [1], g/d	Highest quantile [1], g/d	Funding source [2]
Rautiainen et al. 2015 (53)	WHS	USA	18 146 W	≥45	15.9	8125	Self-report	Beans, peas, string beans, tofu	SFFQ, validated	Quintiles	~16.2	~75.8	Agency

SFFQ=semi-quantitative food frequency questionnaire; W=women; WHS=Women's Health Study; y=years

[1] Lowest and highest quantiles preceded by "~" represents quantiles that have been converted to g/d from another measure (e.g. servings/d were converted to g/d using a defined serving size provided by the study or the serving size was estimated using relevant dietary guidelines).

[2] Agency funding is that from government, university, or not-for-profit sources. Industry funding is that from trade organizations that obtain revenue from the sale of products.

SUPPLEMENTAL DATA

Supplemental Table 15 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and CVD incidence

COHORT	NHANES 1 NHEFS	JPHC	EPIC-Potsdam	ICS	SUN	PURE
STUDY (Supplemental reference)	**Bazzano et al. 2001 (14)**	**Kokubo et al. 2007 (10)**	**von Ruesten et al. 2013 (15)**	**Nouri et al. 2016 (16)**	**Buil-Cosailes et al. 2017 (17)**	**Miller et al. 2017 (11)**
Pre-specified primary confounding variables						
Age	x	x	x	x	x	x
Pre-specified secondary confounding variables						
Sex	x	x	x	x	x	x
Family history of CVD					x	
Smoking	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x	x	x	x
Diabetes [1]	x	x			x	x
Hypertension [1]	x	x	x		x	x
Dyslipidemia [1]	x	x	x	x	x	x
Energy intake	x	x	x		x	x
Physical activity	x	x	x	x	x	x
Other confounding variables						
Ethnicity, race, country of birth	x					
Education	x	x	x	x	x	x
Income, job				x		
Household amenities score						
Marital status				x	x	
Hours of sleep						
Mental status						
Height						
Shared frailty				x		
Family history of cancer						
Family history of hypertension						
History of hypercholesterolemia or hypertension						
Menopausal status		x				
Postmenopausal hormone use						
Aspirin, analgesic use						
Opium use						
Oral contraceptive use						
C-reactive protein						
Carbohydrates						
Grains					x	x
Fruits, vegetables	x	x			x	
Fiber						
Meat, poultry, fish	x	x				x
Egg						
Dairy						
Nuts						
Other protein sources						
No legume consumption			x			

Fat						
PUFA						
MUFA					x	
SFA	x					
Trans fat						
MUFA:SFA						
Dietary cholesterol						
Dietary methionine						
Vitamin supplements use			x			
Magnesium						
Potassium						
Sodium		x				
Alcohol	x	x	x		x	
Tea, coffee						
Water						
SSBs, ASBs, fruit juice						
Junk food (chips, pizza, desserts)						
Legume-adjusted dietary score				x		
MedDiet adherence						
Healthy Food Score						
Centre		x				x
Birth cohort, cohort	x					
Time period, season						
Area of recruitment, residency						x
Method version						
Intervention group						
Randomization treatment assignment						

ASB=artificially sweetened beverage; CVD=cardiovascular disease; EPIC=European Prospective Investigation into Cancer and Nutrition; ICS=Isfahan Cohort Study; JPHC=Japan Public Health Center; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; PURE=Prospective Urban Rural Epidemiology; SSB=sugar sweetened beverage; SUN=Seguimiento Universidad de Navarra

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 16 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and CVD mortality

COHORT	JPHC	JACC	NOMAS	MCCS	EPIC	Moli-sani	Golestan Cohort Study	PURE	HAPIEE Study	PREDIMED	The Netherlands Cohort Study
STUDY (Supplemental reference)	**Kokubo et al. 2007 (10)**	**Nagura et al. 2009 (19)**	**Gardener et al. 2011 (20)**	**Russell et al. 2014 (12)**	**Lassale et al. 2015 (22)**	**Bonaccio et al. 2017 (23)**	**Farvid et al. 2017 (24)**	**Miller et al. 2017 (11)**	**Stefler et al. 2017 (25)**	**Papandreou et al. 2018 (26)**	**van den Brandt et al. 2019 (13)**
Pre-specified primary confounding variables											
Age	x	x	x	x	x	x	x	x	x	x	x
Pre-specified secondary confounding variables				NR [1]							
Sex	x	x	x		x	x	x	x	x	x	x
Family history of CVD											
Smoking	x	x	x		x	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x			x		x	x		x	x
Diabetes [2]	x	x				x		x		x	x
Hypertension [2]	x	x					x	x		x	x
Dyslipidemia [2]	x							x		x	
Energy intake	x		x		x	x	x	x	x		x
Physical activity	x	x	x		x	x	x	x	x	x	x
Other confounding variables											
Ethnicity, race, country of birth			x				x				
Education	x	x	x		x	x	x	x	x	x	x
Income, job						x	x				
Household amenities score									x		
Marital status							x		x		
Hours of sleep		x									
Mental status		x									
Height											x
Shared frailty											
Family history of cancer							x				
Family history of hypertension											
History of hypercholesterolemia or hypertension											
Menopausal status	x										
Postmenopausal hormone use											x
Aspirin, analgesic use							x				
Opium use							x				
Oral contraceptive use											
C-reactive protein						x					
Carbohydrates											
Grains			x					x			
Fruits, vegetables	x	x	x								x

Fiber											
Meat, poultry, fish	x		x					x			
Egg											
Dairy			x								
Nuts											
Other protein sources											
No legume consumption											
Fat											
PUFA		x									
MUFA											
SFA		x									
Trans fat											
MUFA:SFA			x								
Dietary cholesterol		x									
Dietary methionine											
Vitamin supplements use									x		x
Magnesium											
Potassium											
Sodium	x	x									
Alcohol	x	x	x		x		x			x	x
Tea, coffee						x					
Water											
SSBs, ASBs, fruit juice											
Junk food (chips, pizza, desserts)											
Legume-adjusted dietary score						x					
MedDiet adherence										x	
Healthy Food Score											
Centre	x				x			x		x	
Birth cohort, cohort									x		
Time period, season						x					
Area of recruitment, residency							x	x			
Method version											
Intervention group										x	
Randomization treatment assignment											

ASB=artificially sweetened beverage; CVD=cardiovascular disease; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; JPHC=Japan Public Health Center; MCCS=Melbourne Collaborative Cohort Study; NOMAS=Northern Manhattan Study; NR=not reported; PREDIMED=PREvencion con DIeta MEDiterranea study; PURE= Prospective Urban Rural Epidemiology; SSB=sugar sweetened beverage

[1] Study results were reported in an abstract, which stated that "Multivariate regression models were used to calculate cardiovascular mortality hazard risk ratios. Models were adjusted for age, and other lifestyle variables."

[2] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 17 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and CHD incidence

COHORT	NHANES 1 NHEFS	EPIC-Spain	NHS	SUN	EPIC-Greece	ARIC	SMHS	SWHS
STUDY (Supplemental reference)	**Bazzano et al. 2001 (14)**	**Buckland et al. 2009 (27)**	**Bernstein et al. 2010 (28)**	**Martinez-Gonzalez et al. 2011 (29)**	**Dilis et al. 2012 (30)**	**Haring et al. 2014 (32)**	**Yu et al. 2014 (34)**	**Yu et al. 2014 (34)**
Pre-specified primary confounding variables								
Age	x	x	x	x	x	x	x	x
Pre-specified secondary confounding variables								
Sex	x	x	x	x	x	x	x	x
Family history of CVD			x	x				
Smoking	x	x	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x	x	x	x	x	x
Diabetes [1]	x	x		x			x	x
Hypertension [1]	x	x		x	x	x	x	x
Dyslipidemia [1]	x	x		x		x	x	x
Energy intake	x	x	x	x	x	x	x	x
Physical activity	x	x	x	x	x	x	x	x
Other confounding variables								
Ethnicity, race, country of birth	x					x		
Education	x	x			x	x	x	x
Income, job							x	x
Household amenities score								
Marital status								
Hours of sleep								
Mental status								
Height					x			
Shared frailty								
Family history of cancer								
Family history of hypertension								
History of hypercholesterolemia or hypertension								
Menopausal status			x				x	x
Postmenopausal hormone use			x				x	x
Aspirin, analgesic use			x	x			x	x
Opium use								
Oral contraceptive use								
C-reactive protein								
Carbohydrates						x		
Grains								
Fruits, vegetables	x							
Fiber			x			x		
Meat, poultry, fish	x						x	x
Egg								

Dairy								
Nuts								
Other protein sources								
No legume consumption								
Fat								
PUFA								
MUFA								
SFA	x							
Trans fat			x					
MUFA:SFA								
Dietary cholesterol								
Dietary methionine								
Vitamin supplements use			x				x	x
Magnesium						x		
Potassium								
Sodium								
Alcohol	x		x		x	x	x	x
Tea, coffee								
Water								
SSBs, ASBs, fruit juice								
Junk food (chips, pizza, desserts)								
Legume-adjusted dietary score								
MedDiet adherence								
Healthy Food Score								
Centre		x				x		
Birth cohort, cohort	x						x	x
Time period, season			x					
Area of recruitment, residency								
Method version								
Intervention group								
Randomization treatment assignment								

ARIC=Atherosclerosis Risk in Communities; ASB=artificially sweetened beverage; CHD=coronary heart disease; EPIC=European Prospective Investigation into Cancer and Nutrition; NHANES 1 NHEFS=First National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; NHS=Nurses' Health Study; SMHS=Shanghai Men's Health Study; SSB=sugar sweetened beverage; SUN=Seguimiento Universidad de Navarra; SWHS=Shanghai Women's Health Study

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 18 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and CHD mortality

COHORT	AHS	IWHS	JACC	EPIC-Greece	LINXIAN NIT	Moli-sani	Golestan Cohort Study	HAPIEE Study
STUDY (Supplemental reference)	**Fraser et al. 1992 (9)**	**Kelemen et al. 2005 (35)**	**Nagura et al. 2009 (19)**	**Dilis et al. 2012 (30)**	**Wang et al. 2016 (36)**	**Bonaccio et al. 2017 (23)**	**Farvid et al. 2017 (24)**	**Stefler et al. 2017 (25)**
Pre-specified primary confounding variables								
Age	x	x	x	x	x	x	x	x
Pre-specified secondary confounding variables								
Sex	x	x	x	x	x	x	x	x
Family history of CVD								
Smoking	x	x	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x	x	x		x	
Diabetes [1]			x			x		
Hypertension [1]	x	x	x	x			x	
Dyslipidemia [1]								
Energy intake		x		x		x	x	x
Physical activity	x	x	x	x		x	x	x
Other confounding variables								
Ethnicity, race, country of birth							x	
Education		x	x	x		x	x	x
Income, job						x	x	
Household amenities score								x
Marital status							x	x
Hours of sleep			x					
Mental status			x					
Height				x				
Shared frailty								
Family history of cancer		x					x	
Family history of hypertension								
History of hypercholesterolemia or hypertension								
Menopausal status								
Postmenopausal hormone use		x						
Aspirin, analgesic use							x	
Opium use							x	
Oral contraceptive use								
C-reactive protein						x		
Carbohydrates								
Grains								
Fruits, vegetables		x	x					
Fiber		x						
Meat, poultry, fish		x						
Egg		x						
Dairy		x						
Nuts								
Other protein sources								

No legume consumption								
Fat								
PUFA		x	x					
MUFA		x						
SFA		x	x					
Trans fat		x						
MUFA:SFA								
Dietary cholesterol		x	x					
Dietary methionine		x						
Vitamin supplements use		x						x
Magnesium								
Potassium								
Sodium			x					
Alcohol		x	x	x	x		x	
Tea, coffee						x		
Water								
SSBs, ASBs, fruit juice								
Junk food (chips, pizza, desserts)								
Legume-adjusted dietary score						x		
MedDiet adherence								
Healthy Food Score								
Centre								
Birth cohort, cohort								x
Time period, season					x	x		
Area of recruitment, residency					x		x	
Method version								
Intervention group								
Randomization treatment assignment								

AHS=Adventists Health Study; ASB=artificially sweetened beverage; CHD=coronary heart disease; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; IWHS=Iowa Women's Health Study; JACC=Japan Collaborative Cohort; LINXIAN NIT=LINXIAN Nutrition Intervention Trials; SSB=sugar sweetened beverage

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 19 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and MI incidence

COHORT	AHS	JPHC	PURE
STUDY (Supplemental reference)	**Fraser et al. 1992 (9)**	**Kokubo et al. 2007 (10)**	**Miller et al. 2017 (11)**
Pre-specified primary confounding variables			
Age	x	x	x
Pre-specified secondary confounding variables			
Sex	x	x	x
Family history of CVD			
Smoking	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x
Diabetes [1]		x	x
Hypertension [1]	x	x	x
Dyslipidemia [1]		x	x
Energy intake		x	x
Physical activity	x	x	x
Other confounding variables			
Ethnicity, race, country of birth			
Education		x	x
Income, job			
Household amenities score			
Marital status			
Hours of sleep			
Mental status			
Height			
Shared frailty			
Family history of cancer			
Family history of hypertension			
History of hypercholesterolemia or hypertension			
Menopausal status		x	
Postmenopausal hormone use			
Aspirin, analgesic use			
Opium use			
Oral contraceptive use			
C-reactive protein			
Carbohydrates			
Grains			x
Fruits, vegetables		x	
Fiber			
Meat, poultry, fish		x	x
Egg			
Dairy			
Nuts			
Other protein sources			
No legume consumption			

Fat			
PUFA			
MUFA			
SFA			
Trans fat			
MUFA:SFA			
Dietary cholesterol			
Dietary methionine			
Vitamin supplements use			
Magnesium			
Potassium			
Sodium		x	
Alcohol		x	
Tea, coffee			
Water			
SSBs, ASBs, fruit juice			
Junk food (chips, pizza, desserts)			
Legume-adjusted dietary score			
MedDiet adherence			
Healthy Food Score			
Centre		x	x
Birth cohort, cohort			
Time period, season			
Area of recruitment, residency			x
Method version			
Intervention group			
Randomization treatment assignment			

AHS=Adventists Health Study; ASB=artificially sweetened beverage; JPHC=Japan Public Health Center; MI=myocardial infarction; PURE= Prospective Urban Rural Epidemiology; SSB=sugar sweetened beverage

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 20 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and stroke incidence

COHORT	**JPHC**	**Finnish Mobile Clinic Health Examination Survey**	**HPFS**	**NHS**	**EPIC-Greece**	**ARIC**	**PURE**
STUDY (Supplemental reference)	**Kokubo et al. 2007 (10)**	**Mizrahi et al. 2009 (37)**	**Bernstein et al. 2012 (38)**	**Bernstein et al. 2012 (38)**	**Misirli et al. 2012 (39)**	**Haring et al. 2015 (40)**	**Miller et al. 2017 (11)**
Pre-specified primary confounding variables							
Age	x	x	x	x	x	x	x
Pre-specified secondary confounding variables							
Sex	x	x	x	x	x	x	x
Family history of CVD			x	x			
Smoking	x	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x	x	x	x	x
Diabetes [1]	x				x		x
Hypertension [1]	x	x			x	x	x
Dyslipidemia [1]	x	x				x	x
Energy intake	x	x	x	x	x	x	x
Physical activity	x	x	x	x	x	x	x
Other confounding variables							
Ethnicity, race, country of birth						x	
Education	x				x	x	x
Income, job							
Household amenities score							
Marital status							
Hours of sleep							
Mental status							
Height							
Shared frailty							
Family history of cancer							
Family history of hypertension							
History of hypercholesterolemia or hypertension							
Menopausal status	x			x			
Postmenopausal hormone use				x			
Aspirin, analgesic use			x	x			
Opium use							
Oral contraceptive use							
C-reactive protein							
Carbohydrates						x	
Grains							x
Fruits, vegetables	x		x	x			
Fiber			x	x		x	
Meat, poultry, fish	x						x
Egg							
Dairy							
Nuts							
Other protein sources			x	x			

No legume consumption							
Fat						x	
PUFA							
MUFA							
SFA							
Trans fat			x	x			
MUFA:SFA							
Dietary cholesterol							
Dietary methionine							
Vitamin supplements use			x	x			
Magnesium						x	
Potassium							
Sodium	x						
Alcohol	x		x	x		x	
Tea, coffee							
Water							
SSBs, ASBs, fruit juice							
Junk food (chips, pizza, desserts)							
Legume-adjusted dietary score							
MedDiet adherence							
Healthy Food Score							
Centre	x					x	x
Birth cohort, cohort							
Time period, season			x	x			
Area of recruitment, residency							x
Method version							
Intervention group							
Randomization treatment assignment							

ASB=artificially sweetened beverage; ARIC=Atherosclerosis Risk in Communities; EPIC=European Prospective Investigation into Cancer and Nutrition; HPFS=Health Professionals Follow-Up Study; JPHC=Japan Public Health Center; NHS=Nurses' Health Study; PURE=Prospective Urban Rural Epidemiology; SSB=sugar sweetened beverage

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 21 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and stroke mortality

COHORT	**JACC**	**EPIC-Greece**	**LINXIAN NIT**	**Moli-sani**	**Golestan Cohort Study**	**HAPIEE Study**
STUDY (Supplemental reference)	**Nagura et al. 2009 (19)**	**Misirli et al. 2012 (39)**	**Wang et al. 2016 (36)**	**Bonaccio et al. 2017 (23)**	**Farvid et al. 2017 (24)**	**Stefler et al. 2017 (25)**
Pre-specified primary confounding variables						
Age	x	x	x	x	x	x
Pre-specified secondary confounding variables						
Sex	x	x	x	x	x	x
Family history of CVD						
Smoking	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x		x	
Diabetes [1]	x	x		x		
Hypertension [1]	x	x			x	
Dyslipidemia [1]						
Energy intake		x		x	x	x
Physical activity	x	x		x	x	x
Other confounding variables						
Ethnicity, race, country of birth					x	
Education	x	x		x	x	x
Income, job				x	x	
Household amenities score						x
Marital status					x	x
Hours of sleep	x					
Mental status	x					
Height						
Shared frailty						
Family history of cancer					x	
Family history of hypertension						
History of hypercholesterolemia or hypertension						
Menopausal status						
Postmenopausal hormone use						
Aspirin, analgesic use					x	
Opium use					x	
Oral contraceptive use						
C-reactive protein				x		
Carbohydrates						
Grains						
Fruits, vegetables	x					
Fiber						
Meat, poultry, fish						
Egg						
Dairy						
Nuts						

Other protein sources						
No legume consumption						
Fat						
PUFA	x					
MUFA						
SFA	x					
Trans fat						
MUFA:SFA						
Dietary cholesterol	x					
Dietary methionine						
Vitamin supplements use						x
Magnesium						
Potassium						
Sodium	x					
Alcohol	x		x		x	
Tea, coffee				x		
Water						
SSBs, ASBs, fruit juice						
Junk food (chips, pizza, desserts)						
Legume-adjusted dietary score				x		
MedDiet adherence						
Healthy Food Score						
Centre						
Birth cohort, cohort						x
Time period, season			x	x		
Area of recruitment, residency			x		x	
Method version						
Intervention group						
Randomization treatment assignment						

ASB=artificially sweetened beverage; EPIC=European Prospective Investigation into Cancer and Nutrition; HAPIEE=Health Alcohol and Psychosocial factors in Eastern Europe Study; JACC=Japan Collaborative Cohort; LINXIAN NIT=LINXIAN Nutrition Intervention Trials; SSB=sugar sweetened beverage

[1] Includes adjustment for medication use for respective condition or levels of relevant biomarkers

SUPPLEMENTAL DATA

Supplemental Table 22 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and diabetes incidence

COHORT	IWHS	MCCS	NHS	SWHS	MDC	EPIC-Potsdam	PREDIMED	TLGS
STUDY (Supplemental reference)	**Meyer et al. 2000 (41)**	**Hodge et al. 2004 (42)**	**Bazzano et al. 2008 (14)**	**Villegas et al. 2008 (44)**	**Ericson et al. 2013 (45)**	**von Ruesten et al. 2013 (15)**	**Becerra-Tomas et al. 2017 (46)**	**Khalili-Moghadam et al. 2019 (47)**
Pre-specified primary confounding variables								
Age	x	x	x	x	x	x	x	
Pre-specified secondary confounding variables								
Sex	x	x	x	x	x	x	x	
Family history of diabetes		x						
Smoking	x		x	x	x	x	x	
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x	x	x	x	x	x	x	
Energy intake	x	x	x	x	x	x		
Physical activity	x	x	x	x	x	x	x	
Other confounding variables								
Ethnicity, race, country of birth		x						
Education	x	x		x	x	x	x	
Income, job				x				
Household amenities score								
Marital status								
Hours of sleep								
Mental status								
Height								
Shared frailty								
Family history of cancer								
Family history of hypertension								
History of hypercholesterolemia or hypertension								
Menopausal status								
Diabetes Risk Score [1]								x
Postmenopausal hormone use			x					
Aspirin, analgesic use								
Opium use								
Oral contraceptive use								
C-reactive protein								
Carbohydrates								
Grains			x			x		
Fruits, vegetables			x	x		x		
Fiber				x				
Meat, poultry, fish			x			x		
Egg						x		
Dairy						x		
Nuts			x			x		
Other protein sources								

No legume consumption								
Fat						x		
PUFA								
MUFA								
SFA								
Trans fat								
MUFA:SFA								
Dietary cholesterol								
Dietary methionine								
Vitamin supplements use						x		
Magnesium								
Potassium								
Alcohol	x	x	x	x	x	x	x	
Tea, coffee			x			x		
Water						x		
SSBs, ASBs, fruit juice			x			x		
Junk food (chips, pizza, desserts)						x		
Legume-adjusted dietary score							x	
MedDiet adherence							x	
Healthy Food Score								
Centre								
Birth cohort, cohort								
Time period, season					x			
Area of recruitment, residency								
Method version					x			
Intervention group							x	
Randomization treatment assignment								

ASB=artificially sweetened beverage; EPIC=European Prospective Investigation into Cancer and Nutrition; IWHS=Iowa Women's Health Study; MCCS=Melbourne Collaborative Cohort Study; MDC=Malmo Diet and Cancer; NHS=Nurses' Health Study; PREDIMED=PREvencion con DIeta MEDiterranea study; SWHS=Shanghai Women's Health Study; SSB=sugar sweetened beverage; TLGS= Tehran Lipid and Glucose Study

[1] Khalili-Moghadam et al. 2019 (48) defined diabetes risk score as follows: 5 points for having a family history of diabetes; fasting plasma glucose concentrations divided into <5, 5−5.5, and 5.6−6.9 mmol/L with 0, 12, and 33 points, respectively; systolic blood pressure divided into three categories: <120, 120−140, and ≥140 mm Hg with 0, 3, and 7 points, respectively; waist to height ratio divided into three categories: <0.54, 0.54−0.59, and ≥0.59 with 0, 6, and 11 points, respectively; TG/HDL-C (≥3.5) (3 points), and TG/HDL-C (<3.5) (0 point).

SUPPLEMENTAL DATA

Supplemental Table 23 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and hypertension incidence

COHORT	SUN	ARIC	NHS	NHS II	HPFS	TLGS	NutriNet-Santé
STUDY (Supplemental reference)	**Nunez-Cordoba et al. 2009 (48)**	**Weng et al. 2013 (49)**	**Borgi et al. 2016 (50)**	**Borgi et al. 2016 (50)**	**Borgi et al. 2016 (50)**	**Golzarand et al. 2016 (51)**	**Lelong et al. 2017 (52)**
Pre-specified primary confounding variables							
Age	x	x	x	x	x	x	x
Pre-specified secondary confounding variables							
Sex	x	x	x	x	x	x	x
Diabetes							
Smoking	x	x	x	x	x	x	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x		x	x	x	x	x
Energy intake	x	x	x	x	x	x	x
Sodium intake						x	
Physical activity	x	x	x	x	x	x	x
Other confounding variables							
Ethnicity, race, country of birth		x	x	x	x		
Education		x					x
Income, job							
Household amenities score							
Marital status							
Hours of sleep							
Mental status							
Height							
Shared frailty							
Family history of cancer							
Family history of hypertension	x		x	x	x		x
History of hypercholesterolemia or hypertension							
Menopausal status			x	x			
Postmenopausal hormone use							
Aspirin, analgesic use			x	x	x		
Opium use							
Oral contraceptive use			x	x			
C-reactive protein							
Carbohydrates							
Grains	x		x	x	x		
Fruits, vegetables	x						
Fiber						x	
Meat, poultry, fish	x		x	x	x		
Egg							
Dairy	x						
Nuts	x						
Other protein sources							

SUPPLEMENTAL DATA

No legume consumption							
Fat							
PUFA							
MUFA							
SFA							
Trans fat							
MUFA:SFA	x						
Dietary cholesterol							
Dietary methionine							
Vitamin supplements use							
Magnesium							
Potassium						x	
Alcohol	x		x	x	x		x
Tea, coffee	x						
Water							
SSBs, ASBs, fruit juice			x	x	x		
Junk food (chips, pizza, desserts)							
Legume-adjusted dietary score							
MedDiet adherence							
Healthy Food Score		x					
Centre		x					
Birth cohort, cohort							
Time period, season							
Area of recruitment, residency							
Method version							
Intervention group							
Randomization treatment assignment							

ARIC=Atherosclerosis Risk in Communities; HPFS=Health Professionals Follow-Up Study; NHS=Nurses' Health Study; SUN=Seguimiento Universidad de Navarra; TLGS=Tehran Lipid and Glucose Study

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Supplemental Table 24 – Analysis of confounding variables among prospective cohort studies assessing the association between dietary pulses with or without other legumes and obesity incidence

COHORT	**WHS**
STUDY (Supplemental reference)	**Rautiainen et al. 2015 (53)**
Pre-specified primary confounding variables	
Age	x
Sex	x
Smoking	x
Markers of overweight/obesity (BMI, weight, waist circumference, waist-to-hip ratio)	x
Energy intake	x
Physical activity	x
Other confounding variables	
Ethnicity, race, country of birth	
Education	
Income, job	
Household amenities score	
Marital status	
Hours of sleep	
Mental status	
Height	
Shared frailty	
Family history of diabetes	
Family history of cancer	
Family history of hypertension	
History of hypercholesterolemia or hypertension	x
Menopausal status	x
Postmenopausal hormone use	x
Aspirin, analgesic use	
Opium use	
Oral contraceptive use	
C-reactive protein	
Carbohydrates	
Grains	
Fruits, vegetables	
Fiber	
Meat, poultry, fish	
Egg	
Dairy	
Nuts	
Other protein sources	
No legume consumption	
Fat	
PUFA	
MUFA	
SFA	

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Trans fat	
MUFA:SFA	
Dietary cholesterol	
Dietary methionine	
Vitamin supplements use	x
Magnesium	
Potassium	
Alcohol	x
Tea, coffee	
Water	
SSBs, ASBs, fruit juice	
Junk food (chips, pizza, desserts)	
Legume-adjusted dietary score	
MedDiet adherence	
Healthy Food Score	
Centre	
Birth cohort, cohort	
Time period, season	
Area of recruitment, residency	
Method version	
Intervention group	
Randomization treatment assignment	x

WHS=Women's Health Study

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Supplemental Table 25 – Newcastle-Ottawa Scale (NOS) for prospective cohort studies

Study (Supplemental reference)	Selection (maximum 4)				Outcome (maximum 3)			Comparability (maximum 2)		Total
	Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Outcome of interest not present at start of study	Assessment of outcome	Sufficient follow-up duration	Adequate follow-up	Study controls for primary confounding variable [1]	Study controls for secondary confounding variables [2]	
Cardiovascular disease outcomes										
Fraser et al. 1992 (9)	0	1	0	1	1	1	1	1	0	6
Bazzano et al. 2001 (14)	1	1	1	1	1	1	1	1	1	9
Kelemen et al. 2005 (35)	0	1	0	1	1	1	1	1	0	6
Kokubo et al. 2007 (10)	1	1	0	1	1	1	1	1	1	8
Buckland et al. 2009 (27)	1	1	1	1	1	1	1	1	1	9
Mizrahi et al. 2009 (37)	1	1	1	1	1	1	1	1	1	9
Nagura et al. 2009 (19)	1	1	0	1	1	1	0	1	0	6
Bernstein et al. 2010 (28)	0	1	0	1	1	1	1	1	0	6
Gardener et al. 2011 (20)	1	1	1	1	1	1	1	1	0	8
Martinez-Gonzalez et al. 2011 (29)	0	1	0	1	1	1	1	1	1	7
Bernstein et al. 2012 – HPFS (38)	0	1	0	1	1	1	1	1	0	6
Bernstein et al. 2012 – NHS (38)	0	1	0	1	1	1	1	1	0	6
Dilis et al. 2012 (30)	1	1	1	1	1	1	1	1	0	8
Misirli et al. 2012 (39)	1	1	1	1	1	1	1	1	1	9
von Ruesten et al. 2013 (15)	1	1	0	1	1	1	1	1	1	8
Haring et al. 2014 (32)	1	1	1	1	1	1	1	1	1	9
Russell et al. 2014 (12)	1	1	0	1	1	1	0	1	0	6
Yu et al. 2014 (34)	1	1	0	1	1	1	1	1	1	8
Haring et al. 2015 (40)	1	1	1	1	1	1	1	1	1	9
Lassale et al. 2015 (22)	1	1	0	1	1	1	1	1	0	7
Nouri et al. 2016 (16)	1	1	0	1	1	1	1	1	0	7
Wang et al. 2016 (36)	0	1	0	1	1	1	0	1	0	5
Bonaccio et al. 2017 (23)	1	1	1	1	1	1	1	1	0	8
Buil-Cosailes et al. 2017 (17)	0	1	0	1	1	1	1	1	1	7
Farvid et al. 2017 (24)	1	1	0	1	1	1	1	1	0	7
Miller et al. 2017 (11)	1	1	0	1	1	1	1	1	1	8
Stefler et al. 2017 (25)	1	1	0	1	1	1	0	1	0	6
Papandreou et al. 2018 (26)	1	1	1	1	1	1	1	1	1	9
van den Brandt et al. 2019 (13)	1	1	0	1	1	1	0	1	1	7
Diabetes outcomes										
Meyer et al. 2000 (41)	0	1	0	1	0	1	1	1	1	6
Hodge et al. 2004 (42)	1	1	0	1	1	1	1	1	1	8
Bazzano et al. 2008 (43)	0	1	0	1	0	1	1	1	1	6
Villegas et al. 2008 (44)	0	1	1	1	0	1	1	1	1	7

Ericson et al. 2013 (45)	1	1	1	1	1	1	0	1	1	8
von Ruesten et al. 2013 (15)	1	1	0	1	1	1	1	1	1	8
Becerra-Tomas et al. 2017 (46)	1	1	1	1	1	1	1	1	1	9
Khalili-Moghadam et al. 2019 (47)	1	1	1	1	0	1	1	0	0	6
Hypertension outcomes										
Nunez-Cordoba et al. 2009 (48)	0	1	0	1	0	1	1	1	1	6
Weng et al. 2013 (49)	1	1	1	1	1	1	1	1	0	8
Borgi et al. 2016 – NHS (50)	0	1	0	1	0	1	0	1	1	5
Borgi et al. 2016 – NHS II (50)	0	1	0	1	0	1	0	1	1	5
Borgi et al. 2016 – HPFS (50)	0	1	0	1	0	1	0	1	1	5
Golzarand et al. 2016 (51)	1	1	1	1	1	1	1	1	1	9
Lelong et al. 2017 (52)	0	1	0	`1	0	1	1	1	1	6
Obesity outcomes										
Rautiainen et al. 2015 (53)	0	1	0	1	0	1	1	1	1	6

[1] Primary confounding variable was age for all outcomes, with the exception of obesity incidence, which awarded 1/3 point each for controlling for the following confounding variables: age, physical activity, energy intake, sex, baseline BMI or body weight, and smoking status.

[2] One point was awarded for controlling for 7 of the 9 secondary confounding variables for cardiovascular disease outcomes (sex, family history of CVD, smoking, markers of overweight/obesity, diabetes, hypertension, dyslipidemia, energy intake, and physical activity), 4 of the 6 secondary confounding variables for diabetes outcomes (sex, family history of diabetes, smoking, markers of overweight/obesity, energy intake and physical activity) and for 5 of the 7 secondary confounding variables for hypertension outcomes (sex, diabetes, smoking, markers of overweight/obesity, energy intake, sodium intake and physical activity).

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Supplemental Table 26 – Select sensitivity analyses in which the systematic removal of an individual study altered the significance of the pooled effect estimate or the evidence for heterogeneity

Removal of	RR [95% CI], *P-value*	Heterogeneity
CVD Incidence	**0.92 [0.85, 0.99], *P*=0.03**	***I²* = 19%, *P* = 0.29**
Bazzano et al. 2001 (14)	0.91 [0.81, 1.03], *P*=0.12	*I²* = 32%, *P* = 0.20
Kokubo et al. 2007 – W (10)	0.93 [0.86, 1.00], *P*=0.05	*I²* = 16%, *P* = 0.31
Nouri et al. 2016 (16)	0.93 [0.85, 1.01], *P*=0.08	*I²* = 24%, *P* = 0.25
Buil-Cosailes et al. 2017 (17)	0.91 [0.84, 1.00], *P*=0.05	*I²* = 32%, *P* = 0.20
Miller et al. 2017 (11)	0.94 [0.88, 1.01], *P*=0.09	*I²* = 0%, *P* = 0.42
CVD Mortality	**0.97 [0.89, 1.06], *P*=0.53**	***I²* = 47%, *P* = 0.04**
Kokubo et al. 2007 – W (10)	0.97 [0.88, 1.06], *P*=0.51	*I²* = 51%, *P* = 0.03
Lassale et al. 2015 (22)	0.98 [0.87, 1.09], *P*=0.65	*I²* = 51%, *P* = 0.03
Miller et al. 2017 (11)	0.98 [0.89, 1.08], *P*=0.69	*I²* = 51%, *P* = 0.03
Stefler et al. 2017 (25)	0.98 [0.89, 1.08], *P*=0.67	*I²* = 51%, *P* = 0.02
van den Brandt et al. 2019 (13)	0.97 [0.88, 1.07], *P*=0.58	*I²* = 52%, *P* = 0.02
CHD Incidence	**0.90 [0.83, 0.99], *P*=0.03**	***I²* = 34%, *P* = 0.13**
Bazzano et al. 2001 (14)	0.93 [0.86, 1.01], *P*=0.10	*I²* = 14%; *P* = 0.32
Bernstein et al. 2010 (28)	0.91 [0.81, 1.02], *P*=0.10	*I²* = 41%; *P* = 0.09
Dilis et al. 2012 – W (30)	0.91 [0.83, 1.00], *P*=0.05	*I²* = 40%; *P* = 0.10
CHD Mortality	**0.94 [0.82, 1.08], *P*=0.39**	***I²* = 48%, *P* = 0.05**
Fraser et al. 1992 (9)	0.92 [0.79, 1.08], *P*=0.32	*I²* = 51%, *P* = 0.04
Kelemen et al. 2005 (35)	0.96 [0.82, 1.13], *P*=0.61	*I²* = 51%, *P* = 0.05
Nagura et al. 2009 (19)	0.95 [0.81, 1.12], *P*=0.53	*I²* = 54%, *P* = 0.03
Dilis et al. 2012 – M (30)	0.92 [0.79, 1.08], *P*=0.33	*I²* = 52%, *P* = 0.04
Dilis et al. 2012 – W (30)	0.95 [0.82, 1.11], *P*=0.51	*I²* = 53%, *P* = 0.04
Stefler et al. 2017 (25)	0.92 [0.79, 1.08], *P*=0.32	*I²* = 52%, *P* = 0.04
Stroke Mortality	**0.89 [0.78, 1.03], *P*=0.12**	***I²* = 25%, *P* = 0.24**
Bonaccio et al. 2017 (23)	0.88 [0.79, 0.99], *P*=0.03	*I²* = 0%, *P* = 0.52

CVD=cardiovascular disease; CHD=coronary heart disease; HPFS=Health Professionals Follow-Up Study; M=men; RR=relative risk; W=women

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Supplemental Table 27 – Post-hoc sensitivity analyses assessing the association in studies reporting dietary pulses alone as the exposure*

Cardiometabolic disease outcome	Included studies (Supplemental reference)	RR [95% CI], *P-value*	Heterogeneity
CVD Incidence	Kokubo et al. 2007 – M (10) Kokubo et al. 2007 – W (10) Buil-Cosailes et al. 2017 (17) Miller et al. 2017 (11)	0.88 [0.74, 1.05], *P*=0.14	I^2 = 25%, *P* = 0.26
CHD Mortality	Fraser et al. 1992 (9)	1.06 [0.82, 1.37], *P*=0.64	Not applicable
MI Incidence	Fraser et al. 1992 (9) Kokubo et al. 2007 – M (10) Kokubo et al. 2007 – W (10) Miller et al. 2017 (11)	0.90 [0.74, 1.10], *P*=0.29	I^2 = 0%, *P* = 0.58
Stroke Incidence	Kokubo et al. 2007 – M (10) Kokubo et al. 2007 – W (10) Miller et al. 2017 (11)	0.92 [0.67, 1.27], *P*=0.61	I^2 = 64%, *P* = 0.06
Stroke Mortality	Wang et al. 2016 (36)	0.84 [0.68, 1.05], *P*=0.12	Not applicable
Diabetes Incidence	Meyer et al. 2000 (41)	0.96 [0.76, 1.22], *P*=0.74	Not applicable
Hypertension Incidence	Nunez-Cordoba et al. 2009 (48) Borgi et al. 2016 – NHS (50) Borgi et al. 2016 – NHS II (50) Borgi et al. 2016 – HPFS (50) Golzarand et al. 2016 (51)	0.92 [0.87, 0.98], *P*=0.01	I^2 = 0%, *P* = 0.55

CVD=cardiovascular disease; CHD=coronary heart disease; NHS=Nurses' Health Study; HPFS=Health Professionals Follow-Up Study; M=men; MI=myocardial infarction; RR=relative risk; W=women

*Post-hoc sensitivity analyses were conducted for those outcomes that had <10 cohort comparison available. For outcomes with ≥10 cohort comparisons available, refer to the subgroup analyses reported in **Supplemental Figures 15-16.**

SUPPLEMENTAL DATA

Supplemental Table 28 – GRADE certainty of evidence assessment for the association between dietary pulses with or without other legumes and cardiometabolic disease outcomes

Certainty assessment								RR (95% CI)	Certainty
Cardiometabolic disease outcome	**Cohort comparisons, *n***	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**		
CVD incidence	7	observational studies	not serious	not serious	not serious	serious [1]	dose response gradient [2]	**0.92 (0.85, 0.99)**	⊕⊕◯◯ LOW
CVD mortality	12	observational studies	not serious	not serious	not serious	serious [3]	none	**0.97 (0.89, 1.06)**	⊕◯◯◯ VERY LOW
CHD incidence	10	observational studies	not serious	not serious	not serious	serious [4]	none	**0.90 (0.83, 0.99)**	⊕◯◯◯ VERY LOW
CHD mortality	9	observational studies	not serious	not serious	not serious	serious [5]	none	**0.94 (0.82, 1.08)**	⊕◯◯◯ VERY LOW
MI incidence	4	observational studies	not serious	not serious	not serious	serious [6]	none	**0.90 (0.74, 1.10)**	⊕◯◯◯ VERY LOW
Stroke incidence	8	observational studies	not serious	serious [7]	not serious	serious [8]	none	**0.98 (0.86, 1.11)**	⊕◯◯◯ VERY LOW
Stroke mortality	6	observational studies	not serious	not serious	not serious	serious [9]	none	**0.89 (0.78, 1.03)**	⊕◯◯◯ VERY LOW
Diabetes incidence	9	observational studies	not serious	serious [10]	not serious	serious [11]	none	**0.93 (0.83, 1.05)**	⊕◯◯◯ VERY LOW
Hypertension incidence	7	observational studies	serious [12]	not serious	serious [13]	serious [14]	none	**0.91 (0.86, 0.97)**	⊕◯◯◯ VERY LOW

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Certainty assessment								RR (95% CI)	Certainty
Cardiometabolic disease outcome	**Cohort comparisons, *n***	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**		
Obesity incidence	1	observational studies	not serious	not serious [15]	serious [16]	not serious	none	**0.87 (0.81, 0.94)**	⨁◯◯◯ VERY LOW

CHD=chronic heart disease; CI=confidence interval; CVD=cardiovascular disease; MI=myocardial infarction; RR=risk ratio

[1] Serious imprecision for CVD incidence, as the 95% CI (0.85, 0.99) overlapped with the minimally important difference for clinical benefit (RR 0.95).

[2] Upgrade for a dose-response gradient, as the GLST dose-response analyses revealed a significant linear inverse relationship between dietary pulses with or without other legumes and CVD incidence (*P*=0.007, **Supplemental Figure 17a**).

[3] Serious imprecision for CVD mortality, as the 95% CI (0.89, 1.06) overlapped with the minimally important difference for clinical benefit (RR 0.95) and harm (RR 1.05).

[4] Serious imprecision for CHD incidence, as the 95% CI (0.83, 0.99) overlapped with the minimally important difference for clinical benefit (RR 0.95).

[5] Serious imprecision for CHD mortality, as the 95% CI (0.82, 1.08) overlapped with the minimally important difference for clinical benefit (RR 0.95) and harm (RR 1.05).

[6] Serious imprecision for MI incidence, as the 95% CI (0.74, 1.10) overlapped with the minimally important difference for clinical benefit (RR 0.95) and harm (RR 1.05).

[7] Serious inconsistency for stroke incidence, as I^2=58% and *P*=0.02.

[8] Serious imprecision for stroke incidence, as the 95% CI (0.86, 1.11) overlapped with the minimally important difference for clinical benefit (RR 0.95) and harm (RR 1.05).

[9] Serious imprecision for stroke mortality, as the 95% CI (0.78, 1.03) overlapped with the minimally important difference for clinical benefit (RR 0.95).

[10] Serious inconsistency for diabetes incidence, as I^2=70% and *P*=0.0008.

[11] Serious imprecision for diabetes incidence, as the 95% CI (0.83, 1.05) overlapped with the minimally important difference for clinical benefit (RR 0.95).

[12] Serious risk of bias for hypertension incidence, as >50% of the weight (68.7%) was contributed by studies considered to be high risk of bias (NOS<6).

[13] Serious indirectness for hypertension incidence, as >50% of the weight (68.7%) was contributed by studies conducted in health professionals.

[14] Serious imprecision for hypertension incidence, as the 95% CI (0.86, 0.97) overlapped with the minimally important difference for clinical benefit (RR 0.95).

[15] Not able to assess inconsistency for obesity incidence as only 1 cohort study was available for inclusion.

[16] Serious indirectness for obesity incidence, as only 1 cohort study was available for inclusion that was conducted in postmenopausal female health professionals.

SUPPLEMENTAL DATA

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