Dairy Intake and Prediabetes Risk

Evidence from Multiple Cohort Studies and Meta-Analyses

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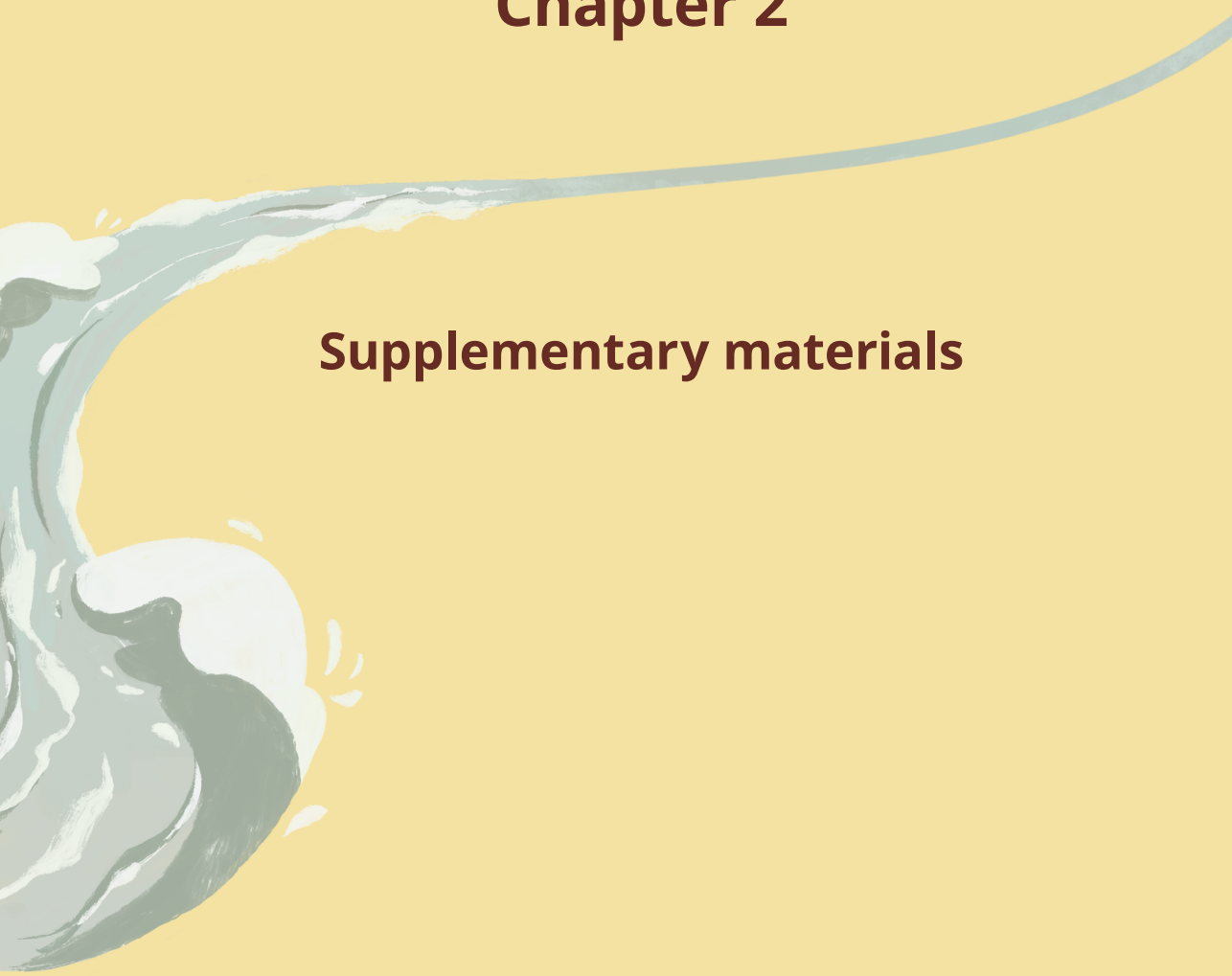
Supplemental files

Chapter 2



Supplementary materials

Contents

Supplemental Table 1. Baseline characteristics and dairy intakes of participants in the Hoorn Studies across enrolment waves (*n* = 2,262)

	Enrolment wave	
	HS1 (*n* = 997)	HS2 (*n* = 1,265)
Follow-up time (y)	6.0 ± 0.4	6.7 ± 0.7
Sex (men)	56% (563)	45% (569)
Age (y)	59.6 ± 6.6	53.0 ± 6.6
Education level		
Low	25% (251)	4% (48)
Middle	62% (619)	55% (691)
High	13% (126)	40% (505)
Smoking		
Current	28% (282)	17% (211)
Previous (>2 months ago)	35% (346)	40% (505)
Never	37% (368)	43% (540)
Cigarette years	160 (0-460)	240 (100-510)
Alcohol intake		
0 g/day	25% (250)	12% (151)
≤10 g/day	43% (432)	42% (527)
10-30 g/day	23% (232)	35% (446)
≥30 g/day	8% (83)	11% (140)
Physical activity, moderate intensity, hours/week	9.0 (5.3-14.0)	6.5 (3.5-10.5)
Family history diabetes mellitus	24% (243)	25% (310)
BMI (kg/m^2)	25.9 ± 3.0	25.6 ± 3.6
Fasting glucose (mmol/L)	5.2 ± 0.4	5.3 ± 0.4
Systolic blood pressure (mmHg)	130 ± 19	130 ± 16
Diastolic blood pressure (mmHg)	81 ± 10	76 ± 10
Antihypertensive medication use	12% (122)	14% (182)
LDL cholesterol (mmol/L)	1.4 ± 0.8	3.3 ± 0.9
Lipid lowering medication	1% (11)	8% (97)
Dietary intake		
Energy intake (kcal/day)	2100 ± 540	2200 ± 630
DHD15-index score	71 ± 13	70 ± 14
Fruit (g/day)	240 ± 150	160 ± 120
Vegetables (g/day)	110 ± 46	190 ± 92
Grain (g/day)	150 ± 65	230 ± 100
Red meat (g/day)	27 ± 22	39 ± 22
Processed meat (g/day)	61 ± 37	33 ± 22
Lean fish (g/day)	11 ± 14	11 ± 11

Supplemental Table 1. Baseline characteristics and dairy intakes of participants in the Hoorn Studies across enrolment waves (*n* = 2,262) (continued)

	Enrolment wave	
	HS1 (*n* = 997)	HS2 (*n* = 1,265)
Fatty fish (g/day)	4.8 ± 9.7	5.1 ± 7.3
Coffee (g/day)	550 ± 270	460 ± 260
Tea (g/day)	310 ± 270	260 ± 260
Fruit juice (g/day)	33 ± 85	81 ± 97
SSBs (g/day)	83 ± 130	140 ± 150
Saturated fat (en%)	17.0 ± 3.3	12.7 ± 2.8
Protein (en%)	14.7 ± 2.6	14.4 ± 2.2
Calcium (g/day)	1100 ± 390	960 ± 330
Dairy intake (servings/day)		
Total dairy	3.7 ± 1.7	2.5 ± 1.4
High-fat dairy	2.1 ± 1.4	1.1 ± 1.2
Low-fat dairy	1.6 ± 1.4	1.3 ± 1.0
Total milk	1.5 ± 1.2	0.8 ± 0.7
High-fat milk	0.3 ± 0.6	0.1 ± 0.3
Low-fat milk	1.1 ± 1.2	0.7 ± 0.6
Plain milk	1.3 ± 1.2	0.6 ± 0.6
High-fat plain milk	0.2 ± 0.6	0.04 ± 0.24
Low-fat plain milk	1.1 ± 1.2	0.6 ± 0.6
Fermented dairy	2.7 ± 1.5	1.8 ± 1.2
High-fat fermented dairy	1.6 ± 1.2	1.0 ± 1.1
Low-fat fermented dairy	1.1 ± 1.1	0.8 ± 0.7
Yogurt	0.6 ± 0.6	0.5 ± 0.4
High-fat yogurt	0.2 ± 0.4	0.1 ± 0.3
Low-fat yogurt	0.4 ± 0.6	0.4 ± 0.4
Cheese	1.5 ± 1.1	1.3 ± 1.1
High-fat cheese	1.4 ± 1.1	0.9 ± 1.1
Low-fat cheese	0.1 ± 0.4	0.4 ± 0.6
Cream	0.5 ± 2.0	1.1 ± 2.8
Ice cream	0.1 ± 0.1	0.1 ± 0.1

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data. Abbreviations: BMI, body mass index; DHD15-index, Dutch Healthy Diet 2015 index score; en%, percentage of total energy intake; LDL, low-density lipoprotein; HS1, Hoorn Studies 1 (first enrolment wave); HS2, Hoorn Studies 2 (second enrolment wave); SSBs, sugar-sweetened beverages.

Supplemental table 2. Missing values of covariates in participants before imputation

	Study population (*n* = 2,262), n (%)
Education level	22 (1.0%)
Smoking	10 (0.4%)
Alcohol intake	1 (0.04%)
Physical activity	47 (2.1%)
Family history diabetes	11 (0.5%)
BMI	4 (0.2%)
Systolic blood pressure	2 (0.1%)
Diastolic blood pressure	5 (0.2%)
LDL cholesterol	6 (0.3%)
Grain	5 (0.2%)
Red meat	1 (0.04%)
Tea	3 (0.1%)
Fruit juice	3 (0.1%)

Of covariates of all analyses, education level, smoking, alcohol intake, physical activity, family history of diabetes, BMI, blood pressure, LDL cholesterol, and intake of grain, red meat, tea, and fruit juice had missing values.
Abbreviations: BMI, Body Mass Index; LDL, Low Density Lipoprotein.

Supplementary Table 3. Baseline characteristics and dairy intakes of participants in the Hoorn Studies according to whether participants had complete follow-up or were lost-to-follow-up

	Complete follow-up (*n* = 3,245)	**Lost-to-follow-up** (*n* = 2,046)
Sex (men)	51% (1,645)	49% (1,008)
Age (y)	56.9 ± 7.6	58.0 ± 9.0
Education level		
Low	15% (494)	22% (444)
Middle	58% (1,857)	57% (1,146)
High	27% (849)	20% (408)
Smoking		
Current	23% (748)	31% (617)
Previous (>2 months ago)	39% (1,252)	35% (696)
Never	38% (1,223)	35% (702)
Alcohol intake g/day	7.2 (2.0-17.2)	5.0 (0.0-15.3)
Physical activity, moderate intensity, hours/week	7.5 (4.0-12.3)	7.0 (3.5-12.7)
BMI (kg/m^2)	26.3 ± 3.6	26.6 ± 4.1
Fasting glucose (mmol/L)	5.6 ± 1.0	5.8 ± 1.6

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: BMI, body mass index.

Supplemental table 4. The associations of dairy intake and prediabetes risk in the Hoorn Studies, stratified for the first enrolment wave in 1989-1992 (Hoorn Study 1, HS1, *n* = 997) and a second wave in 2006-2007 (HS2, *n* = 1,265)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total dairy						
HS1: median, servings/d; n/N	1.9; 77/249	2.9; 83/248	3.8; 87/249	5.5; 82/251		
HS1: model 3	1	1.11 (0.86-1.44)	1.15 (0.89-1.48)	1.02 (0.77-1.35)	0.98	1.00 (0.94-1.06)
HS2: median, servings/d; n/N	1.2; 122/317	1.8; 124/316	2.5; 123/314	3.5; 113/318		
HS2: model 3	1	1.01 (0.83-1.23)	1.01 (0.83-1.23)	0.92 (0.74-1.14)	0.41	0.96 (0.91-1.02)
High-fat dairy						
HS1: median, servings/d; n/N	0.9; 89/243	1.7; 82/254	2.0; 71/249	3.2; 87/251		
HS1: model 3	1	0.86 (0.68-1.10)	0.78 (0.59-1.01)	0.88 (0.67-1.14)	0.60	0.92 (0.85-1.00)
HS2: median, servings/d; n/N	0.0; 114/315	0.7; 122/318	1.4; 127/314	2.0; 119/318		
HS2: model 3	1	1.05 (0.86-1.29)	1.16 (0.94-1.42)	1.09 (0.87-1.37)	0.53	0.99 (0.92-1.06)
Low-fat dairy						
HS1: median, servings/d; n/N	0.0; 75/245	1.0; 91/250	1.8; 86/250	3.1; 77/252		
HS1: model 3	1	1.22 (0.95-1.57)	1.16 (0.90-1.50)	1.01 (0.77-1.33)	0.84	1.06 (0.99-1.13)
HS2: median, servings/d; n/N	0.3; 116/309	0.8; 128/325	1.4; 124/317	2.2; 114/314		
HS2: model 3	1	1.03 (0.84-1.25)	1.03 (0.84-1.25)	0.96 (0.77-1.18)	0.64	0.95 (0.88-1.02)
Total fermented dairy						
HS1: median, servings/d; n/N	1.1; 80/247	2.0; 69/249	2.8; 92/251	4.1; 88/250		
HS1: model 3	1	0.87 (0.66-1.14)	1.16 (0.90-1.49)	1.13 (0.87-1.47)	0.14	1.02 (0.95-1.08)
HS2: median, servings/d; n/N	0.7; 125/326	1.3; 122/308	1.7; 121/315	2.7; 114/316		
HS2: model 3	1	1.05 (0.86-1.27)	0.99 (0.81-1.21)	0.95 (0.77-1.16)	0.51	0.96 (0.89-1.02)
High-fat fermented dairy						
HS1: median, servings/d; n/N	0.3; 84/235	1.1; 84/258	2.1; 79/253	2.6; 82/251		
HS1: model 3	1	0.91 (0.71-1.16)	0.91 (0.70-1.17)	0.93 (0.72-1.21)	0.82	0.92 (0.84-1.01)
HS2: median, servings/d; n/N	0.0; 124/316	0.5; 120/317	1.3; 121/316	2.0; 117/316		
HS2: model 3	1	0.95 (0.78-1.16)	1.00 (0.82-1.22)	0.98 (0.79-1.22)	0.99	0.98 (0.91-1.05)
Low-fat fermented dairy						
HS1: median, servings/d; n/N	0.0; 152/498	0.3; 25/72	1.0; 119/349	2.2; 33/78		
HS1: model 3	1	0.86 (0.66-1.13)	0.99 (0.76-1.29)	1.02 (0.78-1.33)	0.39	1.10 (1.03-1.19)**
HS2: median, servings/d; n/N	0.0; 123/315	0.4; 127/318	0.7; 113/319	1.3; 119/313		
HS2: model 3	1	1.06 (0.87-1.30)	0.94 (0.76-1.16)	0.96 (0.79-1.18)	0.48	0.93 (0.83-1.03)

Supplemental table 4. The associations of dairy intake and prediabetes risk in the Hoorn Studies, stratified for the first enrolment wave in 1989-1992 (Hoorn Study 1, HS1, *n* = 997) and a second wave in 2006-2007 (HS2, *n* = 1,265) (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total milk						
HS1: median, servings/d; n/N	0.2; 71/244	0.9; 96/252	1.6; 76/251	2.8; 86/250		
HS1: model 3	1	1.31 (1.02-1.67)	1.05 (0.80-1.37)	1.10 (0.84-1.44)	1.00	1.00 (0.92-1.08)
HS2: median, servings/d; n/N	0.0; 122/320	0.5; 115/312	0.8; 126/317	1.5; 119/316		
HS2: model 3	1	0.98 (0.80-1.20)	1.03 (0.84-1.25)	0.98 (0.80-1.20)	0.91	1.00 (0.89-1.11)
High-fat milk						
HS1: median, servings/d; n/N	0.0; 113/360	0.1; 58/164	0.2; 79/260	0.9; 79/213		
HS1: model 3	1	1.17 (0.89-1.53)	0.96 (0.75-1.23)	1.11 (0.87-1.43)	0.45	0.95 (0.82-1.11)
HS2: median, servings/d; n/N	0.0; 384/979	0.01; 30/95	0.04; 23/94	0.3; 45/97		
HS2: model 3	1	0.88 (0.64-1.19)	0.64 (0.44-0.93)	1.17 (0.92-1.49)	0.19	1.14 (0.93-1.41)
Low-fat milk						
HS1: median, servings/d; n/N	0.0; 82/248	0.5; 76/246	1.3; 89/252	2.5; 82/251		
HS1: model 3	1	0.96 (0.74-1.23)	1.09 (0.85-1.39)	0.98 (0.76-1.27)	0.93	1.01 (0.93-1.09)
HS2: median, servings/d; n/N	0.0; 121/319	0.4; 115/314	0.8; 130/315	1.4; 116/317		
HS2: model 3	1	0.99 (0.81-1.21)	1.09 (0.89-1.32)	0.98 (0.80-1.20)	0.94	0.97 (0.86-1.09)
Total plain milk						
HS1: median, servings/d; n/N	0.0; 70/249	0.8; 98/248	1.4; 75/246	2.6; 86/254		
HS1: model 3	1	1.39 (1.09-1.78)	1.07 (0.82-1.41)	1.12 (0.85-1.46)	0.98	1.00 (0.93-1.08)
HS2: median, servings/d; n/N	0.0; 123/326	0.3; 90/251	0.7; 161/403	1.4; 108/285		
HS2: model 3	1	0.96 (0.77-1.20)	1.04 (0.86-1.25)	0.99 (0.80-1.22)	0.93	1.01 (0.90-1.13)
High-fat plain milk						
HS1: median, servings/d; n/N	0.0; 259/795	0.3; 19/62	0.8; 32/72	2.0; 19/68		
HS1: model 3	1	0.88 (0.60-1.30)	1.31 (0.98-1.75)	0.76 (0.51-1.13)	0.41	0.94 (0.80-1.10)
HS2: median, servings/d; n/N	0.0; 452/1,194	0.2; 8/24	0.3; 8/18	1.4; 14/29		
HS2: model 3	1	0.91 (0.51-1.62)	1.17 (0.69-1.96)	1.16 (0.78-1.73)	0.44	1.14 (0.91-1.41)

Supplemental table 4. The associations of dairy intake and prediabetes risk in the Hoorn Studies, stratified for the first enrolment wave in 1989-1992 (Hoorn Study 1, HS1, *n* = 997) and a second wave in 2006-2007 (HS2, *n* = 1,265) (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Low-fat plain milk						
HS1: median, servings/d; n/N	0.0; 82/249	0.4; 76/246	1.1; 88/249	2.5; 83/253		
HS1: model 3	1	0.96 (0.75-1.24)	1.09 (0.85-1.39)	0.99 (0.77-1.28)	0.93	1.02 (0.94-1.10)
HS2: median, servings/d; n/N	0.0; 122/322	0.2; 107/288	0.7; 136/340	1.4; 117/315		
HS2: model 3	1	1.00 (0.81-1.23)	1.04 (0.86-1.27)	0.98 (0.80-1.21)	0.92	0.98 (0.87-1.11)
Total yogurt						
HS1: median, servings/d; n/N	0.0; 74/248	0.2; 78/210	0.7; 77/284	1.2; 100/255		
HS1: model 3	1	1.32 (1.02-1.70)	0.96 (0.73-1.26)	1.37 (1.07-1.76)	0.10	1.13 (0.97-1.31)
HS2: median, servings/d; n/N	0.0; 113/278	0.4; 126/349	0.6; 132/323	0.9; 111/315		
HS2: model 3	1	0.91 (0.75-1.12)	1.02 (0.83-1.25)	0.88 (0.71-1.08)	0.41	0.94 (0.79-1.12)
High-fat yogurt						
HS1: median, servings/d; n/N	0.0; 238/734	0.1; 31/86	0.6; 25/89	1.1; 35/88		
HS1: model 3	1	1.14 (0.84-1.55)	0.89 (0.62-1.27)	1.18 (0.88-1.58)	0.50	1.09 (0.87-1.37)
HS2: median, servings/d; n/N	0.0; 312/841	0.1; 57/140	0.2; 62/160	0.6; 51/124		
HS2: model 3	1	1.18 (0.95-1.47)	1.11 (0.90-1.38)	1.17 (0.92-1.49)	0.18	1.05 (0.80-1.39)
Low-fat yogurt						
HS1: median, servings/d; n/N	0.0; 144/440	0.2; 67/185	0.7; 48/178	1.1; 70/194		
HS1: model 3	1	1.14 (0.90-1.44)	0.84 (0.64-1.11)	1.15 (0.91-1.45)	0.67	1.09 (0.93-1.28)
HS2: median, servings/d; n/N	0.0; 123/318	0.2; 159/418	0.5; 45/127	0.9; 155/402		
HS2: model 3	1	1.02 (0.84-1.23)	0.97 (0.73-1.29)	1.00 (0.82-1.21)	0.89	0.91 (0.75-1.10)
Total cheese						
HS1: median, servings/d; n/N	0.5; 79/239	1.0; 82/233	1.6; 89/269	2.6; 79/256		
HS1: model 3	1	1.05 (0.82-1.35)	0.96 (0.75-1.23)	0.97 (0.75-1.27)	0.70	0.96 (0.88-1.05)
HS2: median, servings/d; n/N	0.2; 128/316	0.7; 131/315	1.4; 125/360	2.7; 98/274		
HS2: model 3	1	1.02 (0.84-1.23)	0.85 (0.70-1.03)	0.88 (0.71-1.10)	0.14	0.96 (0.89-1.03)

Supplemental table 4. The associations of dairy intake and prediabetes risk in the Hoorn Studies, stratified for the first enrolment wave in 1989-1992 (Hoorn Study 1, HS1, *n* = 997) and a second wave in 2006-2007 (HS2, *n* = 1,265) (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
High-fat cheese						
HS1: median, servings/d; n/N	0.2; 87/239	1.0; 82/239	1.5; 79/216	2.3; 81/303		
HS1: model 3	1	0.90 (0.71-1.15)	0.95 (0.74-1.21)	0.73 (0.56-0.95)	0.02*	0.89 (0.81-0.99)*
HS2: median, servings/d; n/N	0.0; 128/317	0.4; 117/311	0.9; 127/320	1.9; 110/317		
HS2: model 3	1	0.92 (0.76-1.13)	0.99 (0.81-1.20)	0.86 (0.69-1.07)	0.25	0.98 (0.90-1.05)
Low-fat cheese						
HS1: median, servings/d; n/N	0.0; 292/919	0.5; 10/26	1.0; 11/26	2.0; 16/26		
HS1: model 3	1	1.34 (0.85-2.11)	1.36 (0.84-2.21)	1.93 (1.41-2.64)	<0.0001***	1.33 (1.20-1.47) ***
HS2: median, servings/d; n/N	0.0; 241/621	0.2; 82/216	0.5; 77/214	1.1; 82/214		
HS2: model 3	1	0.98 (0.80-1.20)	0.91 (0.74-1.12)	0.98 (0.80-1.20)	0.74	0.92 (0.81-1.05)
Cream						
HS1: median, servings/d; n/N	0.0; 230/660	0.3; 66/220	1.3; 33/117	NA		
HS1: model 3	1	1.00 (0.79-1.27)	0.95 (0.77-1.17)	NA	0.93	0.98 (0.92-1.04)
HS2: median, servings/d; n/N	0.0; 111/278	0.1; 88/223	0.4; 175/448	1.5; 108/316		
HS2: model 3	1	0.99 (0.80-1.23)	1.00 (0.83-1.20)	0.87 (0.70-1.08)	0.15	0.98 (0.96-1.01)
Ice cream						
HS1: median, servings/d; n/N	0.0; 263/718	0.02; 98/280	0.1; 287/783	0.1; 163/481		
HS1: model 3	1	1.05 (0.83-1.34)	0.96 (0.75-1.24)	0.94 (0.73-1.20)	0.47	0.89 (0.28-2.81)
HS2: median, servings/d; n/N	0.0; 263/718	0.02; 98/280	0.1; 287/783	0.1; 163/481		
HS2: model 3	1	1.26 (0.88-1.81)	0.98 (0.84-1.15)	0.95 (0.77-1.19)	0.58	0.76 (0.35-1.64)

[1] Relative risks (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + median or tertile categories with the lowest category as the reference, adjusted for covariates as follows: Model 3 included age (continuous), sex, follow-up duration (continuous), energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (3 categories), alcohol consumption (continuous), a family history of diabetes (yes/no), intakes of fruit, vegetables, tea, coffee, grains (whole and refined), meat (processed and red) and sugar-sweetened beverages (SSB) (continuous). Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.

[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated.

P-value significance level: *0.05, **0.01, ***0.001.

Abbreviations: CI, Confidence Interval; HS, Hoorn Study; Q, Quartile.

Supplemental Table 5. Associations of dairy product types and prediabetes risk in the Hoorn Studies, stratified by age and BMI (*n* = 2,262).

Dairy type	$P_{interaction}$	Strata	n/N	RR (95%CI)[1]
Interaction with age				
Low-fat dairy	0.004	Age <56	376/1131	0.94 (0.86-1.02)
		Age ≥56	435/1131	1.06 (1.00-1.12)
Low-fat fermented dairy	0.0002	Age <56	376/1131	0.92 (0.83-1.03)
		Age ≥56	435/1131	1.10 (1.02-1.18)*
Yogurt	0.01	Age <56	376/1131	0.95 (0.79-1.15
		Age ≥56	435/1131	1.11 (0.96-1.28)
Low-fat yogurt	0.004	Age <56	376/1131	0.82 (0.66-1.03)
		Age ≥56	435/1131	1.14 (0.99-1.32)
Low-fat cheese	0.002	Age <56	376/1131	0.88 (0.73-1.07)
		Age ≥56	435/1131	1.15 (1.03-1.29)*
Interaction with BMI				
Low-fat fermented dairy	0.01	BMI <25	313/1009	0.99 (0.89-1.10)
		BMI 25-30	383/1010	1.01 (0.93-1.11)
		BMI ≥30	113/239	1.14 (1.01-1.28)*

Only stratified models for which the interaction term was statistically significant (p<0.05) are presented. Models are adjusted for age, sex, follow-up duration, energy intake, education, smoking, physical activity, alcohol consumption, a family history of diabetes, intakes of fruit, vegetables, tea, coffee, grains, meat (processed and red) and sugar-sweetened beverages (SSB).

[1] Relative risks per 1 serving/day (see definition in Table 1) were estimated. P-value significance level: *0.05, **0.01, ***0.001.

Abbreviations: CI, Confidence Interval.

Supplemental Table 6. Baseline characteristics of participants in the Hoorn Studies in the total population and across quartiles (Q) of high-fat cheese intake (*n* = 2,262)

		Quartiles (Q) of high-fat cheese intake			
	Total	**Q1**	**Q2**	**Q3**	**Q4**
	(*n* = 2,262)	(*n* = 558)	(*n* = 600)	(*n* = 532)	(*n* = 572)
Median intake	0.9 ± 1.5	0.0 ± 0.1	0.6 ± 0.3	1.2 ± 0.4	2.3 ± 0.9
Follow-up time (y)	6.4 ± 0.70	6.5 ± 0.72	6.4 ± 0.71	6.3 ± 0.65	6.3 ± 0.70
Sex (men)	50% (1132)	44% (246)	48% (285)	56% (297)	53% (304)
Age (y)	56 ± 7.3	55 ± 7.3	55 ± 7.3	57 ± 7.8	56 ± 6.8
Education level					
Low	13% (299)	11% (64)	10% (63)	18% (97)	13% (75)
Middle	58% (1310)	59% (329)	60% (363)	55% (292)	57% (326)
High	28% (631)	27% (152)	29% (172)	26% (139)	29% (168)
Smoking					
Current	22% (493)	17% (96)	23% (137)	23% (121)	24% (139)
Previous (>2 months ago)	38% (851)	41% (231)	33% (199)	39% (210)	37% (211)
Never	40% (908)	41% (228)	43% (258)	38% (201)	39% (221)
Cigarette years	210 [9-480]	210 [64-470]	230 [15-500]	180 [0-480]	200 [0-470]
Alcohol intake					
0 g/day	18% (401)	19% (106)	19% (113)	18% (97)	15% (85)
≤10 g/day	42% (959)	45% (251)	41% (248)	42% (225)	41% (235)
10-30 g/day	30% (678)	27% (149)	32% (189)	30% (159)	32% (181)
≥30 g/day	10% (223)	9% (52)	8% (49)	10% (51)	12% (71)
Physical activity, moderate intensity, hours/week	7.5 [4.2-12]	6.8 [3.5-11]	7.3 [3.8-12]	7.5 [4.6-12]	8.5 [5.0-13]
BMI (kg/m2)	26 ± 3.4	26 ± 3.5	26 ± 3.2	26 ± 3.2	26 ± 3.5
Fasting glucose (mmol/L)	5.3 ± 0.39	5.3 ± 0.38	5.3 ± 0.37	5.2 ± 0.40	5.3 ± 0.40
Systolic blood pressure (mmHg)	130 ± 17	130 ± 17	130 ± 17	130 ± 19	130 ± 17
Diastolic blood pressure (mmHg)	78 ± 11	77 ± 10	79 ± 10	79 ± 11	79 ± 11
Antihypertensive medication use	13% (304)	17% (96)	15% (92)	11% (61)	10% (55)
LDL cholesterol mmol/L)	3.8 ± 1.1	3.5 ± 1.0	3.7 ± 1.1	4.0 ± 1.1	4.1 ± 1.1
Lipid lowering medication	5% (108)	9% (51)	4% (27)	3% (16)	2% (14)
Family history diabetes mellitus	24% (553)	27% (153)	26% (154)	25% (133)	20% (113)
Dairy intake (servings/day)					
Total dairy	3.0 ± 1.7	1.9 ± 1.3	2.4 ± 1.1	3.2 ± 1.3	4.6 ± 1.6
High-fat dairy	1.5 ± 1.3	0.3 ± 0.5	1.0 ± 0.7	1.8 ± 0.8	3.1 ± 1.2
Low-fat dairy	1.5 ± 1.2	1.6 ± 1.3	1.4 ± 1.0	1.5 ± 1.2	1.5 ± 1.2
Total milk	1.1 ± 1.0	0.8 ± 0.8	1.0 ± 0.9	1.2 ± 1.1	1.2 ± 1.1
High-fat milk	0.2 ± 0.5	0.1 ± 0.4	0.2 ± 0.4	0.2 ± 0.5	0.2 ± 0.5
Low-fat milk	0.9 ± 0.9	0.8 ± 0.8	0.9 ± 0.8	0.9 ± 1.1	1.0 ± 1.0
Plain milk	0.9 ± 1.0	0.7 ± 0.8	0.9 ± 0.9	1.0 ± 1.1	1.1 ± 1.1
High-fat plain milk	0.1 ± 0.4	0.1 ± 0.3	0.1 ± 0.4	0.2 ± 0.5	0.1 ± 0.5

Supplemental Table 6. Baseline characteristics of participants in the Hoorn Studies in the total population and across quartiles (Q) of high-fat cheese intake (*n* = 2,262) (continued)

		Quartiles (Q) of high-fat cheese intake			
	Total	**Q1**	**Q2**	**Q3**	**Q4**
	(*n* = 2,262)	(*n* = 558)	(*n* = 600)	(*n* = 532)	(*n* = 572)
Low-fat plain milk	0.8 ± 0.9	0.6 ± 0.8	0.8 ± 0.8	0.9 ± 1.1	1.0 ± 1.0
Fermented dairy	2.2 ± 1.4	1.2 ± 1.1	1.5 ± 0.8	2.3 ± 0.9	3.7 ± 1.4
High-fat fermented dairy	1.3 ± 1.2	0.1 ± 0.3	0.8 ± 0.4	1.4 ± 0.4	2.8 ± 1.1
Low-fat fermented dairy	0.9 ± 0.9	1.1 ± 1.1	0.8 ± 0.8	0.9 ± 0.9	0.9 ± 0.9
Yogurt	0.5 ± 0.5	0.5 ± 0.5	0.5 ± 0.5	0.5 ± 0.5	0.6 ± 0.5
High-fat yogurt	0.1 ± 0.3	0.1 ± 0.2	0.1 ± 0.3	0.2 ± 0.3	0.2 ± 0.4
Low-fat yogurt	0.4 ± 0.5	0.4 ± 0.4	0.4 ± 0.5	0.4 ± 0.5	0.4 ± 0.5
Cheese	1.4 ± 1.1	0.6 ± 0.8	0.8 ± 0.4	1.4 ± 0.5	2.7 ± 1.1
High-fat cheese	1.1 ± 1.1	0.1 ± 0.1	0.6 ± 0.2	1.2 ± 0.2	2.6 ± 1.1
Low-fat cheese	0.2 ± 0.5	0.5 ± 0.8	0.2 ± 0.4	0.2 ± 0.4	0.1 ± 0.3
Cream	0.8 ± 2.5	0.6 ± 1.7	0.9 ± 2.4	1.0 ± 3.5	0.8 ± 2.1
Ice cream	0.06 ± 0.09	0.06 ± 0.10	0.06 ± 0.11	0.06 ± 0.09	0.06 ± 0.08
Dietary intake					
Energy intake (kcal)	2100 ± 600	1900 ± 560	2100 ± 510	2200 ± 580	2400 ± 620
DHD15-index score	70 ± 14	71 ± 15	70 ± 14	70 ± 13	70 ± 13
Fruit (g/day)	200 ± 140	190 ± 140	190 ± 140	200 ± 150	200 ± 140
Vegetables (g/day)	150 ± 85	170 ± 89	150 ± 86	140 ± 78	140 ± 82
Grain (g/day)	200 ± 95	200 ± 94	190 ± 90	190 ± 93	210 ± 99
Red meat (g/day)	34 ± 23	36 ± 23	36 ± 23	32 ± 22	33 ± 23
Processed meat (g/day)	46 ± 33	38 ± 32	43 ± 30	50 ± 33	52 ± 35
Lean fish (g/day)	11 ± 13	11 ± 13	11 ± 12	11 ± 13	11 ± 14
Fatty fish (g/day)	5.0 ± 8.4	5.1 ± 7.7	5.2 ± 9.1	5.0 ± 8.8	4.6 ± 8.1
Coffee (g/day)	500 ± 270	460 ± 290	470 ± 270	530 ± 270	530 ± 250
Tea (g/day)	280 ± 260	280 ± 290	280 ± 250	270 ± 250	300 ± 270
Fruit juice (g/day)	60 ± 95	71 ± 110	59 ± 89	55 ± 94	54 ± 89
SSBs (g/day)	110 ± 140	120 ± 150	110 ± 140	110 ± 150	110 ± 140
Saturated fat (en%)	15 ± 3.7	12 ± 3.2	14 ± 3.2	16 ± 3.2	17 ± 3.4
Protein (en%)	15 ± 2.4	15 ± 2.8	14 ± 2.2	14 ± 2.3	15 ± 2.2
Calcium (g)	1000 ± 370	840 ± 320	910 ± 290	1000 ± 330	1300 ± 360

Variables are displayed as means ± SD for normally distributed continuous variables, medians (IQR) for non-normally distributed continuous variables or % (n) for categorical variables.
Abbreviations: BMI; Body Mass Index, DHD15-index; Dutch Healthy Diet 2015 index score [56], HS1; Hoorn Studies 1 (first enrolment wave), LDL; Low Density Lipoprotein.

Supplemental Table 7. Sensitivity analyses for the association between dairy intake and prediabetes risk the Hoorn Studies (*n* = 2,262).

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total dairy						
Main analysis model 3	1 (ref)	1.00 (0.86-1.16)	0.87 (0.74-1.03)	0.95 (0.79-1.13)	0.38	0.98 (0.94-1.02)
1. Adjust. other dairy	1 (ref)	1.02 (0.88-1.18)	0.87 (0.74-1.03)	0.93 (0.78-1.11)	0.26	0.97 (0.93-1.01)
2. Excl. comorbidities	1 (ref)	1.02 (0.86-1.19)	0.89 (0.75-1.07)	0.99 (0.82-1.20)	0.76	0.98 (0.94-1.02)
3. Excl. 'energy misreporters'	1 (ref)	1.09 (0.92-1.29)	0.87 (0.71-1.05)	0.93 (0.75-1.14)	0.22	0.95 (0.91-0.99)*
4. Incl. baseline prediabetes	1 (ref)	0.97 (0.85-1.10)	0.91 (0.79-1.04)	0.93 (0.80-1.08)	0.30	0.98 (0.95-1.01)
High-fat dairy						
Main analysis model 3	1 (ref)	1.01 (0.87-1.17)	0.94 (0.79-1.11)	0.85 (0.71-1.03)	0.06	0.96 (0.91-1.01)
1. Adjust. other dairy	1 (ref)	1.01 (0.87-1.17)	0.94 (0.79-1.11)	0.85 (0.70-1.03)	0.06	0.96 (0.91-1.01)
2. Excl. comorbidities	1 (ref)	1.00 (0.85-1.17)	0.98 (0.82-1.17)	0.90 (0.73-1.09)	0.23	0.97 (0.92-1.02)
3. Excl. 'energy misreporters'	1 (ref)	0.93 (0.78-1.10)	0.85 (0.70-1.03)	0.85 (0.69-1.04)	0.17	0.96 (0.90-1.01)
4. Incl. baseline prediabetes	1 (ref)	1.00 (0.88-1.14)	0.94 (0.82-1.08)	0.88 (0.75-1.03)	0.08	0.96 (0.92-1.01)
Low-fat dairy						
Main analysis model 3	1 (ref)	1.06 (0.91-1.23)	1.01 (0.87-1.18)	0.96 (0.82-1.13)	0.48	1.01 (0.96-1.06)
1. Adjust. other dairy	1 (ref)	1.04 (0.89-1.21)	0.98 (0.84-1.15)	0.92 (0.78-1.09)	0.25	1.00 (0.95-1.05)
2. Excl. comorbidities	1 (ref)	1.04 (0.89-1.23)	1.02 (0.86-1.20)	0.97 (0.81-1.15)	0.62	1.00 (0.95-1.05)
3. Excl. 'energy misreporters'	1 (ref)	1.01 (0.84-1.21)	1.03 (0.86-1.23)	0.85 (0.70-1.03)	0.12	0.97 (0.91-1.02)
4. Incl. baseline prediabetes	1 (ref)	1.03 (0.90-1.17)	1.01 (0.88-1.15)	0.95 (0.83-1.09)	0.39	1.01 (0.97-1.05)
Total fermented dairy						
Main analysis model 3	1 (ref)	0.88 (0.75-1.03)	0.95 (0.81-1.11)	0.95 (0.80-1.13)	0.81	0.98 (0.94-1.03)
1. Adjust. other dairy	1 (ref)	0.88 (0.75-1.03)	0.95 (0.81-1.11)	0.94 (0.80-1.12)	0.73	0.98 (0.94-1.02)
2. Excl. comorbidities	1 (ref)	0.87 (0.74-1.03)	0.95 (0.80-1.12)	0.96 (0.80-1.15)	0.86	0.99 (0.94-1.03)
3. Excl. 'energy misreporters'	1 (ref)	0.81 (0.68-0.97)	0.89 (0.74-1.06)	0.86 (0.71-1.04)	0.19	0.95 (0.90-1.00)*
4. Incl. baseline prediabetes	1 (ref)	0.92 (0.81-1.05)	0.93 (0.82-1.07)	0.95 (0.83-1.10)	0.61	0.98 (0.95-1.02)
High-fat fermented dairy						
Main analysis model 3	1 (ref)	0.94 (0.80-1.09)	0.93 (0.79-1.08)	0.83 (0.69-0.99)	0.04*	0.95 (0.90-1.01)
1. Adjust. other dairy	1 (ref)	0.94 (0.80-1.09)	0.93 (0.79-1.09)	0.83 (0.69-0.99)	0.04*	0.95 (0.90-1.01)
2. Excl. comorbidities	1 (ref)	0.96 (0.81-1.13)	0.94 (0.79-1.12)	0.89 (0.74-1.08)	0.25	0.96 (0.91-1.02)
3. Excl. 'energy misreporters'	1 (ref)	0.89 (0.75-1.07)	0.93 (0.78-1.11)	0.79 (0.65-0.97)	0.04*	0.94 (0.89-1.01)
4. Incl. baseline prediabetes	1 (ref)	0.97 (0.85-1.11)	0.93 (0.81-1.07)	0.90 (0.78-1.05)	0.17	0.97 (0.92-1.01)

Supplemental Table 7. Sensitivity analyses for the association between dairy intake and prediabetes risk the Hoorn Studies (*n* = 2,262). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Low-fat fermented dairy						
Main analysis model 3	1 (ref)	0.99 (0.85-1.16)	0.98 (0.84-1.15)	0.96 (0.82-1.13)	0.64	1.03 (0.97-1.10)
1. Adjust. other dairy	1 (ref)	0.99 (0.84-1.15)	0.97 (0.83-1.14)	0.94 (0.80-1.11)	0.44	1.02 (0.96-1.09)
2. Excl. comorbidities	1 (ref)	1.00 (0.85-1.18)	1.00 (0.84-1.18)	0.94 (0.79-1.12)	0.45	1.02 (0.96-1.09)
3. Excl. 'energy misreporters'	1 (ref)	1.00 (0.83-1.20)	0.99 (0.82-1.18)	0.90 (0.74-1.09)	0.23	0.97 (0.91-1.05)
4. Incl. baseline prediabetes	1 (ref)	1.00 (0.88-1.14)	0.97 (0.85-1.10)	0.94 (0.82-1.08)	0.33	1.01 (0.96-1.06)
Total milk						
Main analysis model 3	1 (ref)	1.02 (0.87-1.19)	1.13 (0.97-1.31)	0.96 (0.81-1.15)	0.79	1.00 (0.94-1.06)
1. Adjust. other dairy	1 (ref)	1.01 (0.87-1.19)	1.12 (0.97-1.31)	0.96 (0.81-1.14)	0.76	1.00 (0.94-1.06)
2. Excl. comorbidities	1 (ref)	0.99 (0.84-1.18)	1.15 (0.98-1.35)	0.95 (0.79-1.15)	0.85	1.00 (0.93-1.07)
3. Excl. 'energy misreporters'	1 (ref)	1.08 (0.90-1.30)	1.21 (1.02-1.45)	1.00 (0.81-1.23)	0.79	0.98 (0.91-1.05)
4. Incl. baseline prediabetes	1 (ref)	1.04 (0.91-1.19)	1.14 (1.00-1.29)	1.00 (0.86-1.16)	0.96	1.00 (0.95-1.05)
High-fat milk						
Main analysis model 3	1 (ref)	0.91 (0.76-1.09)	1.01 (0.82-1.24)	1.04 (0.87-1.24)	0.55	1.01 (0.89-1.14)
1. Adjust. other dairy	1 (ref)	0.91 (0.76-1.09)	1.00 (0.81-1.24)	1.02 (0.86-1.22)	0.69	1.00 (0.88-1.13)
2. Excl. comorbidities	1 (ref)	0.92 (0.76-1.11)	0.98 (0.78-1.23)	1.06 (0.88-1.28)	0.44	1.04 (0.91-1.18)
3. Excl. 'energy misreporters'	1 (ref)	0.89 (0.72-1.09)	1.04 (0.82-1.33)	1.10 (0.90-1.34)	0.26	1.04 (0.92-1.18)
4. Incl. baseline prediabetes	1 (ref)	0.95 (0.81-1.10)	1.00 (0.84-1.19)	1.00 (0.87-1.16)	0.88	1.00 (0.90-1.11)
Low-fat milk						
Main analysis model 3	1 (ref)	1.01 (0.86-1.19)	1.04 (0.90-1.21)	0.98 (0.83-1.17)	0.88	0.99 (0.93-1.06)
1. Adjust. other dairy	1 (ref)	1.01 (0.86-1.19)	1.04 (0.90-1.20)	0.98 (0.82-1.16)	0.80	0.99 (0.93-1.06)
2. Excl. comorbidities	1 (ref)	1.04 (0.88-1.24)	1.08 (0.92-1.28)	0.98 (0.82-1.16)	0.72	0.99 (0.92-1.06)
3. Excl. 'energy misreporters'	1 (ref)	1.04 (0.86-1.24)	1.02 (0.85-1.22)	0.98 (0.80-1.18)	0.73	0.96 (0.89-1.04)
4. Incl. baseline prediabetes	1 (ref)	1.02 (0.89-1.16)	1.10 (0.96-1.25)	0.97 (0.85-1.12)	0.71	1.00 (0.95-1.05)
Total plain milk						
Main analysis model 3	1 (ref)	1.07 (0.91-1.26)	1.11 (0.95-1.28)	1.02 (0.85-1.24)	0.79	1.00 (0.94-1.07)
1. Adjust. other dairy	1 (ref)	1.07 (0.91-1.26)	1.11 (0.95-1.28)	1.02 (0.84-1.23)	0.81	1.00 (0.94-1.07)
2. Excl. comorbidities	1 (ref)	1.04 (0.88-1.24)	1.17 (0.99-1.38)	1.04 (0.88-1.24)	0.73	1.01 (0.94-1.08)
3. Excl. 'energy misreporters'	1 (ref)	1.16 (0.95-1.41)	1.12 (0.94-1.33)	1.04 (0.84-1.30)	0.79	0.98 (0.92-1.06)
4. Incl. baseline prediabetes	1 (ref)	1.05 (0.91-1.20)	1.12 (0.98-1.27)	1.04 (0.90-1.20)	0.62	1.00 (0.95-1.06)

Supplemental Table 7. Sensitivity analyses for the association between dairy intake and prediabetes risk the Hoorn Studies (*n* = 2,262). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
High-fat plain milk						
Main analysis model 3	1 (ref)	0.94 (0.69-1.27)	1.18 (0.90-1.54)	0.99 (0.75-1.31)	0.81	1.00 (0.88-1.13)
1. Adjust. other dairy	1 (ref)	0.93 (0.69-1.25)	1.15 (0.88-1.51)	0.97 (0.74-1.28)	0.96	0.99 (0.86-1.12)
2. Excl. comorbidities	1 (ref)	0.94 (0.68-1.30)	1.20 (0.91-1.59)	1.00 (0.74-1.35)	0.75	1.02 (0.89-1.18)
3. Excl. 'energy misreporters'	1 (ref)	1.08 (0.79-1.46)	1.30 (0.99-1.72)	0.97 (0.70-1.36)	0.72	1.04 (0.91-1.18)
4. Incl. baseline prediabetes	1 (ref)	0.94 (0.73-1.21)	1.05 (0.82-1.35)	1.02 (0.81-1.27)	0.82	0.99 (0.89-1.11)
Low-fat plain milk						
Main analysis model 3	1 (ref)	0.93 (0.79-1.09)	1.10 (0.95-1.28)	0.97 (0.82-1.13)	0.87	1.01 (0.94-1.07)
1. Adjust. other dairy	1 (ref)	0.93 (0.79-1.09)	1.10 (0.95-1.28)	0.96 (0.81-1.12)	0.78	1.00 (0.94-1.07)
2. Excl. comorbidities	1 (ref)	0.96 (0.81-1.14)	1.12 (0.95-1.31)	0.97 (0.82-1.16)	0.92	1.00 (0.94-1.08)
3. Excl. 'energy misreporters'	1 (ref)	0.99 (0.83-1.19)	1.02 (0.86-1.21)	0.93 (0.75-1.17)	0.63	0.97 (0.90-1.05)
4. Incl. baseline prediabetes	1 (ref)	0.98 (0.86-1.12)	1.08 (0.95-1.23)	0.96 (0.83-1.10)	0.60	1.01 (0.95-1.06)
Total yogurt						
Main analysis model 3	1 (ref)	1.05 (0.89-1.23)	1.02 (0.87-1.20)	1.04 (0.88-1.21)	0.73	1.04 (0.93-1.17)
1. Adjust. other dairy	1 (ref)	1.05 (0.89-1.23)	1.02 (0.87-1.20)	1.03 (0.88-1.21)	0.77	1.04 (0.92-1.16)
2. Excl. comorbidities	1 (ref)	1.08 (0.91-1.28)	1.05 (0.88-1.24)	1.06 (0.89-1.26)	0.59	1.05 (0.93-1.19)
3. Excl. 'energy misreporters'	1 (ref)	1.00 (0.83-1.20)	0.95 (0.78-1.14)	0.97 (0.81-1.17)	0.68	0.99 (0.87-1.14)
4. Incl. baseline prediabetes	1 (ref)	1.07 (0.94-1.23)	0.97 (0.85-1.12)	1.04 (0.91-1.19)	0.93	1.01 (0.91-1.11)
High-fat yogurt						
Main analysis model 3	1 (ref)	1.11 (0.90-1.36)	1.15 (0.94-1.42)	1.16 (0.95-1.42)	0.10	1.15 (0.96-1.39)
1. Adjust. other dairy	1 (ref)	1.09 (0.93-1.28)	1.20 (1.02-1.40)	1.07 (0.91-1.25)	0.21	1.08 (0.93-1.25)
2. Excl. comorbidities	1 (ref)	1.11 (0.91-1.34)	1.21 (1.00-1.46)	1.12 (0.92-1.36)	0.14	1.16 (0.96-1.40)
3. Excl. 'energy misreporters'	1 (ref)	1.11 (0.90-1.36)	1.15 (0.94-1.42)	1.16 (0.95-1.42)	0.10	1.15 (0.96-1.39)
4. Incl. baseline prediabetes	1 (ref)	1.09 (0.93-1.28)	1.20 (1.02-1.40)	1.07 (0.91-1.25)	0.21	1.08 (0.93-1.25)
Low-fat yogurt						
Main analysis model 3	1 (ref)	1.04 (0.90-1.21)	1.03 (0.87-1.21)	0.99 (0.85-1.16)	0.82	1.01 (0.89-1.14)
1. Adjust. other dairy	1 (ref)	1.04 (0.90-1.21)	1.03 (0.87-1.21)	0.99 (0.84-1.15)	0.78	1.00 (0.89-1.13)
2. Excl. comorbidities	1 (ref)	1.04 (0.88-1.22)	1.04 (0.88-1.24)	0.96 (0.81-1.13)	0.65	0.99 (0.87-1.13)
3. Excl. 'energy misreporters'	1 (ref)	1.00 (0.84-1.19)	0.98 (0.81-1.19)	0.91 (0.76-1.10)	0.31	0.92 (0.78-1.07)
4. Incl. baseline prediabetes	1 (ref)	1.02 (0.90-1.15)	1.00 (0.87-1.15)	0.95 (0.83-1.08)	0.43	0.97 (0.88-1.08)

Supplemental Table 7. Sensitivity analyses for the association between dairy intake and prediabetes risk the Hoorn Studies (*n* = 2,262). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total cheese						
Main analysis model 3	1 (ref)	1.02 (0.88-1.19)	0.90 (0.77-1.05)	0.86 (0.73-1.02)	0.04*	0.95 (0.90-1.01)
1. Adjust. other dairy	1 (ref)	1.02 (0.88-1.19)	0.90 (0.77-1.05)	0.86 (0.73-1.03)	0.04*	0.95 (0.90-1.01)
2. Excl. comorbidities	1 (ref)	0.97 (0.83-1.14)	0.87 (0.74-1.03)	0.87 (0.73-1.04)	0.09	0.96 (0.91-1.01)
3. Excl. 'energy misreporters'	1 (ref)	1.00 (0.84-1.19)	0.87 (0.73-1.04)	0.78 (0.64-0.96)	0.005**	0.92 (0.87-0.99)*
4. Incl. baseline prediabetes	1 (ref)	1.00 (0.88-1.13)	0.87 (0.76-1.00)	0.90 (0.78-1.04)	0.07	0.97 (0.92-1.01)
High-fat cheese						
Main analysis model 3	1 (ref)	0.95 (0.82-1.10)	0.91 (0.77-1.07)	0.79 (0.66-0.94)	0.006**	0.94 (0.88-1.00)*
1. Adjust. other dairy	1 (ref)	0.95 (0.82-1.10)	0.91 (0.77-1.07)	0.79 (0.66-0.94)	0.007**	0.94 (0.88-1.00)*
2. Excl. comorbidities	1 (ref)	0.96 (0.82-1.13)	0.96 (0.81-1.14)	0.84 (0.70-1.02)	0.07	0.95 (0.89-1.01)
3. Excl. 'energy misreporters'	1 (ref)	0.90 (0.76-1.07)	0.87 (0.73-1.04)	0.73 (0.59-0.90)	0.003**	0.92 (0.86-0.99)*
4. Incl. baseline prediabetes	1 (ref)	0.95 (0.83-1.08)	0.94 (0.82-1.08)	0.85 (0.74-0.98)	0.03*	0.96 (0.91-1.00)
Low-fat cheese						
Main analysis model 3	1 (ref)	1.03 (0.85-1.25)	0.99 (0.82-1.19)	1.12 (0.93-1.34)	0.30	1.04 (0.94-1.16)
1. Adjust. other dairy	1 (ref)	1.01 (0.83-1.23)	0.98 (0.81-1.18)	1.10 (0.92-1.32)	0.37	1.04 (0.94-1.15)
2. Excl. comorbidities	1 (ref)	0.92 (0.75-1.15)	0.92 (0.75-1.12)	1.06 (0.87-1.29)	0.66	1.02 (0.92-1.14)
3. Excl. 'energy misreporters'	1 (ref)	1.04 (0.83-1.29)	0.91 (0.72-1.15)	1.02 (0.82-1.27)	0.95	0.97 (0.86-1.10)
4. Incl. baseline prediabetes	1 (ref)	1.00 (0.84-1.19)	1.00 (0.85-1.17)	1.08 (0.92-1.25)	0.39	1.03 (0.95-1.12)
Cream						
Main analysis model 3	1 (ref)	1.02 (0.86-1.21)	0.89 (0.76-1.05)	0.87 (0.74-1.03)	0.08	0.98 (0.96-1.01)
1. Adjust. other dairy	1 (ref)	1.02 (0.86-1.21)	0.89 (0.76-1.05)	0.87 (0.72-1.05)	0.11	0.96 (0.92-1.01)
2. Excl. comorbidities	1 (ref)	1.03 (0.86-1.23)	0.89 (0.75-1.05)	0.85 (0.71-1.02)	0.05	0.98 (0.95-1.01)
3. Excl. 'energy misreporters'	1 (ref)	1.01 (0.83-1.24)	0.89 (0.74-1.06)	0.85 (0.70-1.03)	0.07	0.98 (0.95-1.01)
4. Incl. baseline prediabetes	1 (ref)	0.96 (0.83-1.12)	0.89 (0.78-1.02)	0.91 (0.79-1.05)	0.21	0.99 (0.97-1.01)

Supplemental Table 7. Sensitivity analyses for the association between dairy intake and prediabetes risk the Hoorn Studies (*n* = 2,262). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Ice cream						
Main analysis model 3	1 (ref)	1.06 (0.87-1.28)	0.99 (0.86-1.13)	0.95 (0.81-1.12)	0.44	0.79 (0.42-1.48)
1. Adjust. other dairy	1 (ref)	1.05 (0.87-1.28)	0.98 (0.86-1.12)	0.94 (0.80-1.11)	0.39	0.76 (0.40-1.43)
2. Excl. comorbidities	1 (ref)	1.08 (0.88-1.33)	1.01 (0.88-1.17)	0.99 (0.83-1.18)	0.76	0.78 (0.39-1.56)
3. Excl. 'energy misreporters'	1 (ref)	1.10 (0.87-1.38)	1.00 (0.86-1.18)	0.99 (0.82-1.20)	0.78	0.74 (0.36-1.55)
4. Incl. baseline prediabetes	1 (ref)	0.96 (0.82-1.14)	0.94 (0.84-1.05)	0.93 (0.82-1.07)	0.31	0.73 (0.42-1.29)

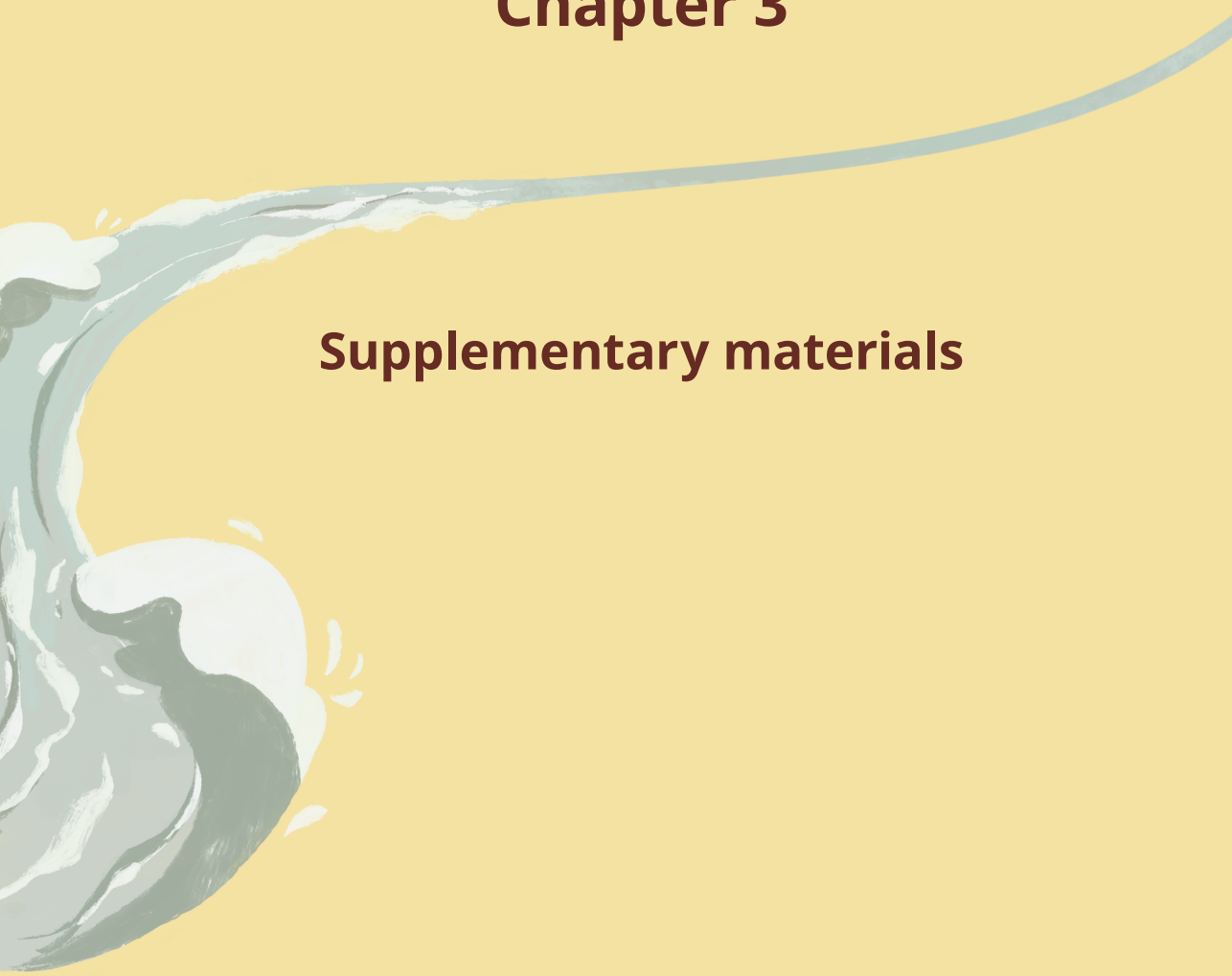
[1] Relative risks (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + median or tertile categories with the lowest category as the reference, adjusted for covariates as follows: Model 3 included age (continuous), sex, follow-up duration (continuous), energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (3 categories), alcohol consumption (continuous), a family history of diabetes (yes/no), intakes of fruit, vegetables, tea, coffee, grains (whole and refined), meat (processed and red) and sugar-sweetened beverages (SSB) (continuous). Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.
[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated.
P-value significance level: *0.05, **0.01, ***0.001.
Abbreviations: CI, Confidence Interval; Q, Quartile.

Supplemental table 8. Sensitivity analyses for associations of substitution of high-fat cheese with alternative dairy products and prediabetes risk in the Hoorn Studies.

	Exclusion comorbidities (*n* = 2,201)	Energy normal reported only (*n* = 1,716)	Inclusion prediabetes at baseline (*n* = 2,661)
	Relative risk (95%CI)[1]	Relative risk (95%CI)[1]	Relative risk (95%CI)[1]
High-fat cheese			
High-fat milk	1.04 (0.90-1.21)	1.09 (0.94-1.26)	1.06 (0.93-1.21)
Low-fat milk	1.04 (0.94-1.14)	1.05 (0.94-1.17)	1.06 (0.96-1.16)
High-fat yogurt	1.22 (0.99-1.49)	1.23 (1.00-1.52)	1.20 (0.99-1.46)
Low-fat yogurt	1.05 (0.90-1.23)	1.02 (0.85-1.23)	1.09 (0.95-1.26)
Low-fat cheese	1.06 (0.94-1.20)	1.06 (0.93-1.21)	1.09 (0.98-1.22)
Cream	1.02 (0.95-1.09)	1.06 (0.98-1.15)	1.05 (0.98-1.12)
Ice cream	0.84 (0.43-1.62)	0.85 (0.42-1.73)	0.82 (0.44-1.54)

[1] Continuous relative risks per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: age (continuous), sex, follow-up duration, cohort, education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no), intakes of fruit, vegetables, tea, coffee, grains (whole and refined), meat (processed and red) and sugar-sweetened beverages (continuous). The substitution model included total servings/day of dairy intake and energy intake (kcal).
Abbreviations: CI, Confidence Interval.

Chapter 3



Supplementary materials

Contents

Supplemental Table 1. Missing values of covariates in participants before imputation.

	Study population	Analyses of prediabetes	Analyses of HOMA-IR
	n = 6770	*n* = 6053	*n* = 5403
Educational level, n (%)	43 (0.6)	34 (0.6)	43 (0.7)
Smoking, n (%)	33 (0.5)	27 (0.4)	33 (0.5)
Physical activity (MET-hours/week), n (%)	265 (3.9)	233 (3.8)	237 (3.6)
Waist circumference, n (%)	312 (4.6)	277 (4.6)	*Repeated measures available*
Cholesterol, n (%)	151 (2.2)	143 (2.4)	*Repeated measures available*
Hypertension, n (%)	58 (0.9)	52 (0.9)	*Repeated measures available*
Triglycerides, n (%)	238 (3.5)	211 (3.5)	*Repeated measures available*

For all covariates of all analyses, only education level, smoking status, physical activity, and baseline waist circumference had missing values before imputation.

Supplemental Table 2. Baseline characteristics of study population across different population subgroups (total *n* = 6,770).[1]

	High-fat milk		Low-fat milk		High-fat yogurt		Low-fat cheese	
	Zero intake *n* = 3358	T3 *n* = 1181	Q1 *n* = 1787	Q4 *n* = 1667	Zero intake *n* = 5150	T3 *n* = 484	Zero intake *n* = 4804	T3 *n* = 665
Total dairy intake (servings/day)	0 ± 0	1.1 ± 0.58	0 ± 0	2.3 ± 0.6	0 ± 0	0.9 ± 0.3	0	2.1 ± 0.5
Range	0.0 - 0.0	0.2 - 14.4	0.0 - 0.1	1.1 - 12.2	0.0 - 0.0	0.4 - 7.4	0.0	0.9 - 15.0
Age at dietary assessment (years)	61.1 ± 3.6	62.2 ± 4.2	62.1 ± 4.0	61.2 ± 3.8	61.7 ± 3.9	62.8 ± 4.0	62.2 ± 4.0	60.6 ± 3.2
Sex female (%)	60.1	55.3	57.3	55.4	57.9	64.7	54.5	69.0
BMI (kg/m2)	26.9 ± 2.3	26.4 ± 2.2	26.3 ± 2.3	26.8 ± 2.2	26.8 ± 2.2	25.7 ± 2.0	26.5 ± 2.2	27.0 ± 2.5
Waist circumference (cm)	91.5 ± 6.7	90.8 ± 6.5	90.7 ± 6.9	92.0 ± 6.9	91.5 ± 6.7	89.6 ± 5.7	91.4 ± 6.7	90.2 ± 6.9
Education level (%)								
Primary education	10.3	14.9	11.9	12.2	11.6	13.2	13.0	8.3
Lower education	40.7	39.5	40.8	37.1	41.7	39.7	41.0	41.8
Intermediate	29.9	26.9	29.2	32.0	28.5	29.1	29.8	28.2
Higher	19.0	18.8	18.2	18.7	18.2	18.0	16.2	21.7
Smoking (%)								
Never	31.6	32.1	30.5	33.7	31.0	38.8	31.6	34.9
Ever	45.5	42.8	42.4	45.3	46.1	41.1	44.8	45.8
Current	22.9	25.2	27.1	21.0	22.9	20.0	23.6	19.3
Physical activity (MET-hours/week)								
Zutphen Physical Activity Questionnaire	42.5 [17.5, 86.0]	46.3 [19.7, 81.1]	42.0 [15.0, 78.0]	43.0 [17.2, 87.7]	42.9 [17.4, 83.5]	46.0 [19.7, 83.5]	40.5 [16.0, 80.8]	50.3 [22.1, 86.9]
LASA Physical Activity Questionnaire	81.1 [56.1, 114]	80.1 [53.5, 114]	80.0 [53.2, 112]	81.0 [56.7, 113]	78.2 [53.4, 110]	84.7 [62.0, 127]	78.5 [53.4, 112]	87.6 [62.9, 116]
Family history diabetes mellitus	11.6	14.1	12.1	12.7	12.5	15.1	15.1	5.9
Dietary intake								
Diet score	6.7 ± 1.1	6.7 ± 1.0	6.1 ± 1.1	7.2 ± 1.0	6.6 ± 1.1	6.9 ± 1.1	6.4 ± 1.1	7.4 ± 1.0
Energy intake (kcal/day)	2,029 ± 323	2,287 ± 342	2,057 ± 350	2,274 ± 336	2,087 ± 331	2,288 ± 336	2,137 ± 337	2,057 ± 303
Total fat intake (E%)	34.6 ± 3.7	35.9 ± 3.4	35.8 ± 4.0	34.3 ± 3.5	34.8 ± 3.7	35.0 ± 3.4	35.7 ± 3.6	32.3 ± 3.3

Supplemental Table 2. Baseline characteristics of study population across different population subgroups (total *n* = 6,770).[1] (continued)

	High-fat milk		Low-fat milk		High-fat yogurt		Low-fat cheese	
	Zero intake *n* = 3358	T3 *n* = 1181	Q1 *n* = 1787	Q4 *n* = 1667	Zero intake *n* = 5150	T3 *n* = 484	Zero intake *n* = 4804	T3 *n* = 665
Total saturated fat intake (E%)	12.8 ± 1.6	14.1 ± 1.6	13.5 ± 1.9	13.1 ± 1.5	12.9 ± 1.6	13.7 ± 1.6	13.6 ± 1.6	11.7 ± 1.4
Total protein intake (E%)	17.0 ± 1.7	16.4 ± 1.5	15.9 ± 1.6	17.7 ± 1.6	16.8 ± 1.7	16.1 ± 1.5	16.3 ± 1.6	18.7 ± 1.8
Carbohydrate intake (E%)	43.9 ± 4.3	44.8 ± 3.8	44.0 ± 4.7	45.1 ± 3.8	44.5 ± 4.3	45.8 ± 3.9	44.2 ± 4.3	45.5 ± 3.9
Calcium intake (mg/day)	1,061 ± 236	1,238 ± 254	883 ± 223	1,465 ± 243	1,090 ± 251	1,271 ± 237	1,069 ± 246	1,390 ± 246
Sodium intake (mg/day)	2,300 ± 455	2,455 ± 456	2,247 ± 467	2,560 ± 447	2,322 ± 464	2,403 ± 440	2,326 ± 465	2,601 ± 477
Alcohol intake (g/day)	14.0 ± 9.8	10.6 ± 8.4	13.4 ± 10.1	11.3 ± 8.7	12.9 ± 9.5	11.0 ± 7.7	13.1 ± 9.6	10.3 ± 7.8
Vegetables (g/day)	217 ± 69.3	208 ± 68.8	204 ± 61.8	216 ± 72.3	210 ± 68.5	206 ± 55.8	205 ± 66.1	228 ± 84.1
Fruit (g/day)	234 ± 107	211 ± 89.0	209 ± 101	234 ± 97.6	226 ± 100	235 ± 87.2	221 ± 97.9	267 ± 97.6
Wholegrains (g/day)	116 ± 43.4	113 ± 41.7	105 ± 44.6	127 ± 43.0	115 ± 42.9	120 ± 43.2	112 ± 43.7	147 ± 43.0
Legumes (g/day)	16.4 ± 13.4	16.2 ± 10.5	17.4 ± 16.2	16.2 ± 10.8	16.2 ± 12.6	12.8 ± 8.2	16.4 ± 12.8	17.6 ± 12.7
Nuts (g/day)	8.5 ± 8.3	8.8 ± 7.8	8.4 ± 8.5	8.3 ± 7.2	8.4 ± 8.0	8.8 ± 8.1	8.5 ± 8.1	8.5 ± 7.1
Red meat (g/day)	93.8 ± 36.5	97.0 ± 33.1	91.2 ± 40.5	97.6 ± 31.9	91.6 ± 36.5	94.6 ± 36.9	97.5 ± 38.6	85.3 ± 34.6
Fish (g/day)	20.5 ± 12.9	20.2 ± 12.1	19.5 ± 13.7	19.6 ± 12.1	20.1 ± 12.8	18.4 ± 11.7	19.5 ± 12.6	22.4 ± 13.3
Tea (g/day)	282 ± 162	292 ± 156	298 ± 168	264 ± 147	286 ± 158	251 ± 122	268 ± 149	314 ± 156
Coffee (g/day)	483 ± 162	501 ± 161	477 ± 169	475 ± 149	471 ± 152	476 ± 142	477 ± 156	482 ± 142
Sugar sweetened beverages (g/day)	87.9 ± 74.4	111 ± 79.6	94.7 ± 78.3	95.5 ± 74.5	94.6 ± 75.9	102 ± 72.6	97.0 ± 78.0	75.8 ± 60.0

[1] Dairy product types significantly associated with prediabetes risk and longitudinal insulin resistance.
Values are mean ± SD for continuous variables with a normal distribution (pooled), or median (25th percentile (75th percentile) for continuous variables with a skewed distribution; percentages for categorical variables, based on unimputed data.
Abbreviations: RS, Rotterdam Study; SD, standard deviation; E%, percentage of total energy intake; MET, metabolic equivalent of task, T; Tertile, Q; Quartile.

Supplemental Table 2. *Continued*.

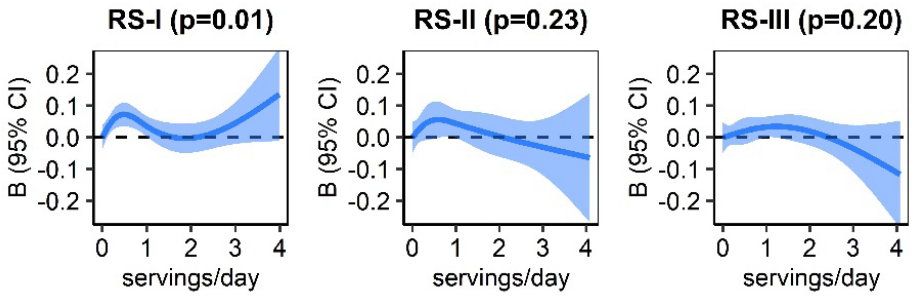
	RS-I	RS-II	RS-III	Pooled
	n = 2971	*n = 1413*	*n = 2386*	*n = 6770*
Total dairy intake (servings/day)	2.1 ± 1.3	1.9 ± 1.4	1.7 ± 1.3	1.9 ± 0.8
Range	0-12.5	0-12.3	0-15.1	0-15.1
Age at dietary assessment (years)	65.5 ± 6.7	63.6 ± 7.2	56.8 ± 6.4	61.7 ± 3.9
Sex, female (%)	59.6	55.1	59.9	58.7
BMI (kg/m2)	26.0 ± 3.4	27.0 ± 4.0	27.2 ± 4.3	26.6 ± 2.2
Waist circumference (cm)	88.8 ± 10.8	93.0 ± 11.8	92.1 ± 12.1	91.1 ± 6.7
Education level (%)				
Primary education	15.8	7.2	9.5	11.8
Lower education	43.8	45.8	34.5	40.9
Intermediate	30.3	28.8	27.3	28.9
Higher	10.1	18.1	28.7	18.3
Smoking (%)				
Never	33.9	29.1	32.1	32.2
Ever	44.7	47.8	43.9	45.0
Current	21.5	23.1	24.0	22.7
Physical activity (MET-hours/week)				
Zutphen Physical Activity Questionnaire	80.7 [55.6, 116]	77.3 [53.0, 105]	NA	
LASA Physical Activity Questionnaire	NA	NA	42.9 [17.7, 82.5]	
Family history diabetes mellitus	21.9	15.2	NA	
Dietary intake				
Diet score	6.9 ± 1.8	6.1 ± 1.8	7.0 ± 1.9	6.7 ± 1.1
Energy intake (kcal/day)	1,984 ± 502	2,154 ± 569	2,309 ± 714	2,113 ± 333
Total fat intake (E%)	35.0 ± 6.0	39.0 ± 7.0	32.0 ± 6.0	35.1 ± 3.6
Total saturated fat intake (E%)	14.0 ± 3.0	15.0 ± 3.0	11.0 ± 3.0	13.2 ± 1.6
Total protein intake (E%)	17.0 ± 3.0	17.0 ± 3.0	16.0 ± 3.0	16.7 ± 1.7
Carbohydrate intake (E%)	45.0 ± 7.0	42.0 ± 8.0	46.0 ± 7.0	44.5 ± 4.2
Calcium intake (mg/day)	1,129 ± 397	1,098 ± 464	1,093 ± 456	1,109 ± 251
Sodium intake (mg/day)	2,206 ± 657	2,536 ± 1005	2,439 ± 860	2,344 ± 463
Alcohol intake (g/day)	4.5 [0.4, 15.4]	8.7 [0.7, 22.6]	8.2 [1.5, 19.8]	6.6 [0.7, 18.8]
Vegetables (g/day)	209 ± 99	198 ± 110	251 ± 186	211 ± 69
Fruit (g/day)	239 ± 135	179 ± 161	352 ± 321	228 ± 98
Wholegrains (g/day)	71 ± 72	146 ± 72	132 ± 82	116 ± 43
Legumes (g/day)	18 ± 18	15 ± 29	16 ± 22	16.5 ± 12.5
Nuts (g/day)	7.0 ± 12.4	7.4 ± 13.1	12.7 ± 16.4	8.5 ± 7.9
Red meat (g/day)	115 ± 106	108 ± 66	80 ± 48	93 ± 36
Fish (g/day)	15.9 ± 18.3	20.3 ± 22.7	31.3 ± 29.5	20 ± 13
Tea (g/day)	369 ± 260	349 ± 336	190 ± 236	288 ± 155
Coffee (g/day)	494 ± 241	498 ± 285	416 ± 269	471 ± 152
Sugar sweetened beverages (g/day)	67 ± 109	148 ± 177	102 ± 124	94 ± 74

Values are mean ± SD for continuous variables with a normal distribution (pooled), or median (25th percentile (75th percentile) for continuous variables with a skewed distribution; percentages for categorical variables, based on unimputed data.
Abbreviations: RS, Rotterdam Study; SD, standard deviation; E%, percentage of total energy intake; MET, metabolic equivalent of task.

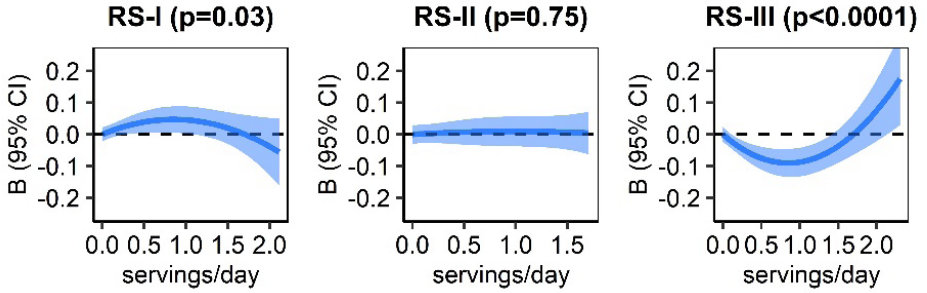
Supplemental Table 2. *Continued.*

	Included participants *n* = 6770	**Excluded participants** *n* = 8162
Age (years)	62.0 ± 7.8	69.2 ± 11.4
Sex, female (%)	58.7	59.4
Body Mass Index (kg/m2)	26.6 ± 3.9	27.1 ± 4.3
Waist circumference (cm)	90.8 ± 11.6	93.4 ± 12.2
Fasting glucose (mmol/L)	5.5 ± 0.6	6.6 ± 2.2
HOMA-IR	2.9 ± 2.4	5.6 ± 13.0
Physical activity (MET-hours/week)		
LASA questionnaire (RS-I and RS-II)	79.7 [54.7, 112.1]	67.2 [40.2, 97.6]
Zutphen Questionnaire (RS-III)	42.9 [17.7, 82.5]	37.3 [16.5, 80.4]
Education level (%)		
Primary	11.8	24.7
Lower	40.9	38.8
Intermediate	28.9	24.8
Higher	18.3	11.6
Smoking (%)		
Never	32.2	34.0
Ever	45.0	40.4
Current	22.7	25.6

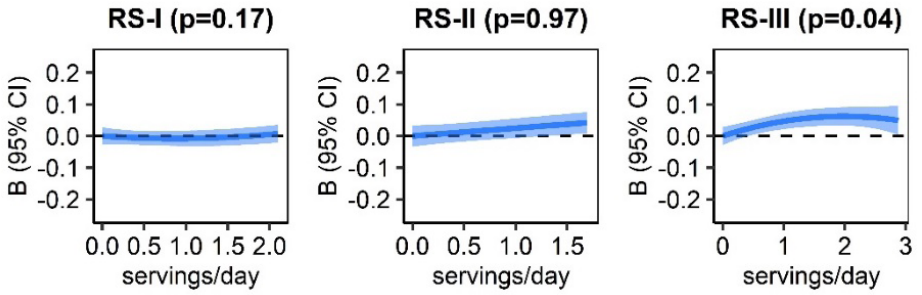
Values are mean ± SD for continuous variables with a normal distribution (pooled), or median [IQR] for continuous variables with a skewed distribution; percentages for categorical variables, based on unimputed data. Excluded participants were those without dietary data at baseline (*n* = 5,140), implausible energy intake (*n* = 85) or with diabetes or without diabetes information at baseline (*n* = 2,932).
Abbreviations: MET, metabolic equivalent of task; RS, Rotterdam Study; SD, standard deviation.



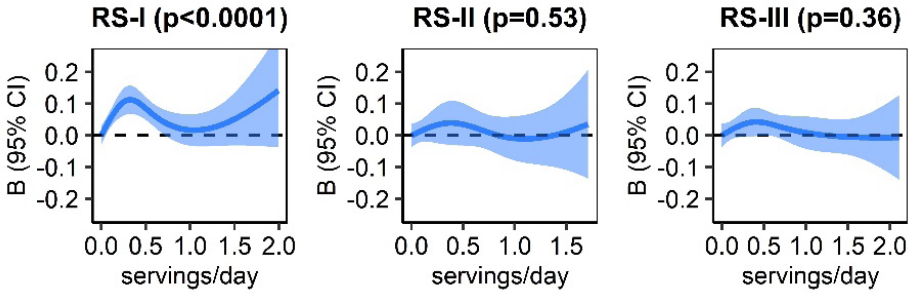
a. Low-fat fermented dairy



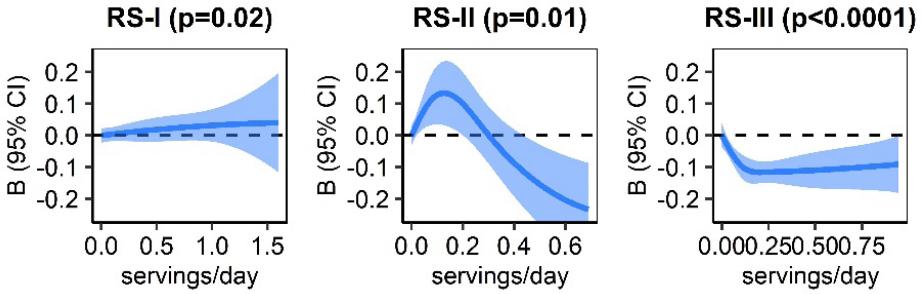
b. High-fat milk



c. Low-fat milk



d. Low-fat yogurt



e. Cream

Supplemental Figure 1. Non-linear relationship of dairy product types and longitudinal HOMA-IR by sub-cohort. Outliers in dairy intakes were excluded (defined as the mean + 3 SD). Dairy product types for which non-linear associations (polynomials or natural splines) were present in at least one sub-cohort are presented.

Supplemental Table 3. Associations of dairy product types and prediabetes risk in the Rotterdam Studies, pooled and by sub-cohort (*n* = 6,053).

	Continuous hazard ratio (95%CI)[1]			
	Pooled	**RS-I**	**RS-II**	**RS-III**
n/N	1139/6053	519/2457	290/1193	330/2139
Total dairy				
Median intake	3.3	3.5	3.8	2.8
Model 1	1.02 (0.99-1.05)	1.07 (1.02-1.13)**	1.02 (0.97-1.07)	0.92 (0.85-0.98)*
Model 2	1.03 (1.00-1.07)	1.08 (1.03-1.14)**	1.03 (0.98-1.08)	0.95 (0.88-1.02)
High-fat dairy				
Median intake	1.7	1.9	2.0	1.1
Model 1	1.00 (0.96-1.04)	1.04 (0.98-1.11)	1.00 (0.95-1.06)	0.91 (0.83-0.99)*
Model 2	1.00 (0.96-1.04)	1.04 (0.98-1.12)	1.00 (0.95-1.06)	0.92 (0.84-1.01)
Low-fat dairy				
Median intake	1.4	1.4	1.3	1.4
Model 1	1.03 (0.99-1.08)	1.06 (1.00-1.13)	1.04 (0.96-1.12)	0.96 (0.88-1.06)
Model 2	1.05 (1.01-1.10)*	1.07 (1.01-1.14)*	1.06 (0.99-1.14)	1.00 (0.91-1.10)
Fermented dairy				
Median intake	2.2	2.4	2.6	1.9
Model 1	1.02 (0.98-1.05)	1.05 (1.00-1.11)*	1.02 (0.97-1.07)	0.94 (0.86-1.02)
Model 2	1.03 (0.99-1.06)	1.06 (1.00-1.12)*	1.02 (0.97-1.07)	0.97 (0.89-1.06)
High-fat fermented dairy				
Median intake	1.3	1.6	1.7	0.9
Model 1	1.03 (0.99-1.07)	1.07 (1.00-1.15)*	1.02 (0.97-1.07)	0.94 (0.85-1.04)
Model 2	1.03 (0.99-1.07)	1.07 (1.00-1.15)*	1.02 (0.96-1.07)	0.95 (0.86-1.06)
Low-fat fermented dairy				
Median intake	0.6	0.5	0.5	0.7
Model 1	0.99 (0.94-1.05)	1.01 (0.93-1.10)	0.99 (0.89-1.09)	0.96 (0.86-1.07)
Model 2	1.01 (0.96-1.07)	1.03 (0.94-1.12)	1.01 (0.91-1.11)	1.01 (0.90-1.13)
Total milk				
Median intake	1.0	1.2	1.1	0.7
Model 1	1.00 (0.95-1.06)	1.05 (0.98-1.14)	1.00 (0.91-1.11)	0.89 (0.80-1.00)*
Model 2	1.02 (0.97-1.08)	1.06 (0.99-1.15)	1.05 (0.95-1.16)	0.92 (0.82-1.03)
High-fat milk				
Median intake	0.0	0.1	0.0	0.0
Model 1	0.87 (0.78-0.97)*	0.95 (0.82-1.10)	0.61 (0.42-0.89)**	0.84 (0.70-1.00)
Model 2	0.88 (0.79-0.99)*	0.95 (0.81-1.10)	0.62 (0.43-0.91)*	0.86 (0.72-1.04)
Low-fat milk				
Median intake	0.8	1.0	0.8	0.5
Model 1	1.05 (0.99-1.11)	1.07 (0.99-1.15)	1.06 (0.97-1.17)	0.94 (0.82-1.09)
Model 2	1.07 (1.01-1.13)*	1.08 (1.00-1.16)*	1.11 (1.00-1.23)*	0.96 (0.84-1.11)
Total yogurt				
Median intake	0.4	0.3	0.1	0.4
Model 1	0.88 (0.78-0.98)*	0.89 (0.74-1.07)	0.90 (0.72-1.13)	0.85 (0.71-1.01)

Supplemental Table 3. Associations of dairy product types and prediabetes risk in the Rotterdam Studies, pooled and by sub-cohort (*n* = 6,053). (continued)

	Continuous hazard ratio (95%CI)[1]			
	Pooled	**RS-I**	**RS-II**	**RS-III**
n/N	1139/6053	519/2457	290/1193	330/2139
Model 2	0.92 (0.82-1.02)	0.89 (0.73-1.07)	0.95 (0.76-1.20)	0.92 (0.77-1.09)
High-fat yogurt				
Median intake	0.0	0.0	0.0	0.0
Model 1	0.66 (0.50-0.88)**	0.76 (0.54-1.08)	0.45 (0.19-1.05)	0.51 (0.27-0.97)*
Model 2	0.67 (0.51-0.89)**	0.76 (0.54-1.07)	0.47 (0.20-1.10)	0.55 (0.29-1.04)
Low-fat yogurt				
Median intake	0.1	0.1	0.0	0.4
Model 1	0.94 (0.84-1.06)	0.96 (0.77-1.19)	0.98 (0.79-1.22)	0.91 (0.77-1.08)
Model 2	0.99 (0.88-1.11)	0.97 (0.78-1.21)	1.03 (0.82-1.29)	0.98 (0.83-1.16)
Total cheese				
Median intake	1.5	1.7	2.0	1.3
Model 1	1.05 (1.01-1.08)**	1.11 (1.04-1.18)**	1.03 (0.98-1.08)	0.98 (0.89-1.08)
Model 2	1.05 (1.01-1.09)**	1.11 (1.04-1.19)**	1.02 (0.97-1.08)	1.00 (0.91-1.10)
High-fat cheese				
Median intake	1.2	1.5	1.6	0.8
Model 1	1.04 (1.00-1.07)*	1.08 (1.02-1.16)*	1.03 (0.98-1.08)	0.96 (0.87-1.07)
Model 2	1.03 (1.00-1.08)	1.08 (1.01-1.16)*	1.02 (0.97-1.08)	0.97 (0.87-1.08)
Low-fat cheese				
Median intake	0.0	0.0	0.0	0.1
Model 1	1.05 (0.97-1.14)	1.10 (0.97-1.26)	1.00 (0.86-1.16)	1.03 (0.89-1.20)
Model 2	1.06 (0.97-1.14)	1.11 (0.97-1.27)	1.00 (0.88-1.14)	1.07 (0.92-1.24)
Cream				
Median intake	0.0	0.0	0.0	0.1
Model 1	1.04 (0.93-1.17)	1.06 (0.94-1.19)	0.93 (0.52-1.66)	0.91 (0.59-1.41)
Model 2	1.03 (0.92-1.16)	1.05 (0.93-1.18)	0.89 (0.50-1.59)	0.92 (0.59-1.42)
Ice cream				
Median intake	0.0	0.0	0.0	0.1
Model 1	0.94 (0.71-1.26)	0.83 (0.38-1.81)	0.93 (0.63-1.35)	1.04 (0.61-1.77)
Model 2	0.94 (0.70-1.26)	0.75 (0.34-1.65)	0.96 (0.65-1.43)	1.00 (0.58-1.73)

[1] Hazard ratios per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Model 1 included age (continuous), sex and energy intake (continuous). Model 2 was additionally adjusted for education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and food groups associated with type 2 diabetes including intakes of fruit, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat, and sugar-sweetened beverages (SSB) (continuous). * P=0.01 to 0.05, ** P<0.01.
Abbreviations: CI, Confidence Interval; HR, Hazard Ratio; RS, Rotterdam Study.

Supplemental Table 4. Associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies, pooled and by sub-cohort (*n* = 6,593).

	Continuous betas from log-transformed HOMA-IR (95%CI)			
	Pooled *n* = 6053	**RS-I** *n* = 2892	**RS-II** *n* = 1391	**RS-III** *n* = 2310
Total dairy				
Median intake	3.3	3.5	3.8	2.8
Model 1	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)	0.01 (-0.01,0.02)	0.00 (-0.02,0.01)
Model 2	0.00 (0.00,0.01)	0.00 (-0.01,0.02)	0.01 (-0.01,0.02)	0.00 (-0.01,0.01)
High-fat dairy				
Median intake	1.7	1.9	2.0	1.1
Model 1	-0.01 (-0.01,0.00)	-0.01 (-0.02,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.00)
Model 2	-0.01 (-0.02,0.00)	-0.01 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.03,0.00)
Low-fat dairy				
Median intake	1.3	1.3	1.3	1.4
Model 1	0.01 (0.00,0.02)	0.01 (-0.01,0.02)	0.02 (0.00,0.04)	0.01 (-0.01,0.03)
Model 2	0.02 (0.01,0.03)**	0.01 (0.00,0.03)	0.02 (0.00,0.04)*	0.02 (0.00,0.04)*
Fermented dairy				
Median intake	2.2	2.4	2.6	1.9
Model 1	-0.01 (-0.02,0.00)	-0.01 (-0.02,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.00)
Model 2	0.00 (-0.01,0.00)	0.00 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.02,0.01)
High-fat fermented dairy				
Median intake	1.4	1.6	1.7	0.8
Model 1	0.00 (-0.01,0.01)	-0.01 (-0.02,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)
Model 2	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.03,0.01)
Low-fat fermented dairy				
Median intake	0.5	0.5	0.5	0.7
Model 1	-0.01 (-0.02,0.00)	-0.01 (-0.03,0.01)	-0.01 (-0.04,0.01)	-0.02 (-0.04,0.01)
Model 2	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.03,0.02)	0.00 (-0.02,0.02)
Total milk				
Median intake	1.0	1.2	1.1	0.7
Model 1	0.01 (0.00,0.02)	0.00 (-0.02,0.02)	0.03 (0.01,0.06)*	0.01 (-0.01,0.03)
Model 2	0.01 (0.00,0.02)	0.00 (-0.02,0.02)	0.03 (0.01,0.06)**	0.01 (-0.01,0.02)
High-fat milk				
Median intake	0.003	0.06	0.04	0
Model 1	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.02)	-0.02 (-0.07,0.04)	-0.02 (-0.05,0.00)
Model 2	-0.02 (-0.04,0.00)	-0.02 (-0.05,0.02)	-0.02 (-0.08,0.04)	-0.02 (-0.05,0.00)
Low-fat milk				
Median intake	0.8	0.9	0.8	0.5
Model 1	0.02 (0.01,0.04)***	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**	0.04 (0.01,0.07)**
Model 2	0.02 (0.01,0.04)***	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**	0.04 (0.01,0.06)**

Supplemental Table 4. Associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies, pooled and by sub-cohort (*n* = 6,593). (continued)

	Continuous betas from log-transformed HOMA-IR (95%CI)			
	Pooled *n* = 6053	**RS-I** *n* = 2892	**RS-II** *n* = 1391	**RS-III** *n* = 2310
Total yogurt				
Median intake	0.4	0.3	0.07	0.4
Model 1	-0.03 (-0.05,-0.01)**	-0.01 (-0.06,0.03)	-0.02 (-0.07,0.03)	-0.04 (-0.07,-0.01)**
Model 2	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.04)	-0.01 (-0.06,0.05)	-0.03 (-0.06,0.00)
High-fat yogurt				
Median intake	0	0	0	0
Model 1	-0.08 (-0.13,-0.03)**	-0.05 (-0.12,0.02)	-0.11 (-0.25,0.03)	-0.11 (-0.19,-0.04)**
Model 2	-0.08 (-0.13,-0.03)**	-0.04 (-0.11,0.03)	-0.11 (-0.25,0.03)	-0.11 (-0.18,-0.03)**
Low-fat yogurt				
Median intake	0.14	0.14	0	0.4
Model 1	-0.02 (-0.04,0.01)	0.00 (-0.05,0.05)	-0.01 (-0.06,0.05)	-0.03 (-0.06,0.00)
Model 2	0.00 (-0.03,0.02)	0.01 (-0.04,0.06)	0.01 (-0.05,0.06)	-0.01 (-0.04,0.02)
Total cheese				
Median intake	1.5	1.7	2	1.3
Model 1	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)
Model 2	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.02,0.01)	0.01 (-0.01,0.02)
High-fat cheese				
Median intake	1.3	1.5	1.7	0.8
Model 1	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)	0.00 (-0.01,0.02)	0.00 (-0.02,0.02)
Model 2	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)
Low-fat cheese				
Median intake	0	0	0	0.08
Model 1	0.00 (-0.02,0.02)	0.01 (-0.02,0.05)	-0.03 (-0.07,0.02)	0.00 (-0.03,0.04)
Model 2	0.01 (-0.01,0.03)	0.02 (-0.02,0.06)	-0.01 (-0.06,0.03)	0.02 (-0.01,0.05)
Cream				
Median intake	0	0	0	0.0821
Model 1	-0.01 (-0.04,0.01)	0.00 (-0.03,0.03)	-0.10 (-0.23,0.04)	-0.11 (-0.19,-0.02)*
Model 2	-0.02 (-0.05,0.01)	0.00 (-0.03,0.03)	-0.13 (-0.26,0.00)	-0.10 (-0.19,-0.02)*
Ice cream				
Median intake	0	0	0	0.0671
Model 1	0.05 (0.00,0.10)*	0.00 (-0.17,0.17)	0.05 (0.00,0.11)*	0.05 (-0.05,0.16)
Model 2	0.04 (-0.01,0.08)	-0.04 (-0.21,0.13)	0.06 (0.00,0.11)*	-0.02 (-0.12,0.08)

[1] Betas from log-transformed HOMA-IR per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Model 2 was adjusted for age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and intakes of fruit, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat, and sugar-sweetened beverages (continuous). * P=0.01 to 0.05, ** P<0.01.

Abbreviations: CI, Confidence Interval; HOMA-IR, Homeostatic Model Assessment of Insulin Resistance; Q, Quartile.

Supplemental Table 5. Associations of dairy product types and prediabetes risk in the Rotterdam Studies, stratified by sex and baseline waist circumference (*n* = 6053).[1]

			Continuous hazard ratio (95%CI)[2]			
	$P_{interaction}$	Strata	Pooled	RS-I	RS-II	RS-III
Interaction with sex						
High-fat fermented dairy	0.04	Women	1.06 (1.01-1.11)*	1.06 (0.96-1.18)	1.08 (1.02-1.15) *	0.85 (0.71-1.02)
		Men	1.02 (0.96-1.09)	1.10 (1.00-1.21) *	0.95 (0.86-1.05)	1.02 (0.89-1.17)
High-fat cheese	0.02	Women	1.07 (1.02-1.12)*	1.09 (0.98-1.20)	1.08 (1.02-1.15) *	0.87 (0.72-1.04)
		Men	1.03 (0.97-1.10)	1.11 (1.01-1.22) *	0.95 (0.86-1.05)	1.04 (0.91-1.19)
Interaction with WC						
Low-fat fermented dairy	0.01	WC <90 cm	1.02 (0.93-1.12)	1.00 (0.89-1.14)	1.15 (0.95-1.39)	0.92 (0.73-1.16)
		WC ≥90 cm	1.01 (0.94-1.09)	1.06 (0.94-1.20)	0.93 (0.82-1.07)	1.04 (0.90-1.19)
Low-fat cheese	0.04	WC <90 cm	1.04 (0.90-1.21)	1.09 (0.89-1.34)	1.10 (0.82-1.48)	0.85 (0.60-1.20)
		WC ≥90 cm	1.09 (0.98-1.21)	1.17 (0.96-1.42)	0.95 (0.79-1.14)	1.16 (0.97-1.38)
Ice cream	0.01	WC <90 cm	0.53 (0.27-1.04)	0.37 (0.10-1.41)	0.54 (0.17-1.75)	0.65 (0.22-1.96)
		WC ≥90 cm	1.15 (0.83-1.58)	1.52 (0.54-4.26)	1.09 (0.73-1.63)	1.17 (0.62-2.22)

[1] Only stratified models for which the interaction term was statistically significant ($p<0.05$) are presented.
[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Models included age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and intake of fruits, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat, and sugar-sweetened beverages (SSB) (continuous). * $P<0.01$.
Abbreviations: CI, confidence interval; HR, Hazard Ratio; WC, waist circumference.

Supplemental Table 6. Associations of dairy intake and longitudinal insulin resistance in the Rotterdam Studies, stratified by sex, age and waist circumference (*n* = 6,593).[1]

			Continuous betas from log-transformed HOMA-IR (95%CI)[2]			
	$P_{interaction}$	Strata	Pooled	RS-I	RS-II	RS-III
Interaction with sex						
Low-fat fermented dairy	0.01	Women	-0.01 (-0.03, 0.00)	-0.01 (-0.03, 0.02)	-0.02 (-0.06, 0.01)	-0.01 (-0.04, 0.01)
		Men	0.00 (-0.02, 0.02)	0.01 (-0.02, 0.05)	0.02 (-0.02, 0.07)	-0.01 (-0.04, 0.01)
Yogurt	0.02	Women	-0.04 (-0.06; -0.01)***	-0.02 (-0.07, 0.03)	-0.06 (-0.12, 0.01)	-0.04 (-0.08; -0.01)*
		Men	-0.02 (-0.05, 0.01)	0.03 (-0.04, 0.11)	0.09 (0.00, 0.18)	-0.04 (-0.08; -0.01)*
Low-fat yogurt	0.01	Women	-0.03 (-0.05, 0.00)	0.01 (-0.05, 0.07)	-0.05 (-0.12, 0.02)	-0.03 (-0.07, 0.00)
		Men	-0.01 (-0.04, 0.02)	0.03 (-0.06, 0.12)	0.13 (0.04, 0.23)*	-0.03 (-0.07, 0.00)
Low-fat cheese	0.05	Women	0.00 (-0.02, 0.03)	0.00 (-0.05, 0.05)	-0.01 (-0.07, 0.04)	0.01 (-0.03, 0.04)
		Men	0.01 (-0.02, 0.04)	0.05 (-0.01, 0.11)	-0.03 (-0.10, 0.05)	0.01 (-0.03, 0.04)
Cream	0.03	Women	0.00 (-0.03, 0.04)	0.01 (-0.03, 0.05)	-0.11 (-0.28, 0.07)	-0.02 (-0.14, 0.09)
		Men	-0.03 (-0.07, 0.01)	-0.03 (-0.07, 0.02)	-0.17 (-0.37, 0.04)	-0.02 (-0.14, 0.09)
Ice cream	0.01	Women	0.07 (0.02, 0.13)**	0.03 (-0.21, 0.28)	0.09 (0.03, 0.16)***	0.00 (-0.13, 0.13)
		Men	-0.03 (-0.10, 0.05)	-0.09 (-0.34, 0.16)	-0.03 (-0.13, 0.06)	0.00 (-0.13, 0.13)
Interaction with age						
High-fat fermented dairy	0.02	Age <61	0.00 (-0.01, 0.01)	0.01 (-0.02, 0.03)	0.01 (-0.01, 0.03)	-0.01 (-0.03, 0.01)
		Age ≥61	-0.01 (-0.02, 0.00)	-0.01 (-0.03, 0.01)	-0.01 (-0.03, 0.01)	0.00 (-0.06, 0.05)
Total cheese	0.01	Age <61	0.01 (0.00, 0.02)	0.02 (-0.01, 0.05)	0.01 (-0.01, 0.03)	0.01 (-0.01, 0.02)
		Age ≥61	-0.01 (-0.02, 0.01)	-0.01 (-0.03, 0.02)	-0.01 (-0.03, 0.01)	0.01 (-0.04, 0.06)
High-fat cheese	0.01	Age <61	0.00 (-0.01, 0.02)	0.01 (-0.02, 0.04)	0.01 (-0.01, 0.03)	0.00 (-0.02, 0.02)
		Age ≥61	-0.01 (-0.02, 0.01)	-0.01 (-0.03, 0.02)	-0.01 (-0.03, 0.01)	0.01 (-0.04, 0.06)

Supplemental Table 6. Associations of dairy intake and longitudinal insulin resistance in the Rotterdam Studies, stratified by sex, age and waist circumference (*n* = 6,593).[1] (continued)

			Continuous betas from log-transformed HOMA-IR (95%CI)[2]			
	$P_{interaction}$	Strata	Pooled	RS-I	RS-II	RS-III
Interaction with baseline WC						
Total dairy	0.01	WC <90 cm	0.00 (-0.01, 0.01)	-0.02 (-0.04, 0.00)	0.01 (-0.01, 0.02)	0.00 (-0.01, 0.02)
		WC ≥90 cm	0.00 (-0.01, 0.01)	0.00 (-0.01, 0.02)	0.00 (-0.02, 0.02)	0.01 (-0.01, 0.02)
Low-fat dairy	0.01	WC <90 cm	0.00 (-0.01, 0.01)	-0.01 (-0.03, 0.01)	0.00 (-0.02, 0.03)	0.01 (-0.01, 0.03)
		WC ≥90 cm	0.01 (0.00, 0.03)	0.02 (0.00, 0.04)	0.01 (-0.01, 0.04)	0.00 (-0.02, 0.03)
Fermented dairy	0.02	WC <90 cm	0.00 (-0.01, 0.01)	-0.02 (-0.04, 0.00)	0.00 (-0.01, 0.02)	0.00 (-0.02, 0.02)
		WC ≥90 cm	0.00 (-0.02, 0.01)	0.00 (-0.02, 0.02)	-0.01 (-0.02, 0.01)	0.00 (-0.02, 0.02)
Low-fat fermented dairy	0.02	WC <90 cm	-0.01 (-0.03, 0.00)	-0.01 (-0.04, 0.02)	-0.02 (-0.05, 0.01)	-0.01 (-0.04, 0.01)
		WC ≥90 cm	0.00 (-0.02, 0.02)	0.01 (-0.02, 0.04)	-0.01 (-0.04, 0.03)	-0.01 (-0.04, 0.02)
Total milk	0.01	WC <90 cm	0.00 (-0.02, 0.02)	-0.01 (-0.04, 0.01)	0.02 (-0.02, 0.05)	0.00 (-0.02, 0.03)
		WC ≥90 cm	0.01 (0.00, 0.03)	0.01 (-0.02, 0.04)	0.03 (0.00, 0.06)	0.00 (-0.02, 0.03)
High-fat milk	0.03	WC <90 cm	-0.02 (-0.04, 0.00)	-0.01 (-0.05, 0.04)	-0.08 (-0.17, 0.01)	-0.02 (-0.05, 0.01)
		WC ≥90 cm	0.00 (-0.03, 0.02)	-0.01 (-0.07, 0.04)	-0.01 (-0.08, 0.06)	0.00 (-0.04, 0.04)
Low-fat yogurt	0.03	WC <90 cm	-0.02 (-0.05, 0.00)	0.00 (-0.07, 0.07)	-0.07 (-0.14, 0.01)	-0.02 (-0.06, 0.01)
		WC ≥90 cm	-0.01 (-0.04, 0.02)	0.00 (-0.07, 0.07)	0.05 (-0.02, 0.12)	-0.03 (-0.08, 0.01)

[1] Only stratified models for which the interaction term was statically significant (p<0.05) are presented.
[2] Betas from log-transformed HOMA-IR per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Models are adjusted for age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and intake of fruits, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat and sugar-sweetened beverages (SSB) (continuous). * P=0.01 to 0.05, ** P=0.01 to 0.001, ***P<0.001.
Abbreviations: CI, confidence interval; HOMA-IR, Homeostatic Model Assessment of Insulin Resistance; HR, Hazard Ratio; WC, waist circumference.

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053).

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Total dairy									
Main analysis model 2	1 (ref)	0.98 (0.83-1.16)	0.91 (0.76-1.08)	1.09 (0.91-1.31)	0.38	1.03 (1.00-1.07)	1.08 (1.03-1.14)**	1.03 (0.98-1.08)	0.95 (0.88-1.02)
1. Adjust. longitudinal WC	1 (ref)	0.97 (0.75-1.27)	0.89 (0.73-1.09)	1.03 (0.85-1.27)	0.78	1.02 (0.97-1.08)	1.06 (0.98-1.15)	1.03 (0.95-1.11)	0.94 (0.83-1.05)
2. Adjust. CVD risk factors	1 (ref)	0.98 (0.83-1.16)	0.90 (0.76-1.08)	1.06 (0.88-1.27)	0.64	1.03 (0.99-1.06)	1.07 (1.02-1.13)*	1.03 (0.98-1.08)	0.95 (0.88-1.02)
3. Adjust. other dairy intake	1 (ref)	0.98 (0.83-1.16)	0.91 (0.76-1.08)	1.09 (0.91-1.31)	0.38	1.03 (1.00-1.07)	1.08 (1.03-1.14)**	1.03 (0.98-1.08)	0.95 (0.88-1.02)
4. Exclusion CHD	1 (ref)	1.02 (0.85-1.22)	0.91 (0.76-1.10)	1.09 (0.90-1.33)	0.45	1.03 (1.00-1.07)	1.07 (1.01-1.13)*	1.04 (0.98-1.09)	0.96 (0.89-1.03)
5. Energy adjusted dairy	1 (ref)	1.17 (0.99-1.37)	1.03 (0.87-1.22)	1.04 (0.87-1.23)	0.95	1.01 (0.96-1.06)	1.05 (0.97-1.13)	1.05 (0.96-1.16)	0.90 (0.82-1.00)
High-fat dairy									
Main analysis model 2	1 (ref)	1.11 (0.94-1.31)	0.97 (0.82-1.15)	0.94 (0.78-1.13)	0.22	1.00 (0.96-1.04)	1.04 (0.98-1.12)	1.00 (0.95-1.06)	0.92 (0.84-1.01)
1. Adjust. longitudinal WC	1 (ref)	1.10 (0.84-1.43)	0.97 (0.79-1.18)	0.96 (0.78-1.17)	0.55	1.00 (0.94-1.06)	1.03 (0.93-1.14)	1.00 (0.91-1.09)	0.94 (0.81-1.07)
2. Adjust. CVD risk factors	1 (ref)	1.12 (0.95-1.32)	1.01 (0.85-1.19)	0.95 (0.78-1.14)	0.25	1.00 (0.96-1.04)	1.04 (0.98-1.11)	1.00 (0.95-1.06)	0.93 (0.85-1.02)
3. Adjust. other dairy intake	1 (ref)	1.14 (0.97-1.35)	1.01 (0.85-1.19)	0.99 (0.82-1.20)	0.49	1.02 (0.98-1.06)	1.07 (1.00-1.14)	1.01 (0.96-1.08)	0.92 (0.84-1.01)
4. Exclusion CHD	1 (ref)	1.15 (0.97-1.38)	0.98 (0.82-1.18)	0.98 (0.81-1.19)	0.35	1.00 (0.96-1.05)	1.03 (0.96-1.11)	1.01 (0.96-1.07)	0.95 (0.87-1.04)
5. Energy adjusted dairy	1 (ref)	0.96 (0.81-1.13)	0.97 (0.82-1.16)	0.78 (0.66-0.94)	0.01	0.86 (0.77-0.95)**	0.92 (0.81-1.06)	0.69 (0.52-0.92)*	0.82 (0.68-0.98)*
Low-fat dairy									
Main analysis model 2	1 (ref)	1.08 (0.92-1.28)	1.10 (0.93-1.31)	1.17 (0.99-1.39)	0.06	1.05 (1.01-1.10)*	1.07 (1.01-1.14)*	1.06 (0.99-1.14)	1.00 (0.91-1.10)
1. Adjust. longitudinal WC	1 (ref)	1.04 (0.79-1.36)	1.04 (0.85-1.27)	1.08 (0.89-1.31)	0.55	1.03 (0.96-1.11)	1.06 (0.95-1.17)	1.05 (0.92-1.19)	0.96 (0.81-1.12)
2. Adjust. CVD risk factors	1 (ref)	1.07 (0.91-1.27)	1.04 (0.87-1.23)	1.14 (0.96-1.35)	0.15	1.04 (1.00-1.09)*	1.06 (1.00-1.13)	1.06 (0.98-1.13)	0.99 (0.90-1.09)
3. Adjust. other dairy intake	1 (ref)	1.09 (0.92-1.29)	1.11 (0.94-1.32)	1.19 (1.00-1.42)	0.04	1.06 (1.01-1.11)**	1.09 (1.02-1.16)*	1.07 (0.99-1.15)	0.98 (0.89-1.08)
4. Exclusion CHD	1 (ref)	1.07 (0.89-1.28)	1.11 (0.93-1.33)	1.17 (0.98-1.41)	0.06	1.05 (1.00-1.10)*	1.07 (1.00-1.15)	1.06 (0.98-1.14)	0.99 (0.89-1.09)
5. Energy adjusted dairy	1 (ref)	1.18 (1.00-1.39)	1.14 (0.96-1.36)	1.16 (0.98-1.38)	0.09	1.06 (1.01-1.12)*	1.07 (1.00-1.15)	1.11 (1.01-1.21)*	0.97 (0.86-1.09)

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053). (continued)

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Total fermented dairy									
Main analysis model 2	1 (ref)	0.98 (0.83-1.15)	0.95 (0.80-1.13)	1.00 (0.84-1.19)	0.94	1.03 (0.99-1.06)	1.06 (1.00-1.12)	1.02 (0.97-1.07)	0.97 (0.89-1.06)
1. Adjust. longitudinal WC	1 (ref)	0.94 (0.72-1.23)	0.94 (0.77-1.15)	0.97 (0.80-1.18)	0.99	1.02 (0.96-1.08)	1.05 (0.95-1.15)	1.02 (0.93-1.10)	0.96 (0.83-1.10)
2. Adjust. CVD risk factors	1 (ref)	0.99 (0.84-1.17)	0.94 (0.79-1.12)	0.98 (0.82-1.17)	0.81	1.02 (0.99-1.06)	1.05 (0.99-1.11)	1.02 (0.96-1.07)	0.97 (0.89-1.06)
3. Adjust. other dairy intake	1 (ref)	0.98 (0.83-1.16)	0.96 (0.81-1.14)	1.02 (0.85-1.22)	0.76	1.03 (1.00-1.07)	1.07 (1.01-1.14)*	1.03 (0.97-1.08)	0.97 (0.89-1.05)
4. Exclusion CHD	1 (ref)	0.99 (0.83-1.18)	0.98 (0.82-1.18)	0.99 (0.82-1.19)	1.00	1.02 (0.99-1.06)	1.05 (0.99-1.12)	1.02 (0.97-1.07)	0.98 (0.89-1.07)
5. Energy adjusted dairy	1 (ref)	0.90 (0.77-1.06)	0.96 (0.82-1.14)	0.85 (0.71-1.01)	0.13	0.97 (0.90-1.05)	0.98 (0.88-1.09)	1.00 (0.87-1.16)	0.89 (0.75-1.06)
High-fat fermented dairy									
Main analysis model 2	1 (ref)	0.99 (0.83-1.16)	0.94 (0.80-1.11)	0.93 (0.78-1.11)	0.41	1.03 (0.99-1.07)	1.07 (1.00-1.15)	1.02 (0.96-1.07)	0.95 (0.86-1.06)
1. Adjust. longitudinal WC	1 (ref)	0.98 (0.75-1.29)	0.93 (0.76-1.13)	0.95 (0.78-1.15)	0.72	1.02 (0.96-1.09)	1.05 (0.93-1.17)	1.02 (0.93-1.10)	0.96 (0.81-1.13)
2. Adjust. CVD risk factors	1 (ref)	0.99 (0.84-1.17)	0.97 (0.82-1.15)	0.93 (0.78-1.11)	0.36	1.02 (0.99-1.07)	1.06 (1.00-1.14)*	1.02 (0.96-1.08)	0.96 (0.86-1.06)
3. Adjust. other dairy intake	1 (ref)	1.00 (0.84-1.18)	0.95 (0.81-1.13)	0.95 (0.79-1.14)	0.54	1.03 (0.99-1.08)	1.09 (1.02-1.16)	1.03 (0.97-1.08)	0.94 (0.85-1.05)
4. Exclusion CHD	1 (ref)	1.02 (0.85-1.22)	0.95 (0.79-1.13)	0.93 (0.77-1.12)	0.31	1.03 (0.99-1.07)	1.05 (0.97-1.13)	1.03 (0.97-1.08)	0.98 (0.89-1.09)
5. Energy adjusted dairy	1 (ref)	1.01 (0.85-1.19)	1.01 (0.85-1.19)	0.89 (0.75-1.05)	0.13	0.83 (0.65-1.07)	0.93 (0.65-1.31)	0.87 (0.54-1.40)	0.57 (0.32-1.03)
Low-fat fermented dairy									
Main analysis model 2	1 (ref)	0.98 (0.83-1.16)	0.93 (0.79-1.11)	1.01 (0.85-1.19)	0.85	1.01 (0.96-1.07)	1.03 (0.94-1.12)	1.01 (0.91-1.11)	1.01 (0.90-1.13)
1. Adjust. longitudinal WC	1 (ref)	0.98 (0.75-1.28)	0.90 (0.74-1.10)	0.96 (0.79-1.16)	0.81	1.00 (0.91-1.10)	1.02 (0.88-1.18)	1.00 (0.83-1.19)	0.97 (0.79-1.16)
2. Adjust. CVD risk factors	1 (ref)	0.96 (0.82-1.13)	0.92 (0.77-1.09)	0.98 (0.83-1.17)	0.99	1.01 (0.95-1.06)	1.01 (0.93-1.10)	1.00 (0.91-1.10)	1.01 (0.90-1.13)
3. Adjust. other dairy intake	1 (ref)	0.97 (0.82-1.14)	0.92 (0.78-1.10)	1.02 (0.86-1.21)	0.68	1.02 (0.97-1.08)	1.05 (0.96-1.15)	1.02 (0.92-1.12)	0.99 (0.88-1.11)
4. Exclusion CHD	1 (ref)	1.01 (0.85-1.21)	0.96 (0.80-1.15)	1.01 (0.84-1.22)	0.97	1.01 (0.95-1.07)	1.04 (0.95-1.14)	1.00 (0.90-1.10)	0.98 (0.87-1.10)
5. Energy adjusted dairy	1 (ref)	0.96 (0.81-1.13)	1.04 (0.89-1.23)	0.92 (0.77-1.09)	0.41	0.99 (0.91-1.07)	0.99 (0.88-1.11)	1.02 (0.88-1.18)	0.95 (0.80-1.12)

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053). (continued)

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Total milk									
Main analysis model 2	1 (ref)	1.13 (0.95-1.33)	1.09 (0.92-1.30)	1.09 (0.92-1.29)	0.31	1.02 (0.97-1.08)	1.06 (0.99-1.15)	1.05 (0.95-1.16)	0.92 (0.82-1.03)
1. Adjust. longitudinal WC	1 (ref)	1.08 (0.83-1.41)	1.08 (0.89-1.32)	1.03 (0.85-1.25)	0.77	1.00 (0.91-1.10)	1.05 (0.92-1.20)	1.01 (0.85-1.19)	0.89 (0.72-1.06)
2. Adjust. CVD risk factors	1 (ref)	1.15 (0.97-1.35)	1.09 (0.92-1.29)	1.09 (0.92-1.29)	0.33	1.02 (0.97-1.08)	1.06 (0.98-1.15)	1.06 (0.95-1.18)	0.91 (0.82-1.02)
3. Adjust. other dairy intake	1 (ref)	1.13 (0.96-1.33)	1.10 (0.92-1.30)	1.10 (0.92-1.30)	0.28	1.03 (0.97-1.09)	1.07 (0.99-1.15)	1.06 (0.95-1.18)	0.92 (0.82-1.03)
4. Exclusion CHD	1 (ref)	1.14 (0.96-1.36)	1.11 (0.93-1.34)	1.11 (0.93-1.34)	0.23	1.02 (0.96-1.08)	1.06 (0.97-1.16)	1.06 (0.95-1.17)	0.92 (0.82-1.04)
5. Energy adjusted dairy	1 (ref)	1.18 (1.00-1.39)	1.04 (0.88-1.24)	1.07 (0.90-1.27)	0.68	1.03 (0.97-1.09)	1.07 (0.99-1.15)	1.05 (0.95-1.17)	0.92 (0.82-1.03)
High-fat milk									
Main analysis model 2	1 (ref)	0.94 (0.78-1.13)	1.03 (0.88-1.21)	0.81 (0.67-0.97)	0.04	0.88 (0.79-0.99)*	0.95 (0.81-1.10)	0.62 (0.43-0.91)*	0.86 (0.72-1.04)
1. Adjust. longitudinal WC	1 (ref)	0.94 (0.68-1.30)	1.05 (0.88-1.25)	0.83 (0.69-1.00)	0.28	0.87 (0.71-1.05)	0.95 (0.72-1.20)	0.56 (0.28-1.02)	0.84 (0.60-1.12)
2. Adjust. CVD risk factors	1 (ref)	0.94 (0.78-1.13)	1.05 (0.90-1.23)	0.83 (0.69-1.00)	0.12	0.90 (0.80-1.00)	0.95 (0.82-1.11)	0.61 (0.41-0.89)*	0.89 (0.75-1.07)
3. Adjust. other dairy intake	1 (ref)	0.95 (0.79-1.15)	1.06 (0.90-1.24)	0.86 (0.71-1.03)	0.14	0.91 (0.82-1.02)	1.01 (0.86-1.18)	0.65 (0.44-0.94)*	0.86 (0.72-1.04)
4. Exclusion CHD	1 (ref)	0.92 (0.76-1.13)	1.01 (0.85-1.20)	0.82 (0.68-1.00)	0.09	0.89 (0.79-1.00)	0.95 (0.81-1.12)	0.69 (0.48-1.00)	0.88 (0.73-1.06)
5. Energy adjusted dairy	1 (ref)	0.95 (0.80-1.14)	1.00 (0.84-1.19)	0.84 (0.69-1.01)	0.12	0.89 (0.80-0.99)*	0.95 (0.81-1.10)	0.72 (0.52-1.00)	0.87 (0.72-1.05)
Low-fat milk									
Main analysis model 2	1 (ref)	1.19 (1.01-1.41)	1.20 (1.02-1.43)	1.14 (0.96-1.36)	0.20	1.07 (1.01-1.13)*	1.08 (1.00-1.16)*	1.11 (1.00-1.23)*	0.96 (0.84-1.11)
1. Adjust. longitudinal WC	1 (ref)	1.15 (0.88-1.51)	1.16 (0.95-1.41)	1.06 (0.87-1.28)	0.79	1.04 (0.94-1.14)	1.06 (0.93-1.20)	1.06 (0.90-1.25)	0.90 (0.69-1.14)
2. Adjust. CVD risk factors	1 (ref)	1.18 (1.00-1.40)	1.18 (0.99-1.39)	1.12 (0.95-1.34)	0.26	1.07 (1.01-1.13)*	1.08 (1.00-1.16)	1.12 (1.01-1.24)*	0.93 (0.80-1.08)
3. Adjust. other dairy intake	1 (ref)	1.20 (1.02-1.42)	1.21 (1.03-1.44)	1.16 (0.97-1.37)	0.16	1.08 (1.02-1.14)*	1.09 (1.01-1.17)*	1.11 (1.01-1.23)*	0.96 (0.83-1.11)
4. Exclusion CHD	1 (ref)	1.19 (0.99-1.42)	1.17 (0.98-1.41)	1.16 (0.96-1.39)	0.17	1.06 (1.00-1.13)*	1.07 (0.99-1.17)	1.10 (1.00-1.22)	0.96 (0.83-1.11)
5. Energy adjusted dairy	1 (ref)	1.11 (0.94-1.32)	1.13 (0.96-1.34)	1.13 (0.96-1.34)	0.10	1.07 (1.01-1.13)*	1.08 (1.00-1.16)	1.11 (1.01-1.23)*	0.96 (0.83-1.11)

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053). (continued)

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Total yogurt									
Main analysis model 2	1 (ref)	0.92 (0.79-1.08)	1.00 (0.84-1.19)	0.84 (0.71-0.99)	0.05	0.92 (0.82-1.02)	0.89 (0.73-1.07)	0.95 (0.76-1.20)	0.92 (0.77-1.09)
1. Adjust. longitudinal WC	1 (ref)	0.90 (0.69-1.16)	1.01 (0.83-1.24)	0.85 (0.71-1.03)	0.35	0.92 (0.76-1.11)	0.88 (0.63-1.20)	0.93 (0.63-1.33)	0.95 (0.69-1.25)
2. Adjust. CVD risk factors	1 (ref)	0.90 (0.77-1.06)	0.99 (0.83-1.18)	0.85 (0.71-1.01)	0.07	0.92 (0.83-1.03)	0.90 (0.74-1.08)	0.95 (0.76-1.20)	0.93 (0.78-1.11)
3. Adjust. other dairy intake	1 (ref)	0.92 (0.79-1.08)	0.99 (0.83-1.18)	0.84 (0.71-1.00)	0.05	0.92 (0.82-1.03)	0.91 (0.75-1.10)	0.96 (0.76-1.21)	0.90 (0.76-1.07)
4. Exclusion CHD	1 (ref)	0.98 (0.83-1.16)	1.02 (0.85-1.23)	0.88 (0.73-1.05)	0.12	0.93 (0.82-1.04)	0.90 (0.73-1.10)	0.99 (0.78-1.25)	0.91 (0.77-1.09)
5. Energy adjusted dairy	1 (ref)	0.90 (0.76-1.06)	0.98 (0.83-1.16)	0.87 (0.73-1.03)	0.10	0.91 (0.82-1.02)	0.88 (0.73-1.07)	0.95 (0.75-1.20)	0.92 (0.78-1.09)
High-fat yogurt									
Main analysis model 2	1 (ref)	0.70 (0.54-0.89)	1.04 (0.84-1.28)	0.70 (0.54-0.91)	0.005	0.67 (0.51-0.89)**	0.76 (0.54-1.07)	0.47 (0.20-1.10)	0.55 (0.29-1.04)
1. Adjust. longitudinal WC	1 (ref)	0.67 (0.43-1.05)	1.04 (0.83-1.31)	0.73 (0.56-0.95)	0.12	0.65 (0.40-1.05)	0.74 (0.40-1.24)	0.40 (0.07-1.45)	0.52 (0.15-1.29)
2. Adjust. CVD risk factors	1 (ref)	0.69 (0.54-0.89)	1.02 (0.82-1.26)	0.75 (0.58-0.98)	0.02	0.72 (0.55-0.96)*	0.81 (0.58-1.13)	0.49 (0.20-1.16)	0.58 (0.30-1.10)
3. Adjust. other dairy intake	1 (ref)	0.71 (0.55-0.90)	1.05 (0.85-1.30)	0.72 (0.55-0.94)	0.01	0.70 (0.53-0.93)*	0.81 (0.57-1.14)	0.49 (0.21-1.14)	0.53 (0.28-1.01)
4. Exclusion CHD	1 (ref)	0.75 (0.58-0.97)	1.01 (0.81-1.24)	0.70 (0.51-0.96)	0.03	0.72 (0.54-0.96)*	0.81 (0.57-1.16)	0.51 (0.21-1.22)	0.57 (0.31-1.07)
5. Energy adjusted dairy	1 (ref)	0.72 (0.56-0.93)	1.02 (0.82-1.26)	0.74 (0.58-0.95)	0.010	0.67 (0.50-0.89)**	0.75 (0.53-1.06)	0.47 (0.20-1.10)	0.54 (0.28-1.03)
Low-fat yogurt									
Main analysis model 2	1 (ref)	1.10 (0.93-1.28)	1.10 (0.92-1.31)	0.99 (0.83-1.17)	0.54	0.99 (0.88-1.11)	0.97 (0.78-1.21)	1.03 (0.82-1.29)	0.98 (0.83-1.16)
1. Adjust. longitudinal WC	1 (ref)	1.08 (0.83-1.41)	1.09 (0.89-1.32)	0.98 (0.82-1.18)	0.73	0.98 (0.80-1.19)	0.95 (0.64-1.36)	0.99 (0.67-1.40)	0.99 (0.73-1.30)
2. Adjust. CVD risk factors	1 (ref)	1.09 (0.93-1.28)	1.08 (0.91-1.28)	0.98 (0.83-1.17)	0.48	0.98 (0.88-1.10)	0.95 (0.76-1.19)	1.02 (0.82-1.27)	0.98 (0.83-1.16)
3. Adjust. other dairy intake	1 (ref)	1.09 (0.93-1.27)	1.09 (0.92-1.30)	0.98 (0.83-1.17)	0.49	0.98 (0.88-1.10)	0.98 (0.79-1.22)	1.04 (0.83-1.30)	0.96 (0.81-1.13)
4. Exclusion CHD	1 (ref)	1.13 (0.96-1.34)	1.11 (0.92-1.33)	1.02 (0.85-1.22)	0.68	0.99 (0.88-1.12)	0.96 (0.75-1.22)	1.06 (0.84-1.34)	0.97 (0.82-1.15)
5. Energy adjusted dairy	1 (ref)	1.05 (0.90-1.24)	1.07 (0.91-1.26)	0.99 (0.83-1.17)	0.69	0.99 (0.88-1.11)	0.97 (0.78-1.20)	1.03 (0.82-1.28)	0.98 (0.83-1.16)

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053). (continued)

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Total cheese									
Main analysis model 2	1 (ref)	1.04 (0.88-1.23)	0.98 (0.83-1.17)	1.11 (0.94-1.33)	0.32	1.05 (1.01-1.09)**	1.11 (1.04-1.19)**	1.02 (0.97-1.08)	1.00 (0.91-1.10)
1. Adjust. longitudinal WC	1 (ref)	0.99 (0.75-1.29)	0.93 (0.76-1.14)	1.06 (0.87-1.29)	0.69	1.03 (0.97-1.10)	1.08 (0.97-1.20)	1.02 (0.93-1.11)	0.98 (0.83-1.14)
2. Adjust. CVD risk factors	1 (ref)	1.05 (0.89-1.25)	1.00 (0.84-1.19)	1.09 (0.91-1.30)	0.52	1.04 (1.00-1.08)	1.09 (1.02-1.17)*	1.02 (0.96-1.07)	1.00 (0.91-1.10)
3. Adjust. other dairy intake	1 (ref)	1.04 (0.88-1.23)	0.98 (0.83-1.17)	1.11 (0.94-1.33)	0.31	1.05 (1.01-1.09)*	1.12 (1.04-1.19)**	1.03 (0.97-1.08)	0.99 (0.90-1.09)
4. Exclusion CHD	1 (ref)	1.04 (0.87-1.24)	1.00 (0.83-1.20)	1.08 (0.90-1.30)	0.51	1.04 (1.00-1.08)*	1.09 (1.02-1.18)*	1.02 (0.97-1.08)	1.01 (0.92-1.11)
5. Energy adjusted dairy	1 (ref)	1.00 (0.84-1.19)	1.02 (0.86-1.21)	1.11 (0.93-1.31)	0.25	1.05 (1.01-1.09)*	1.11 (1.04-1.19)***	1.02 (0.97-1.08)	1.00 (0.91-1.10)
High-fat cheese									
Main analysis model 2	1 (ref)	1.05 (0.89-1.24)	1.03 (0.87-1.21)	1.05 (0.88-1.25)	0.75	1.03 (1.00-1.08)	1.08 (1.01-1.16)*	1.02 (0.97-1.08)	0.97 (0.87-1.08)
1. Adjust. longitudinal WC	1 (ref)	1.04 (0.79-1.36)	1.00 (0.82-1.22)	1.05 (0.86-1.27)	0.83	1.01 (0.96-1.06)	1.06 (0.94-1.17)*	1.02 (0.93-1.10)	0.97 (0.93-1.14)
2. Adjust. CVD risk factors	1 (ref)	1.05 (0.89-1.25)	1.04 (0.88-1.24)	1.03 (0.86-1.23)	0.89	1.03 (0.99-1.07)	1.07 (1.00-1.15)*	1.02 (0.97-1.08)	0.97 (0.87-1.08)
3. Adjust. other dairy intake	1 (ref)	1.06 (0.90-1.26)	1.04 (0.88-1.23)	1.06 (0.89-1.27)	0.63	1.04 (1.00-1.08)*	1.10 (1.03-1.17)*	1.03 (0.97-1.09)	0.96 (0.86-1.07)
4. Exclusion CHD	1 (ref)	1.07 (0.89-1.28)	1.03 (0.86-1.23)	1.03 (0.85-1.24)	0.99	1.03 (0.99-1.08)	1.06 (0.98-1.14)	1.03 (0.97-1.09)	1.00 (0.90-1.11)
5. Energy adjusted dairy	1 (ref)	1.05 (0.88-1.24)	1.00 (0.85-1.19)	1.06 (0.90-1.26)	0.51	1.04 (1.00-1.08)	1.08 (1.01-1.16)*	1.02 (0.97-1.08)	0.98 (0.88-1.09)
Low-fat cheese									
Main analysis model 2	1 (ref)	1.10 (0.90-1.36)	1.16 (0.93-1.45)	1.17 (0.95-1.44)	0.04	1.06 (0.97-1.14)	1.11 (0.97-1.27)	1.00 (0.88-1.14)	1.07 (0.92-1.24)
1. Adjust. longitudinal WC	1 (ref)	1.05 (0.73-1.50)	1.03 (0.81-1.32)	1.07 (0.86-1.32)	0.44	1.02 (0.88-1.19)	1.08 (0.85-1.34)	0.99 (0.73-1.32)	0.98 (0.74-1.24)
2. Adjust. CVD risk factors	1 (ref)	1.08 (0.88-1.34)	1.11 (0.89-1.38)	1.12 (0.91-1.39)	0.12	1.03 (0.95-1.12)	1.07 (0.93-1.23)	0.98 (0.86-1.12)	1.06 (0.91-1.24)
3. Adjust. other dairy intake	1 (ref)	1.13 (0.91-1.39)	1.18 (0.94-1.47)	1.19 (0.96-1.47)	0.02	1.07 (0.99-1.16)	1.15 (1.00-1.33)	1.01 (0.89-1.16)	1.05 (0.90-1.22)
4. Exclusion CHD	1 (ref)	1.09 (0.88-1.36)	1.14 (0.90-1.44)	1.14 (0.91-1.42)	0.09	1.05 (0.96-1.14)	1.14 (0.98-1.33)	0.99 (0.86-1.13)	1.03 (0.88-1.22)
5. Energy adjusted dairy	1 (ref)	1.06 (0.86-1.32)	1.23 (1.00-1.52)	1.13 (0.91-1.40)	0.05	1.06 (0.98-1.14)	1.11 (0.97-1.27)	1.00 (0.88-1.14)	1.07 (0.92-1.24)

Supplemental Table 7. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Rotterdam Studies (*n* = 6,053). (continued)

	Pooled hazard ratio (95%CI) across intake range categories[1]					Pooled continuous hazard ratio (95%CI)[2]	Continuous hazard ratio (95%CI)[2]		
	Q1	Q2	Q3	Q4	P_{trend}		RS-I	RS-II	RS-III
Cream									
Main analysis model 2	1 (ref)	0.90 (0.74-1.10)	0.89 (0.72-1.09)	1.00 (0.82-1.22)	0.52	1.03 (0.92-1.16)	1.05 (0.93-1.18)	0.89 (0.50-1.59)	0.92 (0.59-1.42)
1. Adjust. longitudinal WC	1 (ref)	0.90 (0.66-1.24)	0.94 (0.75-1.17)	1.03 (0.85-1.26)	0.65	1.02 (0.84-1.25)	1.04 (0.84-1.26)	0.88 (0.34-1.90)	0.91 (0.41-1.80)
2. Adjust. CVD risk factors	1 (ref)	0.91 (0.75-1.10)	0.90 (0.73-1.10)	1.03 (0.84-1.26)	0.45	1.04 (0.93-1.16)	1.05 (0.93-1.18)	0.92 (0.51-1.65)	0.97 (0.63-1.49)
3. Adjust. other dairy intake	1 (ref)	0.90 (0.74-1.10)	0.91 (0.74-1.12)	1.04 (0.85-1.28)	0.17	1.09 (0.97-1.22)	1.11 (0.98-1.26)	0.93 (0.52-1.67)	0.86 (0.55-1.35)
4. Exclusion CHD	1 (ref)	0.93 (0.76-1.14)	0.90 (0.73-1.11)	0.96 (0.78-1.19)	0.58	1.02 (0.91-1.16)	1.05 (0.92-1.19)	0.69 (0.33-1.42)	0.90 (0.57-1.42)
5. Energy adjusted dairy	1 (ref)	0.88 (0.72-1.08)	0.94 (0.77-1.15)	0.96 (0.79-1.18)	0.58	1.03 (0.92-1.16)	1.05 (0.93-1.18)	0.90 (0.50-1.60)	0.90 (0.58-1.39)
Ice cream									
Main analysis model 2	1 (ref)	0.93 (0.77-1.12)	0.86 (0.70-1.05)	0.93 (0.78-1.11)	0.50	0.94 (0.70-1.26)	0.75 (0.34-1.65)	0.96 (0.65-1.43)	1.00 (0.58-1.73)
1. Adjust. longitudinal WC	1 (ref)	0.87 (0.62-1.20)	0.84 (0.66-1.05)	0.90 (0.76-1.08)	0.57	0.85 (0.51-1.42)	0.60 (0.13-2.22)	0.85 (0.40-1.52)	0.98 (0.36-2.32)
2. Adjust. CVD risk factors	1 (ref)	0.92 (0.76-1.11)	0.88 (0.71-1.08)	0.95 (0.80-1.13)	0.68	0.98 (0.74-1.31)	0.78 (0.35-1.73)	1.01 (0.69-1.49)	1.02 (0.60-1.73)
3. Adjust. other dairy intake	1 (ref)	0.93 (0.77-1.12)	0.87 (0.71-1.06)	0.95 (0.80-1.13)	0.61	0.97 (0.72-1.31)	0.89 (0.40-1.98)	1.01 (0.67-1.50)	0.94 (0.54-1.63)
4. Exclusion CHD	1 (ref)	0.95 (0.78-1.15)	0.89 (0.72-1.11)	0.97 (0.81-1.17)	0.76	0.91 (0.66-1.25)	0.86 (0.37-2.02)	0.86 (0.54-1.35)	1.01 (0.59-1.73)
5. Energy adjusted dairy	1 (ref)	0.91 (0.76-1.09)	0.85 (0.70-1.04)	0.93 (0.78-1.13)	0.37	0.93 (0.70-1.25)	0.73 (0.34-1.56)	0.95 (0.63-1.41)	1.03 (0.60-1.77)

[1] Relative risks (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + tertile categories with the lowest category as the reference, adjusted for covariates as follows: Model 2 included age (continuous), sex and energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and intakes of fruit, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat and sugar-sweetened beverages (continuous). Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.

[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated.

* P<0.01 to 0.05, ** P<0.01.

Abbreviations: CVD, Cardiovascular Disease; CHD, Coronary Heart Disease; CI, Confidence Interval; Q, HR, Hazard Ratio; WC, waist circumference.

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (n = 6,593).

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Total dairy									
Main analysis model 2	ref	0.02 (-0.02,0.05)	0.00 (-0.04,0.04)	0.04 (0.00,0.08)	0.07	0.00 (0.00,0.01)	0.00 (-0.01,0.02)	0.01 (-0.01,0.02)	0.00 (-0.01,0.01)
1. Adjust. longitudinal WC	ref	0.01 (-0.03,0.04)	-0.01 (-0.05,0.02)	0.01 (-0.03,0.04)	0.81	0.00 (-0.01,0.00)	-0.01 (-0.02,0.00)	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)
2. Adjust. CVD risk factors	ref	0.02 (-0.02,0.05)	0.00 (-0.03,0.04)	0.03 (-0.01,0.06)	0.23	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.05)	0.00 (-0.04,0.04)	0.04 (0.00,0.08)	0.07	0.00 (0.00,0.01)	0.00 (-0.01,0.02)	0.01 (-0.01,0.02)	0.00 (-0.01,0.01)
4. Exclusion CHD	ref	0.02 (-0.02,0.06)	0.00 (-0.04,0.04)	0.04 (0.00,0.09)	0.05	0.00 (0.00,0.01)	0.00 (-0.01,0.02)	0.01 (0.00,0.02)	0.00 (-0.01,0.01)
5. Energy adjusted dairy	ref	0.00 (-0.04,0.04)	0.02 (-0.02,0.06)	0.03 (-0.01,0.07)	0.07	0.01 (-0.01,0.02)	0.00 (-0.01,0.02)	0.02 (0.00,0.05)*	0.00 (-0.02,0.02)
High-fat dairy									
Main analysis model 2	ref	0.02 (-0.02,0.06)	-0.03 (-0.07,0.01)	-0.03 (-0.07,0.01)	0.06	-0.01 (-0.02,0.00)	-0.01 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.03,0.00)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.05)	-0.02 (-0.05,0.02)	-0.01 (-0.05,0.02)	0.18	0.00 (-0.01,0.00)	-0.01 (-0.03,0.00)	0.00 (-0.01,0.01)	0.00 (-0.01,0.01)
2. Adjust. CVD risk factors	ref	0.03 (0.00,0.06)	0.00 (-0.03,0.04)	-0.01 (-0.05,0.03)	0.28	-0.01 (-0.01,0.00)	0.00 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.02,0.01)
3. Adjust. other dairy intake	ref	0.03 (-0.01,0.06)	-0.02 (-0.06,0.02)	-0.02 (-0.06,0.03)	0.23	0.00 (-0.01,0.00)	0.00 (-0.02,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)
4. Exclusion CHD	ref	0.02 (-0.02,0.06)	-0.04 (-0.08,0.00)	-0.03 (-0.07,0.01)	0.075	-0.01 (-0.02,0.00)	-0.01 (-0.03,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.00)
5. Energy adjusted dairy	ref	-0.02 (-0.06,0.02)	-0.02 (-0.06,0.02)	-0.04 (-0.08,-0.01)	0.02*	-0.03 (-0.05,-0.01)**	-0.02 (-0.05,0.01)	-0.03 (-0.08,0.02)	-0.03 (-0.05,0.00)
Low-fat dairy									
Main analysis model 2	ref	0.02 (-0.01,0.06)	0.06 (0.03,0.10)	0.06 (0.03,0.10)	0.0003***	0.02 (0.01,0.03)**	0.00 (-0.01,0.01)	0.02 (0.00,0.04)*	0.02 (0.00,0.04)*
1. Adjust. longitudinal WC	ref	0.00 (-0.03,0.03)	0.02 (-0.01,0.05)	0.01 (-0.02,0.05)	0.31	0.00 (-0.01,0.01)	0.00 (-0.01,0.02)	0.00 (-0.01,0.02)	0.00 (-0.02,0.01)
2. Adjust. CVD risk factors	ref	0.02 (-0.01,0.06)	0.05 (0.01,0.08)	0.04 (0.01,0.08)	0.005**	0.01 (0.00,0.02)	0.00 (-0.01,0.02)	0.02 (0.00,0.04)	0.01 (-0.01,0.02)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.06)	0.06 (0.02,0.10)	0.06 (0.02,0.10)	0.001***	0.01 (0.00,0.02)**	0.01 (-0.01,0.03)	0.02 (0.00,0.04)*	0.02 (0.00,0.03)
4. Exclusion CHD	ref	0.02 (-0.02,0.05)	0.06 (0.02,0.10)	0.07 (0.03,0.11)	0.0001***	0.02 (0.01,0.03)**	0.01 (0.00,0.03)	0.03 (0.00,0.05)*	0.02 (0.00,0.03)
5. Energy adjusted dairy	ref	0.01 (-0.02,0.05)	0.06 (0.02,0.09)	0.06 (0.02,0.10)	0.0007***	0.02 (0.01,0.03)**	0.01 (-0.01,0.03)	0.03 (0.01,0.05)**	0.02 (0.00,0.04)

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (*n* = 6,593). (continued)

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Total fermented dairy									
Main analysis model 2	ref	-0.02 (-0.06,0.02)	0.00 (-0.04,0.04)	-0.01 (-0.05,0.03)	0.77	0.00 (-0.01,0.00)	-0.01 (-0.02,0.01)	0.00 (-0.02,0.01)	-0.01 (-0.02,0.01)
1. Adjust. longitudinal WC	ref	-0.02 (-0.06,0.01)	-0.01 (-0.05,0.02)	-0.04 (-0.07,0.00)	0.13	-0.01 (-0.01,0.00)	-0.01 (-0.03,0.00)	0.00 (-0.01,0.01)	-0.01 (-0.02,0.01)
2. Adjust. CVD risk factors	ref	-0.01 (-0.05,0.02)	0.00 (-0.03,0.04)	-0.02 (-0.05,0.02)	0.51	0.00 (-0.01,0.00)	0.00 (-0.02,0.01)	-0.01 (-0.02,0.01)	0.00 (-0.02,0.01)
3. Adjust. other dairy intake	ref	-0.02 (-0.05,0.02)	0.00 (-0.04,0.04)	-0.01 (-0.05,0.03)	0.87	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)
4. Exclusion CHD	ref	-0.02 (-0.06,0.02)	-0.01 (-0.05,0.03)	-0.02 (-0.07,0.02)	0.49	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.02,0.01)
5. Energy adjusted dairy	ref	0.00 (-0.04,0.04)	0.01 (-0.03,0.04)	-0.03 (-0.07,0.01)	0.15	-0.02 (-0.03,0.00)*	-0.01 (-0.04,0.01)	-0.01 (-0.04,0.03)	-0.03 (-0.06,0.00)*
High-fat fermented dairy									
Main analysis model 2	ref	0.02 (-0.02,0.06)	-0.01 (-0.05,0.02)	-0.01 (-0.05,0.03)	0.49	0.00 (-0.01,0.01)	0.01 (-0.01,0.02)	0.00 (-0.02,0.01)	-0.01 (-0.03,0.01)
1. Adjust. longitudinal WC	ref	0.03 (0.00,0.06)	0.00 (-0.03,0.03)	0.00 (-0.03,0.04)	0.77	0.00 (-0.01,0.01)	-0.02 (-0.03,0.00)	0.00 (-0.01,0.01)	0.01 (-0.01,0.02)
2. Adjust. CVD risk factors	ref	0.03 (0.00,0.06)	0.01 (-0.02,0.05)	0.00 (-0.04,0.03)	0.72	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	-0.01 (-0.02,0.01)	0.00 (-0.02,0.02)
3. Adjust. other dairy intake	ref	0.03 (-0.01,0.06)	-0.01 (-0.05,0.03)	0.00 (-0.04,0.04)	0.81	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)
4. Exclusion CHD	ref	0.02 (-0.02,0.06)	-0.02 (-0.06,0.02)	-0.02 (-0.06,0.03)	0.41	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)
5. Energy adjusted dairy	ref	-0.02 (-0.05,0.02)	-0.01 (-0.05,0.03)	-0.05 (-0.09,-0.01)	0.02*	-0.08 (-0.13,-0.03)**	-0.05 (-0.14,0.03)	-0.06 (-0.17,0.04)	-0.12 (-0.21,-0.04)**
Low-fat fermented dairy									
Main analysis model 2	ref	0.05 (0.01,0.08)	0.04 (0.00,0.08)	0.02 (-0.01,0.06)	0.70	0.00 (-0.01,0.01)	-0.01 (-0.02,0.01)	0.00 (-0.03,0.02)	0.00 (-0.02,0.02)
1. Adjust. longitudinal WC	ref	0.03 (0.00,0.06)	0.00 (-0.03,0.04)	-0.02 (-0.05,0.02)	0.05	-0.01 (-0.02,0.00)*	-0.01 (-0.02,0.01)	-0.01 (-0.04,0.01)	-0.02 (-0.04,0.00)*
2. Adjust. CVD risk factors	ref	0.03 (0.00,0.06)	0.03 (-0.01,0.06)	0.01 (-0.03,0.05)	0.93	-0.01 (-0.02,0.01)	-0.01 (-0.02,0.01)	-0.01 (-0.03,0.02)	-0.01 (-0.02,0.01)
3. Adjust. other dairy intake	ref	0.05 (0.01,0.08)	0.04 (0.00,0.08)	0.03 (-0.01,0.07)	0.58	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.03,0.02)	0.00 (-0.02,0.02)
4. Exclusion CHD	ref	0.05 (0.01,0.09)	0.04 (0.00,0.08)	0.03 (-0.02,0.07)	0.75	0.00 (-0.01,0.01)	0.00 (-0.02,0.03)	0.00 (-0.03,0.03)	0.00 (-0.02,0.02)
5. Energy adjusted dairy	ref	0.06 (0.02,0.10)	0.05 (0.01,0.09)	0.02 (-0.02,0.05)	0.76	-0.01 (-0.03,0.01)	-0.01 (-0.03,0.02)	0.00 (-0.04,0.03)	-0.02 (-0.05,0.01)

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (n = 6,593). (continued)

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Total milk									
Main analysis model 2	ref	0.03 (-0.01,0.07)	0.03 (0.00,0.07)	0.05 (0.01,0.09)	0.02*	0.01 (0.00,0.02)	-0.01 (-0.02,0.01)	0.03 (0.01,0.06)**	0.01 (-0.01,0.02)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.05)	0.02 (-0.02,0.05)	0.02 (-0.01,0.06)	0.25	0.00 (-0.01,0.01)	0.00 (-0.02,0.01)	0.02 (0.00,0.04)**	0.00 (-0.02,0.02)
2. Adjust. CVD risk factors	ref	0.04 (0.01,0.08)	0.04 (0.01,0.08)	0.05 (0.02,0.09)	0.01*	0.01 (0.00,0.02)	0.00 (-0.02,0.02)	0.03 (0.01,0.06)**	0.00 (-0.01,0.02)
3. Adjust. other dairy intake	ref	0.03 (-0.01,0.07)	0.04 (0.00,0.07)	0.05 (0.01,0.09)	0.02*	0.01 (0.00,0.02)	0.00 (-0.02,0.02)	0.03 (0.01,0.06)**	0.00 (-0.01,0.02)
4. Exclusion CHD	ref	0.03 (-0.01,0.07)	0.04 (0.00,0.08)	0.06 (0.02,0.10)	0.004*	0.02 (0.00,0.03)*	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**	0.01 (-0.01,0.03)
5. Energy adjusted dairy	ref	0.01 (-0.03,0.05)	0.04 (0.00,0.07)	0.04 (0.00,0.08)	0,01*	0.01 (0.00,0.02)	0.00 (-0.01,0.02)	0.03 (0.01,0.06)*	0.01 (-0.01,0.02)
High-fat milk									
Main analysis model 2	ref	0.00 (-0.04,0.04)	-0.03 (-0.06,0.01)	0.00 (-0.04,0.03)	0.46	-0.02 (-0.04,0.00)	-0.01 (-0.04,0.01)	-0.02 (-0.08,0.04)	-0.02 (-0.05,0.00)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.06)	0.00 (-0.04,0.03)	0.01 (-0.02,0.04)	0.95	-0.01 (-0.03,0.01)	0.00 (-0.04,0.03)	-0.02 (-0.06,0.03)	-0.01 (-0.03,0.01)
2. Adjust. CVD risk factors	ref	0.01 (-0.03,0.04)	-0.01 (-0.05,0.02)	0.01 (-0.02,0.05)	0.77	-0.01 (-0.03,0.00)	-0.01 (-0.04,0.02)	-0.01 (-0.06,0.04)	-0.01 (-0.04,0.01)
3. Adjust. other dairy intake	ref	0.00 (-0.04,0.04)	-0.02 (-0.06,0.01)	0.00 (-0.04,0.04)	0.65	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.02)	0.00 (-0.06,0.05)	-0.02 (-0.05,0.01)
4. Exclusion CHD	ref	-0.01 (-0.06,0.03)	-0.04 (-0.08,0.00)	-0.01 (-0.05,0.03)	0.47	-0.01 (-0.03,0.01)	0.00 (-0.04,0.04)	-0.01 (-0.07,0.05)	-0.02 (-0.05,0.01)
5. Energy adjusted dairy	ref	-0.03 (-0.07,0.02)	-0.04 (-0.08,0.00)	0.01 (-0.03,0.05)	0.85	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.02)	-0.02 (-0.08,0.04)	-0.02 (-0.05,0.00)
Low-fat milk									
Main analysis model 2	ref	0.02 (-0.02,0.06)	0.02 (-0.02,0.06)	0.07 (0.03,0.11)	0.001**	0.02 (0.01,0.04)**	0.00 (-0.01,0.02)	0.04 (0.01,0.06)**	0.04 (0.01,0.06)**
1. Adjust. longitudinal WC	ref	0.01 (-0.02,0.04)	0.01 (-0.03,0.04)	0.03 (0.00,0.06)	0.15	0.01 (0.00,0.02)	0.00 (-0.02,0.02)	0.02 (0.00,0.04)*	0.01 (-0.01,0.04)
2. Adjust. CVD risk factors	ref	0.02 (-0.02,0.05)	0.02 (-0.01,0.05)	0.06 (0.02,0.09)	0.002**	0.02 (0.01,0.03)**	0.01 (-0.01,0.02)	0.04 (0.01,0.06)**	0.02 (0.00,0.05)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.06)	0.02 (-0.02,0.06)	0.07 (0.03,0.10)	0.002**	0.02 (0.01,0.04)**	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**	0.03 (0.01,0.06)**
4. Exclusion CHD	ref	0.03 (-0.01,0.07)	0.03 (-0.01,0.07)	0.08 (0.04,0.12)	0.0004***	0.03 (0.01,0.04)***	0.01 (-0.01,0.03)	0.04 (0.01,0.07)**	0.04 (0.01,0.07)
5. Energy adjusted dairy	ref	0.03 (-0.01,0.06)	0.03 (-0.01,0.06)	0.08 (0.04,0.11)	0.0002***	0.02 (0.01,0.04)***	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**	0.04 (0.01,0.06)*

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (*n* = 6,593). (continued)

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Total yogurt									
Main analysis model 2	ref	0.04 (0.01,0.08)	0.00 (-0.04,0.04)	-0.01 (-0.05,0.02)	0.18	-0.02 (-0.04,0.00)	-0.01 (-0.04,0.03)	-0.01 (-0.06,0.05)	-0.03 (-0.06,0.00)
1. Adjust. longitudinal WC	ref	0.03 (0.00,0.06)	0.00 (-0.03,0.04)	-0.02 (-0.05,0.02)	0.14	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.03)	-0.01 (-0.05,0.04)	-0.02 (-0.05,0.00)
2. Adjust. CVD risk factors	ref	0.03 (0.00,0.07)	0.00 (-0.03,0.04)	-0.02 (-0.05,0.01)	0.12	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.03)	-0.01 (-0.06,0.04)	-0.03 (-0.06,0.00)*
3. Adjust. other dairy intake	ref	0.04 (0.01,0.08)	0.00 (-0.04,0.04)	-0.01 (-0.05,0.03)	0.23	-0.02 (-0.04,0.01)	0.00 (-0.05,0.04)	0.00 (-0.06,0.05)	-0.03 (-0.06,0.00)
4. Exclusion CHD	ref	0.05 (0.01,0.09)	0.01 (-0.03,0.06)	-0.01 (-0.05,0.03)	0.27	-0.02 (-0.04,0.01)	0.00 (-0.05,0.04)	0.02 (-0.04,0.08)	-0.03 (-0.06,0.00)
5. Energy adjusted dairy	ref	0.03 (0.00,0.07)	0.01 (-0.03,0.04)	-0.02 (-0.05,0.02)	0.12	-0.02 (-0.04,0.00)	-0.01 (-0.05,0.04)	-0.01 (-0.06,0.04)	-0.03 (-0.06,0.00)
High-fat yogurt									
Main analysis model 2	ref	-0.01 (-0.06,0.04)	0.00 (-0.05,0.05)	-0.10 (-0.16,-0.05)	0.0003***	-0.08 (-0.13,-0.03)**	0.01 (-0.01,0.02)	-0.11 (-0.25,0.03)	-0.11 (-0.18,-0.03)**
1. Adjust. longitudinal WC	ref	0.01 (-0.03,0.05)	0.02 (-0.02,0.06)	-0.06 (-0.10,-0.01)	0.04*	-0.04 (-0.08,0.01)	-0.02 (-0.09,0.04)	-0.05 (-0.17,0.07)	-0.05 (-0.11,0.02)
2. Adjust. CVD risk factors	ref	-0.01 (-0.06,0.03)	-0.01 (-0.06,0.03)	-0.07 (-0.12,-0.02)	0.005**	-0.05 (-0.10,-0.01)*	-0.02 (-0.08,0.05)	-0.09 (-0.22,0.05)	-0.08 (-0.15,-0.01)*
3. Adjust. other dairy intake	ref	-0.01 (-0.06,0.04)	0.00 (-0.05,0.05)	-0.10 (-0.16,-0.05)	0.0004***	-0.07 (-0.12,-0.03)**	-0.04 (-0.11,0.03)	-0.10 (-0.24,0.04)	-0.11 (-0.18,-0.03)*
4. Exclusion CHD	ref	-0.01 (-0.06,0.04)	-0.02 (-0.07,0.03)	-0.11 (-0.17,-0.05)	0.0009***	-0.07 (-0.12,-0.02)**	-0.04 (-0.11,0.04)	-0.09 (-0.24,0.07)	-0.11 (-0.19,-0.03)*
5. Energy adjusted dairy	ref	-0.03 (-0.08,0.02)	0.03 (-0.02,0.08)	-0.11 (-0.16,-0.06)	0.0001***	-0.08 (-0.13,-0.03)**	-0.04 (-0.11,0.03)	-0.11 (-0.25,0.03)	-0.11 (-0.19,-0.03)*
Low-fat yogurt									
Main analysis model 2	ref	0.03 (0.00,0.07)	0.07 (0.03,0.10)	0.01 (-0.02,0.05)	0.52	0.00 (-0.03,0.02)	-0.02 (-0.06,0.03)	0.01 (-0.05,0.06)	-0.01 (-0.04,0.02)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.05)	0.05 (0.02,0.08)	0.00 (-0.03,0.03)	0.77	-0.01 (-0.03,0.01)	0.00 (-0.05,0.04)	0.00 (-0.05,0.04)	-0.02 (-0.04,0.01)
2. Adjust. CVD risk factors	ref	0.03 (-0.01,0.06)	0.05 (0.01,0.08)	0.00 (-0.03,0.03)	0.94	-0.01 (-0.03,0.01)	-0.01 (-0.05,0.04)	0.00 (-0.05,0.05)	-0.02 (-0.05,0.01)
3. Adjust. other dairy intake	ref	0.03 (0.00,0.07)	0.07 (0.03,0.10)	0.02 (-0.02,0.05)	0.47	0.00 (-0.03,0.02)	0.01 (-0.04,0.06)	0.01 (-0.04,0.07)	-0.01 (-0.04,0.02)
4. Exclusion CHD	ref	0.04 (0.00,0.08)	0.07 (0.03,0.11)	0.02 (-0.02,0.06)	0.47	0.00 (-0.02,0.02)	0.01 (-0.04,0.07)	0.04 (-0.02,0.10)	-0.01 (-0.05,0.02)
5. Energy adjusted dairy	ref	0.04 (0.00,0.07)	0.06 (0.02,0.09)	0.02 (-0.02,0.05)	0.41	0.00 (-0.03,0.02)	0.01 (-0.04,0.06)	0.00 (-0.05,0.06)	-0.01 (-0.04,0.02)

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (*n* = 6,593). (continued)

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Total cheese									
Main analysis model 2	ref	0.02 (-0.02,0.06)	0.00 (-0.04,0.04)	0.01 (-0.03,0.05)	0.62	0.00 (-0.01,0.01)	-0.05 (-0.12,0.02)	0.00 (-0.02,0.01)	0.01 (-0.01,0.02)
1. Adjust. longitudinal WC	ref	0.00 (-0.03,0.03)	-0.02 (-0.05,0.01)	-0.01 (-0.05,0.02)	0.40	0.00 (-0.01,0.00)	-0.01 (-0.03,0.00)	0.00 (-0.01,0.01)	0.00 (-0.01,0.02)
2. Adjust. CVD risk factors	ref	0.03 (-0.01,0.06)	0.01 (-0.03,0.04)	0.01 (-0.03,0.04)	0.98	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	-0.01 (-0.02,0.01)	0.01 (-0.01,0.02)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.06)	0.00 (-0.04,0.04)	0.02 (-0.03,0.07)	0.31	0.01 (0.00,0.02)	0.01 (-0.02,0.03)	0.02 (0.00,0.05)	0.00 (-0.02,0.03)
4. Exclusion CHD	ref	0.02 (-0.02,0.06)	-0.01 (-0.05,0.04)	0.01 (-0.03,0.05)	0.69	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)	0.00 (-0.01,0.02)
5. Energy adjusted dairy	ref	0.01 (-0.02,0.05)	0.00 (-0.04,0.04)	0.01 (-0.03,0.05)	0.53	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.02,0.01)	0.01 (-0.01,0.02)
High-fat cheese									
Main analysis model 2	ref	0.01 (-0.02,0.05)	0.00 (-0.04,0.04)	0.00 (-0.04,0.04)	0.92	0.00 (-0.01,0.01)	0.00 (-0.05,0.05)	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.05)	0.01 (-0.03,0.04)	0.01 (-0.03,0.04)	0.90	0.00 (-0.01,0.01)	-0.02 (-0.03,0.00)	0.00 (-0.01,0.01)	0.01 (-0.01,0.03)
2. Adjust. CVD risk factors	ref	0.02 (-0.01,0.06)	0.02 (-0.02,0.05)	0.00 (-0.03,0.04)	0.92	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.02,0.01)	0.00 (-0.01,0.02)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.05)	0.00 (-0.04,0.04)	0.01 (-0.04,0.05)	0.56	0.01 (-0.01,0.02)	0.00 (-0.02,0.03)	0.02 (0.00,0.05)	0.00 (-0.03,0.02)
4. Exclusion CHD	ref	0.02 (-0.02,0.06)	-0.01 (-0.05,0.03)	-0.01 (-0.05,0.04)	0.72	0.00 (-0.01,0.01)	-0.01 (-0.03,0.01)	0.00 (-0.01,0.02)	0.00 (-0.02,0.02)
5. Energy adjusted dairy	ref	0.00 (-0.04,0.04)	-0.01 (-0.05,0.03)	-0.01 (-0.05,0.03)	0.96	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)	0.00 (-0.02,0.02)
Low-fat cheese									
Main analysis model 2	ref	0.02 (-0.02,0.07)	0.01 (-0.04,0.06)	0.02 (-0.03,0.07)	0.50	0.01 (-0.01,0.03)	0.00 (-0.02,0.02)	-0.01 (-0.06,0.03)	0.02 (-0.01,0.05)
1. Adjust. longitudinal WC	ref	0.02 (-0.02,0.06)	-0.03 (-0.07,0.01)	-0.03 (-0.07,0.01)	0.09	-0.01 (-0.03,0.01)	0.02 (-0.02,0.05)	-0.03 (-0.07,0.00)	-0.01 (-0.04,0.01)
2. Adjust. CVD risk factors	ref	0.00 (-0.04,0.04)	-0.01 (-0.05,0.04)	-0.01 (-0.05,0.03)	0.46	0.00 (-0.02,0.02)	-0.01 (-0.04,0.03)	-0.03 (-0.07,0.01)	0.01 (-0.02,0.04)
3. Adjust. other dairy intake	ref	0.02 (-0.02,0.07)	0.02 (-0.03,0.06)	0.02 (-0.03,0.08)	0.35	0.02 (-0.01,0.04)	0.02 (-0.02,0.06)	0.01 (-0.04,0.06)	0.02 (-0.02,0.05)
4. Exclusion CHD	ref	0.01 (-0.03,0.06)	0.02 (-0.03,0.07)	0.02 (-0.03,0.07)	0.46	0.01 (-0.01,0.03)	0.03 (-0.02,0.07)	0.00 (-0.05,0.04)	0.01 (-0.02,0.04)
5. Energy adjusted dairy	ref	0.02 (-0.03,0.07)	0.01 (-0.04,0.06)	0.02 (-0.03,0.07)	0.49	0.01 (-0.01,0.03)	0.02 (-0.02,0.06)	-0.01 (-0.06,0.03)	0.02 (-0.01,0.05)

Supplemental Table 8. Sensitivity analyses of associations of dairy product types and longitudinal insulin resistance in the Rotterdam Studies (*n* = 6,593). (continued)

	Pooled betas from log-transformed HOMA-IR (95%CI) across intake range categories[1]					Pooled continuous[2]	Continuous betas from log-transformed HOMA-IR (95%CI)		
	Q1	Q2	Q3	Q4	P_{trend}[3]		RS-I	RS-II	RS-III
Cream									
Main analysis model 2	ref	-0.03 (-0.07,0.02)	-0.05 (-0.09,0.00)	-0.07 (-0.12,-0.03)	0.77	-0.02 (-0.05,0.01)	0.00 (-0.02,0.01)	-0.13 (-0.26,0.00)	-0.10 (-0.19,-0.02)*
1. Adjust. longitudinal WC	ref	-0.01 (-0.05,0.02)	-0.03 (-0.07,0.01)	-0.03 (-0.07,0.01)	0.62	-0.01 (-0.03,0.02)	0.00 (-0.02,0.03)	-0.04 (-0.16,0.07)	-0.05 (-0.12,0.02)*
2. Adjust. CVD risk factors	ref	-0.01 (-0.05,0.03)	-0.03 (-0.07,0.01)	-0.03 (-0.07,0.01)	0.67	-0.01 (-0.03,0.02)	0.00 (-0.02,0.03)	-0.11 (-0.23,0.02)	-0.03 (-0.11,0.04)
3. Adjust. other dairy intake	ref	-0.03 (-0.07,0.02)	-0.05 (-0.09,0.00)	-0.07 (-0.12,-0.02)	0.94	-0.02 (-0.05,0.01)	0.00 (-0.03,0.03)	-0.10 (-0.24,0.03)	-0.11 (-0.20,-0.02)*
4. Exclusion CHD	ref	-0.03 (-0.07,0.02)	-0.05 (-0.10,0.00)	-0.08 (-0.13,-0.03)	0.93	-0.02 (-0.05,0.01)	0.00 (-0.03,0.04)	-0.13 (-0.27,0.01)	-0.11 (-0.20,-0.02)*
5. Energy adjusted dairy	ref	-0.04 (-0.09,0.00)	-0.01 (-0.06,0.03)	-0.08 (-0.13,-0.04)	0.51	-0.02 (-0.05,0.01)	0.00 (-0.03,0.03)	-0.12 (-0.26,0.01)	-0.10 (-0.19,-0.01)*
Ice cream									
Main analysis model 2	ref	0.03 (-0.02,0.07)	0.02 (-0.02,0.07)	0.01 (-0.03,0.05)	0.52	0.04 (-0.01,0.08)	0.01 (-0.03,0.05)	0.06 (0.00,0.11)*	-0.02 (-0.12,0.08)
1. Adjust. longitudinal WC	ref	0.02 (-0.01,0.06)	0.02 (-0.02,0.06)	0.00 (-0.03,0.04)	0.72	0.00 (-0.04,0.04)	-0.05 (-0.21,0.11)	0.01 (-0.04,0.05)	-0.01 (-0.09,0.08)
2. Adjust. CVD risk factors	ref	0.03 (-0.01,0.07)	0.04 (0.00,0.08)	0.02 (-0.02,0.05)	0.18	0.04 (0.00,0.08)	-0.05 (-0.21,0.12)	0.06 (0.01,0.11)*	-0.01 (-0.10,0.08)
3. Adjust. other dairy intake	ref	0.03 (-0.02,0.07)	0.02 (-0.02,0.07)	0.01 (-0.03,0.05)	0.42	0.05 (0.00,0.10)*	-0.04 (-0.21,0.14)	0.08 (0.03,0.14)**	-0.02 (-0.13,0.08)
4. Exclusion CHD	ref	0.02 (-0.02,0.07)	0.03 (-0.02,0.07)	0.01 (-0.03,0.05)	0.47	0.04 (-0.01,0.09)	-0.04 (-0.24,0.15)	0.06 (0.01,0.11)*	-0.01 (-0.11,0.09)
5. Energy adjusted dairy	ref	0.05 (0.01,0.09)	0.00 (-0.04,0.04)	0.00 (-0.04,0.05)	0.58	0.03 (-0.01,0.08)	-0.03 (-0.20,0.13)	0.06 (0.00,0.11)*	-0.02 (-0.12,0.08)

[1] Betas from log-transformed HOMA-IR (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + tertile categories with the lowest category as the reference, adjusted for covariates as follows: Model 2 included age (continuous), sex and energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no, RS-I and RS-II only) and intakes of fruit, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat and sugar-sweetened beverages (continuous).
[2] Betas from log-transformed HOMA-IR per 1 serving/day (see definition in Table 1) were estimated.
* P=0.01 to 0.05, ** P=0.01 to 0.001, ***P<0.001.
Abbreviations: CVD, Cardiovascular Disease; CHD, Coronary Heart Disease; CI, Confidence Interval; HOMA-IR, Homeostatic Model Assessment of Insulin Resistance; Q, Quartile; WC, Waist Circumference.

Supplemental Table 9. Mean dairy intake at baseline and follow-up in a subsample of RS-I and RS-II (*n* = 1,887).

	RS-I *n* = 1,028		**RS-II** *n* = 859	
	Baseline	Follow-up	Baseline	Follow-up
Total dairy	3.85 ± 1.69	4.21 ± 2.54	2.93 ± 1.80	2.83 ± 1.70
High-fat	2.12 ± 1.35	2.45 ± 2.23	1.40 ± 1.40	1.37 ± 1.38
Low-fat	1.72 ± 1.40	1.68 ± 1.49	1.53 ± 1.36	1.46 ± 1.17
Total fermented dairy	2.70 ± 1.43	3.10 ± 2.30	1.98 ± 1.50	2.02 ± 1.43
High-fat	1.77 ± 1.18	2.20 ± 2.17	1.07 ± 1.18	1.11 ± 1.20
Low-fat	0.93 ± 1.10	0.91 ± 1.11	0.92 ± 1.09	0.92 ± 0.99
Total milk	1.43 ± 1.09	1.28 ± 1.20	1.00 ± 1.04	0.87 ± 0.91
High-fat	0.23 ± 0.55	0.21 ± 0.50	0.25 ± 0.70	0.19 ± 0.55
Low-fat	1.20 ± 1.09	1.07 ± 1.15	0.75 ± 0.80	0.68 ± 0.71
Total yogurt	0.47 ± 0.49	0.36 ± 0.52	0.61 ± 0.78	0.59 ± 0.72
High-fat	0.14 ± 0.29	0.03 ± 0.16	0.11 ± 0.42	0.08 ± 0.25
Low-fat	0.33 ± 0.42	0.32 ± 0.52	0.50 ± 0.71	0.51 ± 0.71
Total cheese	1.88 ± 1.11	2.47 ± 2.13	1.34 ± 1.25	1.41 ± 1.21
High-fat	1.66 ± 1.15	2.16 ± 2.16	0.95 ± 1.11	1.02 ± 1.17
Low-fat	0.22 ± 0.61	0.31 ± 0.70	0.39 ± 0.82	0.39 ± 0.66
Cream	0.26 ± 0.69	0.06 ± 0.20	0.12 ± 0.21	0.11 ± 0.21
Ice cream	0.04 ± 0.11	0.12 ± 0.37	0.15 ± 0.35	0.15 ± 0.25

Supplemental Table 10. Associations of dairy product types and prediabetes risk using repeated measures of dairy intakes as time-dependent exposure (*n* = 6,053) or adjusting for dairy intake at follow-up (*n* = 1,707).

	Continuous hazard ratio (95%CI)[1]	
	RS-I	**RS-II**
Total dairy		
Model 2	1.08 (1.03-1.14)**	1.03 (0.98-1.08)
Time-dependent exposure	1.08 (1.02-1.14)**	1.01 (0.96-1.07)
Adjusted for FU intake	1.13 (1.04-1.22)**	1.01 (0.94-1.08)
High-fat dairy		
Model 2	1.04 (0.98-1.12)	1.00 (0.95-1.06)
Time-dependent exposure	1.04 (0.98-1.12)	0.99 (0.93-1.05)
Adjusted for FU intake	1.09 (0.99-1.20)	0.99 (0.92-1.07)
Low-fat dairy		
Model 2	1.07 (1.01-1.14)*	1.06 (0.99-1.14)
Time-dependent exposure	1.07 (1.01-1.14)*	1.06 (0.99-1.14)
Adjusted for FU intake	1.08 (0.98-1.18)*	1.04 (0.94-1.15)
Total fermented		
Model 2	1.06 (1.00-1.12)*	1.02 (0.97-1.07)
Time-dependent exposure	1.06 (1.00-1.12)*	1.00 (0.95-1.05)
Adjusted for FU intake	1.10 (1.01-1.20)	1.01 (0.95-1.09)
High-fat fermented		
Model 2	1.07 (1.00-1.15)	1.02 (0.96-1.07)
Time-dependent exposure	1.07 (1.00-1.15)	0.99 (0.94-1.05)
Adjusted for FU intake	1.09 (0.98-1.22)	1.01 (0.94-1.09)
Low-fat fermented		
Model 2	1.03 (0.94-1.12)	1.01 (0.91-1.11)
Time-dependent exposure	1.03 (0.94-1.12)	1.01 (0.92-1.11)
Adjusted for FU intake	1.07 (0.95-1.20)	1.02 (0.89-1.18)
Total milk		
Model 2	1.06 (0.99-1.15)	1.05 (0.95-1.16)
Time-dependent exposure	1.06 (0.99-1.15)	1.07 (0.97-1.19)
Adjusted for FU intake	1.08 (0.96-1.21)	0.94 (0.82-1.09)
High-fat milk		
Model 2	0.95 (0.81-1.10)	0.62 (0.43-0.91)*
Time-dependent exposure	0.95 (0.81-1.10)	0.88 (0.67-1.15)
Adjusted for FU intake	1.07 (0.89-1.28)	0.56 (0.34-0.91)*
Low-fat milk		
Model 2	1.08 (1.00-1.16)	1.11 (1.00-1.23)*
Time-dependent exposure	1.08 (1.00-1.16)	1.11 (1.00-1.23)
Adjusted for FU intake	1.04 (0.92-1.17)	1.00 (0.87-1.15)

Supplemental Table 10. Associations of dairy product types and prediabetes risk using repeated measures of dairy intakes as time-dependent exposure (*n* = 6,053) or adjusting for dairy intake at follow-up (*n* = 1,707). (continued)

	Continuous hazard ratio (95%CI)[1]	
	RS-I	**RS-II**
Total yogurt		
Model 2	0.98 (0.80-1.20)	0.91 (0.68-1.22)
Time-dependent exposure	0.89 (0.73-1.07)	1.03 (0.84-1.25)
Adjusted for FU intake	0.91 (0.69-1.21)	1.06 (0.79-1.41)
High-fat yogurt		
Model 2	0.76 (0.54-1.07)	0.47 (0.20-1.10)
Time-dependent exposure	0.76 (0.54-1.07)	0.66 (0.34-1.30)
Adjusted for FU intake	0.71 (0.44-1.15)	0.30 (0.08-1.21)
Low-fat yogurt		
Model 2	0.97 (0.78-1.21)	1.03 (0.82-1.29)
Time-dependent exposure	0.97 (0.78-1.21)	1.07 (0.89-1.30)
Adjusted for FU intake	1.02 (0.74-1.41)	1.15 (0.87-1.51)
Total cheese		
Model 2	1.11 (1.04-1.19)**	1.02 (0.97-1.08)
Time-dependent exposure	1.11 (1.04-1.19)**	1.00 (0.94-1.05)
Adjusted for FU intake	1.19 (1.06-1.33)**	1.01 (0.94-1.09)
High-fat cheese		
Model 2	1.08 (1.01-1.16)*	1.02 (0.97-1.08)
Time-dependent exposure	1.08 (1.01-1.16)*	1.00 (0.94-1.06)
Adjusted for FU intake	1.11 (0.99-1.24)*	1.01 (0.94-1.09)
Low-fat cheese		
Model 2	1.11 (0.97-1.27)	1.00 (0.88-1.14)
Time-dependent exposure	1.13 (1.00-1.28)	1.07 (0.90-1.28)
Adjusted for FU intake	1.18 (0.99-1.41)	1.03 (0.83-1.27)
Cream		
Model 2	1.05 (0.93-1.18)	0.89 (0.50-1.59)
Time-dependent exposure	1.05 (0.93-1.18)	0.86 (0.48-1.55)
Adjusted for FU intake	1.05 (0.89-1.24)	0.85 (0.44-1.64)
Ice cream		
Model 2	0.75 (0.34-1.65)	0.96 (0.65-1.43)
Time-dependent exposure	0.75 (0.34-1.65)	1.05 (0.72-1.53)
Adjusted for FU intake	1.25 (0.38-4.05)	0.91 (0.56-1.49)

[1] Relative risks per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Model 2 included age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no) and fruits, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat and sugar-sweetened beverages (SSB) intakes (continuous). * P=0.01 to 0.05, ** P<0.01.
Abbreviations: CI, Confidence Interval; HR, Hazard Ratio, RS, Rotterdam Study.

Supplemental Table 11. Associations of dairy product intakes and longitudinal insulin resistance with repeated measures of dairy intake as fixed effect in RS-I and RS-II (*n* = 4,274).

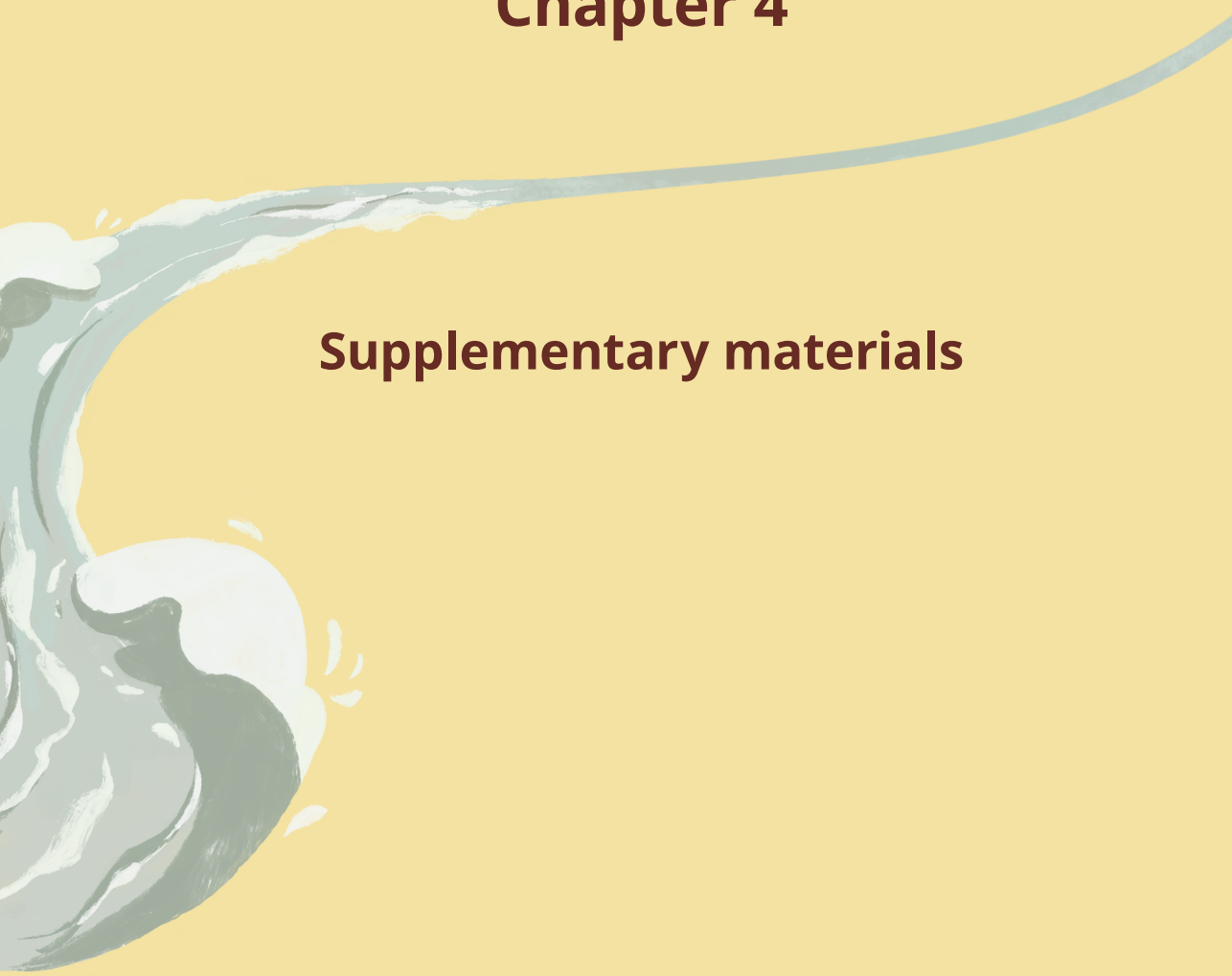
	Continuous betas from log-transformed HOMA-IR (95%CI)	
	RS-I *n* = 2,885	**RS-II** *n* = 1,389
Total dairy		
Model 2	0.00 (-0.01,0.02)	0.01 (-0.01,0.02)
Repeated measures	-0.01 (-0.02, 0.00)	0.00 (-0.01, 0.01)
High-fat dairy		
Model 2	-0.01 (-0.02,0.01)	0.00 (-0.02,0.01)
Repeated measures	-0.01 (-0.02, 0.01)	0.00 (-0.01, 0.01)
Low-fat dairy		
Model 2	0.01 (0.00,0.03)	0.02 (0.00,0.04)*
Repeated measures	0.00 (-0.01, 0.01)	0.01 (-0.01, 0.02)
Total fermented		
Model 2	0.00 (-0.02,0.01)	0.00 (-0.02,0.01)
Repeated measures	-0.01 (-0.02, 0.01)	0.00 (-0.01, 0.01)
High-fat fermented		
Model 2	0.00 (-0.02,0.01)	0.00 (-0.02,0.01)
Repeated measures	0.00 (-0.02, 0.01)	0.00 (-0.02, 0.01)
Low-fat fermented		
Model 2	0.00 (-0.02,0.02)	0.00 (-0.03,0.02)
Repeated measures	-0.01 (-0.03, 0.01)	0.00 (-0.02, 0.02)
Total milk		
Model 2	0.00 (-0.02,0.02)	0.03 (0.01,0.06)**
Repeated measures	-0.01 (-0.02, 0.01)	0.01 (-0.01, 0.03)
High-fat milk		
Model 2	-0.02 (-0.05,0.02)	-0.02 (-0.08,0.04)
Repeated measures	-0.02 (-0.05, 0.01)	0.00 (-0.04, 0.05)
Low-fat milk		
Model 2	0.01 (-0.01,0.03)	0.04 (0.01,0.06)**
Repeated measures	0.00 (-0.02, 0.01)	0.02 (-0.01, 0.04)
Total yogurt		
Model 2	-0.01 (-0.05,0.04)	-0.01 (-0.06,0.05)
Repeated measures	-0.03 (-0.06, 0.00)	0.02 (-0.01, 0.06)
High-fat yogurt		
Model 2	-0.04 (-0.11,0.03)	-0.11 (-0.25,0.03)
Repeated measures	-0.07 (-0.12; -0.02)**	0.04 (-0.05, 0.13)

Supplemental Table 11. Associations of dairy product intakes and longitudinal insulin resistance with repeated measures of dairy intake as fixed effect in RS-I and RS-II (*n* = 4,274). (continued)

	Continuous betas from log-transformed HOMA-IR (95%CI)	
	RS-I *n* = 2,885	**RS-II** *n* = 1,389
Low-fat yogurt		
Model 2	0.01 (-0.04,0.06)	0.01 (-0.05,0.06)
Repeated measures	-0.02 (-0.05, 0.02)	0.02 (-0.02, 0.07)
Total cheese		
Model 2	0.00 (-0.02,0.02)	0.00 (-0.02,0.01)
Repeated measures	0.00 (-0.01, 0.02)	-0.01 (-0.02, 0.00)
High-fat cheese		
Model 2	0.00 (-0.02,0.02)	0.00 (-0.01,0.01)
Repeated measures	0.00 (-0.01, 0.02)	-0.01 (-0.02, 0.00)
Low-fat cheese		
Model 2	0.02 (-0.02,0.06)	-0.01 (-0.06,0.03)
Repeated measures	0.00 (-0.03, 0.02)	-0.02 (-0.05, 0.01)
Cream		
Model 2	0.00 (-0.03,0.03)	-0.13 (-0.26,0.00)
Repeated measures	0.01 (-0.02, 0.04)	-0.02 (-0.12, 0.07)
Ice cream		
Model 2	-0.04 (-0.21,0.13)	0.06 (0.00,0.11)*
Repeated measures	0.06 (-0.02, 0.13)	0.04 (0.00, 0.09)

[1] Betas from log-transformed HOMA-IR per 1 serving/day (see definition in Table 1) were estimated, adjusted for covariates as follows: Model 2 included age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (4 categories), family history of diabetes (yes/no) and fruits, vegetables, wholegrains, legumes, nuts, tea, coffee, red meat and sugar-sweetened beverages (SSB) intakes (continuous). * P=0.01 to 0.05, ** P<0.01. Abbreviations: CI, Confidence Interval; HOMA-IR, Homeostatic Model Assessment of Insulin Resistance; RS, Rotterdam Study.

Chapter 4



Supplementary materials

Contents

Supplemental table 1. Missing values of covariates in participants before imputation.

	Study population (*n* = 4891), n (%)
Smoking status	78 (1.6%)
Physical activity	18 (0.4%)
Family history of diabetes	94 (1.9%)
Waist circumference at baseline	24 (4.9%)
Change in waist circumference from baseline to follow-up	139 (2.8%)
LDL cholesterol	81 (1.7%)
Hypertension	11 (0.2%)

Of covariates of all analyses, smoking, physical activity, family history of diabetes, waist circumference, LDL cholesterol and hypertension had missing values.
Abbreviations: LDL, Low Density Lipoprotein.

Supplemental table 2. Baseline characteristics of participants in the AusDiab study across different population subgroups (*n* = 4,891).

	High-fat milk intake		Low-fat milk intake		Yogurt intake	
	Zero (*n* = 3,080)	M2 (*n* = 888)	T1 (*n* = 2,192)	T3 (*n* = 1,357)	T1 (*n* = 1,195)	T3 (*n* = 2,159)
Total intake (serving/day)	0.0 ± 0.0	1.8 ± 0.6	0.0 ± 0.0	1.8 ± 0.5	0.0 ± 0.0	0.4 ± 0.3
Range intake	0.0-0.0	0.8-3.5	0.0-0.0	1.5-3.5	0.0-0.0	0.1-2.2
Follow-up time (5 y/12 y)	33.5/66.5	32.7/67.3	33.8/66.2	33.5/66.5	40.6/59.4	32.5/67.5
Age at baseline (y)	50.1 ± 12.0	46.6 ± 12.9	48.0 ± 12.3	50.0 ± 12.2	51.1 ± 13.0	49.7 ± 12.1
Sex, female	62.1	44.4	49.5	62.6	40.3	66.9
Educational level						
Primary school/never attended school	3.4	2.8	3.4	2.8	5.4	2.8
Completed some high school	33.0	33.8	34.0	30.2	39.6	30.8
Completed high school	18.8	19.8	20.4	20.3	20.5	19.1
University/further education	44.7	43.6	42.2	46.7	34.6	47.3
Smoking						
Current	7.7	19.6	15.8	7.5	18.1	7.2
Former	29.3	23.9	27.0	27.4	29.8	28.2
Never	62.9	56.5	57.2	65.1	52.0	64.7
Physical activity level						
Inactive (0 min/wk)	13.5	14.3	15.8	12.0	18.9	11.8
Insufficient (1-149 min/wk)	29.9	28.8	29.8	29.7	27.7	29.5
Sufficient (≥150 min/wk)	56.6	56.9	54.4	58.3	53.4	58.8
Family history of diabetes	17.3	17.4	18.4	17.0	16.9	17.6
BMI (kg/m2)	26.2 ± 4.3	25.8 ± 4.3	25.7 ± 4.3	26.3 ± 4.3	26.4 ± 4.2	26.0 ± 4.4
Waist circumference (cm)	87.8 ± 12.8	88.6 ± 12.4	88.0 ± 12.9	87.8 ± 12.9	90.9 ± 12.6	86.4 ± 12.5
Total cholesterol (mmol/L)	5.6 ± 1.0	5.6 ± 1.0	5.6 ± 1.0	5.6 ± 1.0	5.7 ± 1.0	5.6 ± 1.0

Supplemental table 2. Baseline characteristics of participants in the AusDiab study across different population subgroups (*n* = 4,891). (continued)

	High-fat milk intake		Low-fat milk intake		Yogurt intake	
	Zero (*n* = 3,080)	M2 (*n* = 888)	T1 (*n* = 2,192)	T3 (*n* = 1,357)	T1 (*n* = 1,195)	T3 (*n* = 2,159)
LDL cholesterol (mmol/L)	3.5 ± 0.9	3.5 ± 0.9	3.5 ± 0.9	3.5 ± 0.9	3.6 ± 0.9	3.5 ± 0.9
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.4 ± 0.3	1.5 ± 0.4	1.5 ± 0.4	1.4 ± 0.4	1.5 ± 0.4
TAG (mmol/L)	1.1 [0.8, 1.7]	1.1 [0.8, 1.6]	1.1 [0.8, 1.6]	1.2 [0.8, 1.7]	1.2 [0.9, 1.8]	1.1 [0.8, 1.6]
Hypertension	24.3	18.0	21.0	24.1	29.2	21.8
Dietary intake						
Energy intake (kcal/d)	1819 ± 622	2241 ± 684	1986 ± 688	1920 ± 628	1911 ± 680	1932 ± 653
Diet quality	88.8 ± 13.0	79.1 ± 11.7	79.0 ± 13.7	92.1 ± 11.8	77.6 ± 13.3	90.2 ± 12.3
Fruit (g/day)	210.9 ± 138.8	173.1 ± 123.7	188.7 ± 140.1	211.6 ± 131.4	169.3 ± 136.4	226.2 ± 133.5
Vegetables (g/day)	106.7 ± 49.1	101.8 ± 49.3	102.6 ± 50.8	106.4 ± 46.9	98.1 ± 51.0	110.0 ± 48.0
Grains (g/day)	167.8 ± 123.1	165.8 ± 114.3	161.7 ± 122.8	177.4 ± 127.3	139.7 ± 119.0	177.6 ± 122.8
Legumes (g/day)	26.9 ± 18.7	30.2 ± 20.7	28.7 ± 20.4	27.3 ± 18.2	29.8 ± 22.3	26.9 ± 17.3
Nuts (g/day)	3.6 ± 6.9	3.1 ± 5.8	3.6 ± 6.7	3.2 ± 5.8	2.9 ± 6.4	4.0 ± 7.2
Meat (red and processed) (g/day)	89.0 ± 69.2	116.2 ± 78.7	107.4 ± 80.4	87.9 ± 62.7	112.8 ± 85.3	89.6 ± 65.8
Fruit juice (g/day)	84.8 ± 116.7	91.1 ± 123.8	90.8 ± 133.0	86.0 ± 111.6	82.5 ± 130.9	90.6 ± 117.3
Total fat (en%)	34.1 ± 5.6	39.7 ± 3.9	38.7 ± 4.8	32.6 ± 5.2	37.5 ± 5.6	34.6 ± 5.7
Saturated fat (en%)	12.8 ± 2.9	17.7 ± 2.6	16.1 ± 3.4	12.6 ± 2.8	15.2 ± 3.6	13.7 ± 3.3
Carbohydrates (en%)	46.4 ± 5.9	42.8 ± 5.0	43.4 ± 5.8	47.4 ± 5.3	44.2 ± 6.4	46.1 ± 5.6
Protein (en%)	19.8 ± 3.0	18.1 ± 2.5	18.4 ± 2.8	20.4 ± 2.7	18.9 ± 3.1	19.6 ± 2.8
Calcium (mg/day)	922 ± 345	1043 ± 266	802 ± 302	1170 ± 298	785 ± 305	1024 ± 326
Sodium (mg/day)	2526 ± 946	2939 ± 1068	2655 ± 1038	2660 ± 952	2615 ± 1039	2624 ± 976
Alcohol (g/day)	12.6 ± 15.9	13.4 ± 17.7	13.5 ± 17.7	11.4 ± 14.3	14.8 ± 19.6	11.7 ± 14.4

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: en%, percentage of total energy intake; LDL, low-density lipoprotein; HDL, high-density lipoprotein; TAG, triacylglycerol.

Supplemental table 2. *Continued.*

	High-fat cheese intake		Low-fat cheese intake		Ice cream intake	
	T1 (*n* = 1,656)	T3 (*n* = 1,017)	Zero (*n* = 3,726)	M2 (*n* = 708)	T1 (*n* = 1,676)	T3 (*n* = 708)
Total intake (serving/day)	0.0 ± 0.0	0.7 ± 0.3	0.0 ± 0.0	0.5 ± 0.3	0.02 ± 0.02	0.7 ± 0.6
Range intake	0.0-0.1	0.4-2.2	0.0-0.0	0.2-3.0	0.0-0.04	0.20-6.8
Follow-up time (5 years/12 years)	37.3/62.7	29.4/70.6	34.2/65.8	32.6/67.4	35.1/64.9	35.4/64.6
Age at baseline (years)	50.2 ± 12.5	47.7 ± 12.3	48.8 ± 12.4	49.5 ± 11.7	49.7 ± 12.2	49.5 ± 12.5
Sex, female	61.7	53.2	51.4	71.9	69.6	42.7
Educational level						
Primary school/never attended school	4.7	2.3	3.4	3.3	3.8	3.6
Completed some high school	36.7	27.2	33.2	31.8	34.1	33.9
Completed high school	19.6	18.9	19.4	19.2	21.1	17.9
University/further education	39.0	51.6	44.0	45.8	41.1	44.6
Smoking						
Current	8.5	13.4	12.8	6.5	15.0	9.3
Former	27.0	29.5	27.7	31.0	28.4	29.1
Never	64.5	57.1	59.4	62.5	56.6	61.7
Physical activity level						
Inactive (0 min/wk)	16.0	12.4	15.1	12.9	14.6	15.2
Insufficient (1-149 min/wk)	27.4	29.8	30.3	26.1	30.3	29.7
Sufficient (≥150 min/wk)	56.6	57.8	54.6	61.0	55.1	55.1
Family history of diabetes	18.9	17.2	17.2	18.2	17.6	17.8
BMI (kg/m2)	26.2 ± 4.4	25.8 ± 4.4	26.1 ± 4.3	26.2 ± 4.5	25.8 ± 4.5	26.4 ± 4.2
Waist circumference (cm)	87.6 ± 13.0	87.4 ± 12.7	88.6 ± 12.7	86.4 ± 13.0	85.9 ± 13.0	90.4 ± 12.2
Total cholesterol (mmol/L)	5.6 ± 1.0	5.5 ± 1.0	5.6 ± 1.0	5.6 ± 1.0	5.6 ± 1.1	5.6 ± 1.0
LDL cholesterol (mmol/L)	3.5 ± 0.9	3.5 ± 0.9	3.5 ± 0.9	3.5 ± 0.9	3.5 ± 0.9	3.6 ± 0.9

Supplemental table 2. *Continued. (continued)*

	High-fat cheese intake		Low-fat cheese intake		Ice cream intake	
	T1 (*n* = 1,656)	T3 (*n* = 1,017)	Zero (*n* = 3,726)	M2 (*n* = 708)	T1 (*n* = 1,676)	T3 (*n* = 708)
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.5 ± 0.4	1.4 ± 0.4	1.5 ± 0.4	1.5 ± 0.4	1.4 ± 0.4
TAG (mmol/L)	1.2 [0.8, 1.7]	1.1 [0.8, 1.6]	1.1 [0.8, 1.7]	1.1 [0.8, 1.6]	1.1 [0.8-1.6]	1.2 [0.8-1.7]
Hypertension	24.5	18.9	22.9	22.7	22.8	24.2
Dietary intake						
Energy intake (kcal/d)	1,746 ± 609	2,177 ± 706	1,951 ± 671	1,861 ± 592	1,626 ± 532	2,239 ± 671
Diet quality	86.5 ± 15.0	84.8 ± 12.5	82.5 ± 13.5	92.4 ± 12.7	85.6 ± 14.5	83.9 ± 12.9
Fruit (g/day)	216.2 ± 145.2	195.9 ± 135.4	189.5 ± 135.6	229.7 ± 134.1	195.4 ± 136.1	200.8 ± 133.2
Vegetables (g/day)	104.9 ± 51.7	106.1 ± 49.1	101.8 ± 49.1	113.6 ± 48.6	102.6 ± 48.7	108.6 ± 49.7
Grains (g/day)	166.2 ± 127.7	177.2 ± 126.2	162.9 ± 124.5	172.0 ± 110.8	149.4 ± 113.9	182.6 ± 131.0
Legumes (g/day)	28.1 ± 20.3	27.2 ± 18.8	27.9 ± 19.8	27.5 ± 16.9	25.0 ± 18.5	30.3 ± 19.8
Nuts (g/day)	3.3 ± 6.6	4.4 ± 7.8	3.3 ± 6.3	3.9 ± 7.0	3.1 ± 6.5	3.8 ± 6.6
Meat (red and processed) (g/day)	85.9 ± 74.4	110.9 ± 72.6	103.6 ± 76.3	83.3 ± 65.8	76.2 ± 59.8	121.8 ± 80.3
Fruit juice (g/day)	78.1 ± 119.5	104.8 ± 132.7	88.5 ± 124.4	84.8 ± 113.1	72.7 ± 114.5	101.5 ± 127.7
Total fat (en%)	33.7 ± 6.0	38.4 ± 4.8	36.8 ± 5.4	33.5 ± 5.6	34.9 ± 6.3	37.1 ± 4.8
Saturated fat (en%)	12.7 ± 3.3	16.1 ± 3.0	14.9 ± 3.4	12.9 ± 3.0	13.6 ± 3.8	15.2 ± 3.0
Carbohydrates (en%)	47.0 ± 6.3	43.2 ± 5.2	44.7 ± 5.9	46.5 ± 5.8	45.8 ± 6.6	44.6 ± 5.2
Protein (en%)	19.7 ± 3.3	19.0 ± 2.7	19.0 ± 2.9	20.3 ± 3.1	19.6 ± 3.2	18.9 ± 2.7
Calcium (mg/day)	845 ± 335	1,056 ± 332	886 ± 323	1053 ± 319	826 ± 315	1009 ± 328
Sodium (mg/day)	2,344 ± 911	3,035 ± 1,064	2,664 ± 1,016	2,582 ± 891	2,226 ± 831	3,038 ± 1,010
Alcohol (g/day)	10.5 ± 15.0	15.4 ± 18.5	13.7 ± 17.3	11.0 ± 14.6	12.8 ± 17.1	13.6 ± 17.1

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: en%, percentage of total energy intake; LDL, low-density lipoprotein; HDL, high-density lipoprotein; TAG, triacylglycerol.

Supplemental table 2. *Continued.*

	Included (*n* = 4891)	**Excluded** (*n* = 6,356)
Total dairy consumption (serving/day)	2.4 ± 1.2	2.3 ± 1.3
Range	0.0-9.1	0.0-9.9
Follow-up time (5 years/12 years)	34.0/66.0	72.9/27.1 (of *n* = 284)
Age at baseline (years)	49.0 ± 12.3	53.5 ± 15.7
Sex, female	56.7	53.9
Educational level		
Primary school/never attended school	3.4	9.1
Completed some high school	33.1	41.1
Completed high school	19.6	18.4
University/further education	44.0	31.4
Smoking		
Current	11.5	19.1
Former	28.1	30.0
Never	60.4	50.9
Physical activity level		
Inactive (0 min/wk)	14.6	19.2
Insufficient (1-149 min/wk)	29.8	31.4
Sufficient (≥150 min/wk)	55.6	49.4
Family history of diabetes	17.7	19.3
BMI (kg/m2)	26.1 ± 4.3	27.7 ± 5.4
Waist circumference (cm)	88.0 ± 12.8	93.2 ± 14.4
Total cholesterol (mmol/L)	5.6 ± 1.0	5.7 ± 1.1
LDL-cholesterol (mmol/L)	3.5 ± 0.9	3.6 ± 1.0
HDL-cholesterol (mmol/L)	1.5 ± 0.4	1.4 ± 0.4
TAG (mmol/L)	1.1 [0.8-1.7]	1.4 [1.0-2.1]
Hypertension	22.6	40.4
Dietary intake		
Energy intake (kcal/d)	1,910 ± 657	1,912 ± 968
Diet quality	84.6 ± 13.9	83.2 ± 14.7
Fruit (g/day)	198 ± 137	189 ± 145
Vegetables (g/day)	104 ± 49.1	96.8 ± 53.8
Grains (g/day)	164 ± 122	156 ± 156
Legumes (g/day)	27.7 ± 19.3	27.9 ± 22.0
Nuts (g/day)	3.4 ± 6.4	2.9 ± 6.1
Meat (red and processed) (g/day)	97.8 ± 73.8	111 ± 133
Fruit juice (g/day)	86.3 ± 121	85.0 ± 131

Supplemental table 2. *Continued. (continued)*

	Included (*n* = 4891)	**Excluded** (*n* = 6,356)
Total fat (en%)	36.0 ± 5.7	36.3 ± 5.9
Saturated fat (en%)	14.4 ± 3.5	14.7 ± 3.6
Carbohydrates (en%)	45.2 ± 6.0	44.7 ± 6.8
Protein (en%)	19.3 ± 3.0	19.4 ± 3.4
Calcium (mg/day)	908 ± 326	876 ± 383
Sodium (mg/day)	2,612 ± 991	2,627 ± 1,455
Alcohol (g/day)	13.0 ± 16.7	12.0 ± 18.2

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data. Abbreviations: en%, percentage of total energy intake; LDL, low-density lipoprotein; HDL, high-density lipoprotein; TAG, triacylglycerol.

Supplemental table 3. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Ausdiab study (*n* = 4,891).

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]
	T1	T2	T3	P_{trend}	RR (95%CI)
Total dairy					
Main model 3	*1 (ref)*	0.97 (0.82-1.13)	0.97 (0.82-1.15)	0.72	0.96 (0.91-1.02)
Exclusion prevalent CVD	*1 (ref)*	0.96 (0.82-1.13)	0.94 (0.79-1.13)	0.52	0.95 (0.90-1.01)
Energy adjusted dairy	*1 (ref)*	0.96 (0.82-1.13)	0.91 (0.77-1.08)	0.28	0.96 (0.91-1.02)
ADA cut-off for prediabetes	*1 (ref)*	1.01 (0.91-1.12)	0.99 (0.89-1.10)	0.83	0.98 (0.94-1.02)
High-fat dairy					
Main model 3	*1 (ref)*	1.10 (0.94-1.28)	0.92 (0.77-1.09)	0.12	0.92 (0.85-1.00)*
Adjust. other dairy intake	*1 (ref)*	1.10 (0.94-1.29)	0.89 (0.74-1.08)	0.11	0.90 (0.83-0.99)*
Exclusion prevalent CVD	*1 (ref)*	1.11 (0.94-1.30)	0.92 (0.77-1.10)	0.12	0.92 (0.84-1.00)*
Energy adjusted dairy	*1 (ref)*	1.14 (0.97-1.35)	0.93 (0.78-1.10)	0.13	0.92 (0.85-1.00)*
ADA cut-off for prediabetes	*1 (ref)*	1.04 (0.94-1.15)	1.01 (0.91-1.12)	0.87	0.99 (0.95-1.04)
Low-fat dairy					
Main model 3	*1 (ref)*	1.16 (0.98-1.36)	1.16 (0.98-1.37)	0.08	1.06 (0.99-1.13)
Adjust. other dairy intake	*1 (ref)*	1.10 (0.93-1.30)	1.06 (0.89-1.27)	0.55	1.02 (0.95-1.09)
Exclusion prevalent CVD	*1 (ref)*	1.21 (1.03-1.43)	1.16 (0.98-1.39)	0.08	1.05 (0.99-1.12)
Energy adjusted dairy	*1 (ref)*	1.15 (0.98-1.36)	1.15 (0.98-1.36)	0.09	1.06 (0.99-1.13)
ADA cut-off for prediabetes	*1 (ref)*	1.09 (0.98-1.20)	1.05 (0.95-1.17)	0.32	1.02 (0.97-1.06)
Fermented dairy					
Main model 3	*1 (ref)*	0.91 (0.78-1.07)	0.88 (0.75-1.04)	0.16	0.91 (0.80-1.02)
Adjust. other dairy intake	*1 (ref)*	0.91 (0.78-1.07)	0.88 (0.75-1.04)	0.16	0.91 (0.80-1.02)
Exclusion prevalent CVD	*1 (ref)*	0.86 (0.73-1.02)	0.87 (0.73-1.03)	0.12	0.90 (0.79-1.02)
Energy adjusted dairy	*1 (ref)*	0.81 (0.69-0.95)	0.81 (0.69-0.96)	0.02*	0.90 (0.80-1.02)
ADA cut-off for prediabetes	*1 (ref)*	0.98 (0.89-1.08)	0.90 (0.81-1.00)	0.05	0.94 (0.87-1.01)

Supplemental table 3. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Ausdiab study (*n* = 4,891). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]
	T1	T2	T3	P_{trend}	RR (95%CI)
Total milk					
Main model 3	*1 (ref)*	1.06 (0.89-1.27)	0.94 (0.81-1.10)	0.22	0.98 (0.89-1.08)
Adjust. other dairy intake	*1 (ref)*	1.07 (0.89-1.28)	0.96 (0.82-1.13)	0.37	1.00 (0.91-1.11)
Exclusion prevalent CVD	*1 (ref)*	1.02 (0.85-1.24)	0.92 (0.78-1.07)	0.18	0.97 (0.88-1.07)
Energy adjusted dairy	*1 (ref)*	0.98 (0.84-1.15)	0.92 (0.78-1.08)	0.30	0.98 (0.90-1.08)
ADA cut-off for prediabetes	*1 (ref)*	1.06 (0.95-1.19)	0.97 (0.88-1.07)	0.22	1.00 (0.94-1.06)
High-fat milk					
Main model 3	*1 (ref)*	0.99 (0.84-1.17)	0.79 (0.65-0.97)	0.05*	0.89 (0.80-0.99)*
Adjust. other dairy intake	*1 (ref)*	0.97 (0.81-1.17)	0.78 (0.63-0.96)	0.03*	0.87 (0.78-0.98)*
Exclusion prevalent CVD	*1 (ref)*	0.98 (0.82-1.17)	0.79 (0.65-0.98)	0.05*	0.89 (0.80-0.99)*
Energy adjusted dairy	*1 (ref)*	1.01 (0.85-1.20)	0.78 (0.64-0.96)	0.04*	0.89 (0.80-0.99)*
ADA cut-off for prediabetes	*1 (ref)*	1.01 (0.91-1.12)	0.92 (0.82-1.04)	0.28	0.98 (0.92-1.04)
Low-fat milk					
Main model 3	*1 (ref)*	1.27 (1.09-1.49)	1.15 (0.97-1.35)	0.04*	1.07 (0.99-1.16)
Adjust. other dairy intake	*1 (ref)*	1.21 (1.03-1.43)	1.10 (0.93-1.30)	0.18	1.05 (0.96-1.14)
Exclusion prevalent CVD	*1 (ref)*	1.31 (1.12-1.54)	1.14 (0.97-1.36)	0.04*	1.06 (0.98-1.16)
Energy adjusted dairy	*1 (ref)*	1.27 (1.09-1.48)	1.15 (0.98-1.35)	0.04*	1.07 (0.99-1.16)
ADA cut-off for prediabetes	*1 (ref)*	1.11 (1.00-1.22)	1.02 (0.92-1.14)	0.43	1.01 (0.96-1.07)

Supplemental table 3. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Ausdiab study (*n* = 4,891). (continued)

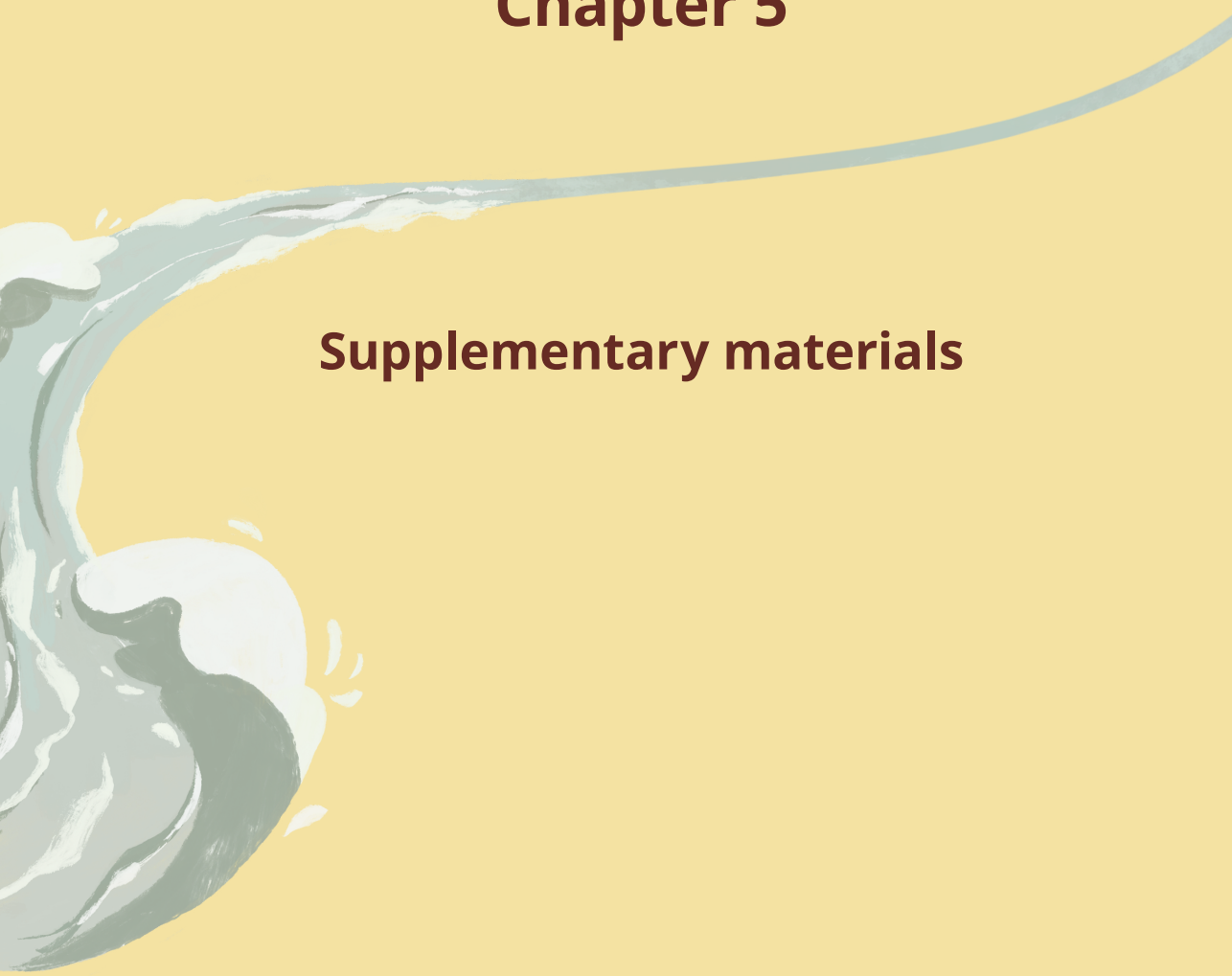
	Relative risk (95% CI) across intake range categories[1]				Continuous[2]
	T1	T2	T3	P_{trend}	RR (95%CI)
Total yogurt					
Main model 3	*1 (ref)*	0.93 (0.78-1.11)	0.99 (0.84-1.17)	0.69	1.14 (0.90-1.43)
Adjust. other dairy intake	*1 (ref)*	0.94 (0.79-1.12)	1.00 (0.85-1.19)	0.61	1.15 (0.91-1.45)
Exclusion prevalent CVD	*1 (ref)*	0.92 (0.76-1.10)	1.00 (0.84-1.19)	0.55	1.15 (0.90-1.46)
Energy adjusted dairy	*1 (ref)*	0.94 (0.79-1.11)	1.03 (0.87-1.22)	0.41	1.14 (0.91-1.44)
ADA cut-off for prediabetes	*1 (ref)*	1.05 (0.94-1.17)	1.10 (0.98-1.22)	0.14	1.16 (1.00-1.34)
Total cheese					
Main model 3	*1 (ref)*	0.94 (0.81-1.09)	0.85 (0.72-1.01)	0.07	0.74 (0.56-0.96)*
Adjust. other dairy intake	*1 (ref)*	0.94 (0.81-1.10)	0.86 (0.71-1.03)	0.09	0.73 (0.55-0.97)*
Exclusion prevalent CVD	*1 (ref)*	0.88 (0.76-1.03)	0.83 (0.69-0.99)	0.04*	0.71 (0.53-0.94)*
Energy adjusted dairy	*1 (ref)*	0.91 (0.79-1.06)	0.75 (0.64-0.89)	0.001**	0.73 (0.55-0.95)*
ADA cut-off for prediabetes	*1 (ref)*	0.97 (0.88-1.07)	0.89 (0.80-0.99)	0.03*	0.79 (0.67-0.93)**
High-fat cheese					
Main model 3	*1 (ref)*	0.87 (0.75-1.01)	0.84 (0.70-1.02)	0.11	0.75 (0.57-1.00)
Adjust. other dairy intake	*1 (ref)*	0.87 (0.75-1.01)	0.85 (0.70-1.03)	0.12	0.76 (0.57-1.01)
Exclusion prevalent CVD	*1 (ref)*	0.85 (0.73-0.99)	0.84 (0.69-1.02)	0.11	0.75 (0.56-1.01)
Energy adjusted dairy	*1 (ref)*	0.95 (0.82-1.11)	0.82 (0.69-0.96)	0.01*	0.76 (0.57-1.00)
ADA cut-off for prediabetes	*1 (ref)*	0.99 (0.90-1.09)	0.89 (0.78-1.00)	0.04*	0.82 (0.69-0.97)*

Supplemental table 3. Sensitivity analyses of associations of dairy product types and prediabetes risk in the Ausdiab study (*n* = 4,891). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]
	T1	T2	T3	P_{trend}	RR (95%CI)
Low-fat cheese					
Main model 3	*1 (ref)*	1.02 (0.81-1.28)	0.99 (0.82-1.20)	0.94	0.87 (0.61-1.25)
Adjust. other dairy intake	*1 (ref)*	1.01 (0.80-1.27)	1.00 (0.82-1.21)	0.98	0.89 (0.62-1.28)
Exclusion prevalent CVD	*1 (ref)*	1.01 (0.80-1.29)	0.93 (0.76-1.15)	0.53	0.82 (0.56-1.21)
Energy adjusted dairy	*1 (ref)*	1.16 (0.95-1.41)	0.83 (0.66-1.05)	0.20	0.81 (0.55-1.18)
ADA cut-off for prediabetes	*1 (ref)*	1.07 (0.92-1.23)	0.99 (0.87-1.12)	0.87	0.88 (0.70-1.11)
Ice cream					
Main model 3	*1 (ref)*	0.95 (0.81-1.11)	0.88 (0.75-1.05)	0.18	1.03 (0.87-1.21)
Adjust. other dairy intake	*1 (ref)*	0.95 (0.81-1.11)	0.87 (0.73-1.03)	0.11	1.00 (0.85-1.18)
Exclusion prevalent CVD	*1 (ref)*	0.95 (0.81-1.12)	0.92 (0.77-1.10)	0.43	1.02 (0.87-1.20)
Energy adjusted dairy	*1 (ref)*	1.08 (0.92-1.27)	0.99 (0.84-1.17)	0.76	1.04 (0.89-1.22)
ADA cut-off for prediabetes	*1 (ref)*	0.98 (0.88-1.08)	0.88 (0.79-0.98)	0.01*	1.04 (0.94-1.15)

[1] Relative risks (95CIs) were estimated across four categories split by tertile values (T1 to T3) or non-consumers + median categories with the lowest category as the reference, adjusted for covariates as follows: Models are adjusted for age (continuous), sex, energy intake (continuous), education (3 categories), smoking (3 categories), physical activity (continuous), alcohol consumption (continuous), family history of diabetes (yes/no) and food groups associated with type 2 diabetes, including intakes of fruit, vegetables, grains, legumes, nuts, red and processed meat, and fruit juice (continuous). Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.
[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated.
P-value significance level: *0.05, **0.01, ***0.001.
Abbreviations: ADA, American Diabetes Association; CI, confidence interval; CVD, cardiovascular disease; LDL, low-density lipoprotein; RR, Relative Risk; T, Tertile, WC, waist circumference.

Chapter 5



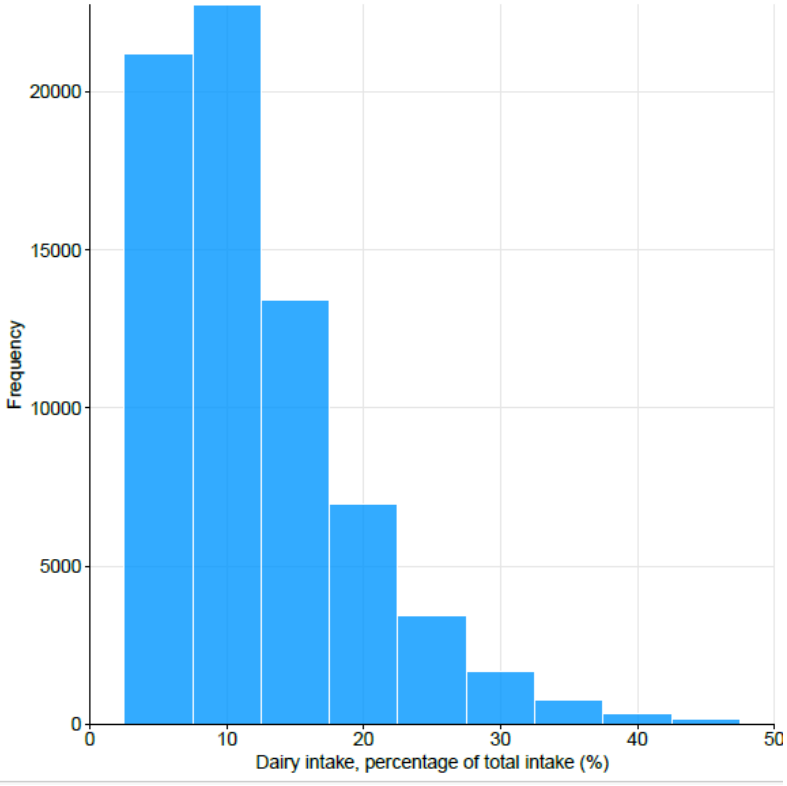
Supplementary materials

Contents

Supplemental table 1. Missing values of covariates in participants before imputation (*n* = 74,132).

	Total n (%)
Educational level	1,284 (1.7)
Smoking status	642 (0.9)
Physical activity	5,005 (6.8)
Waist circumference	59 (0.1)
TAG	20 (0.03)
LDL cholesterol	25 (0.03)
Hypertension	156 (0.2)

Of covariates of all analyses, education, smoking, physical activity, waist circumference, TAG, LDL cholesterol and hypertension had missing values. Abbreviations: LDL, Low Density Lipoprotein; TAG, Triglycerides.



Supplemental figure 1. Distribution of dairy food intake in the diet (weight percentage, %) (*n* = 74,132). Mean ± SD: 11.7 ± 7.6. Median [IQR] = 10.0 [6.3-15.2].

Supplemental table 2. Baseline characteristics of participants in the Lifelines cohort across different population subgroups (n total = 74,132).

	High-fat plain milk		Low-fat plain milk		High-fat yogurt		Low-fat yogurt	
	Zero	T3	Zero	T3	Zero	T3	Zero	T3
	(*n* = 66,901)	(*n* = 2,431)	(*n* = 24,594)	(*n* = 14,866)	(*n* = 59,002)	(*n* = 4,707)	(*n* = 39,011)	(*n* = 11,694)
Total consumption (servings/day)	0	1.3 ± 0.8	0	1.9 ± 0.8	0	0.5 ± 0.3	0	0.7 ± 0.3
Range	0 – 0	0.6 – 9.3	0 – 0	0.9 – 11.1	0 – 0	0.3 – 9.3	0 – 0	0.4 – 7.4
Follow-up time	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.0	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.0	4.1 ± 1.1	4.1 ± 1.0
Sex, female (%)	61.0	42.2	64.4	53.0	60.2	56.9	55.2	67.8
Age at baseline (years)	45.6 ± 12.3	44.6 ± 12.3	47.2 ± 12.4	44.0 ± 12.1	45.3 ± 12.5	47.6 ± 11.5	45.5 ± 12.6	47.2 ± 12.1
Educational level (%)								
Low	27.4	30.7	29.1	26.4	27.8	24.4	28.2	26.4
Intermediate	40.0	42.9	39.1	42.1	40.5	37.4	39.5	40.4
High	32.6	26.4	31.8	31.5	31.7	38.1	32.3	33.2
Smoking (%)								
Never	48.1	49.5	45.4	52.9	47.7	51.8	46.1	51.8
Former	34.8	26.6	36.6	30.9	34.5	34.4	33.7	37.3
Current	17.0	23.9	18.0	16.3	17.9	13.9	20.3	10.9
Pack years among smokers	12.0 [5.6, 20.0]	13.9 [6.0, 22.5]	13.7 [6.6, 22.0]	11.0 [4.95, 19.5]	12.0 [5.5, 20.0]	13.5 [6.0, 21.0]	12.5 [6.0, 21.0]	11.6 [5.3, 19.3]
Alcohol (g/day)	7.2 ± 8.6	7.8 ± 9.8	7.5 ± 9.1	7.0 ± 8.7	7.3 ± 8.8	7.2 ± 8.4	7.8 ± 9.4	6.2 ± 7.4
Physical activity (minutes/week)	200 [80, 375]	180 [60, 375]	195 [65, 375]	210 [90, 390]	200 [75, 375]	210 [90, 390]	180 [60, 360]	225 [100, 405]
Family history of diabetes (%)								
No	29.5	30.8	30.6	29.2	29.8	30.8	31.6	27.2
Yes	8.3	7.7	8.8	7.5	8.2	8.1	8.5	8.3
Unknown/missing	62.2	61.6	60.7	63.3	62.0	61.1	59.9	64.5
BMI (kg/m^2)	25.7 ± 3.9	24.8 ± 3.8	25.5 ± 3.9	25.9 ± 4.0	25.8 ± 4.0	24.6 ± 3.5	25.5 ± 3.9	25.8 ± 3.9
Waist circumference (cm)	89.1 ± 11.6	88.5 ± 11.4	88.4 ± 11.6	90.0 ± 11.7	89.3 ± 11.7	87.1 ± 11.1	89.0 ± 11.8	88.9 ± 11.2
Total cholesterol (mmol/L)	5.1 ± 1.0	5.1 ± 1.0	5.2 ± 1.0	5.1 ± 1.0	5.1 ± 1.0	5.2 ± 1.0	5.1 ± 1.0	5.1 ± 1.0
LDL cholesterol (mmol/L)	3.3 ± 0.9	3.3 ± 0.9	3.3 ± 0.9	3.2 ± 0.9	3.2 ± 0.9	3.3 ± 0.9	3.3 ± 0.9	3.2 ± 0.9
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.5 ± 0.4	1.6 ± 0.4	1.5 ± 0.4	1.5 ± 0.4	1.6 ± 0.4	1.5 ± 0.4	1.6 ± 0.4
TAG (mmol/L)	0.9 [0.7,1.3]	0.9 [0.7,1.3]	0.9 [0.7,1.3]	1.0 [0.7,1.4]	1.0 [0.7,1.3]	0.9 [0.7,1.2]	1.0 [0.7,1.3]	0.9 [0.7,1.3]

Supplemental table 2. Baseline characteristics of participants in the Lifelines cohort across different population subgroups (n total = 74,132). (continued)

	High-fat plain milk		Low-fat plain milk		High-fat yogurt		Low-fat yogurt	
	Zero	T3	Zero	T3	Zero	T3	Zero	T3
	(*n* = 66,901)	(*n* = 2,431)	(*n* = 24,594)	(*n* = 14,866)	(*n* = 59,002)	(*n* = 4,707)	(*n* = 39,011)	(*n* = 11,694)
Hypertension (%)	23.6	22.7	24.4	22.8	23.8	21.3	23.6	24.6
Dietary intake								
Energy intake (kcal/day)	2,029 ± 571	2,449 ± 659	1,971 ± 587	2,242 ± 583	2,019 ± 576	2,216 ± 595	2,073 ± 592	2,004 ± 556
Diet quality[1]	24.6 ± 6.0	22.5 ± 5.5	24.1 ± 6.3	25.1 ± 5.6	24.4 ± 6.0	24.9 ± 5.7	23.6 ± 6.0	26.5 ± 5.8
Fruit (g/day)	143 ± 112	123 ± 107	147 ± 120	142 ± 108	141 ± 112	151 ± 117	132 ± 112	171 ± 114
Vegetables (g/day)	105 ± 59	105 ± 58	108 ± 61	105 ± 57	104 ± 59	114 ± 60	103 ± 59	114 ± 59
Bread (g/day)	112 ± 59	130 ± 72	109 ± 62	121 ± 60	111 ± 60	125 ± 64	114 ± 62	111 ± 59
Legumes (g/day)	9.6 ± 15.2	11.0 ± 16.0	9.6 ± 16.2	10.3 ± 16.0	9.4 ± 15.2	11.0 ± 17.6	9.9 ± 16.2	9.2 ± 14.2
Nuts (g/day)	12.7 ± 14.7	13.4 ± 15.8	12.8 ± 15.5	13.1 ± 14.5	12.5 ± 14.6	14.9 ± 16.6	13.0 ± 15.4	12.5 ± 14.2
Meat (red and processed) (g/day)	66.1 ± 33.0	75.5 ± 37.0	64.3 ± 34.9	70.7 ± 33.4	66.4 ± 33.2	66.0 ± 34.2	66.9 ± 34.8	65.4 ± 31.1
Fish (g/day)	12.5 ± 12.7	11.5 ± 12.1	13.0 ± 13.8	12.1 ± 12.2	12.6 ± 12.8	12.2 ± 12.4	12.4 ± 12.9	13.0 ± 12.9
Coffee (g/day)	422 ± 273	447 ± 291	419 ± 279	422 ± 275	419 ± 277	435 ± 264	422 ± 281	428 ± 262
Tea (g/day)	258 ± 248	227 ± 240	280 ± 265	233 ± 234	254 ± 249	289 ± 256	241 ± 246	300 ± 258
SSB (g/day)	137 ± 168	189 ± 198	135 ± 177	153 ± 171	139 ± 172	133 ± 157	153 ± 184	104 ± 134
Total fat (en%)	34.4 ± 4.8	36.4 ± 4.6	34.5 ± 5.3	34.1 ± 4.4	34.2 ± 4.8	35.7 ± 4.7	34.9 ± 5.0	33.2 ± 4.6
Saturated fat (en%)	15.3 ± 2.3	14.7 ± 2.0	15.2 ± 2.5	15.7 ± 2.1	15.4 ± 2.3	14.9 ± 2.1	15.0 ± 2.3	16.1 ± 2.4
Carbohydrates (en%)	46.1 ± 5.7	45.2 ± 5.3	45.8 ± 6.3	46.4 ± 5.1	46.2 ± 5.7	45.3 ± 5.8	45.7 ± 6.0	46.7 ± 5.4
Added sugar (g/day)	51.2 ± 31.7	68.4 ± 37.9	50.6 ± 33.8	56.3 ± 32.1	51.2 ± 32.1	57.0 ± 34.2	54.2 ± 34.1	47.4 ± 29.0
Calcium (mg/day)	989 ± 347	1,225 ± 431	925 ± 346	1,243 ± 359	979 ± 348	1,112 ± 370	970 ± 358	1,093 ± 350

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.

[1] Diet quality was measured using the Lifelines Diet Score (LLDS), reflecting adherence to the 2015 Dutch Dietary Guidelines for prevention of chronic disease, with higher scores indicating better adherence (30). The LLDS consist of 12 food groups and possible scores range from 0 to 48.

Abbreviations: BMI, Body Mass Index, en%, percentage of total energy intake; LDL, Low Density Lipoprotein; HDL, High Density Lipoprotein; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; SD, Standard Deviation.

Supplemental table 2. *Continued.*

	High-fat cheese		Low-fat cheese		Ice cream	
	Q1	Q4	Zero	T3	Zero	T3
	(*n* = 18,539)	(*n* = 18,596)	(*n* = 39,752)	(*n* = 11,461)	(*n* = 39,752)	(*n* = 11,461)
Total consumption (servings/day)	0.1 ± 0.1	2.7 ± 1.2	0	1.6 ± 1.0	0 ± 0	0.14 ± 0.11
Range	0 – 0.3	1.6 – 15.6	0 – 0	0.8 – 13.4	0 - 0	0.1 - 2.4
Follow-up time	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1
Sex, female (%)	60.0	53.5	55.1	61.0	55.1	61.0
Age at baseline (years)	43.9 ± 13.0	47.6 ± 11.5	45.0 ± 12.0	48.9 ± 12.5	45.0 ± 12.0	48.9 ± 12.4
Educational level (%)						
Low	30.8	26.7	26.6	32.3	26.6	32.3
Intermediate	41.4	38.2	40.4	38.2	40.4	38.2
High	27.8	35.1	33.0	29.5	33.0	29.5
Smoking (%)						
Never	52.2	42.9	49.0	43.0	49.0	43.0
Former	31.2	37.5	32.3	41.0	32.3	41.0
Current	16.6	19.6	18.7	16.0	18.7	16.0
Pack years among smokers	11.0 [4.5, 19.0]	13.5 [6.8, 22.0]	13.0 [6.2, 21.0]	12.3 [5.6, 19.9]	13.0 [6.2, 21.0]	12.3 [5.9, 19.9]
Alcohol (g/day)	5.8 ± 7.9	9.1 ± 9.6	7.5 ± 9.1	7.3 ± 8.3	7.5 ± 9.1	7.3 ± 8.3
Physical activity (minutes/week)	200 [75, 390]	210 [80, 390]	180 [60, 360]	230 [90, 420]	250 [96 540]	285 [120, 585]
Family history of diabetes (%)						
No	30.6	29.1	30.6	28.3	30.6	28.3
Yes	8.4	7.9	8.2	8.8	8.2	8.8
Unknown/missing	61.0	63.1	61.3	62.9	61.3	62.9
BMI (kg/m^2)	25.8 ± 4.0	25.5 ± 3.8	25.4 ± 3.9	26.1 ± 3.8	25.3 ± 3.9	26.0 ± 3.8
Waist circumference (cm)	88.9 ± 11.7	89.5 ± 11.5	88.8 ± 11.7	90.2 ± 11.3	88.7 ± 11.7	90.2 ± 11.3
Total cholesterol (mmol/L)	5.0 ± 1.0	5.2 ± 1.0	5.1 ± 1.0	5.2 ± 1.0	5.1 ± 1.0	5.2 ± 1.0
LDL cholesterol (mmol/L)	3.2 ± 0.9	3.3 ± 0.9	3.3 ± 0.9	3.3 ± 0.9	3.3 ± 0.9	3.33 ± 0.9
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.6 ± 0.4	1.5 ± 0.4	1.5 ± 0.4	1.5 ± 0.4	1.5 ± 0.4
TAG (mmol/L)	1.0 [0.7,1.3]	0.9 [0.7,1.3]	0.9 [0.7,1.3]	1.0 [0.7,1.4]	0.9 [0.7, 1.3]	1.0 [0.7, 1.4]
Hypertension (%)	23.6	23.9	22.2	28.7	22.2	28.7

Supplemental table 2. *Continued. (continued)*

	High-fat cheese		Low-fat cheese		Ice cream	
	Q1	Q4	Zero	T3	Zero	T3
	(*n* = 18,539)	(*n* = 18,596)	(*n* = 39,752)	(*n* = 11,461)	(*n* = 39,752)	(*n* = 11,461)
Dietary intake						
Energy intake (kcal/day)	1,900 ± 586	2,314 ± 585	2,119 ± 592	2,071 ± 575	2,119 ± 592	2,071 ± 575
Diet quality[1]	24.5 ± 6.3	23.9 ± 5.8	23.6 ± 5.9	25.7 ± 6.0	23.6 ± 5.9	25.7 ± 6.0
Fruit (g/day)	145 ± 118	141 ± 112	132 ± 111	166 ± 116	132 ± 111	167 ± 116
Vegetables (g/day)	102 ± 60	109 ± 59	104 ± 59	110 ± 59	104 ± 59	110 ± 59
Bread (g/day)	108 ± 62	127 ± 62	117 ± 62	119 ± 58	117 ± 62	119 ± 58
Legumes (g/day)	9.3 ± 16.5	10.5 ± 15.4	9.8 ± 16.0	9.8 ± 14.9	9.8 ± 6.0	9.8 ± 14.9
Nuts (g/day)	11.2 ± 14.8	14.8 ± 16.2	13.2 ± 15.6	12.7 ± 14.3	13.2 ± 15.6	12.7 ± 14.3
Meat (red and processed) (g/day)	65.7 ± 34.5	70.0 ± 35.9	68.9 ± 34.3	65.5 ± 33.5	68.9 ± 34.3	65.5 ± 33.5
Fish (g/day)	11.8 ± 12.8	13.0 ± 13.1	11.7 ± 12.3	13.7 ± 13.1	11.7 ± 12.3	13.7 ± 13.1
Coffee (g/day)	384 ± 279	476 ± 274	428 ± 282	455 ± 261	427 ± 281	455 ± 261
Tea (g/day)	255 ± 252	254 ± 246	248 ± 249	268 ± 246	248 ± 249	268 ± 246
SSB (g/day)	139 ± 181	148 ± 173	155 ± 179	115 ± 156	155 ± 179	115 ± 156
Total fat (en%)	32.7 ± 5.0	36.7 ± 4.6	35.1 ± 4.9	34.0 ± 4.7	35.1 ± 4.9	34.0 ± 4.7
Protein (en%)	15.3 ± 2.6	15.5 ± 2.1	14.9 ± 2.2	16.5 ± 2.3	14.9 ± 2.2	16.5 ± 2.3
Carbohydrates (en%)	48.2 ± 5.7	43.4 ± 5.5	45.9 ± 5.9	45.3 ± 5.4	45.9 ± 5.9	45.3 ± 5.4
Added sugar (g/day)	51.5 ± 34.3	55.0 ± 33.1	56.4 ± 33.8	46.7 ± 30.4	56.4 ± 33.8	46.7 ± 30.4
Calcium (mg/day)	863 ± 331	1,245 ± 362	977 ± 352	1,213 ± 373	977 ± 352	1213 ± 373

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.

[1] Diet quality was measured using the Lifelines Diet Score (LLDS), reflecting adherence to the 2015 Dutch Dietary Guidelines for prevention of chronic disease, with higher scores indicating better adherence (30). The LLDS consist of 12 food groups and possible scores range from 0 to 48.

Abbreviations: BMI, Body Mass Index, en%, percentage of total energy intake; LDL, Low Density Lipoprotein; HDL, High Density Lipoprotein; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; SD, Standard Deviation.

Supplemental table 2. *Continued.*

	Females				Males			
	Q1 (*n* = 11,050)	Q2 (*n* = 11,055)	Q3 (*n* = 11,118)	Q4 (*n* = 11,025)	Q1 (*n* = 7,503)	Q2 (*n* = 7,446)	Q3 (*n* = 7,444)	Q4 (*n* = 7,491)
Total consumption (servings/day)	1.5 ± 0.5	2.7 ± 0.3	3.7 ± 0.3	5.6 ± 1.9	1.6 ± 0.5	2.9 ± 0.3	4.0 ± 0.4	6.4 ± 1.7
Range	0 – 2.2	2.2 – 3.2	3.2 – 4.3	4.3 – 20.4	0 – 2.4	2.4 – 3.4	3.4 – 4.7	4.7 – 22.4
Follow-up time	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.0	4.1 ± 1.1	4.1 ± 1.1	4.1 ± 1.1	4.2 ± 1.1
Age at baseline (years)	41.5 ± 12.4	44.3 ± 12.3	46.0 ± 11.9	47.9 ± 11.2	44.1 ± 12.3	46.4 ± 12.4	47.2 ± 12.5	47.6 ± 12.2
Educational level (%)								
Low	26.5	27.2	28.6	29.1	27.5	27.5	26.0	27.5
Intermediate	42.8	42.6	41.2	40.2	38.4	37.6	37.8	38.1
High	30.7	30.2	30.2	30.7	34.1	34.9	36.2	34.4
Smoking (%)								
Never	50.1	50.0	50.2	48.1	44.6	46.1	46.6	47.1
Former	30.3	33.2	34.5	37.5	32.5	35.3	36.0	34.9
Current	19.6	16.8	15.3	14.5	22.9	18.6	17.5	18.0
Pack years among smokers	10.3 [4.3, 18.4]	11.1 [5.5, 18.4]	12.0 [6.0, 19.2]	12.5 [6.1, 21.0]	12.5 [5.4, 21.0]	13.5 [6.4, 21.2]	13.20 [6.0, 21.5]	13.8 [6.3, 22.0]
Alcohol (g/day)	4.9 ± 6.7	5.1 ± 6.4	5.2 ± 6.6	5.7 ± 6.8	10.6 ± 10.9	10.2 ± 10.2	10.2 ± 9.9	10.4 ± 10.3
Physical activity (minutes/week)	230 [90, 480]	240 [100, 480]	244 [120, 501.50]	280 [120, 570]	255 [90, 570]	270 [120, 580]	300 [120, 630]	310 [120, 690]
Family history of diabetes (%)								
No	31.3	28.9	27.7	25.8	33.5	30.2	30.3	30.2
Yes	8.2	9.0	9.0	8.4	7.9	7.5	7.5	7.0
Unknown/missing	60.5	62.1	63.3	65.8	58.6	62.3	62.2	62.8
BMI (kg/m^2)	25.3 ± 4.4	25.4 ± 4.3	25.5 ± 4.2	25.4 ± 4.2	26.1 ± 3.5	26.1 ± 3.3	26.1 ± 3.3	26.1 ± 3.3
Waist circumference (cm)	84.7 ± 11.6	85.5 ± 11.3	85.9 ± 11.1	85.9 ± 11.0	93.9 ± 10.4	94.4 ± 9.9	94.4 ± 9.9	94.6 ± 9.8
Total cholesterol (mmol/L)	5.0 ± 1.0	5.1 ± 1.0	5.1 ± 1.0	5.2 ± 1.0	5.2 ± 1.0	5.2 ± 1.0	5.2 ± 1.0	5.2 ± 1.0
LDL cholesterol (mmol/L)	3.0 ± 0.9	3.1 ± 0.9	3.2 ± 0.9	3.2 ± 0.9	3.4 ± 0.9	3.4 ± 0.9	3.4 ± 0.9	3.4 ± 0.9
HDL cholesterol (mmol/L)	1.6 ± 0.4	1.6 ± 0.4	1.7 ± 0.4	1.7 ± 0.4	1.3 ± 0.3	1.3 ± 0.3	1.3 ± 0.3	1.4 ± 0.3
TAG (mmol/L)	0.9 [0.6, 1.1]	0.9 [0.7, 1.2]	0.9 [0.7, 1.2]	0.9 [0.6, 1.2]	1.1 [0.8, 1.6]	1.1 [0.8, 1.6]	1.1 [0.8, 1.6]	1.1 [0.8, 1.5]
Hypertension (%)	16.7	19.1	20.3	20.6	29.0	30.2	30.5	29.3

Supplemental table 2. *Continued. (continued)*

	Females				Males			
	Q1 (*n* = 11,050)	Q2 (*n* = 11,055)	Q3 (*n* = 11,118)	Q4 (*n* = 11,025)	Q1 (*n* = 7,503)	Q2 (*n* = 7,446)	Q3 (*n* = 7,444)	Q4 (*n* = 7,491)
Dietary intake								
Energy intake (kcal/day)	1,591 ± 431	1,766 ± 407	1,899 ± 402	2,114 ± 445	2,086 ± 564	2,252 ± 534	2,409 ± 534	2,724 ± 582
Diet quality [1]	24.2 ± 6.2	25.2 ± 6.1	25.8 ± 5.9	26.1 ± 5.8	21.9 ± 5.8	23.1 ± 5.6	23.4 ± 5.5	23.3 ± 5.5
Fruit (g/day)	133 ± 112	141 ± 106	152 ± 106	166 ± 113	115 ± 112	126 ± 107	134 ± 110	145 ± 120
Vegetables (g/day)	103 ± 61	105 ± 55	108 ± 55	114 ± 57	94.4 ± 60.6	98.2 ± 58.4	102 ± 57	110 ± 63
Bread (g/day)	82.8 ± 48.1	91.9 ± 44.8	99.4 ± 43.5	106 ± 46	124 ± 69	135 ± 65	142 ± 64	157 ± 70
Legumes (g/day)	8.0 ± 14.5	7.8 ± 12.6	8.3 ± 12.4	9.2 ± 13.4	11.3 ± 20.0	11.3 ± 15.6	11.7 ± 16.7	12.9 ± 19.0
Nuts (g/day)	9.8 ± 12.5	10.4 ± 12.2	10.9 ± 11.9	12.4 ± 13.8	14.5 ± 17.2	15.4 ± 16.7	16.0 ± 16.6	16.8 ± 17.8
Meat (red and processed) (g/day)	56.5 ± 29.7	59.0 ± 27.9	60.8 ± 28.3	61.6 ± 30.6	74.9 ± 37.5	75.0 ± 34.0	76.9 ± 33.7	82.5 ± 38.4
Fish (g/day)	12.0 ± 13.2	12.0 ± 12.1	12.2 ± 12.2	13.0 ± 13.0	12.4 ± 13.0	12.8 ± 12.5	13.0 ± 12.4	13.0 ± 13.0
Coffee (g/day)	298 ± 262	360 ± 253	386 ± 248	428 ± 247	465 ± 293	505 ± 275	510 ± 265	538 ± 281
Tea (g/day)	319 ± 282	306 ± 259	309 ± 250	312 ± 252	163 ± 205	169 ± 190	176 ± 196	184 ± 205
SSB (g/day)	129 ± 172	119 ± 152	117 ± 147	117 ± 148	185 ± 208	166 ± 178	166 ± 177	173 ± 193
Total fat (en%)	33.9 ± 5.3	34.3 ± 4.8	34.4 ± 4.5	35.2 ± 4.8	33.9 ± 5.2	34.4 ± 4.6	34.7 ± 4.5	35.5 ± 4.7
Protein (en%)	14.8 ± 2.6	15.3 ± 2.3	15.7 ± 2.1	16.4 ± 2.3	14.1 ± 2.0	14.5 ± 1.9	14.9 ± 1.9	15.6 ± 2.0
Carbohydrates (en%)	47.2 ± 6.5	46.6 ± 5.6	46.1 ± 5.3	44.7 ± 5.5	46.8 ± 6.0	46.3 ± 5.3	45.8 ± 5.1	44.6 ± 5.4
Added sugar (g/day)	42.0 ± 28.7	45.1 ± 27.0	46.9 ± 27.2	48.6 ± 28.3	58.1 ± 36.5	60.5 ± 34.3	63.3 ± 34.7	68.5 ± 37.4
Calcium (mg/day)	614 ± 144	830 ± 124	1,009 ± 127	1,361 ± 287	667 ± 154	892 ± 124	1,099 ± 138	1,529 ± 335

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.

[1] Diet quality was measured using the Lifelines Diet Score (LLDS), reflecting adherence to the 2015 Dutch Dietary Guidelines for prevention of chronic disease, with higher scores indicating better adherence (30). The LLDS consist of 12 food groups and possible scores range from 0 to 48.

Abbreviations: BMI, Body Mass Index, en%, percentage of total energy intake; LDL, Low Density Lipoprotein; HDL, High Density Lipoprotein; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; SD, Standard Deviation.

Supplemental table 2. *Continued.*

	Included (*n* = 74,132)	Excluded (*n* = 49,228)	P-value[1]
Sex, female (%)	59.7	58.0	<0.001***
Age at baseline (years)	45.5 ± 12.3	45.4 ± 13.9	0.08
Educational level (%)			<0.001***
Low	27.6	34.1	
Intermediate	40.2	39.4	
High	32.2	26.5	
Smoking (%)			<0.001***
Never	48.2	43.3	
Former	34.2	32.5	
Current	17.6	24.2	
Pack years among smokers	12.0 [5.6, 20.2]	13.2 [6.5, 22.1]	<0.001***
Physical activity (minutes/week)	200 [75, 375]	180 [60, 360]	<0.001***
Alcohol (g/day)	7.27 ± 8.70	7.1 ± 9.2	0.001**
Family history of diabetes (%)	22.6	24.3	<0.001***
BMI (kg/m^2)	25.7 ± 3.9	26.7 ± 4.8	<0.001***
Waist circumference (cm)	89.1 ± 11.6	91.9 ± 13.5	<0.001***
Total cholesterol (mmol/L)	5.1 ± 1.0	5.1 ± 1.0	<0.001***
LDL cholesterol (mmol/L)	3.3 ± 0.9	3.2 ± 0.9	<0.001***
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.5 ± 0.4	<0.001***
TAG (mmol/L)	0.9 [0.7, 1.3]	1.0 [0.8, 1.5]	<0.001***
Hypertension (%)	23.4	30.6	<0.001***
Fasting glucose (mmol/L)	4.9 ± 0.4	5.3 ± 1.2	<0.001***
HbA1c (%)	5.5 ± 0.3	5.7 ± 0.6	<0.001***
Dietary intake			
Energy intake (kcal/day)	2054 ± 583	2015 ± 607	<0.001***
Diet quality[2]	24.4 ± 6.0	23.7 ± 6.1	<0.001***
Total dairy (serving/day)	3.5 ± 1.8	3.4 ± 1.9	<0.001***
Fruit (g/day)	141 ± 112	133 ± 113	<0.001***
Vegetables (g/day)	105 ± 58	100 ± 58	<0.001***
Bread (g/day)	113 ± 60	108 ± 60	0.005**
Legumes (g/day)	10 ± 15	10 ± 16	0.001**
Nuts (g/day)	13 ± 15	12 ± 15	<0.001***
Meat (red and processed) (g/day)	67 ± 33	67 ± 35	0.1
Fish (g/day)	12 ± 13	12 ± 13	0.03*
Coffee (g/day)	423 ± 275	419 ± 288	0.01*
Tea (g/day)	256 ± 248	229 ± 243	<0.001***

Supplemental table 2. *Continued. (continued)*

	Included (*n* = 74,132)	Excluded (*n* = 49,228)	P-value[1]
SSB (g/day)	142 ± 172	157 ± 196	<0.001***
Total fat (en%)	34.5 ± 4.8	34.6 ± 5.1	<0.001***
Protein (en%)	15.3 ± 2.3	15.3 ± 2.5	<0.001***
Carbohydrates (en%)	46.0 ± 5.7	45.9 ± 6.0	0.003**
Added sugar (g/day)	52 ± 32	52 ± 35	0.82
Calcium (mg/day)	996 ± 352	998 ± 361	0.57

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
[1] P-values were obtained using ANOVA for normal distributed continuous variables, Kruskal-Wallis Rank Sum test for skewed continuous variables and chi-square tests for categorical variables. * P=0.01 to 0.05, ** P=0.01 to 0.001, *** P<0.001.
[2] Diet quality was measured using the Lifelines Diet Score (LLDS), reflecting adherence to the 2015 Dutch Dietary Guidelines for prevention of chronic disease, with higher scores indicating better adherence (30). The LLDS consist of 12 food groups and possible scores range from 0 to 48.
Abbreviations: BMI, Body Mass Index, en%, percentage of total energy intake; LDL, Low Density Lipoprotein; HDL, High Density Lipoprotein; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; SD, Standard Deviation.

Supplemental table 2. *Continued.*

	Included (*n* = 74,132)	Excluded, no follow-up measurement (*n* = 32,982)	P-value[1]
Sex, female (%)	59.7	59.7	0.90
Age at baseline (years)	45.5 ± 12.3	40.8 ± 12.5	<0.001***
Educational level (%)			<0.001***
Low	27.6	28.4	
Intermediate	40.2	42.5	
High	32.2	29.0	
Smoking (%)			<0.001***
Never	48.2	46.7	
Former	34.2	27.2	
Current	17.6	26.1	
Pack years among smokers	12.0 [5.6, 20.2]	10.9 [5.2, 18.8]	<0.001***
Physical activity (minutes/week)	200 [75, 375]	180 [60, 360]	<0.001***
Alcohol (g/day)	7.27 ± 8.70	7.18 ± 9.15	0.12
Family history of diabetes (%)	8.2	8.0	<0.001***
BMI (kg/m^2)	25.7 ± 3.9	25.8 ± 4.3	<0.001***
Waist circumference (cm)	89.1 ± 11.6	88.9 ± 12.4	0.01*
Total cholesterol (mmol/L)	5.1 ± 1.0	5.0 ± 1.0	<0.001***
LDL cholesterol (mmol/L)	3.3 ± 0.9	3.2 ± 0.9	<0.001***
HDL cholesterol (mmol/L)	1.5 ± 0.4	1.5 ± 0.4	<0.001***
TAG (mmol/L)	0.9 [0.7, 1.3]	1.0 [0.7, 1.3]	0.24
Hypertension (%)	23.4	20.3	<0.001***
Fasting glucose (mmol/L)	4.9 ± 0.4	4.8 ± 0.4	<0.001***
HbA1c (%)	5.5 ± 0.3	5.4 ± 0.3	<0.001***
Dietary intake			
Energy intake (kcal/day)	2054 ± 583	2031 ± 619	<0.001***
Diet quality[2]	24.4 ± 6.0	23.2 ± 6.1	<0.001***
Total dairy (serving/day)	3.5 ± 1.8	3.3 ± 1.9	
Fruit (g/day)	141 ± 112	125 ± 109	<0.001***
Vegetables (g/day)	105 ± 58	98.8 ± 58.1	<0.001***
Bread (g/day)	113 ± 60	108 ± 62.6	<0.001***
Legumes (g/day)	10 ± 15	9.7 ± 16.5	0.79
Nuts (g/day)	13 ± 15	12 ± 14.8	<0.001***
Meat (red and processed) (g/day)	67 ± 33	66 ± 34.8	0.33
Fish (g/day)	12 ± 13	12 ± 13.0	<0.001***

Supplemental table 2. *Continued. (continued)*

	Included (*n* = 74,132)	Excluded, no follow-up measurement (*n* = 32,982)	P-value[1]
Coffee (g/day)	423 ± 275	399 ± 295	<0.001***
Tea (g/day)	256 ± 248	229 ± 245	<0.001***
SSB (g/day)	142 ± 172	175 ± 208	<0.001***
Total fat (en%)	34.5 ± 4.8	34.5 ± 5.0	0.08
Protein (en%)	15.3 ± 2.3	15.1 ± 2.4	<0.001***
Carbohydrates (en%)	46.0 ± 5.7	46.3 ± 6.0	<0.001***
Added sugar (g/day)	52 ± 32	55.0 ± 35.7	<0.001***
Calcium (mg/day)	996 ± 352	952 ± 353.3	<0.001***

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
[1] P-values were obtained using ANOVA for normal distributed continuous variables, Kruskal-Wallis Rank Sum test for skewed continuous variables and chi-square tests for categorical variables.
[2] Diet quality was measured using the Lifelines Diet Score (LLDS), reflecting adherence to the 2015 Dutch Dietary Guidelines for prevention of chronic disease, with higher scores indicating better adherence (30). The LLDS consist of 12 food groups and possible scores range from 0 to 48. * P=0.01 to 0.05, ** P=0.01 to 0.001, *** P<0.001.
Abbreviations: BMI, Body Mass Index, en%, percentage of total energy intake; LDL, Low Density Lipoprotein; HDL, High Density Lipoprotein; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; SD, Standard Deviation.

Supplemental table 3. Associations of dairy product types and prediabetes risk in the Lifelines cohort, stratified by sex, age, baseline waist circumference and educational level (*n* = 74,132).

	Continuous relative risks (95%CI)[1]					
	Sex		Age			
	Female	Male	<40	40-50	50-60	≥60
Total dairy	**1.02 (0.99-1.05)**	**0.99 (0.96-1.02)**	0.93 (0.85-1.02)	1.04 (1.01-1.08)*	1.00 (0.96-1.04)	0.99 (0.95-1.04)
High-fat dairy	1.00 (0.96-1.05)	0.98 (0.94-1.02)	**0.93 (0.81-1.07)**	**1.04 (0.99-1.09)**	**1.00 (0.95-1.06)**	**0.93 (0.88-0.99)***
Low-fat dairy	1.03 (0.99-1.07)	1.00 (0.96-1.04)	0.94 (0.83-1.07)	1.03 (0.99-1.08)	1.00 (0.95-1.05)	1.04 (1.00-1.09)
Fermented dairy	1.01 (0.97-1.05)	1.00 (0.96-1.03)	0.91 (0.81-1.02)	1.04 (0.99-1.08)	1.01 (0.96-1.05)	0.99 (0.94-1.04)
High-fat fermented dairy	1.00 (0.95-1.04)	0.99 (0.94-1.03)	0.91 (0.79-1.04)	1.04 (0.99-1.09)	1.00 (0.95-1.06)	0.94 (0.88-1.00)*
Low-fat fermented dairy	1.02 (0.97-1.07)	1.01 (0.96-1.07)	0.94 (0.76-1.17)	1.02 (0.96-1.09	1.01 (0.95-1.08)	1.05 (0.99-1.11)
Total milk	1.06 (1.00-1.11)*	1.01 (0.96-1.06)	1.04 (0.92-1.17)	1.07 (1.01-1.13)*	0.99 (0.92-1.06)	1.03 (0.97-1.10)
Plain milk	1.04 (0.98-1.11)	1.03 (0.97-1.09)	1.03 (0.90-1.19)	1.06 (0.99-1.13)	1.02 (0.93-1.11)	1.02 (0.94-1.11)
High-fat plain milk	0.87 (0.67-1.13)	1.01 (0.86-1.20)	1.25 (0.90-1.27)	0.83 (0.64-1.07)	1.13 (0.90-1.43)	0.86 (0.62-1.19)
Low-fat plain milk	1.06 (0.99-1.13)	1.03 (0.97-1.09)	1.00 (0.86-1.15)	1.08 (1.01-1.15)*	1.00 (0.91-1.10)	1.04 (0.96-1.13)
Yogurt	0.93 (0.79-1.09)	1.04 (0.88-1.23)	0.81 (0.46-1.42)	0.92 (0.75-1.14)	0.95 (0.78-1.17)	1.06 (0.88-1.28)
High-fat yogurt	0.86 (0.64-1.16)	0.74 (0.52-1.06)	0.92 (0.35-2.41)	0.79 (0.49-1.27)	0.79 (0.52-1.20)	0.82 (0.57-1.17)
Low-fat yogurt	0.96 (0.81-1.14)	1.17 (0.98-1.40)	0.80 (0.42-1.52)	0.98 (0.79-1.23)	1.01 (0.82-1.26)	1.13 (0.94-1.35)
Cheese	1.02 (0.97-1.06)	1.00 (0.96-1.04)	0.92 (0.81-1.03)	1.05 (1.00-1.10)*	1.02 (0.97-1.08)	0.97 (0.91-1.03)
High-fat cheese	1.00 (0.95-1.05)	0.99 (0.95-1.04)	**0.92 (0.80-1.06)**	**1.04 (0.99-1.10)**	**1.01 (0.95-1.07)**	**0.94 (0.88-1.01)**
Low-fat cheese	1.03 (0.97-1.10)	1.02 (0.95-1.09)	0.94 (0.74-1.20)	1.03 (0.95-1.12)	1.04 (0.95-1.13)	1.04 (0.97-1.12)
Cream[2]	1.01 (0.93-1.09)	0.96 (0.88-1.05)	0.89 (0.70-1.12)	0.98 (0.90-1.07)	0.92 (0.80-1.06)	1.04 (0.95-1.13)
Ice cream	0.61 (0.24-1.53)	1.49 (0.70-3.21)	0.46 (0.22-10.9)	1.12 (0.38-3.29)	1.85 (0.74-4.65)	0.50 (0.16-1.58)

[1] Relative risks per 1 serving/day (see definition in Table 1) were estimated.
[2] Cream was analysed in serving sizes of 50g/day.
Models were adjusted for age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages. RRs in bold represent stratified models for which the interaction term was statistically significant (p<0.05). * P <0.05.
Abbreviations: CI, Confidence Interval.

Supplemental table 3. *Continued.*

	Continuous relative risks (95%CI)[1]				
	Waist circumference		Educational level		
	< 80/94	≥ 80/94	Low	Intermediate	High
Total dairy	0.97 (0.92-1.03)	1.00 (0.98-1.03)	0.99 (0.96-1.03)	1.01 (0.97-1.06)	1.01 (0.96-1.06)
High-fat dairy	0.91 (0.85-0.98)*	1.01 (0.98-1.05)	0.99 (0.95-1.04)	1.01 (0.96-1.06)	0.94 (0.88-1.01)
Low-fat dairy	1.04 (0.98-1.11)	1.00 (0.97-1.03)	0.99 (0.95-1.04)	1.01 (0.97-1.06)	1.06 (1.00-1.12)*
Fermented dairy	0.98 (0.92-1.04)	1.01 (0.98-1.04)	0.98 (0.94-1.02)	1.02 (0.97-1.06)	1.01 (0.96-1.07)
High-fat fermented dairy	0.91 (0.84-0.98)*	1.01 (0.98-1.05)	0.99 (0.94-1.04)	1.00 (0.95-1.06)	0.97 (0.91-1.03)
Low-fat fermented dairy	**1.08 (1.00-1.16)**	**0.99 (0.95-1.04)**	**0.98 (0.93-1.04)**	**1.03 (0.97-1.10)**	**1.07 (1.00-1.16)**
Total milk	1.02 (0.95-1.10)	1.03 (0.98-1.07)	1.03 (0.97-1.09)	1.07 (1.01-1.13)*	0.98 (0.91-1.06)
Plain milk	**1.03 (0.93-1.13)**	**1.03 (0.98-1.08)**	1.01 (0.95-1.09)	1.06 (0.99-1.14)	1.05 (0.96-1.15)
High-fat plain milk	0.87 (0.66-1.14)	1.03 (0.88-1.21)	0.95 (0.75-1.21)	1.05 (0.87-1.21)	0.82 (0.56-1.21)
Low-fat plain milk	1.05 (0.95-1.16)	1.02 (0.97-1.07)	1.02 (0.95-1.09)	1.06 (0.98-1.13)	1.07 (0.97-1.17)
Yogurt	1.05 (0.82-1.34)	0.95 (0.84-1.09)	1.11 (0.92-1.35)	0.91 (0.76-1.09)	0.87 (0.69-1.10)
High-fat yogurt	0.81 (0.49-1.34)	0.88 (0.68-1.13)	**1.11 (0.81-1.54)**	**0.78 (0.51-1.19)**	**0.45 (0.27-0.76)****
Low-fat yogurt	1.16 (0.89-1.51)	0.98 (0.85-1.13)	1.09 (0.88-1.36)	0.97 (0.80-1.17)	1.07 (0.85-1.35)
Cheese	0.96 (0.89-1.03)	1.01 (0.98-1.05)	0.98 (0.93-1.03)	1.01 (0.96-1.06)	1.05 (0.99-1.11)
High-fat cheese	0.90 (0.83-0.98)*	1.02 (0.98-1.06)	0.99 (0.94-1.04)	1.01 (0.95-1.06)	0.99 (0.92-1.06)
Low-fat cheese	1.10 (1.01-1.20)*	0.99 (0.94-1.04)	**0.97 (0.90-1.04)**	**1.01 (0.93-1.10)**	**1.16 (1.06-1.26)*****
Cream[2]	1.00 (0.90-1.10)	0.99 (0.92-1.06)	1.00 (0.91-1.09)	0.93 (0.83-1.04)	1.00 (0.91-1.09)
Ice cream	2.25 (0.79-6.42)	0.77 (0.37-1.58)	1.12 (0.44-2.84)	1.46 (0.58-3.68)	0.44 (0.11-1.76)

[1] Relative risks per 1 serving/day (see definition in Table 1) were estimated.
[2] Cream was analysed in serving sizes of 50g/day.
Models were adjusted for age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages. RRs in bold represent stratified models for which the interaction term was statistically significant (p<0.05). * P=0.01 to 0.05, ** P=0.001 to 0.01, *** P <0.001.
Abbreviations: CI, Confidence Interval.

Supplemental table 4. Sensitivity analyses of associations of dairy product types and prediabetes in the Lifelines cohort.

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total dairy						
Main model 3	1 (ref)	0.94 (0.84-1.04)	0.95 (0.85-1.06)	0.96 (0.86-1.08)	0.73	1.00 (0.98-1.03)
Exclusion CVD/cancer	1 (ref)	0.94 (0.83-1.06)	0.97 (0.85-1.10)	0.96 (0.84-1.10)	0.73	0.99 (0.97-1.02)
Energy adjusted dairy	1 (ref)	0.93 (0.83-1.03)	0.94 (0.84-1.05)	0.99 (0.89-1.10)	0.89	1.01 (0.98-1.03)
Sex-specific quartiles	1 (ref)	0.95 (0.85-1.06)	0.94 (0.84-1.05)	0.99 (0.88-1.12)	0.92	NA
ADA cut-off for prediabetes	1 (ref)	0.95 (0.89-1.00)	0.94 (0.89-1.00)	0.98 (0.91-1.03)	0.40	1.00 (0.99-1.01)
High-fat dairy						
Main model 3	1 (ref)	0.97 (0.87-1.08)	0.95 (0.85-1.05)	0.94 (0.84-1.06)	0.34	0.99 (0.96-1.02)
Adjust. other dairy intake	1 (ref)	0.97 (0.88-1.08)	0.95 (0.86-1.06)	0.95 (0.85-1.07)	0.46	0.99 (0.96-1.02)
Exclusion CVD/cancer	1 (ref)	0.86 (0.76-0.97)	0.89 (0.79-1.01)	0.94 (0.82-1.07)	0.78	0.99 (0.95-1.02)
Energy adjusted dairy	1 (ref)	0.97 (0.87-1.08)	0.92 (0.83-1.02)	0.96 (0.87-1.07)	0.47	0.99 (0.96-1.02)
Sex-specific quartiles	1 (ref)	0.96 (0.87-1.07)	0.92 (0.83-1.02)	0.95 (0.85-1.06)	0.32	NA
ADA cut-off for prediabetes	1 (ref)	1.01 (0.95-1.07)	0.98 (0.92-1.03)	1.01 (0.95-1.07)	0.92	1.01 (0.99-1.02)
Low-fat dairy						
Main model 3	1 (ref)	0.93 (0.84-1.04)	1.02 (0.92-1.13)	0.99 (0.89-1.10)	0.76	1.01 (0.99-1.04)
Adjust. other dairy intake	1 (ref)	0.93(0.84-1.04)	1.02 (0.92-1.13)	0.98 (0.88-1.09)	0.90	1.01 (0.98-1.04)
Exclusion CVD/cancer	1 (ref)	0.94 (0.83-1.06)	0.97 (0.86-1.09)	0.95 (0.84-1.08)	0.60	1.00 (0.97-1.04)
Energy adjusted dairy	1 (ref)	0.96 (0.87-1.07)	0.99 (0.89-1.10)	1.02 (0.91-1.13)	0.59	1.02 (0.99-1.05)
Sex-specific quartiles	1 (ref)	0.91 (0.82-1.02)	1.00 (0.90-1.11)	0.98 (0.88-1.09)	0.89	NA
ADA cut-off for prediabetes	1 (ref)	0.99 (0.94-1.05)	0.97 (0.92-1.02)	0.95 (0.91-1.01)	0.10	0.99 (0.98-1.01)
Fermented dairy						
Main model 3	1 (ref)	0.97 (0.87-1.09)	0.95 (0.85-1.06)	1.01 (0.90-1.13)	0.73	1.00 (0.98-1.03)
Adjust. other dairy intake	1 (ref)	0.97 (0.87-1.09)	0.95 (0.85-1.06)	1.01 (0.91-1.13)	0.70	1.00 (0.98-1.03)
Exclusion CVD/cancer	1 (ref)	0.97 (0.86-1.10)	0.97 (0.85-1.10)	1.01 (0.89-1.15)	0.79	0.99 (0.96-1.02)
Energy adjusted dairy	1 (ref)	0.95 (0.85-1.07)	0.96 (0.86-1.07)	0.98 (0.88-1.10)	0.92	1.00 (0.98-1.03)
Sex-specific quartiles	1 (ref)	0.98 (0.88-1.09)	0.94 (0.84-1.05)	1.03 (0.92-1.15)	0.54	NA
ADA cut-off for prediabetes	1 (ref)	0.99 (0.93-1.05)	0.97 (0.92-1.03)	0.97 (0.92-1.03)	0.34	1.00 (0.98-1.01)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and prediabetes in the Lifelines cohort. (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
High-fat fermented dairy						
Main model 3	1 (ref)	0.90 (0.81-1.00)	0.94 (0.85-1.05)	0.95 (0.85-1.05)	0.66	0.98 (0.94-1.01)
Adjust. other dairy intake	1 (ref)	0.90 (0.81-1.00)	0.95 (0.85-1.05)	0.95 (0.86-1.07)	0.81	0.99 (0.96-1.02)
Exclusion CVD/cancer	1 (ref)	0.86 (0.76-0.97)	0.94 (0.83-1.06)	0.98 (0.87-1.12)	0.60	0.99 (0.95-1.02)
Energy adjusted dairy	1 (ref)	1.03 (0.93-1.15)	0.93 (0.83-1.04)	0.96 (0.86-1.06)	0.21	0.99 (0.96-1.02)
Sex-specific quartiles	1 (ref)	0.93 (0.84-1.03)	0.91 (0.82-1.01)	0.94 (0.85-1.05)	0.39	NA
ADA cut-off for prediabetes	1 (ref)	0.97 (0.92-1.03)	0.96 (0.91-1.01)	0.99 (0.93-1.05)	0.86	1.01 (0.99-1.02)
Low-fat fermented dairy						
Main model 3	1 (ref)	1.13 (1.01-1.26)	1.07 (0.97-1.19)	1.07 (0.97-1.19)	0.60	1.02 (0.98-1.06)
Adjust. other dairy intake	1 (ref)	1.12 (1.01-1.25)	1.07 (0.96-1.19)	1.07 (0.96-1.20)	0.66	1.02 (0.98-1.06)
Exclusion CVD/cancer	1 (ref)	1.04 (0.92-1.18)	1.03 (0.91-1.16)	1.00 (0.89-1.14)	0.81	1.01 (0.96-1.05)
Energy adjusted dairy	1 (ref)	1.08 (0.97-1.20)	1.10 (0.99-1.22)	1.07 (0.96-1.19)	0.41	1.02 (0.98-1.06)
Sex-specific quartiles	1 (ref)	1.09 (0.98-1.21)	1.09 (0.98-1.21)	1.08 (0.97-1.20)	0.31	NA
ADA cut-off for prediabetes	1 (ref)	1.02 (0.97-1.09)	0.98 (0.93-1.03)	0.97 (0.92-1.03)	0.14	0.99 (0.97-1.01)
Total milk						
Main model 3	1 (ref)	1.07 (0.96-1.18)	1.05 (0.94-1.17)	1.13 (1.01-1.27)	0.06	1.03 (0.99-1.07)
Adjust. other dairy intake	1 (ref)	1.06 (0.96-1.18)	1.04 (0.94-1.16)	1.13 (1.00-1.26)	0.07	1.03 (0.99-1.07)
Exclusion CVD/cancer	1 (ref)	1.13 (1.00-1.28)	1.04 (0.91-1.18)	1.20 (1.05-1.37)	0.04*	1.04 (0.99-1.08)
Energy adjusted dairy	1 (ref)	1.05 (0.94-1.17)	1.04 (0.94-1.15)	1.10 (0.99-1.22)	0.10	1.03 (1.00-1.07)
Sex-specific quartiles	1 (ref)	1.10 (0.99-1.22)	1.02 (0.92-1.13)	1.12 (1.00-1.26)	0.13	NA
ADA cut-off for prediabetes	1 (ref)	1.04 (0.99-1.10)	1.00 (0.94-1.06)	1.02 (0.96-1.08)	0.55	1.00 (0.98-1.02)
Plain milk						
Main model 3	1 (ref)	1.13 (1.02-1.25)	1.04 (0.94-1.14)	1.17 (1.05-1.30)	0.04*	1.04 (0.99-1.08)
Adjust. other dairy intake	1 (ref)	1.13 (1.02-1.25)	1.03 (0.93-1.14)	1.17 (1.05-1.30)	0.04*	1.03 (0.99-1.08)
Exclusion CVD/cancer	1 (ref)	1.16 (1.03-1.31)	1.05 (0.94-1.19)	1.19 (1.05-1.35)	0.05*	1.03 (0.98-1.09)
Energy adjusted dairy	1 (ref)	1.11 (1.00-1.23)	1.07 (0.97-1.19)	1.15 (1.04-1.27)	0.02*	1.04 (1.00-1.09)
Sex-specific quartiles	1 (ref)	1.15 (1.04-1.27)	1.05 (0.95-1.16)	1.17 (1.06-1.31)	0.03*	NA
ADA cut-off for prediabetes	1 (ref)	1.04 (0.99-1.10)	1.02 (0.97-1.07)	1.03 (0.98-1.09)	0.49	1.00 (0.98-1.03)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and prediabetes in the Lifelines cohort. (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
High-fat plain milk						
Main model 3	1 (ref)	1.04 (0.85-1.29)	1.08 (0.89-1.32)	0.93 (0.76-1.15)	0.72	0.96 (0.83-1.11)
Adjust. other dairy intake	1 (ref)	1.05 (0.85-1.29)	1.08 (0.89-1.32)	0.94 (0.76-1.16)	0.74	0.97 (0.84-1.12)
Exclusion CVD/cancer	1 (ref)	1.10 (0.87-1.39)	1.12 (0.89-1.40)	0.99 (0.78-1.26)	0.80	1.01 (0.87-1.18)
Energy adjusted dairy	1 (ref)	1.05 (0.85-1.30)	1.19 (0.97-1.45)	0.88 (0.71-1.10)	0.67	0.97 (0.85-1.12)
Sex-specific quartiles	1 (ref)	1.02 (0.82-1.26)	1.13 (0.93-1.38)	0.91 (0.74-1.13)	0.67	NA
ADA cut-off for prediabetes	1 (ref)	1.09 (0.98-1.21)	1.08 (0.97-1.20)	1.02 (0.92-1.14)	0.38	1.03 (0.97-1.10)
Low-fat plain milk						
Main model 3	1 (ref)	1.10 (1.00-1.22)	1.03 (0.93-1.13)	1.18 (1.06-1.31)	0.01*	1.04 (1.00-1.09)
Adjust. other dairy intake	1 (ref)	1.10 (1.00-1.22)	1.02 (0.93-1.13)	1.18 (1.06-1.31)	0.01*	1.04 (1.00-1.09)
Exclusion CVD/cancer	1 (ref)	1.11 (0.99-1.25)	1.03 (0.91-1.15)	1.18 (1.05-1.34)	0.03*	1.03 (0.98-1.09)
Energy adjusted dairy	1 (ref)	1.06 (0.96-1.18)	1.09 (0.99-1.20)	1.17 (1.06-1.29)	0.002**	1.05 (1.01-1.10)*
Sex-specific quartiles	1 (ref)	1.11 (1.00-1.22)	1.02 (0.93-1.13)	1.18 (1.06-1.31)	0.01*	NA
ADA cut-off for prediabetes	1 (ref)	1.03 (0.97-1.08)	1.02 (0.97-1.07)	1.02 (0.97-1.08)	0.62	1.00 (0.98-1.02)
Yogurt						
Main model 3	1 (ref)	1.12 (1.01-1.24)	1.08 (0.98-1.20)	1.00 (0.90-1.11)	0.96	0.98 (0.87-1.10)
Adjust. other dairy intake	1 (ref)	1.12 (1.01-1.24)	1.09 (0.99-1.20)	1.00 (0.91-1.11)	0.99	0.98 (0.87-1.10)
Exclusion CVD/cancer	1 (ref)	1.17 (1.04-1.32)	1.09 (0.97-1.22)	0.99 (0.88-1.12)	0.72	0.91 (0.80-1.04)
Energy adjusted dairy	1 (ref)	1.10 (0.99-1.21)	1.10 (1.00-1.22)	1.00 (0.90-1.11)	0.93	0.98 (0.87-1.10)
Sex-specific quartiles	1 (ref)	1.11 (1.00-1.23)	1.09 (0.99-1.20)	1.01 (0.91-1.11)	0.92	NA
ADA cut-off for prediabetes	1 (ref)	1.04 (0.99-1.10)	1.01 (0.96-1.06)	0.98 (0.93-1.03)	0.36	0.96 (0.91-1.02)
High-fat yogurt						
Main model 3	1 (ref)	0.99 (0.85-1.14)	1.03 (0.89-1.18)	0.86 (0.74-1.01)	0.13	0.80 (0.64-1.01)
Adjust. other dairy intake	1 (ref)	0.99 (0.85-1.15)	1.03 (0.89-1.18)	0.87 (0.74-1.02)	0.14	0.80 (0.64-1.01)
Exclusion CVD/cancer	1 (ref)	0.93 (0.78-1.11)	1.11 (0.95-1.30)	0.90 (0.75-1.08)	0.57	0.88 (0.68-1.13)
Energy adjusted dairy	1 (ref)	0.98 (0.85-1.14)	1.03 (0.90-1.19)	0.87 (0.75-1.01)	0.13	0.80 (0.64-1.01)
Sex-specific quartiles	1 (ref)	0.96 (0.82-1.12)	1.04 (0.91-1.19)	0.86 (0.74-1.01)	0.14	NA
ADA cut-off for prediabetes	1 (ref)	1.03 (0.96-1.12)	0.99 (0.92-1.06)	0.95 (0.88-1.03)	0.22	0.92 (0.82-1.03)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and prediabetes in the Lifelines cohort. (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Low-fat yogurt						
Main model 3	1 (ref)	1.13 (1.02-1.26)	1.07 (0.96-1.19)	1.07 (0.96-1.19)	0.19	1.04 (0.92-1.18)
Adjust. other dairy intake	1 (ref)	1.13 (1.02-1.26)	1.07 (0.96-1.19)	1.07 (0.97-1.19)	0.19	1.04 (0.92-1.18)
Exclusion CVD/cancer	1 (ref)	1.14 (1.01-1.28)	1.01 (0.89-1.15)	1.02 (0.90-1.15)	0.91	0.93 (0.81-1.08)
Energy adjusted dairy	1 (ref)	1.14 (1.02-1.26)	1.07 (0.96-1.19)	1.07 (0.96-1.18)	0.22	1.04 (0.92-1.18)
Sex-specific quartiles	1 (ref)	1.14 (1.03-1.27)	1.08 (0.98-1.20)	1.05 (0.95-1.17)	0.32	NA
ADA cut-off for prediabetes	1 (ref)	1.03 (0.97-1.09)	1.02 (0.97-1.08)	0.99 (0.94-1.05)	0.93	0.99 (0.92 – 1.05)
Cheese						
Main model 3	1 (ref)	0.96 (0.86-1.07)	0.96 (0.86-1.07)	1.03 (0.93-1.16)	0.33	1.01 (0.98-1.04)
Adjust. other dairy intake	1 (ref)	0.96 (0.86-1.07)	0.96 (0.86-1.07)	1.03 (0.93-1.16)	0.33	1.01 (0.98-1.04)
Exclusion CVD/cancer	1 (ref)	0.92 (0.81-1.05)	0.95 (0.84-1.08)	1.05 (0.92-1.19)	0.23	1.00 (0.96-1.03)
Energy adjusted dairy	1 (ref)	1.00 (0.90-1.12)	0.98 (0.88-1.10)	1.05 (0.94-1.17)	0.32	1.01 (0.98-1.04)
Sex-specific quartiles	1 (ref)	0.98 (0.88-1.09)	0.93 (0.84-1.04)	1.04 (0.93-1.16)	0.49	NA
ADA cut-off for prediabetes	1 (ref)	0.97 (0.91-1.02)	0.99 (0.93-1.05)	1.00 (0.94-1.06)	0.55	1.00 (0.99-1.02)
High-fat cheese						
Main model 3	1 (ref)	1.04 (0.94-1.16)	0.95 (0.85-1.05)	1.00 (0.90-1.11)	0.73	1.00 (0.96-1.03)
Adjust. other dairy intake	1 (ref)	1.04 (0.94-1.16)	0.95 (0.85-1.06)	1.01 (0.90-1.13)	0.84	1.00 (0.96-1.03)
Exclusion CVD/cancer	1 (ref)	1.02 (0.90-1.15)	0.93 (0.82-1.05)	1.04 (0.91-1.18)	0.65	0.99 (0.95-1.03)
Energy adjusted dairy	1 (ref)	1.04 (0.93-1.15)	0.97 (0.87-1.08)	0.99 (0.89-1.10)	0.66	1.00 (0.96-1.03)
Sex-specific quartiles	1 (ref)	1.03 (0.93-1.14)	0.96 (0.87-1.07)	0.99 (0.89-1.10)	0.59	NA
ADA cut-off for prediabetes	1 (ref)	1.04 (0.98-1.10)	0.97 (0.91-1.02)	1.01 (0.95-1.07)	0.82	1.01 (0.99-1.02)
Low-fat cheese						
Main model 3	1 (ref)	1.08 (0.97-1.20)	1.09 (0.99-1.21)	1.07 (0.97-1.18)	0.16	1.03 (0.98-1.07)
Adjust. other dairy intake	1 (ref)	1.08 (0.97-1.21)	1.10 (0.99-1.22)	1.07 (0.97-1.19)	0.17	1.03 (0.98-1.07)
Exclusion CVD/cancer	1 (ref)	1.03 (0.91-1.17)	1.05 (0.92-1.18)	1.04 (0.92-1.17)	0.52	1.02 (0.96-1.07)
Energy adjusted dairy	1 (ref)	1.07 (0.95-1.19)	1.06 (0.95-1.18)	1.08 (0.97-1.19)	0.15	1.03 (0.98-1.07)
Sex-specific quartiles	1 (ref)	1.08 (0.97-1.20)	1.09 (0.98-1.20)	1.08 (0.97-1.20)	0.24	NA
ADA cut-off for prediabetes	1 (ref)	1.02 (0.97-1.09)	1.03 (0.98-1.09)	0.99 (0.94-1.05)	0.80	1.00 (0.97-1.02)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and prediabetes in the Lifelines cohort. (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Cream						
Main model 3	1 (ref)	0.88 (0.80-0.96)	0.90 (0.81-1.00)	0.88 (0.78-0.99)	0.05	0.40 (0.02-8.44)
Adjust. other dairy intake	1 (ref)	0.88 (0.80-0.96)	0.90 (0.81-1.00)	0.88 (0.78-0.99)	0.06	0.41 (0.02-8.55)
Exclusion CVD/cancer	1 (ref)	0.87 (0.78-0.97)	0.83 (0.73-0.94)	0.85 (0.74-0.98)	0.02*	0.32 (0.01-16.55)
Energy adjusted dairy	1 (ref)	0.86 (0.77-0.95)	0.90 (0.81-0.99)	0.88 (0.79-0.97)	0.04*	0.39 (0.02-8.16)
Sex-specific quartiles	1 (ref)	0.88 (0.80-0.96)	0.90 (0.81-1.00)	0.88 (0.78-0.99)	0.05	NA
ADA cut-off for prediabetes	1 (ref)	0.97 (0.93-1.02)	1.00 (0.94-1.06)	0.97 (0.91-1.04)	0.61	0.89 (0.25-3.22)
Ice cream						
Main model 3	1 (ref)	0.97 (0.88-1.07)	1.00 (0.91-1.10)	0.94 (0.83-1.06)	0.46	1.03 (0.56-1.89)
Adjust. other dairy intake	1 (ref)	0.97 (0.88-1.07)	1.00 (0.91-1.10)	0.94 (0.84-1.06)	0.48	1.03 (0.56-1.90)
Exclusion CVD/cancer	1 (ref)	0.95 (0.85-1.07)	1.04 (0.94-1.16)	0.84 (0.73-0.97)	0.17	0.57 (0.27-1.20)
Energy adjusted dairy	1 (ref)	0.99 (0.89-1.09)	0.97 (0.88-1.08)	0.98 (0.88-1.08)	0.57	1.04 (0.57-1.90)
Sex-specific quartiles	1 (ref)	0.97 (0.88-1.07)	1.00 (0.91-1.10)	0.94 (0.83-1.06)	0.46	NA

[1] Relative risks (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + tertile or median categories with the lowest category as the reference, adjusted for covariates as follows: Model 3 included age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, and dietary intakes (fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages). Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.
[2] Relative risks per 1 serving/day (see definition in Table 1) were estimated.
* P=0.01 to 0.05, ** P<0.01.
Abbreviations: CI, Confidence Interval; Q, Quartile.

Supplemental table 5. Diabetes risk at baseline based on PROCAM diabetes risk score and desire to lose weight according to top and bottom quartiles of total dairy and dairy type intake.

	Total dairy		High-fat plain milk		Low-fat plain milk		Ice cream	
	Q1 (*n* = 18,600)	Q4 (*n* = 18,544)	Zero (*n* = 66,901)	T3 (*n* = 2,431)	Zero (*n* = 24,594)	T3 (*n* = 14,866)	Zero (*n* = 27,713)	T3 (*n* = 10,245)
Age (years)	42.5±12.4	47.8±11.7	45.6±12.3	44.6±12.3	47.2±12.4	44.0±12.1	45.5±12.3	46.2±12.3
PROCAM score	-14.6±0.7	-14.4±0.6	-14.5±0.6	-14.6±0.6	-14.5±0.6	-14.5±0.6	-14.5±0.7	-14.5±0.7
Highest tertile of PROCAM score (%)	29.3	35.6	34.0	25.9	35.1	31.6	33.8	35.7
Fasting glucose (mmol/L)	4.8±0.4	4.9±0.4	4.9±0.4	4.9±0.4	4.9±0.4	4.9±0.4	4.9±0.4	4.9±0.4
BMI (kg/m2)	25.6±4.1	25.7±3.8	25.7±3.9	24.8±3.8	25.5±3.9	25.9±4.0	25.7±4.0	25.8±3.9
HDL cholesterol (mmol/L)	1.5±0.4	1.5±0.4	1.5±0.4	1.5±0.4	1.6±0.4	1.5±0.4	1.5±0.4	1.5±0.4
Family history of diabetes (%)	8.1	7.7	8.3	7.7	8.8	7.5	8.8	8.6
Hypertension (%)								
No	78.8	75.4	76.4	77.3	75.6	77.2	75.7	76.1
Borderline	9.3	11.3	10.4	12.2	10.5	10.7	10.8	10.6
Manifest	12.0	13.3	13.2	10.5	13.9	12.1	13.5	13.4
Desire to lose weight (%)	57.0	51.6	56.3	36.5	53.3	54.8	54.1	55.9

Values are mean ± SD for continuous variables, or percentages for categorical variables, based on unimputed data. Diabetes risk at baseline was calculated according to the PROCAM diabetes risk algorithm with the following formula [40]: y = -18.5694 + 0.0258×age(years) + 6.461163×10-3×glucose (mmol/L) + 0.108×BMI (kg/m2) - 0.4585×10-3×HDL cholesterol (mmol/L) + 0.4190×family history of diabetes (no = 0; yes = 1) + 0.1713×hypertension (no = 0; borderline = 1; manifest = 2). Borderline hypertension was defined as: (1) systolic blood pressure ≥ 140 mmHg and < 160 mmHg; or (2) diastolic blood pressure ≥ 90 mmHg and < 95 mmHg. Manifested hypertension was defined as: (1) use of hypertensive medication; or (2) systolic blood pressure ≥ 160 mmHg; or (3) diastolic blood pressure ≥ 95 mmHg.
Abbreviations: BMI, Body Mass Index; HDL, High Density Lipoprotein; Q, Quartile; SD, Standard Deviation; T, Tertile.

Supplemental table 5. *Continued.*

	High-fat yogurt		Low-fat yogurt		High-fat cheese		Low-fat cheese	
	Zero (*n* = 59,002)	T3 (*n* = 4,707)	Zero (*n* = 39,011)	T3 (*n* = 11,694)	Q1 (*n* = 18,539)	Q4 (*n* = 18,596)	Zero (*n* = 39,752)	T3 (*n* = 11,461)
Age (years)	45.3±12.5	47.6±11.5	45.5±12.6	47.2±12.1	43.9±13.0	47.6±11.5	45.0±12.0	48.9±12.5
PROCAM score	-14.5±0.7	-14.6±0.6	-14.5±0.7	-14.4±0.6	-14.5±0.7	-14.5±0.6	-14.5±0.6	-14.3±0.6
Highest tertile of PROCAM value (%)	34.3	28.3	32.6	36.6	33.0	34.1	30.3	42.8
Fasting glucose (mmol/L)	4.9±0.4	4.8±0.4	4.9±0.4	4.8±0.4	4.8±0.4	4.9±0.4	4.9±0.4	4.9±0.4
BMI (kg/m2)	25.8±4.0	24.6±3.5	25.5±3.9	25.8±3.9	25.8±4.0	25.5±3.8	25.4±3.9	26.1±3.8
HDL cholesterol (mmol/L)	1.5±0.4	1.6±0.4	1.5±0.4	1.6±0.4	1.5±0.4	1.6±0.4	1.5±0.4	1.5±0.4
Family history of diabetes (%)	8.2	8.1	8.5	8.3	8.4	7.9	8.2	8.8
Hypertension (%)								
No	76.2	78.8	76.4	75.4	76.4	76.1	77.9	71.4
Borderline	10.4	10.3	10.7	9.9	9.8	11.5	10.7	10.8
Manifest	13.4	10.9	12.8	14.7	13.8	12.4	11.5	17.9
Desire to lose weight (%)	57.3	41.1	51.0	59.7	56.6	50.7	50.1	59.7

Values are mean ± SD for continuous variables, or percentages for categorical variables, based on unimputed data. Diabetes risk at baseline was calculated according to the PROCAM diabetes risk algorithm with the following formula [40]: y = -18.5694 + 0.0258×age(years) + 6.461163×10-3×glucose (mmol/L) + 0.108×BMI (kg/m2) - 0.4585×10-3×HDL cholesterol (mmol/L) + 0.4190×family history of diabetes (no = 0; yes = 1) + 0.1713×hypertension (no = 0; borderline = 1; manifest = 2). Borderline hypertension was defined as: (1) systolic blood pressure ≥ 140 mmHg and < 160 mmHg; or (2) diastolic blood pressure ≥ 90 mmHg and < 95 mmHg. Manifested hypertension was defined as: (1) use of hypertensive medication; or (2) systolic blood pressure ≥ 160 mmHg; or (3) diastolic blood pressure ≥ 95 mmHg.
Abbreviations: BMI, Body Mass Index; HDL, High Density Lipoprotein; Q, Quartile; SD, Standard Deviation; T, Tertile.

Supplemental table 6. Cross-sectional associations between diabetes risk and dairy intake at baseline (*n* = 72,615).

	β (95%CI)[1]	p-value
Total dairy	-0.05 (-0.08; -0.03)	<0.001***
High-fat dairy	-0.17 (-0.20; -0.15)	<0.001***
Low-fat dairy	0.12 (0.10; 0.14)	<0.001***
Fermented dairy	-0.05 (-0.07; -0.03)	<0.001***
High-fat fermented dairy	-0.12 (-0.14; -0.11)	<0.001***
Low-fat fermented dairy	0.07 (0.05; 0.08)	<0.001***
Total milk	0.01 (-0.01; 0.02)	0.44
Plain milk	0.03 (0.02; 0.05)	<0.001***
High-fat plain milk	-0.03 (-0.03; -0.02)	<0.001***
Low-fat plain milk	0.06 (0.05; 0.08)	<0.001***
Yogurt	-0.01 (-0.02; -0.01)	<0.001***
High-fat yogurt	-0.03 (-0.03; -0.02)	<0.001***
Low-fat yogurt	0.02 (0.01; 0.02)	<0.001***
Cheese	-0.03 (-0.04; -0.01)	0.005
High-fat cheese	-0.09 (-0.11; -0.07)	<0.001***
Low-fat cheese	0.07 (0.06; 0.08)	<0.001***
Cream	0.00 (0.00; 0.00)	<0.001***
Ice cream	0.00 (0.00; 0.00)	0.85

[1] β per 1 serving/day (see definition in Table 1) were estimated. Diabetes risk at baseline was calculated according to the PROCAM diabetes risk algorithm with the following formula [40]: y = -18.5694 + 0.0258×age(years) + 6.461163×10-3×glucose (mmol/L) + 0.108×BMI (kg/m2) - 0.4585×10-3×HDL cholesterol (mmol/L) + 0.4190×family history of diabetes (no = 0; yes = 1) + 0.1713×hypertension (no = 0; borderline = 1; manifest = 2). Models were adjusted for age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages. * P=0.01 to 0.05, ** P=0.001 to 0.01, *** P <0.001.

Supplemental table 7. Cross-sectional associations between desire to lose weight and dairy intake at baseline (*n* = 74,001).

	β (95%CI)[1]	p-value
Total dairy	-0.05 (-0.07; -0.02)	<0.001***
High-fat dairy	-0.15 (-0.16; -0.13)	<0.001***
Low-fat dairy	0.10 (0.08; 0.11)	<0.001***
Fermented dairy	0.01 (-0.01; 0.03)	0.44
High-fat fermented dairy	-0.08 (-0.11; -0.06)	<0.001***
Low-fat fermented dairy	0.10 (0.08; 0.10)	<0.001***
Total milk	-0.04 (-0.06; -0.03)	<0.001***
Plain milk	-0.02 (-0.03; -0.01)	0.003**
High-fat plain milk	-0.03 (-0.04; -0.03)	<0.001***
Low-fat plain milk	0.02 (0.00; 0.03)	0.02*
Yogurt	-0.05 (-0.07; -0.02)	<0.001***
High-fat yogurt	-0.05 (-0.07; -0.02)	<0.001***
Low-fat yogurt	0.03 (0.02; 0.03)	<0.001***
Cheese	0.01 (-0.01; 0.03)	0.18
High-fat cheese	-0.06 (-0.07; -0.04)	<0.001***
Low-fat cheese	0.07 (0.06; 0.08)	<0.001**
Cream	0.00 (0.00; 0.00)	<0.001***
Ice cream	0.00 (0.00; 0.00)	<0.001**

[1] β per 1 serving/day (see definition in Table 1) were estimated. Models were adjusted for age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages. * P=0.01 to 0.05, ** P=0.001 to 0.01, *** P <0.001.

Supplemental table 8. Associations of dairy product types and prediabetes in the Lifelines cohort, additionally adjusted for 'desire to lose weight' (*n* = 74,001).

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	RR	RR (95%CI)	RR (95%CI)	RR	P_{trend}	RR (95%CI)
Total dairy						
Main model 3	1 (ref)	0.94 (0.84-1.04)	0.95 (0.85-1.06)	0.96 (0.86-1.08)	0.73	1.00 (0.98-1.03)
+ Weight loss desire	1 (ref)	0.93 (0.83-1.03)	0.94 (0.84-1.05)	0.95 (0.85-1.07)	0.58	1.00 (0.98-1.02)
High-fat dairy						
Main model 3	1 (ref)	0.97 (0.87-1.08)	0.95 (0.85-1.05)	0.94 (0.84-1.06)	0.34	0.99 (0.96-1.02)
+ Weight loss desire	1 (ref)	0.97 (0.87-1.08)	0.95 (0.86-1.06)	0.97 (0.87-1.09)	0.66	1.00 (0.97-1.03)
Low-fat dairy						
Main model 3	1 (ref)	0.94 (0.84-1.04)	1.00 (0.90-1.11)	1.01 (0.91-1.13)	0.50	1.02 (0.99-1.05)
+ Weight loss desire	1 (ref)	0.92 (0.82-1.08)	0.99 (0.90-1.10)	0.95 (0.86-1.06)	0.68	1.00 (0.98-1.03)
Fermented dairy						
Main model 3	1 (ref)	0.97 (0.87-1.09)	0.95 (0.85-1.06)	1.01 (0.90-1.13)	0.73	1.00 (0.98-1.03)
+ Weight loss desire	1 (ref)	0.96 (0.86-1.07)	0.94 (0.84-1.05)	0.99 (0.89-1.11)	0.94	1.00 (0.97-1.03)
High-fat fermented dairy						
Main model 3	1 (ref)	0.90 (0.81-1.00)	0.94 (0.85-1.05)	0.95 (0.85-1.05)	0.66	0.98 (0.94-1.01)
+ Weight loss desire	1 (ref)	0.89 (0.80-0.99)	0.94 (0.85-1.05)	0.96 (0.86-1.07)	0.94	0.99 (0.96-1.03)
Low-fat fermented dairy						
Main model 3	1 (ref)	1.13 (1.01-1.26)	1.07 (0.97-1.19)	1.07 (0.97-1.19)	0.60	1.02 (0.98-1.06)
+ Weight loss desire	1 (ref)	1.10 (0.98-1.22)	1.04 (0.93-1.15)	1.02 (0.92-1.14)	0.78	1.01 (0.97-1.04)
Total milk						
Main model 3	1 (ref)	1.07 (0.96-1.18)	1.05 (0.94-1.17)	1.13 (1.01-1.27)	0.06	1.03 (0.99-1.07)
+ Weight loss desire	1 (ref)	1.06 (0.96-1.17)	1.05 (0.94-1.17)	1.13 (1.01-1.27)	0.05	1.03 (0.99-1.07)
Plain milk						
Main model 3	1 (ref)	1.13 (1.02-1.25)	1.04 (0.94-1.14)	1.17 (1.05-1.30)	0.04*	1.04 (0.99-1.08)
+ Weight loss desire	1 (ref)	1.12 (1.01-1.24)	1.03 (0.93-1.13)	1.16 (1.04-1.28)	0.05	1.03 (0.99-1.08)

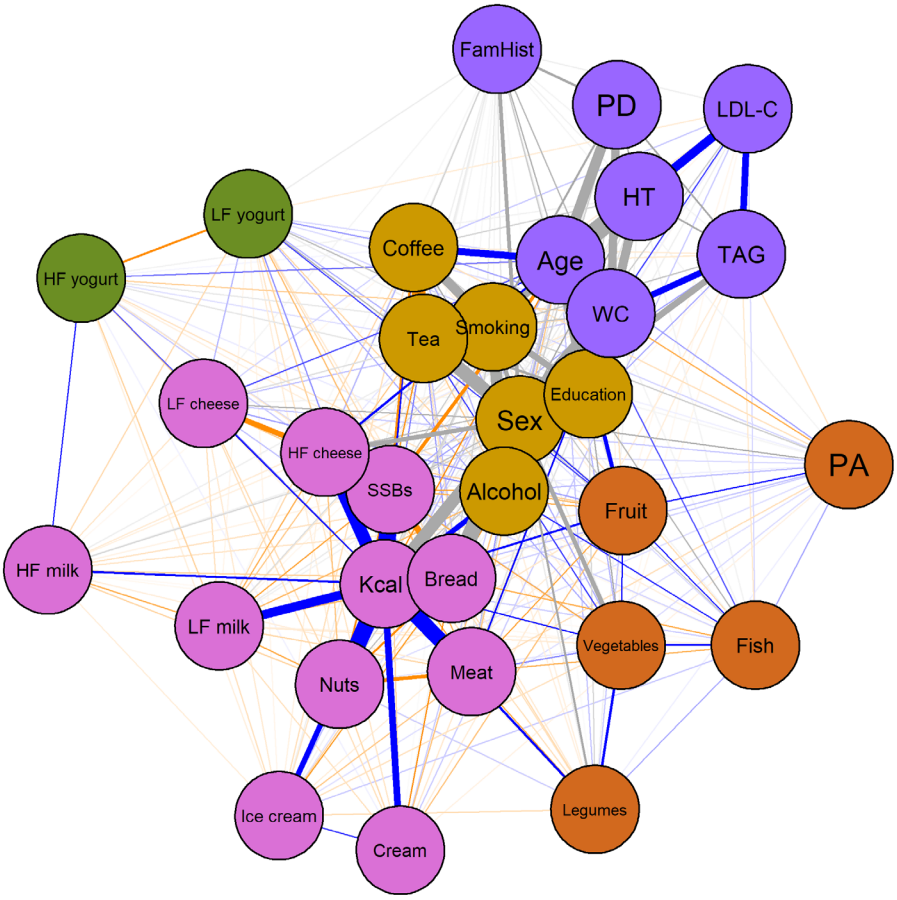
Supplemental table 8. Associations of dairy product types and prediabetes in the Lifelines cohort, additionally adjusted for 'desire to lose weight' (*n* = 74,001). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	RR	RR (95%CI)	RR (95%CI)	RR	P_{trend}	RR (95%CI)
High-fat plain milk						
Main model 3	1 (ref)	1.04 (0.85-1.29)	1.08 (0.89-1.32)	0.93 (0.76-1.15)	0.72	0.96 (0.83-1.11)
+ Weight loss desire	1 (ref)	1.07 (0.86-1.31)	1.11 (0.91-1.36)	1.00 (0.81-1.23)	0.74	1.01 (0.88-1.16)
Low-fat plain milk						
Main model 3	1 (ref)	1.10 (1.00-1.22)	1.03 (0.93-1.13)	1.18 (1.06-1.31)	0.01*	1.04 (1.00-1.09)
+ Weight loss desire	1 (ref)	1.08 (0.98-1.20)	1.01 (0.91-1.11)	1.15 (1.04-1.28)	0.03*	1.04 (0.99-1.08)
Yogurt						
Main model 3	1 (ref)	1.12 (1.01-1.24)	1.08 (0.98-1.20)	1.00 (0.90-1.11)	0.96	0.98 (0.87-1.10)
+ Weight loss desire	1 (ref)	1.10 (0.99-1.22)	1.08 (0.98-1.19)	1.00 (0.91-1.11)	0.98	0.98 (0.87-1.10)
High-fat yogurt						
Main model 3	1 (ref)	0.99 (0.85-1.14)	1.03 (0.89-1.18)	0.86 (0.74-1.01)	0.13	0.80 (0.64-1.01)
+ Weight loss desire	1 (ref)	1.00 (0.86-1.13)	1.06 (0.93-1.22)	0.91 (0.78-1.07)	0.50	0.88 (0.70-1.10)
Low-fat yogurt						
Main model 3	1 (ref)	1.13 (1.02-1.26)	1.07 (0.96-1.19)	1.07 (0.96-1.19)	0.19	1.04 (0.92-1.18)
+ Weight loss desire	1 (ref)	1.11 (1.00-1.23)	1.04 (0.94-1.16)	1.04 (0.94-1.16)	0.44	1.01 (0.89-1.15)
Cheese						
Main model 3	1 (ref)	0.96 (0.86-1.07)	0.96 (0.86-1.07)	1.03 (0.93-1.16)	0.33	1.01 (0.98-1.04)
+ Weight loss desire	1 (ref)	0.95 (0.86-1.03)	0.95 (0.86-1.06)	1.01 (0.91-1.13)	0.53	1.00 (0.97-1.03)
High-fat cheese						
Main model 3	1 (ref)	1.04 (0.94-1.16)	0.95 (0.85-1.05)	1.00 (0.90-1.11)	0.73	1.00 (0.96-1.03)
+ Weight loss desire	1 (ref)	1.03 (0.93-1.14)	0.95 (0.85-1.05)	1.01 (0.91-1.13)	0.94	1.00 (0.97-1.03)

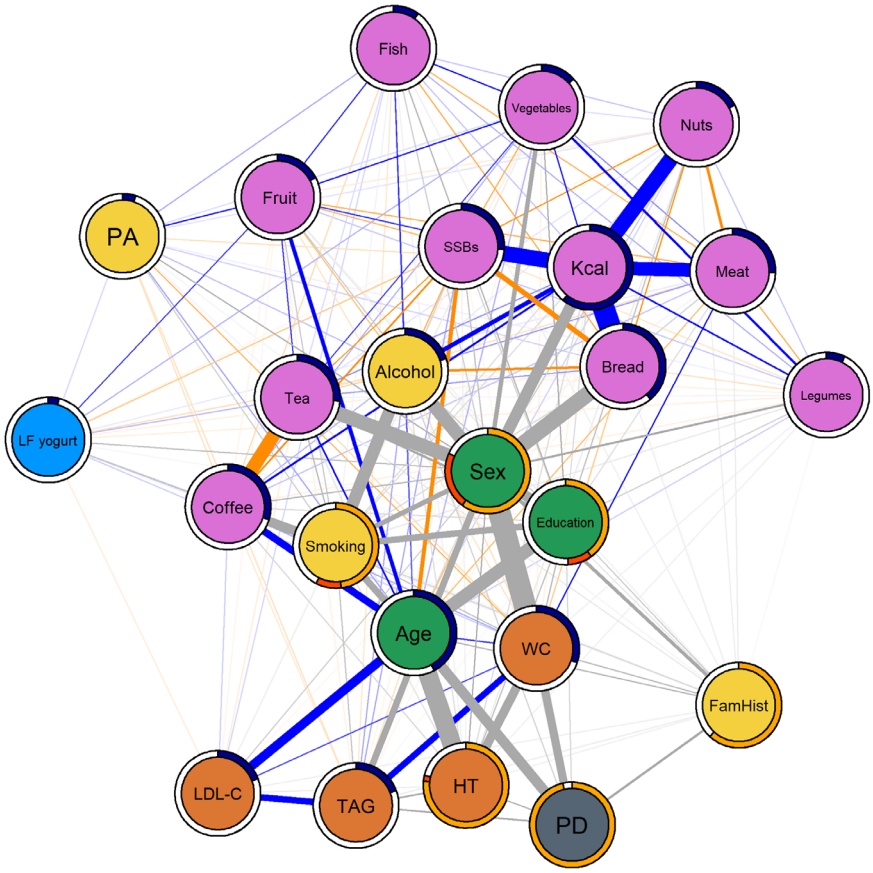
Supplemental table 8. Associations of dairy product types and prediabetes in the Lifelines cohort, additionally adjusted for 'desire to lose weight' (*n* = 74,001). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
	RR	RR (95%CI)	RR (95%CI)	RR	P_{trend}	RR (95%CI)
Low-fat cheese						
Main model 3	1 (ref)	1.08 (0.97-1.20)	1.09 (0.99-1.21)	1.07 (0.97-1.18)	0.16	1.03 (0.98-1.07)
+ Weight loss desire	1 (ref)	1.04 (0.94-1.17)	1.05 (0.97-1.16)	1.02 (0.92-1.13)	0.67	1.01 (0.96-1.06)
Cream						
Main model 3	1 (ref)	0.88 (0.80-0.96)	0.90 (0.81-1.00)	0.88 (0.78-0.99)	0.05	0.40 (0.02-8.44)
+ Weight loss desire	1 (ref)	0.88 (0.80-0.97)	0.89 (0.80-0.99)	0.89 (0.79-1.00)	0.07	0.55 (0.03-10.8)
Ice cream						
Main model 3	1 (ref)	0.97 (0.88-1.07)	1.00 (0.91-1.10)	0.94 (0.83-1.06)	0.46	1.01 (0.83-1.24)
+ Weight loss desire	1 (ref)	0.96 (0.87-1.05)	0.98 (0.89-1.08)	0.92 (0.82-1.03)	0.24	0.95 (0.51-1.78)

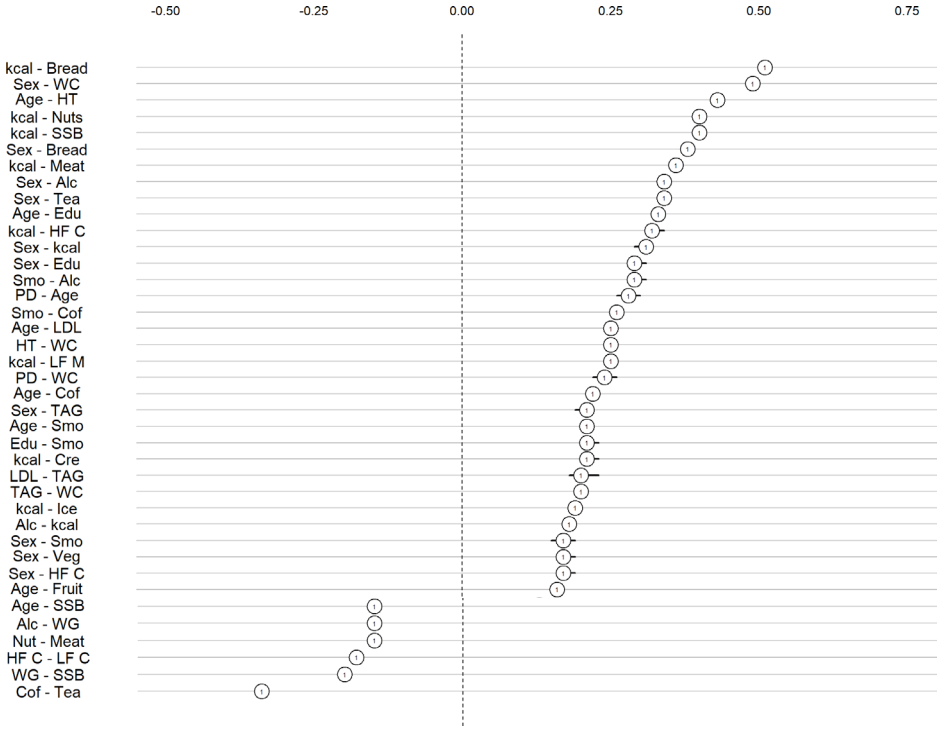
Model 3 was adjusted for age, sex, energy intake, follow-up duration, educational level, alcohol use, smoking behaviour, physical activity level, family history of diabetes, fruit, vegetables, bread, legumes, nuts, red and processed meat, coffee, tea, and sugar-sweetened beverages. * P=0.01 to 0.05, ** P<0.01. Abbreviations: CI, Confidence Interval; RR, Relative Risk.



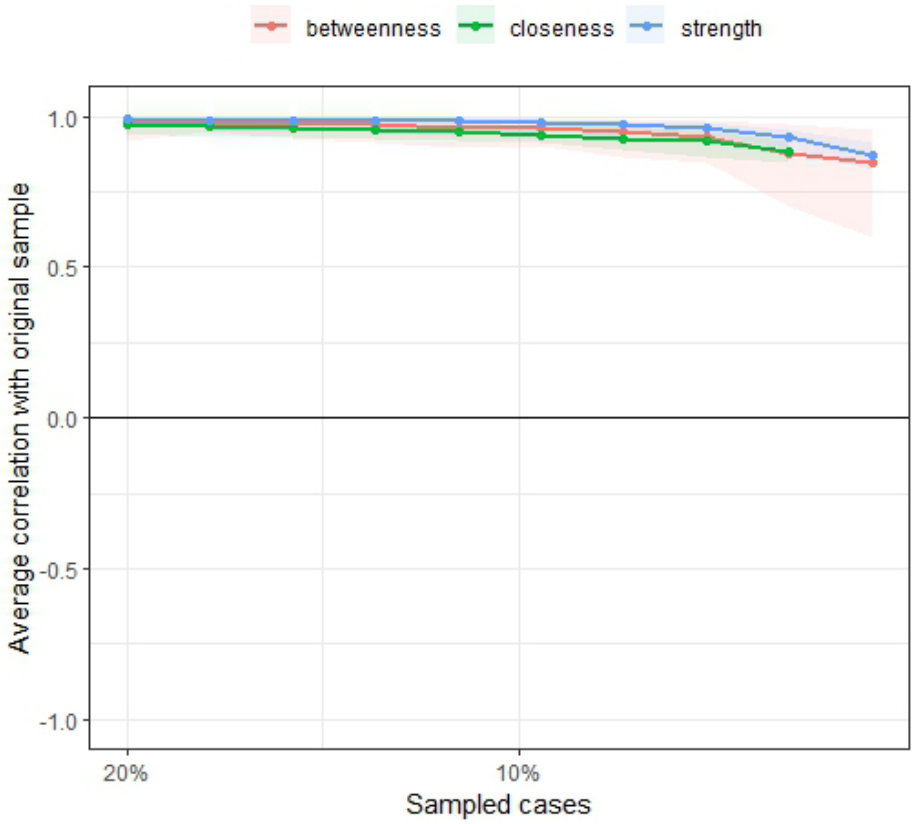
Supplemental figure 2. Clusters of variables (represented by the different colours) that strongly connect in the network. Clustering variables may co-occur, have similar properties, or have similar function [24, 25]. Clusters of behaviours or food groups could be interesting targets for interventions as the intervention on a single variable may affect other variables in the cluster even though these were not directly targeted. The most frequent occurring solution of the clustering algorithm was one with 5 clusters (42 of 100 estimations). The prediabetes cluster (purple) and energy density cluster (pink nodes) were consistently identified in all solutions. HF, High-fat; HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; LF, Low-fat; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; WC, Waist circumference.



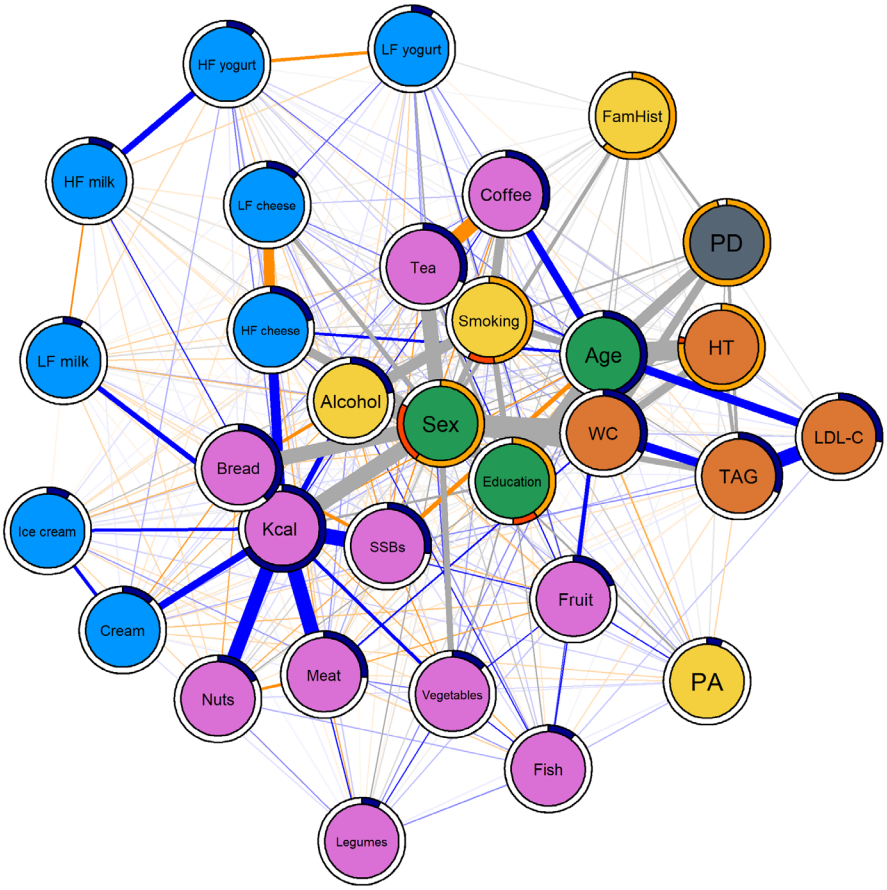
Supplemental figure 3. Network structure of low-fat yogurt (blue), food groups and energy intake (pink), lifestyle risk factors (yellow), socio-demographic characteristics (green), clinical markers (orange) and prediabetes (grey) of the study population with complete data for variables in the model (*n* = 67,206). The conditional independent relationships are reflected by edges between nodes (i.e., the variables); blue and orange edges indicate positive and negative relationships respectively between two continuous nodes and grey edges indicate a relationship between at least one categorical variable. Edge thickness is proportional to the strength of the relationship between the nodes with the highest edge weight being 0.49 (between nodes sex and waist circumference). The absence of an edge indicates that two nodes are conditional independent in the network. The predictability is indicated by the rings around each node; blue rings indicate the proportion variance explained by neighbouring nodes with the full circle indicating a r^2 of 1.0; the range/red rings indicate the accuracy for the categorical nodes, respectively the marginal of the variable and the additionally achieved accuracy by all other remaining variables, with the full circle indicating an accuracy of 100%. HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; LF, Low-fat; PA, Physical Activity; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; WC, Waist circumference.



Supplemental figure 4. Plot of bootstrapped sampling variation around the edge-weights reflecting accuracy of the edge-weights, a measure of the stability of the network. The plot shows good accuracy of estimates, as indicated by narrow intervals around the edge weights. Only edge weights with values ≤-0.2 or ≥0.2 are shown. Alc, Alcohol; Cof, Coffee; Fru, Fruit; HF, High-fat; HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; Leg, Legumes; Edu, Educational Level; LF, Low-fat; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; Smo, Smoking; TAG, Triglycerides; Veg, Vegetables; WC, Waist circumference.

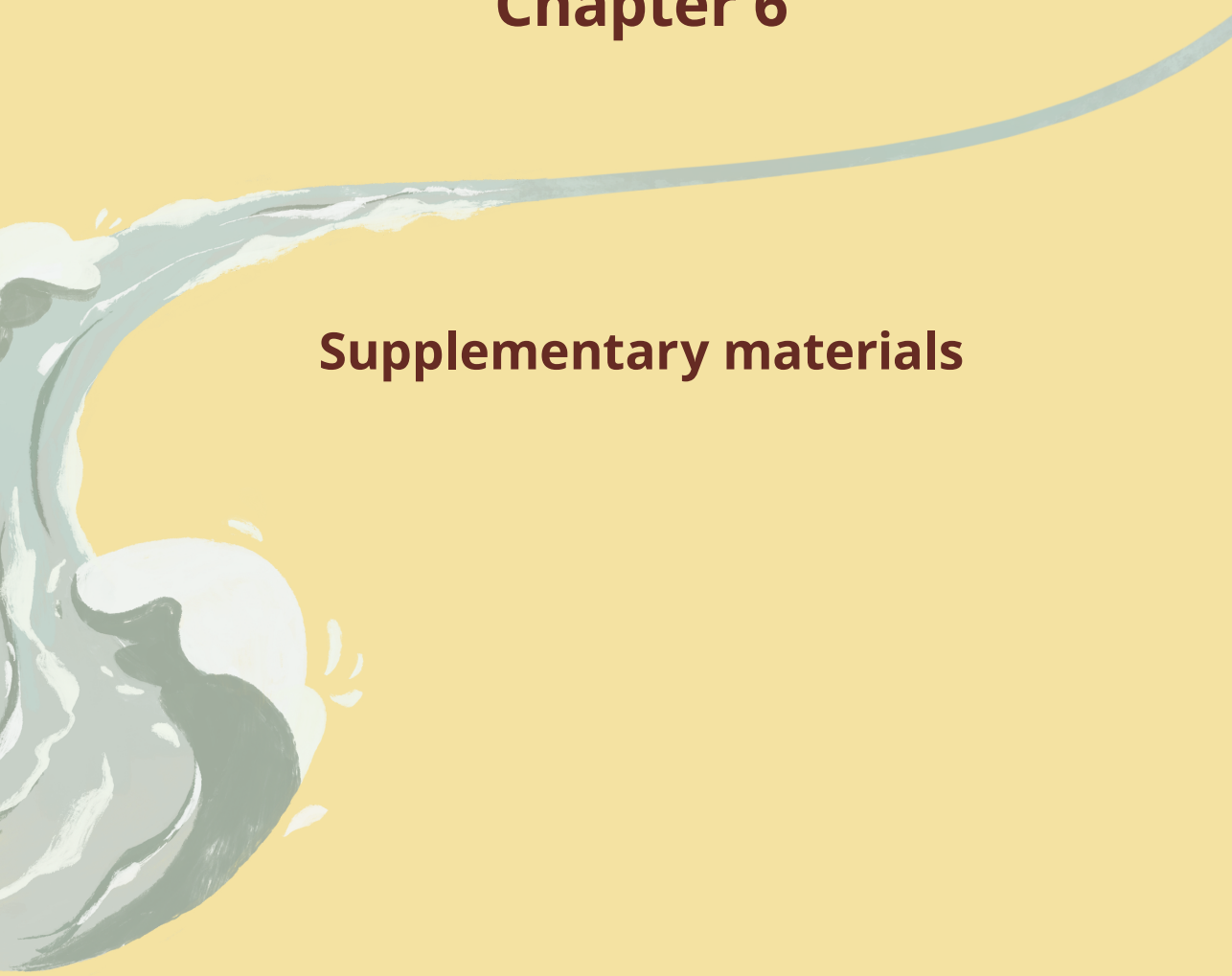


Supplemental figure 5. Average correlation coefficients between centrality indices of the networks within the case-dropped bootstrapped samples and the original sample reflecting the stability of the centrality indices. Lines reflect the mean of each index, and the coloured areas reflect the 95%CI. The CS-coefficient to retain a correlation of 0.9 in at least 95% of the samples was 0.97 for strength, 0.86 for closeness and 0.91 for betweenness, indicating high stability of the centrality indices and low influence of participant characteristics.



Supplemental figure 6. Network structure of dairy (blue), food groups and energy intake (pink), lifestyle risk factors (yellow), socio-demographic characteristics (green), clinical markers (orange) and prediabetes (grey) of the study population with complete data for variables in the model with a nonparanormal transformation applied to non-normally distributed continuous variables (n = 67,206). In this semi-parametric copula GGM, the positioning of nodes and edge-weights were similar to main Figure 2 of the manuscript. The conditional independent relationships are reflected by edges between nodes (i.e., the variables); blue and orange edges indicate positive and negative relationships respectively between two continuous nodes and grey edges indicate a relationship between at least one categorical variable. Edge thickness is proportional to the strength of the relationship between the nodes, with the highest edge weight being 0.48 (between nodes kcal and bread). The absence of an edge indicates that two nodes are conditional independent in the network. The predictability is indicated by the rings around each node; blue rings indicate the proportion variance explained by neighbouring nodes for the continuous nodes; orange/red rings the accuracy for the categorical nodes, respectively the marginal of the variable and the additionally achieved accuracy by all other remaining variables. HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; LF, Low-fat; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; WC, Waist circumference.

Chapter 6



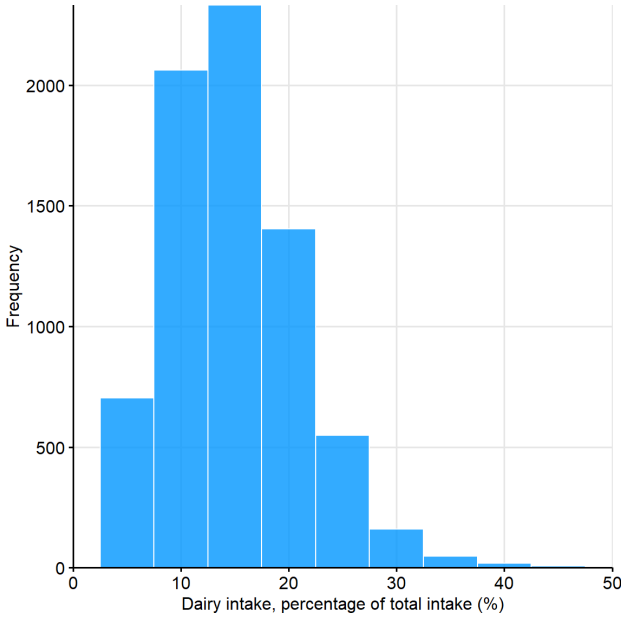
Supplementary materials

Contents

Supplemental table 1. Missing values of covariates in participants before imputation (*n* = 7,521).

	Total n (%)
Educational level	24 (0.3%)
Age at completing education	51 (0.7%)
Ethnic origin	269 (3.6%)
Smoking status	12 (0.2%)
Physical activity	147 (2.0%)
Waist circumference	5 (0.1%)
Hypertension	1 (0.0%)
Dyslipidaemia	56 (0.7%)
Change in alcohol intake	22 (0.3%)
Change in MDS score	22 (0.3%)
Change in DASH score	22 (0.3%)
Change in physical activity level	241 (3.2%)
Change in waist circumference	763 (10.1%)

Abbreviations: DASH, Dietary Approaches to Stop Hypertension; tMDS, tertiles Mediterranean diet score.



Supplemental figure 1. Distribution of dairy food intake in the diet (weight percentage, %) (*n* = 7,521). Mean ± SD: 14.4 ± 6.5. Median [IQR] = 14.0 [10.0-18.3].

Supplemental table 2. Baseline characteristics of participants in the Fenland study across different population subgroups (*n* = 7,521).

	Quartiles of total dairy intake			
	Q1	Q2	Q3	Q4
N participants	1,887	1,883	1,859	1,892
Total dairy intake (servings/day)	1.2 ± 0.4	2.2 ± 0.2	2.9 ± 0.2	4.2 ± 0.8
Range	0.0-1.8	1.8-2.5	2.5-3.3	3.4-11.6
Follow-up time (years)	6.7 ± 2.0	6.8 ± 2.1	6.8 ± 2.0	6.7 ± 2.0
Age at baseline (years)	48.8 ± 7.5	48.7 ± 7.3	48.6 ± 7.4	48.7 ± 7.4
Sex (ref. men), female	52.6	53.2	54.2	47.7
Educational level (ref. low)				
Intermediate	46.6	45.2	45.0	44.9
High	35.8	38.2	40.3	38.9
Age completing education (years)	19.2 ± 4.8	19.1 ± 4.2	19.5 ± 4.2	19.5 ± 4.4
Ethnic origin (ref. White), non-White	4.0	2.8	1.2	1.3
Working (ref. not working)	89.3	89.0	89.7	87.9
Household income (ref. <£20,000)				
£20,000-40,000	33.2	32.8	33.7	35.4
>£40,000	54.3	57.4	55.6	53.9
Marital status (ref. single)				
Married	80.6	84.0	83.1	83.3
Widowed/separated	9.4	8.7	9.5	9.0
Smoking status (ref. never)				
Former	34.0	34.4	33.1	31.9
Current	11.1	9.5	8.0	8.9
Pack-years among smokers	3,747 [1,681-8,793]	4,082 [1,715-8,547]	3,910 [1,383-7,216]	4,621 [1,860-8,492]
Alcohol intake (ay)	6.2 [1.6; 12.5]	6.8 [2.0; 13.6]	6.6 [1.7; 12.5]	6.0 [1.4; 11.5]
Physical activity (kJ/kg/day)	52.3 ± 20.8	53.6 ± 21.0	54.9 ± 21.7	57.4 ± 22.9
Family history of diabetes (%)	25.3	22.7	22.8	22.9
BMI (kg/m2)	26.5 ± 4.7	26.2 ± 4.3	26.4 ± 4.6	26.5 ± 4.2
Body fat (%)	32.9 ± 8.5	32.7 ± 8.1	32.8 ± 8.4	32.0 ± 8.4
Waist circumference (cm)	90.1 ± 13.2	89.4 ± 12.6	89.8 ± 13.1	90.5 ± 12.5
Hypertension	40.1	35.6	35.3	35.8
Dyslipidaemia	9.5	9.4	7.9	9.2
Dietary intake at baseline				
Energy intake (kcal/day)	1,632 ± 496	1,858 ± 505	2,029 ± 515	2,272 ± 586
DASH score	23.1 ± 4.5	23.8 ± 4.5	24.8 ± 4.4	25.4 ± 4.4
tMDS score	7.4 ± 1.5	7.7 ± 1.4	7.8 ± 1.4	7.7 ± 1.5
Fruit (g/day)	208 ± 166	229 ± 162	255 ± 166	279 ± 205
Vegetables (g/day)	260 ± 140	263 ± 127	278 ± 144	291 ± 135

Supplemental table 2. Baseline characteristics of participants in the Fenland study across different population subgroups (*n* = 7,521). (continued)

	Quartiles of total dairy intake			
	Q1	Q2	Q3	Q4
Wholegrains (g/day)	73.6 ± 79.2	79.0 ± 77.9	87.9 ± 77.0	99.1 ± 89.5
Refined grains (g/day)	105 ± 74	120 ± 67	130 ± 71	138 ± 75
Meat (red and processed) (g/day)	58.8 ± 39.9	64.3 ± 41.1	64.5 ± 40.5	67.9 ± 46.0
Coffee (g/day)	252 ± 299	283 ± 302	298 ± 302	325 ± 324
Tea (g/day)	416 ± 360	485 ± 356	510 ± 356	562 ± 377
SSB (g/day)	100.9 ± 135.5	98.2 ± 104.5	105.4 ± 109.0	107.1 ± 108.1
Total fat (en%)	31.4 ± 5.8	31.9 ± 5.3	32.0 ± 5.0	32.4 ± 5.4
SFAs (en%)	10.8 ± 2.8	11.8 ± 2.7	12.1 ± 2.7	12.7 ± 3.0
Protein (en%)	18.1 ± 3.8	18.1 ± 3.5	18.1 ± 3.3	18.5 ± 3.3
Carbohydrate (en%)	49.9 ± 8.0	49.9 ± 6.7	50.5 ± 6.2	50.3 ± 6.4
Intrinsic and milk sugars (g/day)	50.5 ± 34.7	56.3 ± 32.1	61.9 ± 32.8	68.0 ± 36.9
Calcium (mg/day)	696 ± 192	921 ± 179	1,107 ± 184	1,412 ± 268
Sodium (mg/day)	1,667 ± 638	1,898 ± 632	2,085 ± 632	2,380 ± 738

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: BMI, Body Mass Index; Q, Quartile; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; tMDS, tertiles Mediterranean diet score.

Supplemental table 2. *Continued.*

	High-fat milk		Low-fat milk		High-fat yogurt		Low-fat yogurt	
	Zero	M2	Zero	T3	Zero	T3	Zero	T3
N participants	6,314	572	1,349	1,705	4,909	751	2,249	1,582
Total intake (servings/day)	0.0 ± 0.0	1.8 ± 0.7	0.1 ± 0.1	2.6 ± 0.5	0.0 ± 0.0	0.6 ± 0.3	0.0 ± 0.0	1.0 ± 0.5
Range	0.0-0.0	1.1-7.3	0.0-0.4	1.8-3.7	0.0-0.0	0.4-4.5	0.0-0.0	0.8-6.0
Follow-up time (years)	6.7 ± 2.1	7.2 ± 1.9	6.8 ± 1.9	6.7 ± 2.1	6.9 ± 2.0	6.3 ± 1.8	6.7 ± 2.0	6.7 ± 2.0
Age at baseline (years)	48.8 ± 7.4	48.5 ± 7.2	48.7 ± 7.3	48.7 ± 7.5	48.6 ± 7.4	49.0 ± 7.4	48.6 ± 7.5	49.6 ± 7.3
Sex, female (%)	52.8	37.9	53.2	44.1	49.6	56.3	39.8	65.3
Educational level (%)								
Intermediate	46.1	41.5	40.2	48.0	50.4	34.1	44.7	49.2
High	37.6	40.8	43.9	34.5	29.9	56.2	37.2	33.7
Age completing education (years)	19.2 ± 4.4	19.4 ± 4.3	19.8 ± 5.0	19.0 ± 4.1	18.7 ± 4.2	20.7 ± 4.7	19.3 ± 4.7	19.0 ± 4.1
Ethnic origin, non-white (%)	2.2	1.4	3.7	1.1	1.9	2.7	3.0	1.4
Working (%)	89.3	85.7	87.7	88.4	89.1	89.2	88.1	89.8
Household income (%)								
£20,000-40,000	33.8	35.9	33.5	35.8	36.2	30.4	35.3	36.8
>£40,000	55.7	48.8	53.0	53.9	51.8	59.5	52.8	52.5
Marital status (%)								
Married	83.7	76.0	76.6	84.2	82.7	80.5	81.3	82.9
Widowed/separated	8.9	13.7	10.5	9.0	9.1	9.5	8.7	9.9
Smoking status (%)								
Former	33.5	31.9	32.1	31.6	33.0	33.2	32.6	32.6
Current	8.9	12.8	12.2	9.3	10.5	6.5	12.6	5.7
Pack-years among smokers	4,109 [1,744-8,255]	4,876 [1,977-9,426]	3,853 [1,500-9,363]	4,743 [1,934-8,766]	4,379 [1,915-9,046]	2,516 [1,342-6,259]	4,894 [2,335-9,751]	3,737 [1,600-7,095]
Alcohol intake (g/day)	6.4 [1.7; 12.5]	6.7 [1.3; 13.3]	5.9 [0.9; 12.5]	5.9 [1.6; 11.4]	5.9 [1.4; 11.9]	6.3 [1.7; 11.6]	6.3 [1.6; 13.6]	5.4 [1.3; 10.9]
Physical activity (kJ/kg/day)	54.3 ± 21.5	58.4 ± 23.4	54.2 ± 21.6	56.5 ± 23.0	54.7 ± 21.9	55.7 ± 22.1	55.1 ± 22.2	54.0 ± 21.4
Family history of diabetes (%)	23.8	21.5	23.0	22.5	24.4	20.9	24.5	25.0
BMI (kg/m2)	26.5 ± 4.5	25.8 ± 4.2	25.9 ± 4.5	26.8 ± 4.3	26.8 ± 4.6	25.3 ± 4.0	26.3 ± 4.5	26.5 ± 4.5

Supplemental table 2. *Continued. (continued)*

	High-fat milk		Low-fat milk		High-fat yogurt		Low-fat yogurt	
	Zero	M2	Zero	T3	Zero	T3	Zero	T3
Body fat (%)	32.9 ± 8.3	30.1 ± 8.0	31.9 ± 8.7	32.1 ± 8.4	32.9 ± 8.5	31.5 ± 8.2	31.1 ± 8.2	34.3 ± 8.4
Waist circumference (cm)	90.1 ± 12.9	90.2 ± 12.9	88.8 ± 12.9	91.6 ± 12.7	91.0 ± 13.1	87.1 ± 11.7	91.0 ± 13.1	88.9 ± 12.8
Hypertension	37.2	34.3	34.4	38.6	39.1	32.0	38.3	36.5
Dyslipidaemia	9.1	6.7	7.7	9.9	9.4	7.6	9.9	9.2
Dietary intake at baseline								
Energy intake (kcal/day)	1,927 ± 567	2,223 ± 591	1,902 ± 625	2,121 ± 582	1,895 ± 572	2,121 ± 583	1,890 ± 578	1,989 ± 549
DASH score	24.6 ± 4.4	22.0 ± 4.8	22.6 ± 4.8	25.8 ± 4.1	24.0 ± 4.6	24.9 ± 4.5	22.9 ± 4.6	25.9 ± 4.2
tMDS score	7.6 ± 1.4	7.5 ± 1.5	7.6 ± 1.6	7.5 ± 1.4	7.4 ± 1.4	8.2 ± 1.4	7.3 ± 1.5	7.9 ± 1.4
Fruit (g/day)	245 ± 177	225 ± 174	235 ± 192	246 ± 168	231 ± 174	281 ± 197	194 ± 153	314 ± 208
Vegetables (g/day)	273 ± 138	260 ± 125	275 ± 141	270 ± 126	265 ± 141	290 ± 139	250 ± 132	299 ± 158
Wholegrains (g/day)	85.3 ± 81.7	83.6 ± 83.2	83.4 ± 87.9	93.1 ± 86.7	78.6 ± 78.3	95.4 ± 94.7	71.6 ± 78.2	97.2 ± 85.6
Refined grains (g/day)	122 ± 73	139 ± 71	119 ± 77	132 ± 74	119 ± 73	135 ± 72	123 ± 77	117 ± 69
Meat (red and processed) (g/day)	63.7 ± 41.8	70.9 ± 43.2	59.6 ± 43.3	68.7 ± 46.0	66.1 ± 42.8	56.9 ± 41.9	66.5 ± 45.6	60.5 ± 39.6
Coffee (g/day)	290 ± 308	312 ± 321	285 ± 315	325 ± 325	281 ± 312	314 ± 302	291 ± 322	281 ± 302
Tea (g/day)	493 ± 366	554 ± 374	401 ± 368	588 ± 375	494 ± 373	492 ± 352	498 ± 386	494 ± 366
SSB (g/day)	101.8 ± 115.3	109.9 ± 110.1	113.9 ± 139.1	99.6 ± 103.3	103.1 ± 121.0	102.3 ± 105.0	103.1 ± 125.9	101.6 ± 106.4
Total fat (en%)	31.6 ± 5.3	34.9 ± 5.0	33.7 ± 6.0	31.2 ± 5.1	31.4 ± 5.4	34.0 ± 5.2	33.0 ± 5.8	30.3 ± 4.9
SFAs (en%)	11.6 ± 2.7	14.5 ± 3.0	12.6 ± 3.6	11.9 ± 2.7	11.4 ± 2.8	13.5 ± 2.8	12.4 ± 3.2	11.0 ± 2.5
Protein (en%)	18.3 ± 3.5	17.4 ± 3.2	17.4 ± 3.8	18.9 ± 3.2	18.4 ± 3.6	17.5 ± 3.2	17.7 ± 3.5	19.1 ± 3.5
Carbohydrate (en%)	50.4 ± 6.9	48.4 ± 6.2	48.9 ± 8.0	50.8 ± 6.3	50.5 ± 7.0	49.2 ± 6.8	49.0 ± 7.6	51.9 ± 6.3
Intrinsic and milk sugars (g/day)	58.4 ± 34.4	68.0 ± 36.9	59.5 ± 38.0	63.2 ± 34.9	59.0 ± 35.9	62.2 ± 32.6	59.4 ± 36.5	59.3 ± 33.2
Calcium (mg/day)	1,027 ± 335	1,233 ± 314	862 ± 342	1,349 ± 276	999 ± 332	1,166 ± 354	935 ± 330	1,165 ± 321
Sodium (mg/day)	2,001 ± 712	2,172 ± 725	1,911 ± 760	2,219 ± 737	1,966 ± 704	2,107 ± 742	1,902 ± 700	2,102 ± 690

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data. Abbreviations: BMI, Body Mass Index; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; M, median; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; T, Tertile; tMDS, tertiles Mediterranean diet score; Q, Quartile.

Supplemental table 2. *Continued.*

	High-fat cheese		Low-fat cheese	
	Q1	Q4	Zero	T3
N participants	1,884	1,870	4,650	682
Total intake (servings/day)	0.1 ± 0.1	0.9 ± 0.4	0.0 ± 0.0	0.8 ± 0.5
Range	0.0-0.2	0.5-5.2	0.0-0.0	0.6-6.8
Follow-up time (years)	6.8 ± 2.1	6.7 ± 2.0	6.7 ± 2.1	6.8 ± 2.0
Age at baseline (years)	49.9 ± 7.3	47.7 ± 7.5	48.7 ± 7.4	48.7 ± 7.6
Sex, female (%)	56.9	48.2	45.4	74.6
Educational level (%)				
Intermediate	50.9	38.5	45.8	47.7
High	29.8	49.7	37.0	38.1
Age completing education (years)	18.7 ± 4.6	20.3 ± 4.6	19.2 ± 4.3	19.6 ± 4.9
Ethnic origin, non-white (%)	4.0	1.3	2.5	2.0
Working (%)	89.2	88.6	89.4	87.2
Household income (%)				
£20,000-40,000	34.8	31.6	33.1	39.6
>£40,000	51.4	58.5	56.2	49.3
Marital status (%)				
Married	80.8	81.8	83.4	80.3
Widowed/separated	10.1	8.9	8.6	10.1
Smoking status (%)				
Former	33.6	32.5	33.3	33.0
Current	8.5	9.5	9.2	8.8
Pack-years among smokers	4,799 [2,461-9,046]	4,082 [1,511-7,451]	4,219 [1,709-9,160]	3,317 [1,644-6,619]
Alcohol intake (g/day)	5.4 [0.9; 10.3]	7.2 [2.3; 14.5]	6.6 [1.7; 13.2]	5.4 [0.9; 10.6]
Physical activity (kJ/kg/day)	52.3 ± 21.9	56.7 ± 21.6	54.7 ± 21.7	52.2 ± 19.7
Family history of diabetes (%)	24.3	22.8	23.3	25.7
BMI (kg/m2)	26.7 ± 4.7	25.9 ± 4.2	26.4 ± 4.4	26.4 ± 4.7
Body fat (%)	33.5 ± 8.6	31.6 ± 8.2	31.9 ± 8.3	35.3 ± 8.2
Waist circumference (cm)	89.9 ± 13.1	89.7 ± 12.7	90.6 ± 12.8	87.7 ± 13.2
Hypertension (%)	39.9	31.7	36.8	38.4
Dyslipidaemia (%)	10.2	6.8	9.0	8.9
Dietary intake at baseline				
Energy intake (kcal/day)	1,677 ± 517	2,256 ± 588	1,920 ± 565	2,009 ± 612
DASH score	25.2 ± 4.6	23.9 ± 4.5	23.6 ± 4.5	26.8 ± 4.2
tMDS score	7.5 ± 1.5	7.8 ± 1.4	7.5 ± 1.5	8.2 ± 1.4
Fruit (g/day)	253 ± 196	243 ± 165	223 ± 164	337 ± 236
Vegetables (g/day)	274 ± 162	282 ± 129	255 ± 126	338 ± 180
Wholegrains (g/day)	87.4 ± 86.0	90.1 ± 82.7	77.5 ± 76.3	113.6 ± 92.7

Supplemental table 2. *Continued. (continued)*

	High-fat cheese		Low-fat cheese	
	Q1	Q4	Zero	T3
Refined grains (g/day)	100 ± 73	148 ± 76	124 ± 73	115 ± 69
Meat (red and processed) (g/day)	58.8 ± 40.8	65.7 ± 47.1	66.1 ± 42.4	54.8 ± 42.0
Coffee (g/day)	256 ± 305	325 ± 315	288 ± 310	278 ± 311
Tea (g/day)	498 ± 369	486 ± 366	499 ± 370	477 ± 370
SSB (g/day)	90.1 ± 119.7	113.2 ± 116.8	105.0 ± 120.5	101.9 ± 118.8
Total fat (en%)	29.6 ± 5.6	34.2 ± 5.0	32.0 ± 5.4	30.8 ± 5.5
SFAs (en%)	10.3 ± 2.8	13.3 ± 2.7	11.9 ± 2.9	11.1 ± 2.8
Protein (en%)	19.3 ± 4.0	17.3 ± 3.0	18.0 ± 3.4	19.2 ± 3.9
Carbohydrate (en%)	51.7 ± 7.6	48.8 ± 6.5	50.0 ± 6.9	51.6 ± 7.2
Intrinsic and milk sugars (g/day)	50.0 ± 33.5	68.6 ± 36.3	59.8 ± 34.9	56.7 ± 38.3
Calcium (mg/day)	906 ± 321	1,211 ± 336	993 ± 325	1,157 ± 370
Sodium (mg/day)	1,720 ± 648	2,375 ± 734	1,944 ± 682	2,202 ± 780

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: BMI, Body Mass Index; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; M, median; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; T, Tertile; tMDS, tertiles Mediterranean diet score; Q, Quartile.

Supplemental table 2. *Continued.*

	Changes in total dairy		Changes in high-fat milk[1]		Changes in low-fat milk[1]	
	Decrease	Increase	Decrease	Increase	Decrease	Increase
N participants	4,211	3,288	294	5,065	1,785	3,574
Change in intake (servings/day)	-0.9 ± 0.8	0.8 ± 0.9	-1.4 ± 0.8	0.1 ± 0.3	-1.1 ± 0.6	0.3 ± 0.6
Range	-10.4; 0.0	0.0; 10.9	-3.7; 0.0	0.0; 3.7	-3.7; 0.0	0.0; 3.7
Follow-up time (years)	6.8 ± 2.1	6.7 ± 2.0	7.0 ± 1.9	6.6 ± 2.1	6.8 ± 2.1	6.6 ± 2.0
Age at baseline (years)	48.6 ± 7.4	48.9 ± 7.3	47.8 ± 7.2	48.6 ± 7.4	48.1 ± 7.5	48.8 ± 7.3
Sex, female (%)	51.1	53.0	43.5	51.0	50.4	50.7
Educational level (%)						
Intermediate	45.6	45.2	36.2	45.2	47.2	43.5
High	38.4	38.2	46.8	38.6	36.3	40.4
Age completing education (years)	19.4 ± 4.5	19.3 ± 4.4	20.0 ± 5.0	19.4 ± 4.5	19.2 ± 4.4	19.5 ± 4.6
Ethnic origin, non-white (%)	2.6	2.0	2.8	2.3	2.5	2.2
Working (%)	88.4	89.7	86.7	89.7	89.1	89.8
Household income (%)						
£20,000-40,000	34.4	33.0	39.8	33.9	35.0	33.9
>£40,000	54.4	56.4	47.1	55.7	55.4	55.1
Marital status (%)						
Married	82.8	82.7	75.2	83.6	84.3	82.6
Widowed/separated	9.1	9.2	12.2	8.9	8.4	9.3
Smoking status (%)						
Former	33.6	33.0	28.2	33.2	34.8	32.1
Current	9.7	8.9	15.3	9.1	9.9	9.3
Pack-years among smokers	3,519 [1,461-7,467]	4,722 [2,075-9,298]	3,778 [1,324-7,862]	4,131 [1,744-8,373]	4,168 [1,729-8,506]	3,872 [1,525-8,118]
Alcohol intake (g/day)	6.4 [1.7; 12.5]	6.2 [1.7; 12.3]	6.3 [0.9; 14.0]	6.4 [1.7; 12.5]	6.6 [1.7; 12.5]	6.4 [1.7; 12.5]
Physical activity (kJ/kg/day)	55.2 ± 21.9	53.6 ± 21.3	57.1 ± 22.6	54.6 ± 21.6	56.2 ± 22.3	54.0 ± 21.4
Family history of diabetes (%)	22.5	24.6	19.0	23.7	22.7	23.8
BMI (kg/m2)	26.4 ± 4.3	26.4 ± 4.6	25.7 ± 4.6	26.4 ± 4.4	26.5 ± 4.3	26.2 ± 4.4
Body fat (%)	32.5 ± 8.3	32.7 ± 8.5	30.3 ± 8.7	32.5 ± 8.3	32.6 ± 8.3	32.3 ± 8.3

Supplemental table 2. *Continued. (continued)*

	Changes in total dairy		Changes in high-fat milk[1]		Changes in low-fat milk[1]	
	Decrease	Increase	Decrease	Increase	Decrease	Increase
Waist circumference (cm)	90.0 ± 12.6	89.9 ± 13.2	89.2 ± 13.1	90.0 ± 12.7	90.3 ± 12.6	89.7 ± 12.9
Hypertension (%)	36.0	37.7	34.7	35.8	34.6	36.3
Dyslipidaemia (%)	9.0	8.9	7.2	8.9	10.1	8.2
Dietary intake at baseline						
Energy intake (kcal/day)	2,016 ± 574	1,861 ± 568	2,203 ± 626	1,941 ± 566	2,007 ± 561	1,929 ± 576
DASH score	24.5 ± 4.6	23.9 ± 4.5	20.8 ± 4.4	24.2 ± 4.4	25.0 ± 4.3	23.6 ± 4.5
tMDS score	7.7 ± 1.5	7.6 ± 1.5	7.4 ± 1.5	7.6 ± 1.5	7.6 ± 1.4	7.6 ± 1.5
Fruit (g/day)	249 ± 184	235 ± 168	199 ± 146	238 ± 173	241 ± 174	233 ± 170
Vegetables (g/day)	275 ± 139	270 ± 135	256 ± 120	270 ± 138	272 ± 133	268 ± 139
Wholegrains (g/day)	87.0 ± 81.0	82.0 ± 81.2	73.3 ± 76.2	83.1 ± 81.5	87.1 ± 80.9	80.3 ± 81.4
Refined grains (g/day)	127 ± 74	120 ± 71	140 ± 75	125 ± 73	127 ± 76	126 ± 72
Meat (red and processed) (g/day)	64.3 ± 42.8	63.3 ± 41.1	73.4 ± 46.3	64.9 ± 42.1	66.4 ± 45.1	64.9 ± 41.0
Coffee (g/day)	301 ± 314	274 ± 299	340 ± 329	292 ± 308	309 ± 318	287 ± 305
Tea (g/day)	492 ± 369	494 ± 362	510 ± 379	486 ± 366	501 ± 366	480 ± 367
SSB (g/day)	102.5 ± 112.6	103.4 ± 117.5	117.4 ± 125.5	103.8 ± 114.3	102.2 ± 112.1	105.8 ± 116.3
Total fat (en%)	32.1 ± 5.3	31.8 ± 5.5	36.4 ± 5.0	32.0 ± 5.2	31.7 ± 5.1	32.5 ± 5.4
SFAs (en%)	12.0 ± 2.9	11.6 ± 2.8	15.3 ± 3.0	11.9 ± 2.8	11.9 ± 2.7	12.1 ± 3.0
Protein (en%)	18.3 ± 3.4	18.1 ± 3.6	16.9 ± 3.1	18.2 ± 3.4	18.5 ± 3.3	17.9 ± 3.4
Carbohydrate (en%)	50.1 ± 6.7	50.3 ± 7.2	46.9 ± 6.9	50.1 ± 6.8	50.2 ± 6.5	49.8 ± 7.0
Intrinsic and milk sugars (g/day)	60.8 ± 34.6	57.1 ± 35.0	68.1 ± 39.7	59.1 ± 34.1	60.2 ± 33.5	59.3 ± 35.0
Calcium (mg/day)	1,117 ± 332	926 ± 307	1,120 ± 338	1,017 ± 335	1,155 ± 318	957 ± 325
Sodium (mg/day)	2,077 ± 698	1,918 ± 715	2,133 ± 764	2,000 ± 713	2,080 ± 705	1,971 ± 719

[1] Excluding participants who consumed non-specific milk at baseline or follow-up (*n* = 2,162, 29%) to avoid classification errors in change estimates.
Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data. Abbreviations: BMI, Body Mass Index; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; tMDS, tertiles Mediterranean diet score.

Supplemental table 2. *Continued.*

	Changes in high-fat yogurt		Changes in low-fat yogurt		Changes in high-fat cheese		Changes in low-fat cheese	
	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase
N participants	1,113	6,386	2,604	4,895	3,612	3,887	1,573	5,926
Change in intake (servings/day)	-0.2 ± 0.2	0.1 ± 0.3	-0.4 ± 0.4	0.2 ± 0.4	-0.2 ± 0.3	0.2 ± 0.3	-0.3 ± 0.4	0.1 ± 0.3
Range	-2.4; -0.1	0.0; 6.0	-5.6; -0.1	0.0; 6.0	-4.2; 0.0	0.0; 5.1	-6.8; -0.1	0.0; 9.0
Follow-up time (years)	6.5 ± 2.0	6.8 ± 2.0	6.8 ± 2.1	6.7 ± 2.0	6.8 ± 2.1	6.7 ± 2.0	6.8 ± 2.0	6.7 ± 2.0
Age at baseline (years)	48.9 ± 7.4	48.7 ± 7.4	48.5 ± 7.5	48.8 ± 7.3	48.4 ± 7.3	49.0 ± 7.5	48.3 ± 7.6	48.8 ± 7.3
Sex, female (%)	54.4	51.5	55.5	50.0	51.5	52.3	61.0	49.5
Educational level (%)								
Intermediate	40.1	46.4	45.9	45.2	46.2	44.8	45.3	45.5
High	47.5	36.7	39.2	37.8	37.9	38.6	40.1	37.8
Age completing education (years)	19.9 ± 4.4	19.2 ± 4.4	19.4 ± 4.3	19.3 ± 4.5	19.3 ± 4.4	19.3 ± 4.4	19.5 ± 4.6	19.2 ± 4.4
Ethnic origin, non-white (%)	3.0	2.2	2.4	2.3	2.5	2.2	2.5	2.3
Working (%)	88.5	89.1	89.7	88.6	88.6	89.3	88.4	89.1
Household income (%)								
£20,000-40,000	31.5	34.2	33.1	34.2	34.2	33.5	34.3	33.7
>£40,000	58.7	54.7	56.6	54.6	55.1	55.5	53.7	55.7
Marital status (%)								
Married	82.5	82.8	83.2	82.6	82.4	83.1	80.5	83.4
Widowed/separated	9.0	9.1	8.9	9.2	9.3	8.9	10.5	8.7
Smoking status (%)								
Former	35.2	33.0	33.7	33.1	32.0	34.6	32.5	33.5
Current	7.4	9.7	7.4	10.4	10.2	8.6	9.2	9.4
Pack-years among smokers	2,699 [1,207-6,547]	4,164 [1,735-8,597]	2,860 [1,088-6,940]	4,409 [1,956-8,944]	3,791 [1,604-7,926]	4,300 [1,653-8,729]	3,675 [1,379-7,054]	4,131 [1,744-8,686]
Alcohol intake (g/day)	7.0 [1.8; 13.1]	6.3 [1.7; 12.5]	6.4 [1.7; 12.9]	6.3 [1.7; 12.5]	6.7 [1.7; 13.0]	6.2 [1.7; 12.0]	5.9 [1.6; 11.9]	6.6 [1.7; 12.5]
Physical activity (kJ/kg/day)	54.4 ± 21.5	54.5 ± 21.7	54.8 ± 21.6	54.4 ± 21.7	54.9 ± 21.3	54.2 ± 21.9	54.8 ± 21.7	54.5 ± 21.7
Family history of diabetes (%)	23.0	23.5	21.9	24.3	22.8	24.1	23.6	23.4
BMI (kg/m2)	26.1 ± 4.2	26.4 ± 4.5	26.3 ± 4.4	26.4 ± 4.5	26.4 ± 4.3	26.4 ± 4.5	26.2 ± 4.3	26.4 ± 4.5

Supplemental table 2. *Continued. (continued)*

	Changes in high-fat yogurt		Changes in low-fat yogurt		Changes in high-fat cheese		Changes in low-fat cheese	
	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase
Body fat (%)	32.6 ± 8.4	32.6 ± 8.4	32.9 ± 8.3	32.5 ± 8.4	32.6 ± 8.3	32.6 ± 8.4	33.5 ± 8.3	32.4 ± 8.4
Waist circumference (cm)	89.3 ± 12.6	90.1 ± 12.9	89.5 ± 12.8	90.2 ± 12.9	90.1 ± 12.9	89.8 ± 12.9	88.7 ± 12.9	90.3 ± 12.9
Hypertension (%)	34.4	37.2	35.2	37.6	36.2	37.2	36.6	36.8
Dyslipidaemia (%)	8.8	9.0	7.6	9.7	8.4	9.6	9.1	9.0
Dietary intake at baseline								
Energy intake (kcal/day)	2,046 ± 575	1,931 ± 575	1,978 ± 571	1,931 ± 579	2,024 ± 588	1,877 ± 557	1,987 ± 596	1,937 ± 571
DASH score	24.5 ± 4.5	24.2 ± 4.5	25.0 ± 4.4	23.9 ± 4.6	24.0 ± 4.5	24.5 ± 4.6	25.3 ± 4.5	24.0 ± 4.5
tMDS score	7.9 ± 1.4	7.6 ± 1.5	7.8 ± 1.4	7.5 ± 1.5	7.6 ± 1.4	7.7 ± 1.5	7.9 ± 1.4	7.6 ± 1.5
Fruit (g/day)	260 ± 193	239 ± 175	268 ± 190	229 ± 169	239 ± 170	246 ± 184	271 ± 195	235 ± 172
Vegetables (g/day)	281 ± 130	271 ± 138	283 ± 134	267 ± 139	275 ± 129	271 ± 145	301 ± 160	265 ± 130
Wholegrains (g/day)	92.3 ± 84.6	83.5 ± 80.4	92.4 ± 85.0	80.8 ± 78.7	85.4 ± 84.5	84.3 ± 77.8	96.1 ± 88.0	81.8 ± 78.9
Refined grains (g/day)	129 ± 70	123 ± 73	123 ± 72	124 ± 73	129 ± 72	119 ± 73	122 ± 71	124 ± 73
Meat (red and processed) (g/day)	61.2 ± 41.8	64.4 ± 42.1	62.3 ± 40.5	64.7 ± 42.9	66.2 ± 44.0	61.8 ± 40.1	59.5 ± 41.2	65.0 ± 42.2
Coffee (g/day)	309 ± 308	286 ± 308	281 ± 299	294 ± 313	295 ± 308	284 ± 308	279 ± 305	292 ± 309
Tea (g/day)	481 ± 351	495 ± 369	488 ± 362	496 ± 368	498 ± 368	489 ± 365	483 ± 366	496 ± 366
SSB (g/day)	99.6 ± 104.1	103.4 ± 116.5	101.1 ± 109.4	103.8 ± 117.5	105.7 ± 115.2	100.2 ± 114.3	100.9 ± 113.0	103.4 ± 115.2
Total fat (en%)	33.1 ± 5.3	31.7 ± 5.4	31.4 ± 5.1	32.2 ± 5.5	32.6 ± 5.3	31.3 ± 5.4	31.8 ± 5.4	32.0 ± 5.4
SFAs (en%)	12.6 ± 2.8	11.7 ± 2.9	11.6 ± 2.7	12.0 ± 2.9	12.2 ± 2.9	11.5 ± 2.8	11.7 ± 2.8	11.9 ± 2.9
Protein (en%)	17.8 ± 3.3	18.3 ± 3.5	18.5 ± 3.4	18.1 ± 3.5	18.1 ± 3.3	18.4 ± 3.6	18.6 ± 3.6	18.1 ± 3.4
Carbohydrate (en%)	49.4 ± 6.8	50.3 ± 6.9	50.6 ± 6.5	49.9 ± 7.1	49.6 ± 6.6	50.7 ± 7.1	50.3 ± 6.9	50.1 ± 6.9
Intrinsic and milk sugars (g/day)	61.2 ± 34.4	58.8 ± 34.9	58.7 ± 33.5	59.4 ± 35.5	61.4 ± 35.6	57.1 ± 33.9	58.5 ± 35.9	59.3 ± 34.5
Calcium (mg/day)	1,097 ± 331	1,023 ± 334	1,085 ± 326	1,006 ± 336	1,076 ± 340	995 ± 325	1,100 ± 350	1,016 ± 328
Sodium (mg/day)	2,084 ± 703	1,994 ± 711	2,060 ± 706	1,979 ± 711	2,104 ± 726	1,917 ± 683	2,102 ± 722	1,982 ± 705

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data. Abbreviations: BMI, Body Mass Index; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; tMDS, tertiles Mediterranean diet score.

Supplemental table 2. *Continued.*

		Included				Excluded
	Total	Male	Female	Age < 50	Age ≥ 50	
N participants	7,521	3,905	3,616	3925	3596	4,914
Total dairy intake (servings/day)	2.6 ± 1.2	2.7 ± 1.2	2.6 ± 1.2	2.6 ± 1.2	2.6 ± 1.2	2.6 ± 1.4
Range	0-11.6	0-10.8	0-11.6	0-11.6	0-9.9	0-18.4
Follow-up time (years)	6.7 ± 2.0	6.7 ± 2.0	6.8 ± 2.1	7.1 ± 2.1	6.3 ± 1.8	6.8 ± 2.0
Age at baseline (years)	48.7 ± 7.4	48.6 ± 7.5	48.8 ± 7.3	42.8 ± 4.4	55.2 ± 3.5	47.1 ± 7.6
Sex (ref. men), female	51.9			51.5	52.3	56.7
Educational level (%)						
Intermediate	45.4	45.9	45.0	43.8	47.2	47.5
High	38.3	39.7	37.1	41.2	35.2	27.0
Age completing education (years)	19.3 ± 4.4	19.5 ± 4.5	19.2 ± 4.4	19.6 ± 4.2	19.0 ± 4.7	18.5 ± 4.2
Ethnic origin, non-white (%)	2.3	2.0	2.6	2.8	1.8	3.7
Working (%)	89.0	93.5	84.8	92.6	85.0	85.1
Household income (%)						
£20,000-40,000	33.8	31.8	35.7	31.3	36.6	37.8
>£40,000	55.3	60.3	50.6	59.3	50.8	43.9
Marital status (%)						
Married	82.7	84.5	81.1	82.6	82.9	79.2
Widowed/separated	9.1	6.9	11.2	7.2	11.1	10.1
Smoking status (%)						
Former	33.3	34.3	32.4	29.8	37.2	33.0
Current	9.4	10.5	8.3	10.4	8.2	18.1
Pack-years among smokers	5,713 [2,725-9,898]	3,525 [1,503-7,150]	4,594 [1,746-9,475]	3,090 [1,189-6,319]	6,077 [2,698-11,314]	4,024 [1,653-8,273]
Alcohol intake (g/day)	6.4 [1.7; 12.5]	9.4 [3.4; 15.8]	5.4 [0.9; 10.3]	6.2 [1.7; 11.7]	6.7 [1.7; 13.3]	5.4 [0.9; 10.9]
Physical activity (kJ/kg/day)	54.6 ± 21.7	58.7 ± 22.8	50.7 ± 19.9	58.8 ± 22.0	50.0 ± 20.4	52.0 ± 22.5
Family history of diabetes (%)	23.4	22.3	24.5	21.8	25.2	24.4
BMI (kg/m2)	26.4 ± 4.4	27.0 ± 3.8	25.8 ± 4.9	26.1 ± 4.4	26.8 ± 4.5	27.7 ± 5.3
Body fat (%)	32.6 ± 8.4	27.5 ± 6.1	37.3 ± 7.3	31.6 ± 8.3	33.7 ± 8.4	34.7 ± 9.1

Supplemental table 2. *Continued. (continued)*

	Included					Excluded
	Total	Male	Female	Age < 50	Age ≥ 50	
Waist circumference (cm)	90.0 ± 12.9	96.3 ± 10.9	84.1 ± 11.8	88.5 ± 12.5	91.5 ± 13.1	92.6 ± 14.2
Hypertension (%)	36.7	42.5	31.4	30.0	44.0	41.6
Dyslipidaemia (%)	9.0	11.1	7.1	4.6	13.8	10.1
Dietary intake at baseline						
Energy intake (kcal/day)	1,948 ± 577	2,090 ± 604	1,816 ± 517	1,985 ± 585	1,907 ± 565	2,008 ± 835
DASH score	24.3 ± 4.5	23.0 ± 4.4	25.4 ± 4.3	23.7 ± 4.5	24.8 ± 4.5	23.6 ± 4.6
tMDS score	7.6 ± 1.5	7.4 ± 1.4	7.9 ± 1.5	7.7 ± 1.4	7.6 ± 1.5	7.4 ± 1.5
Fruit (g/day)	243 ± 178	218 ± 162	266 ± 188	236 ± 175	249 ± 180	235 ± 204
Vegetables (g/day)	273 ± 137	247 ± 119	297 ± 148	263 ± 127	284 ± 147	276 ± 158
Wholegrains (g/day)	84.9 ± 81.6	78.6 ± 78.7	90.8 ± 83.8	80.9 ± 81.6	89.3 ± 81.5	77.6 ± 92.9
Refined grains (g/day)	124 ± 73	137 ± 77	112 ± 67	132 ± 75	115 ± 69	125 ± 89
Meat (red and processed) (g/day)	63.9 ± 42.1	72.4 ± 44.1	56.0 ± 38.5	64.5 ± 42.6	63.2 ± 41.5	71.6 ± 50.5
Coffee (g/day)	289 ± 308	332 ± 320	250 ± 291	289 ± 314	290 ± 301	300 ± 335
Tea (g/day)	493 ± 366	485 ± 367	501 ± 366	463 ± 364	526 ± 366	488 ± 382
SSB (g/day)	102.9 ± 115.0	113.0 ± 117.2	93.5 ± 112.1	116.2 ± 127.4	88.4 ± 97.7	115.2 ± 152.6
Total fat (en%)	31.9 ± 5.4	32.1 ± 5.1	31.8 ± 5.6	32.0 ± 5.4	31.9 ± 5.4	32.3 ± 5.6
SFAs (en%)	11.8 ± 2.9	12.0 ± 2.8	11.7 ± 2.9	11.9 ± 2.8	11.8 ± 2.9	11.9 ± 2.9
Protein (en%)	18.2 ± 3.5	17.6 ± 3.2	18.8 ± 3.6	18.0 ± 3.5	18.4 ± 3.4	18.5 ± 3.9
Carbohydrate (en%)	50.2 ± 6.9	49.8 ± 6.6	50.5 ± 7.1	50.5 ± 6.9	49.8 ± 6.9	50.0 ± 7.2
Intrinsic and milk sugars (g/day)	59.2 ± 34.8	66.7 ± 36.2	52.2 ± 31.8	61.6 ± 25.3	63.1 ± 25.7	63.7 ± 47.8
Calcium (mg/day)	1,034 ± 336	1,062 ± 348	1,008 ± 322	1,036 ± 335	1,032 ± 336	1,036 ± 412
Sodium (mg/day)	2,007 ± 712	2,099 ± 739	1,923 ± 675	2,045 ± 716	1,967 ± 704	2,079 ± 953

Values are mean ± SD for continuous variables with a normal distribution, or median [IQR] for continuous variables with a skewed distribution, percentages for categorical variables, based on unimputed data.
Abbreviations: BMI, Body Mass Index; DASH, Dietary Approaches to Stop Hypertension; en%, percentage of total energy intake; SFA, Saturated Fatty acids; SSB, Sugar Sweetened Beverages; SD, Standard Deviation; tMDS, tertiles Mediterranean diet score.

Supplemental table 3. Pearson correlation coefficients of dairy types with blood markers (*n* = 7,521).

	Cholesterol	TAG	HDL-c	LDL-c	CRP	Adiponectin	C15:0	C17:0	*t*C16:1n7	C14:0
Milk	-.01	.05	-.10	.01	-.02	-.08	.10	.05	.04	.05
High fat milk	.01	.01	-.02	.02	-.01	-.05	.11	.06	.08	.04
Low fat milk	-.02	.04	-.09	.00	-.01	-.05	.03	.01	-.01	.02
Yogurt	-.02	-.07	.06	-.03	-.02	.10	.10	.10	.02	.06
High fat yogurt	-.01	-.05	.05	-.01	-.04	.04	.16	.11	.11	.07
Low fat yogurt	-.02	-.05	.04	-.02	-.01	.09	.04	.06	-.02	.03
Cheese	-.03	-.03	.04	-.04	-.02	.05	.20	.07	.09	.12
High fat cheese	-.02	-.01	.02	-.02	-.04	-.01	**.22**	.06	.12	.14
Low fat cheese	-.03	-.04	.04	-.04	.01	.09	.04	.05	.00	.01
Total dairy products	-.03	.02	-.08	.00	-.02	-.05	.15	.08	.06	.08
High fat dairy	.00	.01	-.03	.01	-.02	-.06	.18	.09	.11	.08
Low fat dairy	-.03	.02	-.07	-.01	-.01	-.01	.04	.03	-.01	.03
Fermented dairy	-.03	-.07	.06	-.04	-.02	.11	.15	.11	.05	.09
High fat fermented dairy	-.02	-.05	.05	-.02	-.05	.03	**.24**	.11	.15	.13
Low fat fermented dairy	-.03	-.06	.05	-.03	.00	.10	.05	.07	-.02	.03
Cream	.05	-.03	.06	.04	-.02	.01	.19	.10	.12	.08
Ice cream	-.01	.03	-.08	.02	.04	-.05	.00	-.04	.00	.06
Butter	.04	-.02	.04	.03	.01	-.02	**.23**	.10	.16	.09

Abbreviations: CRP, C-reactive protein; HDL-c, high density lipoprotein cholesterol; LDL-c, low density lipoprotein cholesterol; TAG, triacylglycerol.

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639).

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total dairy						
Main model 4	1 (ref)	0.66 (0.48-0.92)	0.87 (0.64-1.20)	0.82 (0.57-1.17)	0.48	0.98 (0.87-1.10)
Complete case analysis	1 (ref)	0.64 (0.46-0.90)	0.74 (0.53-1.04)	0.79 (0.54-1.15)	0.30	0.95 (0.84-1.07)
Adjust. tMDS score[3]	1 (ref)	0.68 (0.49-0.94)	0.89 (0.65-1.21)	0.85 (0.61-1.18)	0.56	0.99 (0.90-1.10)
Adjust. DASH score[3]	1 (ref)	0.69 (0.50-0.95)	0.93 (0.68-1.27)	0.92 (0.65-1.30)	0.92	1.02 (0.91-1.14)
Energy adjusted dairy	1 (ref)	1.04 (0.76-1.42)	0.97 (0.69-1.35)	0.94 (0.66-1.32)	0.64	0.98 (0.88-1.10)
Outcome glycaemic status	1 (ref)	0.78 (0.63-0.96)	0.93 (0.75-1.14)	0.94 (0.76-1.17)	0.88	1.01 (0.94-1.08)
High-fat dairy						
Main model 4	1 (ref)	0.89 (0.64-1.23)	1.09 (0.78-1.52)	1.32 (0.93-1.88)	0.06	1.20 (1.03-1.39)*
Complete case analysis	1 (ref)	0.81 (0.57-1.15)	1.01 (0.71-1.45)	1.30 (0.90-1.88)	0.07	1.18 (1.00-1.38)*
Adjust. other dairy intake	1 (ref)	0.88 (0.63-1.23)	1.08 (0.77-1.51)	1.18 (0.82-1.70)	0.23	1.13 (0.96-1.33)
Adjust. tMDS score[3]	1 (ref)	0.91 (0.65-1.26)	1.13 (0.81-1.58)	1.38 (0.97-1.95)	0.03*	1.21 (1.06-1.39)**
Adjust. DASH score[3]	1 (ref)	0.89 (0.64-1.25)	1.10 (0.79-1.53)	1.31 (0.93-1.85)	0.06	1.19 (1.03-1.37)*
Energy adjusted dairy	1 (ref)	0.88 (0.63-1.22)	1.25 (0.91-1.72)	1.28 (0.93-1.77)	0.04*	1.20 (1.04-1.39)*
Outcome glycaemic status	1 (ref)	1.04 (0.84-1.28)	1.11 (0.89-1.38)	1.26 (1.00-1.58)	0.03*	1.15 (1.05-1.26)**
Low-fat dairy						
Main model 4	1 (ref)	0.78 (0.57-1.07)	0.81 (0.59-1.11)	0.81 (0.58-1.13)	0.29	0.90 (0.80-1.01)
Complete case analysis	1 (ref)	0.77 (0.56-1.07)	0.72 (0.52-1.01)	0.74 (0.52-1.05)	0.11	0.88 (0.78-1.00)
Adjust. other dairy intake	1 (ref)	0.83 (0.60-1.15)	0.90 (0.64-1.25)	0.92 (0.65-1.31)	0.80	0.94 (0.84-1.06)
Adjust. tMDS score[3]	1 (ref)	0.80 (0.58-1.09)	0.82 (0.60-1.13)	0.82 (0.60-1.12)	0.29	0.90 (0.81-1.01)
Adjust. DASH score[3]	1 (ref)	0.80 (0.58-1.10)	0.86 (0.62-1.19)	0.89 (0.64-1.26)	0.65	0.93 (0.83-1.05)
Energy adjusted dairy	1 (ref)	1.01 (0.74-1.36)	0.84 (0.60-1.17)	0.83 (0.60-1.17)	0.21	0.90 (0.80-1.01)
Outcome glycaemic status	1 (ref)	0.84 (0.69-1.03)	0.92 (0.75-1.12)	0.84 (0.68-1.03)	0.15	0.94 (0.87-1.01)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total fermented dairy						
Main model 4	1 (ref)	1.12 (0.81-1.53)	0.96 (0.69-1.35)	1.27 (0.89-1.81)	0.28	1.07 (0.90-1.27)
Complete case analysis	1 (ref)	1.04 (0.74-1.45)	0.99 (0.70-1.40)	1.15 (0.78-1.68)	0.53	1.02 (0.85-1.23)
Adjust. other dairy intake	1 (ref)	1.14 (0.84-1.57)	0.99 (0.71-1.38)	1.29 (0.91-1.84)	0.25	1.07 (0.90-1.26)
Adjust. tMDS score[3]	1 (ref)	1.13 (0.82-1.54)	0.98 (0.70-1.38)	1.28 (0.91-1.81)	0.25	1.07 (0.92-1.25)
Adjust. DASH score[3]	1 (ref)	1.12 (0.82-1.53)	0.99 (0.71-1.39)	1.31 (0.93-1.85)	0.19	1.09 (0.93-1.28)
Energy adjusted dairy	1 (ref)	1.05 (0.77-1.45)	1.05 (0.76-1.46)	1.23 (0.88-1.73)	0.24	1.07 (0.90-1.27)
Outcome glycaemic status	1 (ref)	1.07 (0.88-1.31)	0.90 (0.73-1.11)	1.06 (0.84-1.33)	0.94	1.01 (0.90-1.13)
High-fat fermented dairy						
Main model 4	1 (ref)	0.89 (0.65-1.21)	1.00 (0.71-1.39)	1.13 (0.79-1.60)	0.43	1.26 (0.92-1.74)
Complete case analysis	1 (ref)	0.85 (0.61-1.18)	0.95 (0.67-1.34)	1.07 (0.74-1.56)	0.63	1.18 (0.81-1.72)
Adjust. other dairy intake	1 (ref)	0.87 (0.64-1.19)	0.97 (0.69-1.35)	1.11 (0.78-1.58)	0.47	1.25 (0.90-1.72)
Adjust. tMDS score[3]	1 (ref)	0.91 (0.67-1.24)	1.01 (0.73-1.41)	1.18 (0.84-1.68)	0.29	1.32 (0.98-1.79)
Adjust. DASH score[3]	1 (ref)	0.90 (0.66-1.22)	0.98 (0.70-1.37)	1.14 (0.81-1.62)	0.39	1.28 (0.94-1.74)
Energy adjusted dairy	1 (ref)	0.80 (0.58-1.11)	1.04 (0.76-1.43)	1.16 (0.83-1.62)	0.21	1.27 (0.92-1.74)
Outcome glycaemic status	1 (ref)	0.99 (0.82-1.21)	1.07 (0.87-1.32)	1.01 (0.80-1.27)	0.89	1.13 (0.93-1.37)
Low-fat fermented dairy						
Main model 4	1 (ref)	1.41 (1.03-1.93)	1.03 (0.72-1.47)	1.15 (0.81-1.63)	0.85	0.99 (0.81-1.22)
Complete case analysis	1 (ref)	1.38 (0.99-1.93)	1.00 (0.69-1.45)	1.14 (0.78-1.66)	0.86	0.95 (0.76-1.19)
Adjust. other dairy intake	1 (ref)	1.43 (1.04-1.96)	1.06 (0.74-1.50)	1.18 (0.83-1.68)	0.96	1.00 (0.82-1.22)
Adjust. tMDS score[3]	1 (ref)	1.41 (1.03-1.94)	1.03 (0.72-1.48)	1.14 (0.81-1.61)	0.79	0.98 (0.80-1.19)
Adjust. DASH score[3]	1 (ref)	1.41 (1.03-1.93)	1.05 (0.74-1.49)	1.19 (0.84-1.68)	0.99	1.01 (0.83-1.24)
Energy adjusted dairy	1 (ref)	1.33 (0.97-1.83)	1.00 (0.71-1.41)	1.14 (0.81-1.60)	0.95	0.99 (0.81-1.22)
Outcome glycaemic status	1 (ref)	1.15 (0.94-1.40)	1.09 (0.88-1.35)	0.98 (0.78-1.23)	0.43	0.95 (0.82-1.09)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Milk						
Main model 4	1 (ref)	0.76 (0.58-0.99)	0.81 (0.57-1.16)	0.80 (0.54-1.18)	0.18	0.92 (0.80-1.06)
Complete case analysis	1 (ref)	0.75 (0.56-0.99)	0.73 (0.49-1.08)	0.82 (0.54-1.23)	0.16	0.90 (0.78-1.05)
Adjust. other dairy intake	1 (ref)	0.75 (0.58-0.99)	0.82 (0.57-1.17)	0.81 (0.55-1.21)	0.22	0.93 (0.81-1.07)
Adjust. tMDS score[3]	1 (ref)	0.78 (0.60-1.02)	0.84 (0.60-1.18)	0.84 (0.58-1.22)	0.24	0.94 (0.83-1.07)
Adjust. DASH score[3]	1 (ref)	0.79 (0.60-1.04)	0.89 (0.63-1.27)	0.91 (0.62-1.33)	0.50	0.97 (0.85-1.11)
Energy adjusted dairy	1 (ref)	1.28 (0.94-1.75)	0.92 (0.65-1.29)	0.97 (0.68-1.37)	0.38	0.93 (0.81-1.06)
Outcome glycaemic status	1 (ref)	0.82 (0.68-0.98)	0.94 (0.75-1.17)	0.91 (0.72-1.16)	0.47	1.00 (0.91-1.09)
High-fat milk						
Main model 4	1 (ref)	0.88 (0.56-1.39)	0.88 (0.56-1.39)		0.12	1.22 (1.01-1.47)*
Complete case analysis	1 (ref)	0.94 (0.59-1.50)	1.53 (1.02-2.28)		0.09	1.20 (0.99-1.46)
Adjust. other dairy intake	1 (ref)	0.83 (0.53-1.31)	1.32 (0.88-1.97)		0.38	1.15 (0.93-1.42)
Adjust. tMDS score[3]	1 (ref)	0.89 (0.57-1.40)	1.56 (1.07-2.28)		0.08	1.23 (1.03-1.48)*
Adjust. DASH score[3]	1 (ref)	0.85 (0.54-1.33)	1.49 (1.02-2.18)		0.15	1.21 (1.00-1.46)
Energy adjusted dairy	1 (ref)	0.96 (0.61-1.51)	1.39 (0.95-2.02)		0.14	1.21 (1.00-1.46)
Outcome glycaemic status	1 (ref)	1.12 (0.86-1.45)	1.37 (1.10-1.72)		0.01**	1.17 (1.04-1.31)*
Low-fat milk						
Main model 4	1 (ref)	1.10 (0.80-1.52)	0.82 (0.58-1.16)	0.79 (0.54-1.15)	0.06	0.86 (0.75-0.98)*
Complete case analysis	1 (ref)	1.07 (0.77-1.49)	0.78 (0.55-1.11)	0.73 (0.49-1.08)	0.02*	0.85 (0.74-0.98)*
Adjust. other dairy intake	1 (ref)	1.18 (0.85-1.64)	0.90 (0.63-1.29)	0.89 (0.60-1.32)	0.21	0.89 (0.78-1.03)
Adjust. tMDS score[3]	1 (ref)	1.11 (0.81-1.53)	0.84 (0.59-1.18)	0.81 (0.56-1.17)	0.07	0.87 (0.77-0.99)*
Adjust. DASH score[3]	1 (ref)	1.12 (0.82-1.55)	0.86 (0.61-1.22)	0.88 (0.60-1.28)	0.20	0.90 (0.78-1.03)
Energy adjusted dairy	1 (ref)	1.11 (0.82-1.50)	0.90 (0.65-1.25)	0.76 (0.54-1.07)	0.06	0.86 (0.76-0.99)*
Outcome glycaemic status	1 (ref)	1.13 (0.91-1.39)	0.89 (0.71-1.11)	0.92 (0.73-1.16)	0.12	0.93 (0.86-1.01)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total yogurt						
Main model 4	1 (ref)	0.80 (0.56-1.15)	0.79 (0.59-1.05)	0.92 (0.65-1.30)	0.66	0.93 (0.73-1.19)
Complete case analysis	1 (ref)	0.75 (0.50-1.11)	0.78 (0.58-1.06)	0.87 (0.60-1.26)	0.52	0.88 (0.67-1.15)
Adjust. other dairy intake	1 (ref)	0.79 (0.55-1.13)	0.79 (0.59-1.05)	0.92 (0.65-1.30)	0.67	0.93 (0.73-1.19)
Adjust. tMDS score[3]	1 (ref)	0.80 (0.55-1.15)	0.80 (0.60-1.06)	0.91 (0.66-1.26)	0.62	0.94 (0.74-1.18)
Adjust. DASH score[3]	1 (ref)	0.79 (0.55-1.14)	0.81 (0.61-1.08)	0.94 (0.68-1.31)	0.77	0.97 (0.76-1.23)
Energy adjusted dairy	1 (ref)	1.16 (0.85-1.59)	0.95 (0.68-1.32)	1.00 (0.70-1.41)	0.65	0.93 (0.73-1.19)
Outcome glycaemic status	1 (ref)	1.05 (0.84-1.31)	0.95 (0.79-1.14)	0.89 (0.71-1.12)	0.24	0.88 (0.74-1.04)
High-fat yogurt						
Main model 4	1 (ref)	1.05 (0.75-1.46)	0.91 (0.55-1.48)	1.28 (0.85-1.92)	0.29	1.22 (0.74-2.01)
Complete case analysis	1 (ref)	0.99 (0.69-1.41)	1.02 (0.62-1.68)	1.13 (0.72-1.77)	0.60	1.08 (0.61-1.90)
Adjust. other dairy intake	1 (ref)	1.01 (0.72-1.40)	0.90 (0.55-1.47)	1.23 (0.82-1.84)	0.37	1.19 (0.71-2.00)
Adjust. tMDS score[3]	1 (ref)	1.04 (0.75-1.45)	0.91 (0.56-1.49)	1.30 (0.87-1.94)	0.24	1.36 (0.81-2.29)
Adjust. DASH score[3]	1 (ref)	1.03 (0.74-1.43)	0.89 (0.55-1.46)	1.27 (0.85-1.89)	0.30	1.32 (0.77-2.25)
Energy adjusted dairy	1 (ref)	1.19 (0.82-1.73)	0.65 (0.39-1.07)	1.33 (0.92-1.91)	0.20	1.23 (0.75-2.02)
Outcome glycaemic status	1 (ref)	1.17 (0.94-1.44)	0.93 (0.66-1.31)	1.22 (0.93-1.60)	0.18	1.21 (0.83-1.78)
Low-fat yogurt						
Main model 4	1 (ref)	1.19 (0.89-1.59)	0.87 (0.62-1.22)	0.95 (0.67-1.34)	0.34	0.89 (0.68-1.17)
Complete case analysis	1 (ref)	1.15 (0.84-1.57)	0.87 (0.61-1.25)	0.94 (0.65-1.35)	0.39	0.85 (0.64-1.14)
Adjust. other dairy intake	1 (ref)	1.20 (0.90-1.61)	0.88 (0.63-1.24)	0.96 (0.68-1.36)	0.38	0.90 (0.69-1.17)
Adjust. tMDS score[3]	1 (ref)	1.20 (0.90-1.61)	0.88 (0.63-1.24)	0.94 (0.68-1.32)	0.31	0.89 (0.68-1.15)
Adjust. DASH score[3]	1 (ref)	1.19 (0.89-1.60)	0.89 (0.64-1.25)	0.97 (0.70-1.36)	0.43	0.92 (0.70-1.20)
Energy adjusted dairy	1 (ref)	1.16 (0.85-1.57)	0.94 (0.68-1.30)	0.94 (0.67-1.30)	0.40	0.89 (0.68-1.17)
Outcome glycaemic status	1 (ref)	1.17 (0.97-1.41)	1.01 (0.81-1.25)	0.90 (0.72-1.12)	0.09	0.84 (0.70-1.01)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Cheese						
Main model 4	1 (ref)	0.91 (0.66-1.25)	0.88 (0.63-1.23)	1.23 (0.88-1.71)	0.20	1.27 (0.99-1.62)
Complete case analysis	1 (ref)	0.87 (0.62-1.21)	0.83 (0.58-1.18)	1.19 (0.84-1.70)	0.28	1.21 (0.91-1.61)
Adjust. other dairy intake	1 (ref)	0.89 (0.65-1.23)	0.88 (0.63-1.23)	1.24 (0.89-1.73)	0.17	1.28 (1.00-1.63)
Adjust. tMDS score[3]	1 (ref)	0.93 (0.67-1.27)	0.90 (0.64-1.26)	1.26 (0.90-1.75)	0.15	1.27 (1.01-1.61)
Adjust. DASH score[3]	1 (ref)	0.92 (0.67-1.26)	0.88 (0.63-1.23)	1.25 (0.89-1.74)	0.16	1.27 (1.01-1.60)
Energy adjusted dairy	1 (ref)	1.05 (0.77-1.44)	0.89 (0.63-1.25)	1.28 (0.91-1.78)	0.21	1.26 (0.98-1.62)
Outcome glycaemic status	1 (ref)	0.92 (0.75-1.13)	0.98 (0.79-1.20)	1.03 (0.83-1.28)	0.69	1.15 (0.98-1.34)
High-fat cheese						
Main model 4	1 (ref)	0.80 (0.58-1.10)	1.03 (0.75-1.42)	1.02 (0.71-1.45)	0.63	1.28 (0.86-1.91)
Complete case analysis	1 (ref)	0.78 (0.56-1.09)	0.98 (0.69-1.37)	0.98 (0.67-1.43)	0.81	1.23 (0.77-1.96)
Adjust. other dairy intake	1 (ref)	0.80 (0.58-1.09)	1.01 (0.73-1.40)	1.01 (0.71-1.44)	0.66	1.28 (0.86-1.90)
Adjust. tMDS score[3]	1 (ref)	0.81 (0.59-1.12)	1.05 (0.76-1.46)	1.06 (0.75-1.50)	0.48	1.33 (0.92-1.91)
Adjust. DASH score[3]	1 (ref)	0.80 (0.58-1.09)	1.02 (0.74-1.41)	1.02 (0.72-1.45)	0.61	1.28 (0.89-1.85)
Energy adjusted dairy	1 (ref)	0.78 (0.56-1.07)	0.93 (0.68-1.27)	0.98 (0.71-1.36)	0.82	1.29 (0.86-1.91)
Outcome glycaemic status	1 (ref)	0.98 (0.81-1.20)	1.10 (0.90-1.35)	0.89 (0.71-1.12)	0.41	1.11 (0.89-1.39)
Low-fat cheese						
Main model 4	1 (ref)	1.13 (0.85-1.50)	0.80 (0.49-1.28)	1.26 (0.85-1.87)	0.34	1.26 (0.90-1.77)
Complete case analysis	1 (ref)	1.11 (0.82-1.50)	0.70 (0.41-1.21)	1.24 (0.81-1.90)	0.46	1.21 (0.83-1.76)
Adjust. other dairy intake	1 (ref)	1.16 (0.87-1.54)	0.85 (0.53-1.37)	1.31 (0.89-1.94)	0.23	1.29 (0.93-1.79)
Adjust. tMDS score[3]	1 (ref)	1.13 (0.85-1.51)	0.78 (0.48-1.25)	1.22 (0.83-1.81)	0.43	1.22 (0.89-1.67)
Adjust. DASH score[3]	1 (ref)	1.14 (0.85-1.52)	0.78 (0.49-1.26)	1.27 (0.86-1.88)	0.33	1.26 (0.93-1.71)
Energy adjusted dairy	1 (ref)	1.11 (0.78-1.59)	1.09 (0.77-1.53)	1.05 (0.73-1.50)	0.79	1.26 (0.90-1.77)
Outcome glycaemic status	1 (ref)	0.99 (0.82-1.21)	1.16 (0.90-1.50)	1.24 (0.95-1.62)	0.09	1.21 (0.97-1.50)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Cream						
Main model 4	1 (ref)	1.07 (0.81-1.42)	0.97 (0.67-1.41)	0.81 (0.53-1.24)	0.42	0.51 (0.21-1.25)
Complete case analysis	1 (ref)	1.09 (0.81-1.47)	1.00 (0.67-1.47)	0.86 (0.55-1.34)	0.62	0.55 (0.22-1.37)
Adjust. other dairy intake	1 (ref)	1.07 (0.81-1.42)	0.95 (0.66-1.38)	0.80 (0.52-1.23)	0.38	0.49 (0.20-1.21)
Adjust. tMDS score[3]	1 (ref)	1.06 (0.80-1.41)	0.98 (0.68-1.42)	0.79 (0.52-1.21)	0.38	0.50 (0.20-1.21)
Adjust. DASH score[3]	1 (ref)	1.06 (0.80-1.40)	0.96 (0.66-1.39)	0.77 (0.51-1.18)	0.30	0.46 (0.19-1.15)
Energy adjusted dairy	1 (ref)	0.99 (0.71-1.37)	1.08 (0.78-1.51)	0.87 (0.61-1.26)	0.63	0.54 (0.23-1.27)
Outcome glycaemic status	1 (ref)	1.13 (0.94-1.36)	1.20 (0.96-1.51)	1.02 (0.79-1.32)	0.48	0.90 (0.63-1.29)
Ice cream						
Main model 4	1 (ref)	1.22 (0.93-1.59)	1.08 (0.75-1.57)	1.01 (0.64-1.58)	0.87	0.94 (0.24-3.70)
Complete case analysis	1 (ref)	1.25 (0.95-1.65)	0.93 (0.62-1.41)	0.84 (0.51-1.39)	0.32	0.61 (0.12-3.16)
Adjust. other dairy intake	1 (ref)	1.27 (0.97-1.66)	1.14 (0.79-1.65)	1.05 (0.67-1.65)	0.97	1.04 (0.28-3.91)
Adjust. tMDS score[3]	1 (ref)	1.22 (0.94-1.59)	1.11 (0.77-1.60)	1.04 (0.66-1.64)	0.98	1.11 (0.28-4.42)
Adjust. DASH score[3]	1 (ref)	1.22 (0.93-1.59)	1.11 (0.77-1.61)	1.04 (0.66-1.63)	0.99	1.11 (0.28-4.40)
Energy adjusted dairy	1 (ref)	1.10 (0.77-1.58)	1.19 (0.89-1.61)	1.11 (0.81-1.54)	0.41	1.07 (0.29-3.95)
Outcome glycaemic status	1 (ref)	0.93 (0.78-1.12)	1.06 (0.85-1.33)	0.96 (0.74-1.25)	0.95	0.78 (0.33-1.84)

Supplemental table 4. Sensitivity analyses of associations of dairy product types and incident prediabetes in the Fenland study (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]				Continuous[2]	
	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Butter						
Main model 4	1 (ref)	0.94 (0.69-1.29)	1.03 (0.72-1.46)	0.88 (0.65-1.20)	0.48	0.88 (0.75-1.04)
Complete case analysis	1 (ref)	1.00 (0.72-1.38)	1.10 (0.77-1.59)	0.94 (0.67-1.30)	0.75	0.88 (0.74-1.05)
Adjust. other dairy intake	1 (ref)	0.95 (0.70-1.30)	1.03 (0.72-1.47)	0.91 (0.65-1.29)	0.68	0.86 (0.71-1.05)
Adjust. tMDS score[3]	1 (ref)	0.95 (0.69-1.29)	1.03 (0.73-1.47)	0.91 (0.67-1.23)	0.63	0.91 (0.77-1.07)
Adjust. DASH score[3]	1 (ref)	0.92 (0.68-1.26)	1.01 (0.71-1.44)	0.88 (0.65-1.20)	0.52	0.90 (0.76-1.06)
Energy adjusted dairy	1 (ref)	1.09 (0.80-1.48)	0.89 (0.65-1.24)	0.86 (0.61-1.20)	0.28	0.89 (0.76-1.04)
Outcome glycaemic status	1 (ref)	0.97 (0.80-1.19)	1.04 (0.82-1.31)	0.92 (0.76-1.12)	0.49	0.96 (0.87-1.05)

[1] Relative risks (95CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers + tertile or median categories with the lowest category as the reference, adjusted for covariates as follows: Model 4 included age, sex, study site and energy intake, educational level, age at completion of education, ethnic origin, alcohol use, smoking behaviour, physical activity, family history of diabetes, dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages), hypertension, dyslipidaemia and waist circumference. Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.
[2] Relative risks per 1 serving/day (see definition in Table 2) were estimated.
[3] Adjusted for (change in) DASH score or tMDS score as proxy for diet quality, instead of individual food groups.
* P=0.01 to 0.05, ** P<0.01.
Abbreviations: CI, Confidence Interval; Q, Quartile.

Supplemental table 5. Associations of dairy intake and incident prediabetes in the Fenland study, stratified by age and educational level (*n* = 6,639).

	$P_{interaction}$	Strata	n/N	RR (95%CI)
Interaction with age				
Low-fat dairy	0.04*	<50	131/3,634	0.80 (0.67-0.97)*
		≥50	159/3,005	0.97 (0.84-1.12)
Interaction with educational level				
Total dairy		Low	65/1,041	1.11 (0.91-1.35)
	0.72	Intermediate	144/2,964	1.00 (0.99-1.01)
	0.01*	High	80/2,614	0.78 (0.61-1.00)*
Total fermented dairy		Low	65/1,041	1.42 (1.09-1.86)*
	0.24	Intermediate	144/2,964	1.02 (1.00-1.04)
	0.05*	High	80/2,614	0.76 (0.50-1.16)
Low-fat fermented dairy		Low	65/1,041	1.37 (1.00-1.87)
	0.18	Intermediate	144/2,964	1.00 (0.98-1.03)
	0.02*	High	80/2,614	0.60 (0.38-0.95)*
Total yogurt		Low	65/1,041	1.30 (0.87-1.96)
	0.27	Intermediate	144/2,964	1.01 (0.99-1.04)
	0.04*	High	80/2,614	0.59 (0.35-1.01)

Only stratified models for which the interaction term was statistically significant (p<0.05) are presented. Models are adjusted for adjusted for age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, alcohol use, smoking behaviour, physical activity, family history of diabetes, fruit, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, coffee, tea, sugar-sweetened beverages, hypertension, dyslipidaemia and waist circumference. * P<0.05
Abbreviations: CI, Confidence Interval; RR, Relative Risk.

Supplemental table 6. Sensitivity analyses of associations of increases in dairy product type intake and glycaemic status and markers in the Fenland study (*n* = 7,410).

	Glycaemic status[1] RR (95%CI)[2]	FPG β (95%CI)[2]	2hPG β (95%CI)[2]	HbA1c β (95%CI)[2]
Total dairy				
Main model 4	1.02 (0.95-1.10)	0.01 (-0.01, 0.03)	0.02 (-0.01, 0.06)	0.01 (0.00, 0.02)
Complete case analysis	1.02 (0.94-1.11)	0.01 (-0.01, 0.02)	0.02 (-0.02, 0.06)	0.00 (-0.01, 0.01)
Adjust. tMDS score[3]	1.01 (0.95-1.08)	0.01 (0.00, 0.03)	0.03 (-0.01, 0.06)	0.01 (0.00, 0.02)
Adjust. DASH score[3]	1.02 (0.95-1.09)	0.01 (0.00, 0.03)	0.03 (-0.01, 0.07)	0.01 (0.00, 0.02)*
Energy adjusted dairy	1.02 (0.95-1.10)	0.01 (0.00, 0.03)	0.02 (-0.02, 0.06)	0.01 (0.00, 0.02)
Outcome prediabetes risk	1.03 (0.90-1.18)	0.01 (0.00, 0.02)	0.02 (-0.02, 0.05)	0.00 (0.00, 0.01)
Excluding non-specific milk	0.99 (0.96-1.01)	0.00 (-0.01, 0.00)	-0.01 (-0.05, 0.03)	0.00 (0.00, 0.00)
High-fat dairy				
Main model 4	0.93 (0.85-1.03)	-0.01 (-0.03, 0.01)	-0.03 (-0.08, 0.03)	0.00 (-0.01, 0.01)
Complete case analysis	0.88 (0.77-1.00)*	-0.02 (-0.04, 0.01)	-0.03 (-0.09, 0.03)	-0.01 (-0.03, 0.0)
Adjust. other dairy intake	0.94 (0.85-1.03)	-0.01 (-0.03, 0.01)	-0.02 (-0.08, 0.03)	0.00 (-0.01, 0.01)
Adjust. tMDS score[3]	0.95 (0.87-1.05)	-0.01 (-0.03, 0.01)	-0.02 (-0.07, 0.03)	0.00 (-0.01, 0.01)
Adjust. DASH score[3]	0.95 (0.86-1.04)	-0.01 (-0.03, 0.01)	-0.02 (-0.07, 0.03)	0.00 (-0.01, 0.01)
Energy adjusted dairy	0.94 (0.85-1.04)	-0.01 (-0.03, 0.01)	-0.03 (-0.08, 0.02)	0.00 (-0.01, 0.01)
Outcome prediabetes risk	0.93 (0.78-1.09)	0.01 (-0.01, 0.02)	-0.01 (-0.05, 0.03)	0.00 (-0.01, 0.01)
Excluding non-specific milk	0.99 (0.97-1.01)	0.00 (-0.01, 0.00)	-0.01 (-0.04, 0.03)	0.00 (0.00, 0.00)
Low-fat dairy				
Main model 4	1.07 (0.99-1.16)	0.02 (0.00, 0.04)*	0.04 (0.00, 0.08)*	0.01 (0.00, 0.02)
Complete case analysis	1.06 (0.95-1.18)	0.01 (-0.01, 0.03)	0.02 (-0.02, 0.07)	0.00 (-0.01, 0.01)
Adjust. other dairy intake	1.07 (0.99-1.15)	0.02 (0.00, 0.03)*	0.04 (0.00, 0.08)*	0.01 (0.00, 0.02)
Adjust. tMDS score[3]	1.06 (0.98-1.14)	0.02 (0.00, 0.04)*	0.04 (0.00, 0.08)*	0.01 (0.00, 0.02)
Adjust. DASH score[3]	1.07 (0.99-1.15)	0.02 (0.00, 0.04)*	0.05 (0.01, 0.09)**	0.01 (0.00, 0.02)*
Energy adjusted dairy	1.07 (0.99-1.15)	0.02 (0.00, 0.04)*	0.04 (0.00, 0.08)	0.01 (0.00, 0.02)
Outcome prediabetes risk	1.08 (0.95-1.24)	0.01 (-0.01, 0.02)	0.02 (-0.01, 0.06)	0.00 (-0.01, 0.01)
Excluding non-specific milk	0.99 (0.96-1.01)	0.00 (-0.01, 0.00)	-0.01 (-0.05, 0.03)	0.00 (0.00, 0.00)*
Total fermented dairy				
Main model 4	1.05 (0.96-1.16)	0.00 (-0.03, 0.02)	0.00 (-0.05, 0.06)	0.00 (-0.01, 0.01)
Complete case analysis	1.07 (0.96-1.18)	0.00 (-0.02, 0.02)	0.01 (-0.04, 0.06)	0.00 (-0.02, 0.01)
Adjust. other dairy intake	1.05 (0.96-1.16)	0.00 (-0.03, 0.02)	0.00 (-0.05, 0.06)	0.00 (-0.01, 0.01)
Adjust. tMDS score[3]	1.03 (0.94-1.14)	0.00 (-0.03, 0.02)	0.00 (-0.05, 0.05)	0.00 (-0.01, 0.01)
Adjust. DASH score[3]	1.04 (0.95-1.15)	0.00 (-0.03, 0.02)	0.00 (-0.05, 0.06)	0.00 (-0.01, 0.02)
Energy adjusted dairy	1.05 (0.95-1.16)	0.00 (-0.03, 0.02)	0.00 (-0.06, 0.05)	0.00 (-0.01, 0.01)
Outcome prediabetes risk	1.23 (1.05-1.44)	0.00 (-0.02, 0.02)	0.01 (-0.04, 0.06)	0.00 (-0.01, 0.01)
Adjust. baseline glycaemic status[1]	1.05 (0.96-1.16)	0.00 (-0.03, 0.02)	0.00 (-0.05, 0.06)	0.00 (-0.01, 0.01)
High-fat fermented dairy				
Main model 4	1.04 (0.91-1.19)	0.00 (-0.03, 0.04)	-0.01 (-0.09, 0.07)	0.01 (-0.01, 0.03)
Complete case analysis	1.00 (0.87-1.15)	-0.01 (-0.04, 0.02)	-0.01 (-0.10, 0.07)	0.00 (-0.02, 0.01)
Adjust. other dairy intake	1.04 (0.91-1.19)	0.00 (-0.03, 0.04)	-0.01 (-0.09, 0.07)	0.01 (-0.01, 0.03)
Adjust. tMDS score[3]	1.05 (0.91-1.20)	0.01 (-0.03, 0.04)	0.00 (-0.08, 0.08)	0.01 (-0.01, 0.03)
Adjust. DASH score[3]	1.05 (0.91-1.20)	0.00 (-0.03, 0.04)	0.00 (-0.08, 0.08)	0.01 (-0.01, 0.03)
Energy adjusted dairy	1.04 (0.91-1.19)	0.01 (-0.03, 0.04)	-0.01 (-0.09, 0.07)	0.01 (-0.01, 0.03)
Outcome prediabetes risk	1.19 (0.89-1.58)	0.00 (-0.02, 0.02)	0.02 (-0.06, 0.09)	0.00 (-0.01, 0.02)
Adjust. baseline glycaemic status[1]	1.04 (0.91-1.19)	0.00 (-0.03, 0.04)	-0.01 (-0.09, 0.07)	0.01 (-0.01, 0.03)

Supplemental table 6. Sensitivity analyses of associations of increases in dairy product type intake and glycaemic status and markers in the Fenland study (*n* = 7,410). (continued)

	Glycaemic status[1]	FPG	2hPG	HbA1c
	RR (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]
Low-fat fermented dairy				
Main model 4	1.06 (0.93-1.22)	-0.01 (-0.03, 0.02)	0.00 (-0.06, 0.07)	0.00 (-0.02, 0.01)
Complete case analysis	1.11 (0.97-1.28)	0.00 (-0.03, 0.03)	0.02 (-0.04, 0.09)	0.00 (-0.02, 0.01)
Adjust. other dairy intake	1.06 (0.93-1.22)	-0.01 (-0.03, 0.02)	0.00 (-0.06, 0.07)	0.00 (-0.02, 0.01)
Adjust. tMDS score[3]	1.03 (0.90-1.17)	-0.01 (-0.04, 0.02)	0.00 (-0.07, 0.06)	0.00 (-0.02, 0.01)
Adjust. DASH score[3]	1.04 (0.91-1.18)	-0.01 (-0.03, 0.02)	0.01 (-0.06, 0.07)	0.00 (-0.02, 0.01)
Energy adjusted dairy	1.06 (0.93-1.21)	-0.01 (-0.03, 0.02)	0.00 (-0.06, 0.06)	0.00 (-0.02, 0.01)
Outcome prediabetes risk	1.22 (1.04-1.43)*	0.00 (-0.02, 0.02)	0.01 (-0.05, 0.07)	0.00 (-0.01, 0.01)
Adjust. baseline glycaemic status[1]	1.06 (0.93-1.22)	-0.01 (-0.03, 0.02)	0.00 (-0.06, 0.07)	0.00 (-0.02, 0.01)
Milk				
Main model 4	1.00 (0.91-1.10)	0.02 (0.00, 0.04)	0.04 (0.00, 0.09)	0.01 (0.00, 0.02)
Complete case analysis	0.97 (0.87-1.09)	0.01 (-0.01, 0.03)	0.03 (-0.02, 0.08)	0.00 (-0.01, 0.01)
Adjust. other dairy intake	1.00 (0.91-1.10)	0.02 (0.00, 0.04)	0.04 (-0.01, 0.09)	0.01 (0.00, 0.02)
Adjust. tMDS score[3]	1.00 (0.92-1.10)	0.02 (0.00, 0.04)	0.05 (0.00, 0.09)	0.01 (0.00, 0.02)*
Adjust. DASH score[3]	1.00 (0.92-1.10)	0.02 (0.00, 0.04)*	0.05 (0.00, 0.10)*	0.01 (0.00, 0.02)**
Energy adjusted dairy	1.00 (0.91-1.10)	0.02 (0.00, 0.04)	0.04 (-0.01, 0.09)	0.01 (0.00, 0.02)
Outcome prediabetes risk	0.89 (0.76-1.05)	0.01 (-0.01, 0.02)	0.02 (-0.02, 0.06)	0.00 (-0.01, 0.01)
Excluding non-specific milk	0.99 (0.96-1.01)	0.00 (-0.01, 0.00)	-0.01 (-0.05, 0.03)	0.00 (0.00, 0.00)
High-fat milk				
Main model 4	0.86 (0.75-0.99)*	-0.03 (-0.05, 0.00)*	-0.04 (-0.11, 0.03)	-0.01 (-0.03, 0.01)
Complete case analysis	0.83 (0.67-1.04)	-0.04 (-0.07, 0.00)*	-0.01 (-0.10, 0.08)	-0.02 (-0.04, 0.00)
Adjust. other dairy intake	0.86 (0.75-0.99)*	-0.03 (-0.05, 0.00)*	-0.04 (-0.11, 0.03)	-0.01 (-0.03, 0.01)
Adjust. tMDS score[3]	0.86 (0.75-0.99)*	-0.03 (-0.05, 0.00)*	-0.04 (-0.11, 0.03)	-0.01 (-0.02, 0.01)
Adjust. DASH score[3]	0.86 (0.75-0.99)*	-0.03 (-0.05, 0.00)*	-0.05 (-0.12, 0.02)	-0.01 (-0.03, 0.00)
Energy adjusted dairy	0.87 (0.76-1.00)	-0.02 (-0.05, 0.00)	-0.04 (-0.12, 0.03)	-0.01 (-0.02, 0.01)
Outcome prediabetes risk	0.82 (0.65-1.04)	0.00 (-0.01, 0.02)	-0.03 (-0.08, 0.03)	0.00 (-0.02, 0.01)
Excluding non-specific milk	0.99 (0.96-1.01)	0.00 (-0.01, 0.00)	-0.01 (-0.04, 0.03)	0.00 (0.00, 0.00)
Low-fat milk				
Main model 4	1.07 (0.98-1.17)	0.03 (0.01, 0.05)**	0.06 (0.01, 0.11)*	0.01 (0.00, 0.02)
Complete case analysis	1.04 (0.91-1.18)	0.02 (0.00, 0.04)	0.02 (-0.03, 0.08)	0.01 (0.00, 0.02)
Adjust. other dairy intake	1.06 (0.97-1.16)	0.03 (0.01, 0.05)**	0.06 (0.01, 0.11)*	0.01 (0.00, 0.02)
Adjust. tMDS score[3]	1.07 (0.98-1.16)	0.03 (0.01, 0.05)**	0.06 (0.01, 0.11)*	0.01 (0.00, 0.03)*
Adjust. DASH score[3]	1.08 (0.99-1.17)	0.04 (0.01, 0.06)**	0.07 (0.02, 0.12)**	0.02 (0.01, 0.03)**
Energy adjusted dairy	1.07 (0.98-1.17)	0.03 (0.01, 0.05)**	0.06 (0.01, 0.11)*	0.01 (0.00, 0.02)*
Outcome prediabetes risk	0.99 (0.85-1.16)	0.01 (-0.01, 0.02)	0.03 (-0.01, 0.07)	0.00 (0.00, 0.01)
Excluding non-specific milk	1.06 (0.95-1.18)	0.03 (0.00, 0.05)	0.03 (-0.02, 0.09)	0.01 (0.00, 0.03)
Yogurt				
Main model 4	1.10 (0.96-1.25)	0.00 (-0.03, 0.04)	0.01 (-0.07, 0.09)	0.00 (-0.02, 0.02)
Complete case analysis	1.11 (0.96-1.27)	, 0.01 (-0.03, 0.02)	0.02 (-0.06, 0.09)	-0.01 (-0.02, 0.01)
Adjust. other dairy intake	1.10 (0.96-1.25)	0.00 (-0.03, 0.04)	0.01 (-0.07, 0.09)	0.00 (-0.02, 0.02)
Adjust. tMDS score[3]	1.06 (0.93-1.22)	0.00 (-0.03, 0.03)	0.00 (-0.08, 0.08)	0.00 (-0.02, 0.02)
Adjust. DASH score[3]	1.08 (0.94-1.23)	0.00 (-0.03, 0.04)	0.01 (-0.07, 0.09)	0.00 (-0.02, 0.02)
Energy adjusted dairy	1.10 (0.97-1.26)	0.01 (-0.03, 0.04)	0.01 (-0.07, 0.09)	0.00 (-0.01, 0.02)
Outcome prediabetes risk	1.29 (1.03-1.63)*	-0.01 (-0.03, 0.02)	0.01 (-0.06, 0.08)	0.00 (-0.01, 0.01)

Supplemental table 6. Sensitivity analyses of associations of increases in dairy product type intake and glycaemic status and markers in the Fenland study (*n* = 7,410). (continued)

	Glycaemic status[1]	FPG	2hPG	HbA1c
	RR (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]
High-fat yogurt				
Main model 4	1.09 (0.89-1.33)	0.01 (-0.04, 0.06)	0.01 (-0.12, 0.14)	0.00 (-0.03, 0.03)
Complete case analysis	0.98 (0.76-1.26)	-0.02 (-0.07, 0.03)	-0.03 (-0.15, 0.10)	-0.01 (-0.04, 0.01)
Adjust. other dairy intake	1.09 (0.89-1.33)	0.01 (-0.04, 0.06)	0.01 (-0.12, 0.14)	0.00 (-0.03, 0.03)
Adjust. tMDS score[3]	1.11 (0.90-1.37)	0.01 (-0.04, 0.06)	0.00 (-0.12, 0.13)	0.00 (-0.03, 0.03)
Adjust. DASH score[3]	1.11 (0.90-1.36)	0.01 (-0.04, 0.06)	0.01 (-0.12, 0.13)	0.00 (-0.03, 0.03)
Energy adjusted dairy	1.10 (0.91-1.34)	0.01 (-0.04, 0.06)	0.01 (-0.12, 0.14)	0.00 (-0.03, 0.03)
Outcome prediabetes risk	1.32 (0.88-1.99)	0.00 (-0.03, 0.03)	0.02 (-0.09, 0.12)	-0.01 (-0.03, 0.01)
Low-fat yogurt				
Main model 4	1.09 (0.93-1.27)	0.00 (-0.03, 0.03)	0.01 (-0.07, 0.09)	0.00 (-0.01, 0.02)
Complete case analysis	1.13 (0.97-1.33)	0.00 (-0.03, 0.03)	0.03 (-0.05, 0.11)	0.00 (-0.02, 0.02)
Adjust. other dairy intake	1.09 (0.93-1.27)	0.00 (-0.03, 0.03)	0.01 (-0.07, 0.09)	0.00 (-0.01, 0.02)
Adjust. tMDS score[3]	1.04 (0.89-1.21)	0.00 (-0.03, 0.03)	0.00 (-0.08, 0.08)	0.00 (-0.02, 0.02)
Adjust. DASH score[3]	1.05 (0.91-1.22)	0.00 (-0.03, 0.03)	0.01 (-0.07, 0.09)	0.01 (-0.01, 0.02)
Energy adjusted dairy	1.09 (0.94-1.27)	0.00 (-0.03, 0.03)	0.01 (-0.07, 0.09)	0.00 (-0.01, 0.02)
Outcome prediabetes risk	1.24 (0.97-1.59)	-0.01 (-0.03, 0.02)	0.01 (-0.07, 0.08)	0.00 (-0.01, 0.02)
Total cheese				
Main model 4	1.01 (0.87-1.16)	-0.01 (-0.04, 0.02)	-0.01 (-0.08, 0.06)	0.00 (-0.02, 0.01)
Complete case analysis	1.04 (0.88-1.22)	0.00 (-0.03, 0.03)	0.00 (-0.08, 0.08)	0.00 (-0.02, 0.01)
Adjust. other dairy intake	1.00 (0.87-1.16)	-0.01 (-0.04, 0.02)	-0.01 (-0.08, 0.06)	0.00 (-0.02, 0.02)
Adjust. tMDS score[3]	1.00 (0.87-1.15)	-0.01 (-0.04, 0.02)	0.00 (-0.07, 0.07)	0.00 (-0.01, 0.02)
Adjust. DASH score[3]	1.01 (0.88-1.15)	-0.01 (-0.04, 0.02)	0.00 (-0.07, 0.07)	0.00 (-0.01, 0.02)
Energy adjusted dairy	1.00 (0.86-1.16)	-0.01 (-0.04, 0.02)	-0.02 (-0.09, 0.05)	0.00 (-0.02, 0.01)
Outcome prediabetes risk	1.20 (0.97-1.48)	0.01 (-0.02, 0.04)	0.02 (-0.05, 0.08)	0.00 (-0.01, 0.01)
High-fat cheese				
Main model 4	1.00 (0.86-1.17)	0.00 (-0.03, 0.04)	-0.02 (-0.11, 0.07)	0.01 (-0.01, 0.03)
Complete case analysis	1.01 (0.86-1.19)	0.00 (-0.05, 0.04)	-0.01 (-0.11, 0.10)	0.01 (-0.02, 0.03)
Adjust. other dairy intake	1.00 (0.86-1.17)	0.00 (-0.03, 0.04)	-0.02 (-0.11, 0.07)	0.01 (-0.01, 0.03)
Adjust. tMDS score[3]	1.00 (0.87-1.16)	0.00 (-0.03, 0.04)	0.01 (-0.09, 0.10)	0.02 (0.00, 0.04)
Adjust. DASH score[3]	1.01 (0.87-1.16)	0.00 (-0.03, 0.04)	-0.01 (-0.10, 0.09)	0.02 (0.00, 0.03)
Energy adjusted dairy	0.99 (0.85-1.16)	0.00 (-0.03, 0.04)	-0.02 (-0.12, 0.07)	0.01 (-0.01, 0.03)
Outcome prediabetes risk	1.09 (0.75-1.59)	0.00 (-0.03, 0.03)	0.02 (-0.08, 0.11)	0.01 (-0.01, 0.03)
Low-fat cheese				
Main model 4	1.03 (0.76-1.39)	-0.02 (-0.08, 0.04)	0.00 (-0.11, 0.10)	-0.01 (-0.04-0.01)
Complete case analysis	1.09 (0.80-1.47)	0.01 (-0.04, 0.06)	0.01 (-0.11, 0.14)	-0.01 (-0.03-0.02)
Adjust. other dairy intake	1.03 (0.76-1.39)	-0.02 (-0.08, 0.04)	0.00 (-0.11, 0.10)	-0.01 (-0.04-0.01)
Adjust. tMDS score[3]	1.01 (0.76-1.35)	-0.02 (-0.08, 0.04)	- 0.01 (-0.12, 0.10)	-0.01 (-0.04-0.01)
Adjust. DASH score[3]	1.03 (0.78-1.36)	-0.02 (-0.08, 0.04)	0.00 (-0.11, 0.11)	-0.01 (-0.04-0.01)
Energy adjusted dairy	1.02 (0.75-1.39)	-0.02 (-0.08, 0.04)	-0.01 (-0.11, 0.10)	-0.01 (-0.04-0.01)
Outcome prediabetes risk	1.24 (1.03-1.50)*	0.02 (-0.03, 0.08)	0.01 (-0.09, 0.11)	-0.01 (-0.03-0.01)

Supplemental table 6. Sensitivity analyses of associations of increases in dairy product type intake and glycaemic status and markers in the Fenland study (*n* = 7,410). (continued)

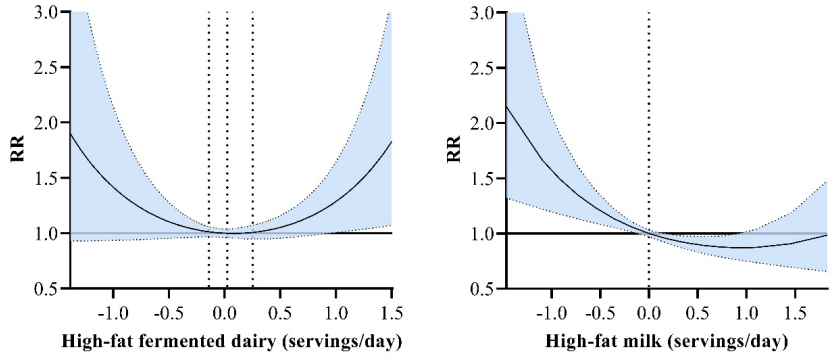
	Glycaemic status[1]	FPG	2hPG	HbA1c
	RR (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]	β (95%CI)[2]
Cream				
Main model 4	0.93 (0.63-1.37)	0.06 (-0.01, 0.12)	0.00 (-0.13, 0.13)	0.03 (-0.01, 0.06)
Complete case analysis	0.96 (0.62-1.48)	0.06 (-0.01, 0.13)	0.01 (-0.16, 0.19)	0.02 (-0.01, 0.06)
Adjust. other dairy intake	0.93 (0.63-1.37)	0.06 (-0.01, 0.12)	0.00 (-0.13, 0.13)	0.03 (-0.01, 0.06)
Adjust. tMDS score[3]	0.96 (0.66-1.40)	0.06 (0.00, 0.12)	0.01 (-0.12, 0.14)	0.03 (-0.01, 0.07)
Adjust. DASH score[3]	0.95 (0.65-1.38)	0.06 (0.00, 0.12)	0.00 (-0.13, 0.13)	0.03 (-0.01, 0.07)
Energy adjusted dairy	0.93 (0.63-1.37)	0.06 (-0.01, 0.12)	0.01 (-0.12, 0.14)	0.03 (-0.01, 0.06)
Outcome prediabetes risk	0.85 (0.47-1.55)	0.05 (0.01, 0.09)*	, 0.01 (-0.11, 0.09)	0.02 (-0.01, 0.05)
Ice cream				
Main model 4	1.04 (0.57-1.91)	0.08 (-0.10, 0.26)	0.13 (-0.26, 0.53)	0.01 (-0.08, 0.09)
Complete case analysis	1.01 (0.51-1.98)	0.06 (-0.10, 0.22)	-0.08 (-0.48, 0.33)	-0.04 (-0.12, 0.05)
Adjust. other dairy intake	1.04 (0.57-1.91)	0.09 (-0.09, 0.26)	0.13 (-0.27, 0.52)	0.01 (-0.08, 0.10)
Adjust. tMDS score[3]	1.21 (0.68-2.14)	0.10 (-0.08, 0.28)	0.23 (-0.16, 0.63)	0.02 (-0.07, 0.11)
Adjust. DASH score[3]	1.18 (0.66-2.09)	0.10 (-0.08, 0.28)	0.22 (-0.18, 0.61)	0.02 (-0.07, 0.10)
Energy adjusted dairy	1.05 (0.58-1.91)	0.09 (-0.09, 0.26)	0.13 (-0.26, 0.51)	0.01 (-0.08, 0.09)
Outcome prediabetes risk	0.89 (0.30-2.65)	0.08 (-0.08, 0.25)	0.00 (-0.37, 0.38)	0.00 (-0.06, 0.07)
Butter				
Main model 4	1.11 (1.01-1.22)*	0.01 (-0.01, 0.03)	0.01 (-0.03, 0.05)	0.01 (0.00, 0.02)
Complete case analysis	1.10 (0.99-1.22)	0.01 (-0.01, 0.02)	0.01 (-0.04, 0.05)	0.01 (0.00, 0.02)
Adjust. other dairy intake	1.11 (1.01-1.22)*	0.01 (-0.01, 0.03)	0.01 (-0.03, 0.05)	0.01 (0.00, 0.02)
Adjust. tMDS score[3]	1.11 (1.01-1.22)*	0.01 (-0.01, 0.03)	0.01 (-0.03, 0.06)	0.01 (0.00, 0.02)*
Adjust. DASH score[3]	1.11 (1.01-1.21)*	0.01 (-0.01, 0.03)	0.01 (-0.03, 0.05)	0.01 (0.00, 0.02)
Energy adjusted dairy	1.12 (1.02-1.23)*	0.01 (-0.01, 0.03)	0.01 (-0.03, 0.05)	0.01 (0.00, 0.02)
Outcome prediabetes risk	1.03 (0.88-1.21)	0.01 (-0.01, 0.02)	-0.01 (-0.04, 0.03)	0.00 (0.00, 0.01)

[1] Glycaemic status was operationalized as an ordinal variable with three levels: normoglycaemia, prediabetes and type 2 diabetes.

[2] Relative risks (95%CI) for glycaemic status or β (95%CI) for glycaemic markers per 1 serving/day (see definition in Table 2) were estimated , adjusted for covariates as follows: Model 4 included the baseline value of the outcome, age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, baseline and changes in alcohol use, smoking behaviour, baseline and changes in physical activity, family history, baseline intake of the dairy type, baseline and changes in dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages), hypertension, dyslipidaemia and baseline and changes in waist. * P=0.01 to 0.05, **P<0.01.

[3] Adjusted for (change in) DASH score or tMDS score as proxy for diet quality, instead of individual food groups.

Abbreviations: 2hPG, 2-hour glucose; CI, Confidence Interval; DASH, Dietary Approaches to Stop Hypertension; FPG, fasting plasma glucose; HbA1c, glycated haemoglobin; RR, Relative Risk.



Supplemental figure 2. Non-linear association between changes in high-fat fermented dairy (P for non-linearity = 0.04) and high-fat milk intake (P for non-linearity = 0.03) and glycaemic status in the Fenland study. Glycaemic status was operationalized as an ordinal variable with three levels: normoglycaemia, prediabetes and type 2 diabetes. The solid line indicates the risk estimate fitted with polynomial regression. The dotted vertical lines indicate the 5th, 50th and 95th percentile of intake. The coloured area indicates the 95% confidence interval around the relative risk (RR). The model age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, (change in) alcohol use, smoking behaviour, (change in) physical activity, family history, (change in) intake of fruit, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, sugar-sweetened beverages, hypertension, dyslipidaemia and (change in) waist circumference.

Supplemental table 7. Associations of changes in dairy product type intake and glycaemic status in the Fenland study, stratified by age or waist circumference (*n* = 7,410).

	$P_{interaction}$	Strata	n/N[1]	RR (95%CI)
Interaction with age				
Low-fat fermented dairy	0.003**	<50	258/3,867	0.88 (0.62-1.23)
		≥50	423/3,543	1.02 (0.80-1.30)
Low-fat yogurt	0.03*	<50	258/3,867	0.74 (0.48-1.14)
		≥50	423/3,543	0.97 (0.69-1.36)
Interaction with waist circumference[2]				
Total dairy	0.002**	<80/94	129/3,181	1.00 (0.84-1.19)
		≥80/94	411/4,224	1.06 (0.98-1.14)
High-fat dairy	0.02*	<80/94	129/3,181	1.04 (0.81-1.33)
		≥80/94	411/4,224	0.94 (0.85-1.04)
Total fermented dairy	0.005*	<80/94	129/3,181	0.91 (0.69-1.19)
		≥80/94	411/4,224	1.11 (1.01-1.22)*
High-fat fermented dairy	0.04*	<80/94	129/3,181	1.07 (0.72-1.58)
		≥80/94	411/4,224	1.05 (0.92-1.20)
Low-fat fermented dairy	0.04*	<80/94	129/3,181	0.82 (0.55-1.21)
		≥80/94	411/4,224	1.16 (1.01-1.31)*
Total yogurt	0.01*	<80/94	129/3,181	0.92 (0.64-1.32)
		≥80/94	411/4,224	1.14 (1.02-1.29)*
High-fat yogurt	0.04*	<80/94	129/3,181	1.27 (0.67-2.37)
		≥80/94	411/4,224	1.01 (0.82-1.25)
Ice cream	0.006**	<80/94	129/3,181	1.98 (0.75-5.28)
		≥80/94	411/4,224	1.08 (0.59-1.96)

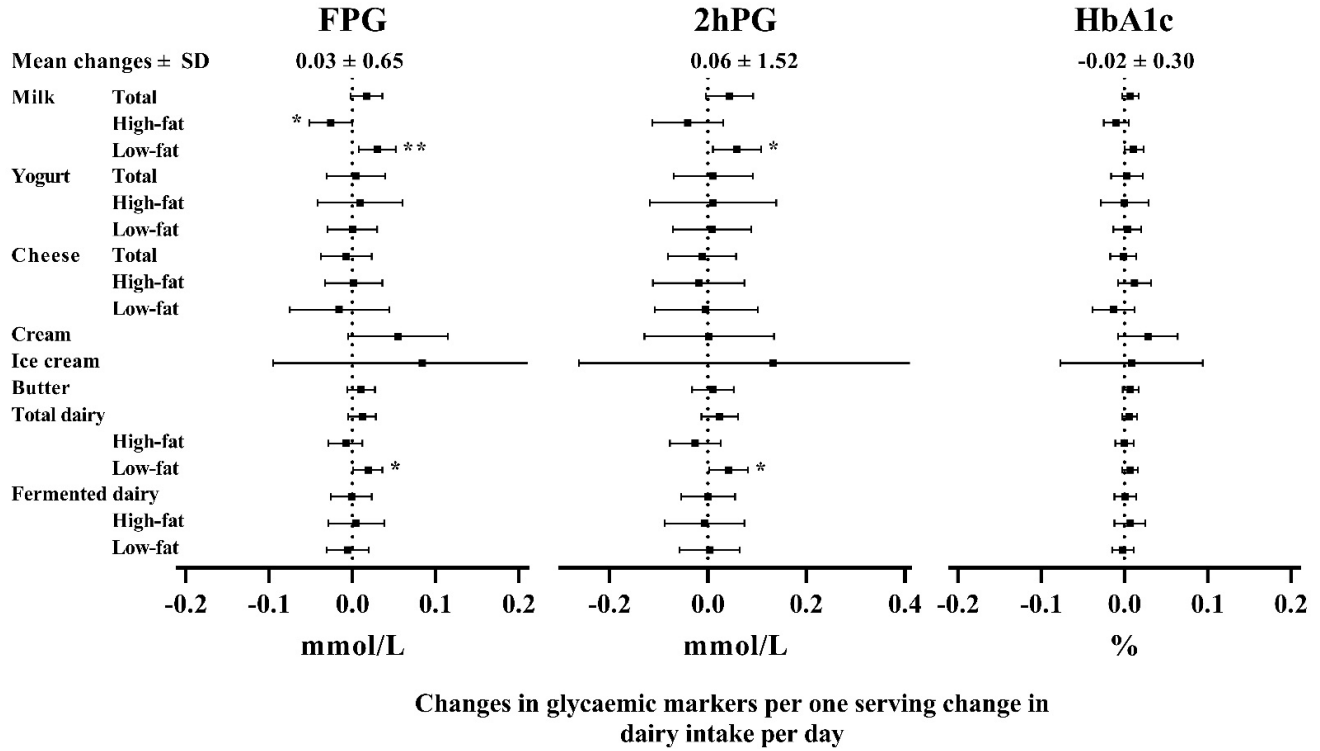
Only stratified models for which the interaction term was statistically significant (p<0.05) are presented. Models are adjusted for adjusted for age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, (change in) alcohol use, smoking behaviour, (change in) physical activity, family history, (change in) intake of fruit, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, sugar-sweetened beverages, hypertension, dyslipidaemia and (change in) waist circumference.

[1] The number of cases of prediabetes and type 2 diabetes out of the total number of participants.

[2] Waist circumference was divided according to sex-specific cut-offs (≥80 cm for women, ≥94 cm for men) for increased risk of metabolic complications proposed by the WHO [65].

* P =0.01 to 0.05, **P <0.01.

Abbreviations: CI, Confidence Interval; R, Relative Risk.



Supplemental figure 3. Associations of changes in dairy intake from baseline to follow-up in servings/day with changes in glycaemic markers (FPG, fasting plasma glucose; 2hPG, 2-hour post-prandial glucose; HbA1c, glycated haemoglobin) (*n* = 7,410). Effect estimates (β) with 95%CIs were adjusted for the baseline values of the outcome, age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, baseline and changes in alcohol use, smoking behaviour, baseline and changes in physical activity, family history, baseline intake of the dairy type, baseline and changes in dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages), hypertension, dyslipidaemia and baseline and changes in waist circumference. * P<0.05, ** P<0.01.

Supplemental table 8. Associations of dairy intake and prediabetes risk in the Fenland study using different prediabetes definitions (*n* = 6,639).

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
Prediabetes definition	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Total dairy						
FPG, 2hPG & HbA1c	1 (ref)	0.66 (0.48-0.92)	0.87 (0.64-1.20)	0.82 (0.57-1.17)	0.48	0.98 (0.87-1.10)
FPG only	1 (ref)	0.42 (0.23-0.77)	0.88 (0.54-1.42)	0.56 (0.29-1.07)	0.19	0.82 (0.68-1.00)
FPG & 2hPG	1 (ref)	0.66 (0.47-0.94)	0.87 (0.63-1.21)	0.77 (0.52-1.14)	0.34	0.94 (0.83-1.06)
FPG & HbA1c	1 (ref)	0.55 (0.36-0.85)	0.94 (0.65-1.38)	0.73 (0.46-1.15)	0.42	0.96 (0.83-1.11)
High-fat dairy						
FPG, 2hPG & HbA1c	1 (ref)	0.89 (0.64-1.23)	1.09 (0.78-1.52)	1.32 (0.93-1.88)	0.06	1.20 (1.03-1.39)*
FPG only	1 (ref)	1.62 (0.90-2.90)	1.49 (0.80-2.78)	1.82 (0.98-3.39)	0.10	1.18 (0.96-1.46)
FPG & 2hPG	1 (ref)	1.05 (0.75-1.49)	1.08 (0.75-1.57)	1.40 (0.95-2.05)	0.07	1.15 (0.98-1.34)
FPG & HbA1c	1 (ref)	1.03 (0.68-1.57)	1.15 (0.75-1.77)	1.48 (0.96-2.31)	0.05	1.27 (1.07-1.51)**
Low-fat dairy						
FPG, 2hPG & HbA1c	1 (ref)	0.78 (0.57-1.07)	0.81 (0.59-1.11)	0.81 (0.58-1.13)	0.29	0.90 (0.80-1.01)
FPG only	1 (ref)	0.50 (0.29-0.84)	0.51 (0.29-0.87)	0.53 (0.30-0.93)	0.04*	0.75 (0.61-0.94)*
FPG & 2hPG	1 (ref)	0.68 (0.49-0.95)	0.75 (0.54-1.05)	0.71 (0.50-1.01)	0.10	0.88 (0.77-1.00)*
FPG & HbA1c	1 (ref)	0.64 (0.43-0.96)	0.70 (0.47-1.04)	0.75 (0.50-1.12)	0.26	0.85 (0.73-0.99)*
Fermented dairy						
FPG, 2hPG & HbA1c	1 (ref)	1.12 (0.81-1.53)	0.96 (0.69-1.35)	1.27 (0.89-1.81)	0.28	1.07 (0.90-1.27)
FPG only	1 (ref)	1.01 (0.61-1.68)	0.80 (0.46-1.39)	0.75 (0.39-1.43)	0.28	0.77 (0.55-1.09)
FPG & 2hPG	1 (ref)	1.05 (0.75-1.47)	0.98 (0.69-1.39)	1.21 (0.83-1.77)	0.38	1.09 (0.92-1.30)
FPG & HbA1c	1 (ref)	0.99 (0.67-1.45)	0.84 (0.56-1.26)	1.05 (0.68-1.65)	0.93	1.02 (0.81-1.29)
High-fat fermented dairy						
FPG, 2hPG & HbA1c	1 (ref)	0.89 (0.65-1.21)	1.00 (0.71-1.39)	1.13 (0.79-1.60)	0.43	1.26 (0.92-1.74)
FPG only	1 (ref)	1.16 (0.68-2.00)	1.33 (0.76-2.32)	1.22 (0.68-2.22)	0.50	1.34 (0.89-2.03)
FPG & 2hPG	1 (ref)	0.83 (0.59-1.16)	0.95 (0.66-1.36)	1.22 (0.84-1.76)	0.24	1.32 (0.96-1.80)
FPG & HbA1c	1 (ref)	1.03 (0.70-1.54)	1.25 (0.83-1.87)	1.19 (0.78-1.84)	0.37	1.46 (1.04-2.06)*

Supplemental table 8. Associations of dairy intake and prediabetes risk in the Fenland study using different prediabetes definitions (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
Prediabetes definition	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Low-fat fermented dairy						
FPG, 2hPG & HbA1c	1 (ref)	1.41 (1.03-1.93)	1.03 (0.72-1.47)	1.15 (0.81-1.63)	0.85	0.99 (0.81-1.22)
FPG only	1 (ref)	1.24 (0.77-1.98)	0.88 (0.50-1.55)	0.55 (0.28-1.07)	0.02*	0.48 (0.29-0.80)**
FPG & 2hPG	1 (ref)	1.26 (0.90-1.76)	1.07 (0.74-1.54)	1.07 (0.73-1.56)	0.83	0.99 (0.79-1.24)
FPG & HbA1c	1 (ref)	1.27 (0.89-1.82)	0.69 (0.44-1.08)	0.85 (0.56-1.31)	0.13	0.83 (0.61-1.13)
Milk						
FPG, 2hPG & HbA1c	1 (ref)	0.76 (0.58-0.99)	0.81 (0.57-1.16)	0.80 (0.54-1.18)	0.18	0.92 (0.80-1.06)
FPG only	1 (ref)	0.85 (0.53-1.36)	0.71 (0.37-1.33)	0.67 (0.33-1.35)	0.18	0.86 (0.67-1.09)
FPG & 2hPG	1 (ref)	0.78 (0.59-1.04)	0.76 (0.51-1.12)	0.71 (0.46-1.08)	0.07	0.88 (0.76-1.02)
FPG & HbA1c	1 (ref)	0.71 (0.51-1.00)	0.80 (0.51-1.26)	0.81 (0.51-1.30)	0.31	0.93 (0.78-1.11)
High-fat milk						
FPG, 2hPG & HbA1c	1 (ref)	0.88 (0.56-1.39)	1.50 (1.02-2.20)		0.12	1.22 (1.01-1.47)*
FPG only	1 (ref)	1.96 (1.15-3.34)	1.03 (0.51-2.09)		0.24	1.17 (0.90-1.51)
FPG & 2hPG	1 (ref)	1.05 (0.67-1.64)	1.54 (1.04-2.28)		0.05	1.18 (0.97-1.42)
FPG & HbA1c	1 (ref)	1.04 (0.63-1.73)	1.44 (0.90-2.31)		0.16	1.25 (1.00-1.55)*
Low-fat milk						
FPG, 2hPG & HbA1c	1 (ref)	1.10 (0.80-1.52)	0.82 (0.58-1.16)	0.79 (0.54-1.15)	0.06	0.86 (0.75-0.98)*
FPG only	1 (ref)	0.81 (0.49-1.36)	0.74 (0.43-1.29)	0.56 (0.30-1.04)	0.07	0.82 (0.65-1.04)
FPG & 2hPG	1 (ref)	0.95 (0.68-1.32)	0.76 (0.53-1.08)	0.69 (0.47-1.02)	0.02*	0.83 (0.72-0.96)*
FPG & HbA1c	1 (ref)	0.99 (0.67-1.45)	0.76 (0.50-1.16)	0.74 (0.47-1.17)	0.09	0.85 (0.72-1.00)
Yogurt						
FPG, 2hPG & HbA1c	1 (ref)	0.80 (0.56-1.15)	0.79 (0.59-1.05)	0.92 (0.65-1.30)	0.66	0.93 (0.73-1.19)
FPG only	1 (ref)	1.01 (0.59-1.73)	0.68 (0.41-1.14)	0.44 (0.21-0.95)	0.02*	0.45 (0.25-0.80)**
FPG & 2hPG	1 (ref)	0.75 (0.51-1.11)	0.74 (0.54-1.00)	0.84 (0.58-1.22)	0.37	0.84 (0.63-1.12)
FPG & HbA1c	1 (ref)	0.83 (0.54-1.27)	0.74 (0.52-1.05)	0.65 (0.41-1.04)	0.06	0.71 (0.49-1.04)

Supplemental table 8. Associations of dairy intake and prediabetes risk in the Fenland study using different prediabetes definitions (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
Prediabetes definition	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
High-fat yogurt						
FPG, 2hPG & HbA1c	1 (ref)	1.05 (0.75-1.46)	0.91 (0.55-1.48)	1.28 (0.85-1.92)	0.29	1.22 (0.74-2.01)
FPG only	1 (ref)	1.18 (0.69-2.02)	0.82 (0.34-2.01)	1.07 (0.50-2.29)	0.92	0.79 (0.24-2.58)
FPG & 2hPG	1 (ref)	1.13 (0.80-1.59)	0.72 (0.40-1.28)	1.02 (0.63-1.66)	0.91	0.92 (0.47-1.80)
FPG & HbA1c	1 (ref)	0.87 (0.56-1.34)	1.11 (0.63-1.95)	1.39 (0.86-2.23)	0.18	1.48 (0.77-2.86)
Low-fat yogurt						
FPG, 2hPG & HbA1c	1 (ref)	1.19 (0.89-1.59)	0.87 (0.62-1.22)	0.95 (0.67-1.34)	0.34	0.89 (0.68-1.17)
FPG only	1 (ref)	1.33 (0.85-2.08)	0.77 (0.43-1.38)	0.51 (0.25-1.02)	0.01**	0.42 (0.23-0.79)**
FPG & 2hPG	1 (ref)	1.16 (0.85-1.58)	0.83 (0.58-1.20)	0.88 (0.61-1.28)	0.23	0.84 (0.61-1.15)
FPG & HbA1c	1 (ref)	1.15 (0.82-1.62)	0.74 (0.49-1.12)	0.66 (0.42-1.03)	0.01*	0.62 (0.41-0.95)*
Cheese						
FPG, 2hPG & HbA1c	1 (ref)	0.91 (0.66-1.25)	0.88 (0.63-1.23)	1.23 (0.88-1.71)	0.20	1.27 (0.99-1.62)
FPG only	1 (ref)	0.98 (0.58-1.63)	0.73 (0.41-1.30)	0.97 (0.57-1.66)	0.85	1.14 (0.77-1.68)
FPG & 2hPG	1 (ref)	0.90 (0.64-1.26)	0.79 (0.54-1.16)	1.41 (0.99-2.00)	0.04*	1.40 (1.13-1.75)**
FPG & HbA1c	1 (ref)	0.93 (0.62-1.40)	1.08 (0.72-1.62)	1.16 (0.77-1.76)	0.39	1.38 (1.05-1.80)*
High-fat cheese						
FPG, 2hPG & HbA1c	1 (ref)	0.80 (0.58-1.10)	1.03 (0.75-1.42)	1.02 (0.71-1.45)	0.63	1.28 (0.86-1.91)
FPG only	1 (ref)	1.02 (0.60-1.75)	1.31 (0.76-2.25)	1.14 (0.65-1.98)	0.55	1.47 (0.95-2.27)
FPG & 2hPG	1 (ref)	0.81 (0.57-1.15)	1.21 (0.86-1.70)	1.07 (0.73-1.56)	0.41	1.46 (1.04-2.05)*
FPG & HbA1c	1 (ref)	0.88 (0.59-1.30)	1.06 (0.71-1.59)	1.10 (0.72-1.68)	0.49	1.47 (0.98-2.20)
Low-fat cheese						
FPG, 2hPG & HbA1c	1 (ref)	1.13 (0.85-1.50)	0.80 (0.49-1.28)	1.26 (0.85-1.87)	0.34	1.26 (0.90-1.77)
FPG only	1 (ref)	0.78 (0.47-1.32)	1.01 (0.51-2.01)	0.59 (0.24-1.50)	0.26	0.53 (0.18-1.58)
FPG & 2hPG	1 (ref)	1.07 (0.78-1.46)	0.99 (0.62-1.59)	1.37 (0.90-2.10)	0.17	1.37 (0.99-1.88)
FPG & HbA1c	1 (ref)	0.94 (0.65-1.37)	0.92 (0.54-1.56)	1.24 (0.78-1.98)	0.42	1.32 (0.89-1.96)

Supplemental table 8. Associations of dairy intake and prediabetes risk in the Fenland study using different prediabetes definitions (*n* = 6,639). (continued)

	Relative risk (95% CI) across intake range categories[1]					Continuous[2]
Prediabetes definition	Q1	Q2	Q3	Q4	P_{trend}	RR (95%CI)
Cream						
FPG, 2hPG & HbA1c	1 (ref)	1.07 (0.81-1.42)	0.97 (0.67-1.41)	0.81 (0.53-1.24)	0.42	0.51 (0.21-1.25)
FPG only	1 (ref)	1.26 (0.78-2.04)	1.29 (0.73-2.28)	1.07 (0.53-2.17)	0.59	0.52 (0.17-1.60)
FPG & 2hPG	1 (ref)	0.98 (0.72-1.32)	0.88 (0.58-1.33)	0.65 (0.40-1.06)	0.08	0.31 (0.09-1.00)*
FPG & HbA1c	1 (ref)	1.12 (0.79-1.59)	1.23 (0.81-1.87)	0.94 (0.57-1.56)	0.86	0.61 (0.26-1.45)
Ice cream						
FPG, 2hPG & HbA1c	1 (ref)	1.22 (0.93-1.59)	1.08 (0.75-1.57)	1.01 (0.64-1.58)	0.87	0.94 (0.24-3.70)
FPG only	1 (ref)	0.92 (0.58-1.45)	1.14 (0.66-1.98)	0.66 (0.31-1.41)	0.33	0.44 (0.04-4.98)
FPG & 2hPG	1 (ref)	1.21 (0.91-1.61)	1.05 (0.71-1.55)	0.90 (0.55-1.48)	0.54	0.64 (0.14-3.03)
FPG & HbA1c	1 (ref)	0.92 (0.66-1.27)	0.80 (0.51-1.25)	0.76 (0.45-1.31)	0.31	0.51 (0.08-3.36)

[1] Relative risks (95%CIs) were estimated across four categories split by quartile values (Q1 to Q4) or non-consumers & tertile or median categories with the lowest category as the reference, adjusted for covariates as follows: age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, alcohol use, smoking behaviour, physical activity, family history of diabetes, dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages), hypertension, dyslipidaemia and waist circumference. Linear trend across intake range categories was assessed by including median values of each category as a continuous variable in the model.
[2] Relative risks per 1 serving/day (see definition in Table 2) were estimated.
* P=0.01 to 0.05, **P<0.01.
Abbreviations: 2hPG; 2-hour Plasma Glucose; CI, Confidence Interval; FPG, Fasting Plasma Glucose; HbA1c, Glycated Haemoglobin; Q, Quartile.

Supplemental table 9. Longitudinal associations of repeated measures of dairy intake and glycaemic outcomes at baseline and follow-up in the Fenland study.

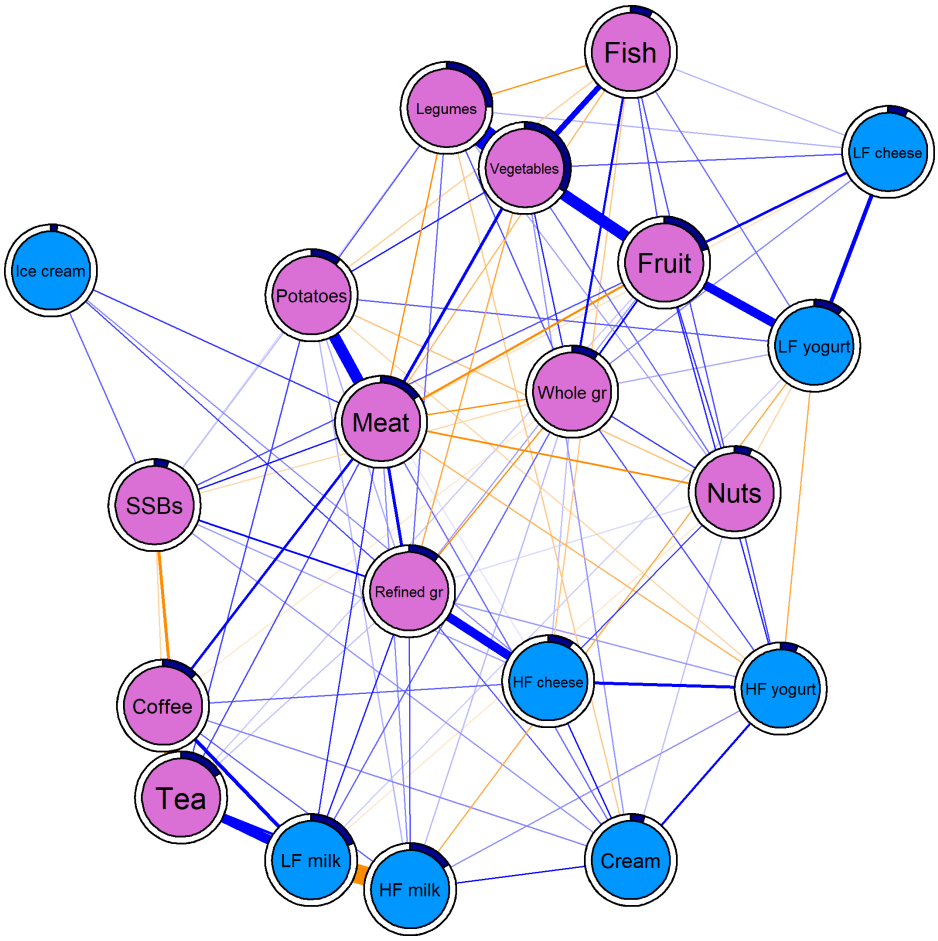
	FPG (mmol/L)	**2hPG** (mmol/L)	**HbA1c** (%)
Participants (N)	7410	7397	7408
Mean SD at first follow-up	4.80 ± 0.47	5.16 ± 1.40	5.51 ± 0.32
Mean SD at second follow-up	4.82 ± 0.65	5.21 ± 1.57	5.49 ± 0.38
Dairy type (servings/day)	B (95%CI)	B (95%CI)	B (95%CI)
Total dairy	0.002 (0.0, 0.004)*	0.003 (-0.002, 0.008)	0.0006 (-0.0004, 0.002)
High-fat dairy	0.002 (-0.0003, 0.005)	0.006 (-0.002, 0.01)	-0.002 (-0.003, -0.0001)*
Low-fat dairy	0.001 (-0.001, 0.003)	0.002 (-0.004, 0.007)	0.002 (0.0005, 0.003)**
Total fermented dairy	-0.0003 (-0.003, 0.003)	0.01 (0.001, 0.02)*	0.0 (-0.002, 0.002)
High-fat fermented dairy	0.003 (-0.002, 0.007)	0.01 (0.001, 0.03)*	-0.002 (-0.004, 0.0009)
Low-fat fermented dairy	-0.002 (-0.006, 0.002)	0.006 (-0.004, 0.02)	0.001 (-0.001, 0.003)
Total milk	0.003 (0.001, 0.005)*	0.0001 (-0.007, 0.007)	0.0007 (-0.0006, 0.002)
High-fat milk	0.001 (-0.003, 0.005)	0.003 (-0.009, 0.014)	-0.004 (-0.006, -0.001)**
Low-fat milk	0.003 (0.0003, 0.005)*	-0.0003 (-0.007, 0.007)	0.002 (0.001, 0.003)**
Total yogurt	-0.003 (-0.007, 0.001)	0.01 (-0.002, 0.021)	-0.0005 (-0.003, 0.002)
High-fat yogurt	-0.002 (-0.01, 0.008)	0.01 (-0.02, 0.04)	-0.005 (-0.01, 0.0007)
Low-fat yogurt	-0.003 (-0.007, 0.002)	0.008 (-0.004, 0.02)	0.0007 (-0.002, 0.003)
Cheese	0.003 (-0.002, 0.008)	0.01 (-0.002, 0.02)	0.0006 (-0.002, 0.003)
High-fat cheese	0.005 (-0.001, 0.01)	0.016 (-0.0004, 0.03)	-0.0004 (-0.004, 0.003)
Low-fat cheese	0-0.001 (-0.009, 0.007)	0.003 (-0.02, 0.03)	0.003 (-0.002, 0.007)
Cream	0.007 (-0.004, 0.018)	0.006 (-0.02, 0.04)	0.002 (-0.004, 0.008)
Ice cream	0.02 (-0.007, 0.04)	-0.009 (-0.07, 0.06)	0.02 (0.003, 0.03)*
Butter	0.003 (0.0002, 0.005)*	0.008 (0.002, 0.02)*	-0.0003 (-0.002, 0.001)

β (95%CI) for glycaemic markers for the dairy*time interaction per 1 serving/day (see definition in Table 2) were estimated , adjusted for covariates as follows: the baseline value of the outcome, age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, baseline and changes in alcohol use, smoking behaviour, baseline and changes in physical activity, family history, baseline intake of the dairy type, baseline and changes in dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages), hypertension, dyslipidaemia and baseline and changes in waist. * P =0.01 to 0.05, **P <0.01.
Abbreviations: 2hPG, 2-hour glucose; CI, Confidence Interval; FPG, fasting plasma glucose; HbA1c, glycated haemoglobin.

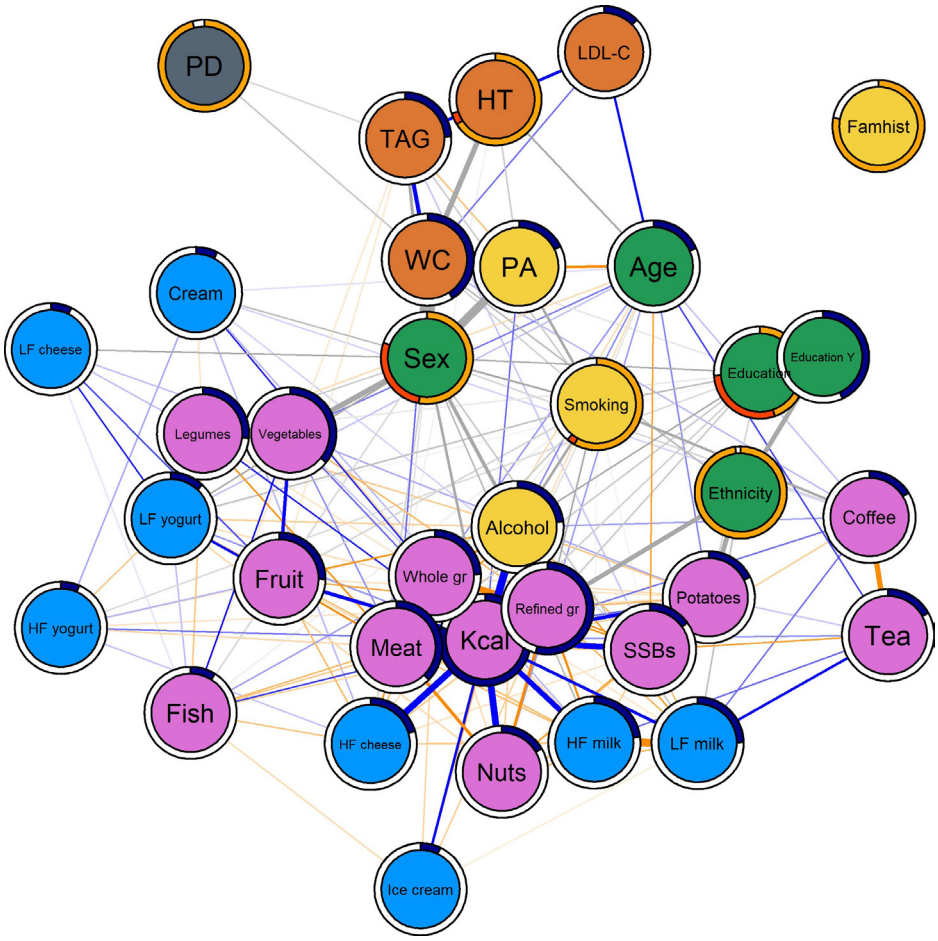
Supplemental table 10. Contribution of selected dairy fat biomarkers to the association of dairy type intake and prediabetes risk in participants with complete data of dairy fat biomarkers (*n* = 6,418).

	RR (95%CI)[1]	% Attenuation[2]	Bootstrapped CI
High-fat dairy			
Model 4	1.21 (1.04-1.41)		
+ C15:0	1.25 (1.07-1.45)	-15.9	-112; 11.1
+ C17:0	1.24 (1.07-1.45)	-13.3	-75.3; 0.5
+ *t*C16:1n7	1.23 (1.06-1.44)	-10.4	-67.8; 5.7
+ C14:0	1.17 (1.01-1.37)	16.2	4.2; 95.5
+ all dairy fat biomarkers	1.24 (1.06-1.45)	-13.9	-101.2; 17.2
High-fat milk			
Model 4	1.23 (1.01-1.49)		
+ C15:0	1.24 (1.02-1.51)	-6.7	-63.5; 32.4
+ C17:0	1.25 (1.03-1.51)	-8.1	-69.2; 33.0
+ *t*C16:1n7	1.24 (1.02-1.51)	-5.5	-46.7; 23.8
+ C14:0	1.20 (0.99-1.46)	8.5	-43.3; 67.4
+ all dairy fat biomarkers	1.24 (1.02-1.52)	-7.2	-77.8; 32.0
Low-fat milk			
Model 4	0.85 (0.74-0.98)		
+ C15:0	0.85 (0.74-0.98)	0.9	-2.3; 8.0
+ C17:0	0.85 (0.74-0.98)	-0.2	-6.2; 5.5
+ *t*C16:1n7	0.85 (0.74-0.98)	-0.4	-5.6; 4.4
+ C14:0	0.85 (0.74-0.98)	-2.0	-22.4; 8.3
+ all dairy fat biomarkers	0.85 (0.74-0.98)	-1.7	-27.0; 13.0

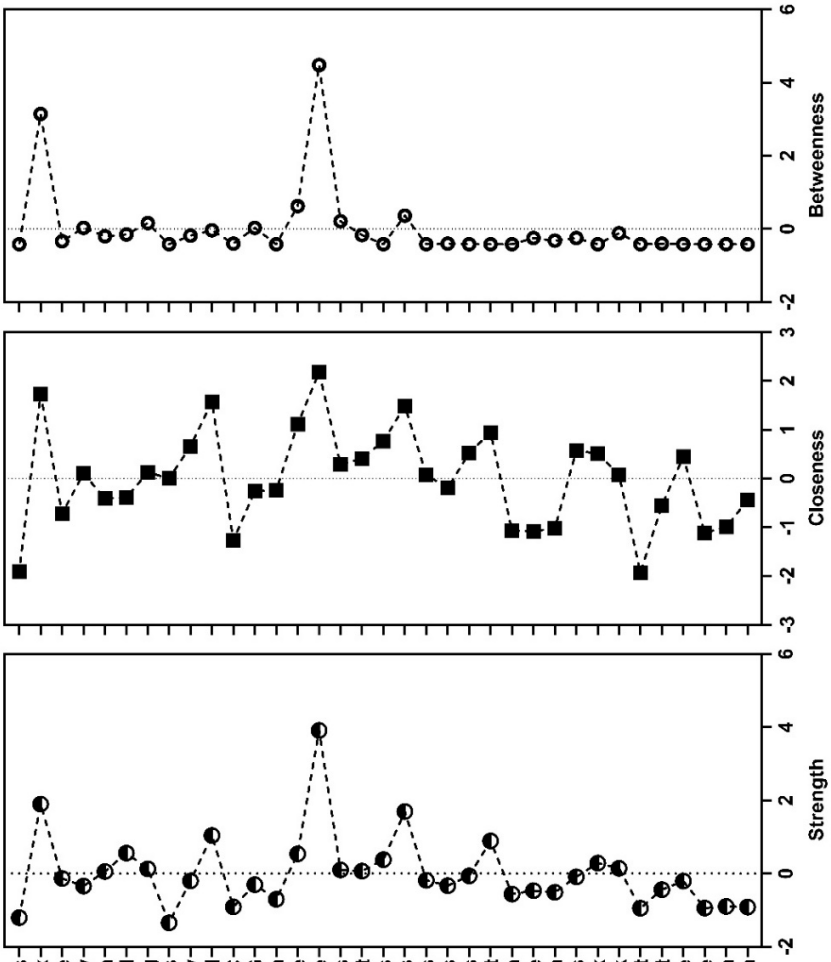
[1] Values represent the associations with prediabetes risk (RR with corresponding 95%CI) per 1 serving/day (see definition in Table 2), adjusted for covariates as follows: Model 4 included age, sex, study site, energy intake, educational level, age at completion of education, ethnic origin, alcohol use, smoking behaviour, physical activity, family history of diabetes, dietary intakes (fruits, vegetables, whole grains, refined grains, potatoes, legumes, nuts, red and processed meat, fatty fish, coffee, tea, and sugar-sweetened beverages) and hypertension, dyslipidaemia and waist circumference.
[2] Percentage changes in RR were calculated as changes in coefficients from those of model 4 (reference) upon statistical adjustment for the dairy fat biomarkers (mediation analysis).
Abbreviations: CI, Confidence Interval; RR, Relative Risk.



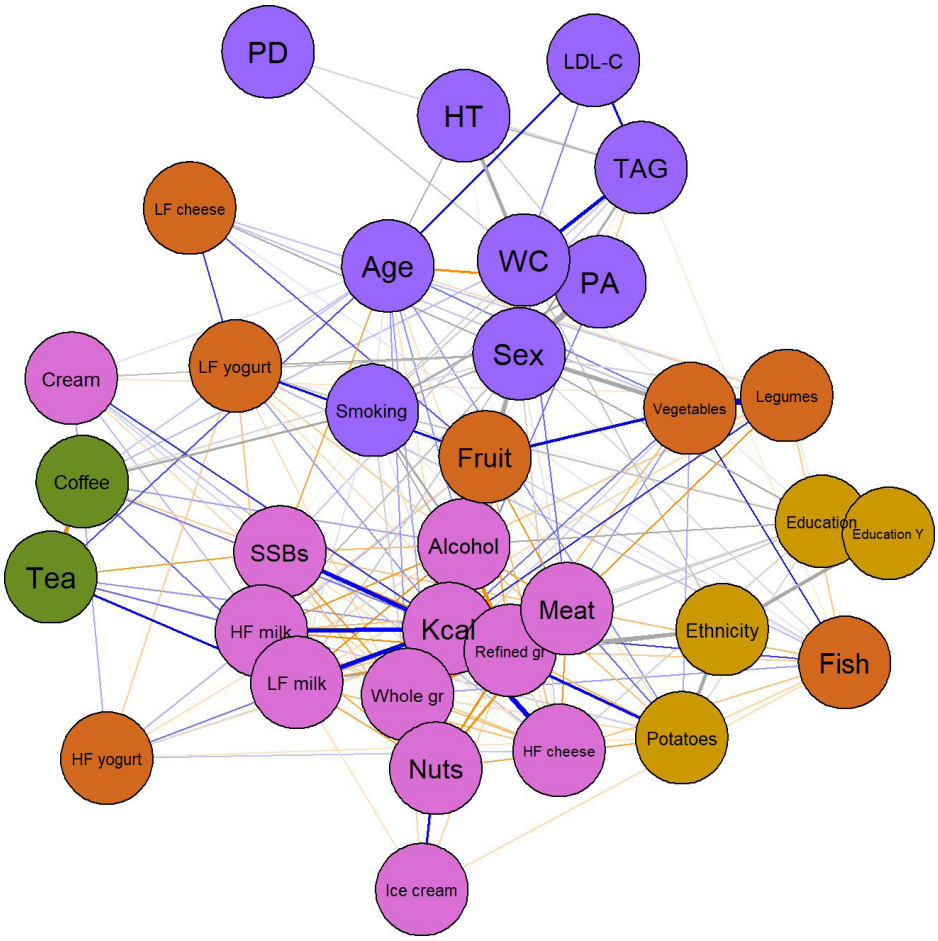
Supplemental figure 4. Network structure of dairy intake (blue) and food groups (pink) of the study population with complete data for variables in the model (n = 6,639). The edges between nodes (variables) represent conditional independent relationships; blue and orange edges indicate positive and negative relationships respectively between 2 continuous nodes. Edge thickness is proportional to the strength of the relationship between the nodes, with the highest edge weight being 0.43 (between nodes vegetables and legumes). The absence of an edge indicates that two nodes are conditional independent in the network. The predictability is indicated by the rings around each node; blue rings indicate the proportion variance explained by neighbouring nodes with the full circle indicating a r2 of 1.0. Gr, grains; HF, high-fat; LF, low-fat; SSB, sugar-sweetened beverage.



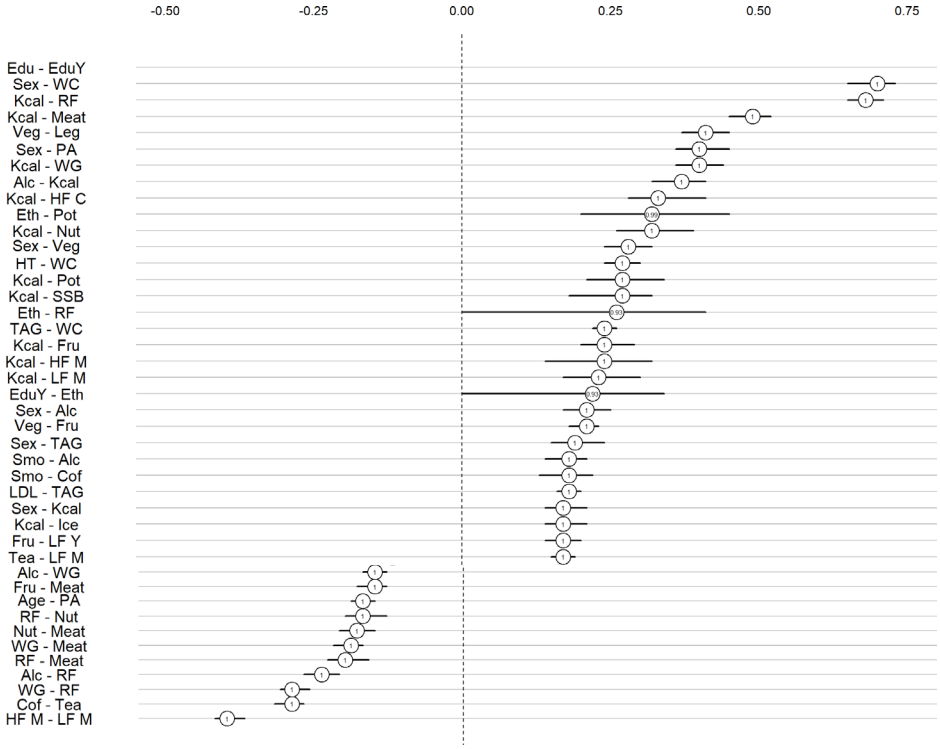
Supplemental figure 5. Network structure of dairy intake (blue), food groups and energy intake (pink), health factors (yellow), sociodemographic characteristics (green), clinical markers (orange), and prediabetes (grey) of the study population with complete data for variables in the model (*n* = 6,162). The edges between nodes (variables) represent conditional independent relationships; blue and orange edges indicate positive and negative relationships respectively between 2 continuous nodes, and grey edges indicate a relationship between at least 1 categorical variable. Edge thickness is proportional to the strength of the relationship between the nodes, with the highest edge weight being 1.08 (between nodes education and educational years). The absence of an edge indicates that two nodes are conditional independent in the network. The predictability is indicated by the rings around each node; blue rings indicate the proportion variance explained by neighbouring nodes with the full circle indicating a r^2 of 1.0; the range/red rings indicate the accuracy for the categorical nodes, respectively the marginal of the variable and the additionally achieved accuracy by all other remaining variables, with the full circle indicating an accuracy of 100%. Gr, grains; HF, high-fat; HT, hypertension; LDL-C, low-density lipoprotein cholesterol; LF, low-fat; PA, physical activity; PD, prediabetes; SSB, sugar-sweetened beverages; TAG, triglycerides; WC, waist circumference.



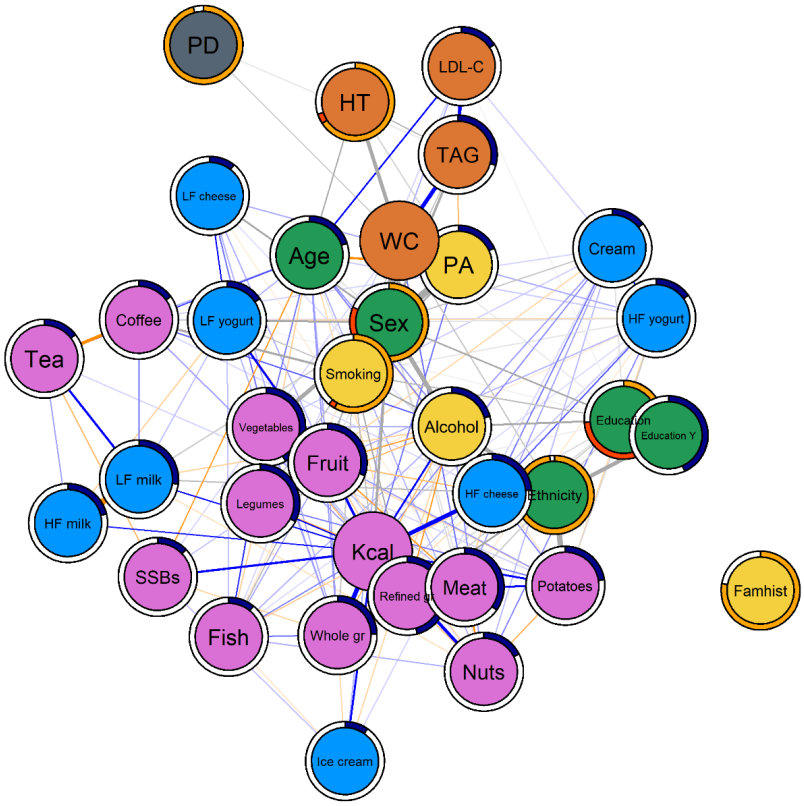
Supplemental figure 6. Standardized centrality of each variable in the network as indicated by the strength (i.e., the sum of the absolute connection weights of a node, with higher values indicating stronger connectivity of a node), closeness (i.e., inverse sum of the distance between one node and all other nodes) and betweenness (i.e., number of times the node is in the shortest paths between other nodes). LDL-C, low-density lipoprotein cholesterol; SSB, sugar-sweetened beverages; TAG, triglycerides.



Supplemental figure 7. Clusters of variables (represented by the different colours) that strongly connect in the network, i.e. have many positive edges inside the cluster and few positive edges with nodes outside of it, reversed for negative edges. The exact placement of nodes is not based on this clustering algorithm, thus nodes within a cluster may be spread throughout the network. Clustering variables may co-occur, have similar properties, or have similar function [66, 67]. Clusters of behaviours or food groups could be interesting targets for interventions as the intervention on a single variable may affect other variables in the cluster even though these were not directly targeted. The most frequent occurring solution of the clustering algorithm was one with 5 clusters (49 of 100 estimations), followed by 6 clusters (42 of 100 estimations). The most frequently identified solution is shown. All clusters were consistently found, only high-fat yogurt was occasionally classified in the yellow cluster instead of the orange cluster. In the 6-cluster solution, cream was regarded as separate cluster, sometimes together with high-fat yogurt. Family history of diabetes is not shown as this node was not connected to other nodes. Gr; grains. HF, High-fat; HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; LF, Low-fat; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; WC, Waist circumference.



Supplemental figure 8. Plot of bootstrapped sampling variation around the edge-weights reflecting accuracy of the edge-weights, a measure of the stability of the network. The plot shows good accuracy of estimates, as indicated by narrow intervals around the edge weights. Only edge weights with values ≤-0.2 or ≥0.2 are shown. Alc, Alcohol; Cof, Coffee; EduY, Age at completion of education; Eth, Ethnicity; Fru, Fruit; HF, High-fat; HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; Leg, Legumes; LF, Low-fat; Nut, Nuts; PA, Physical Activity; PD, Prediabetes; Pot, Potatoes; RF, Refined Grains; SSB, Sugar Sweetened Beverages; Smo, Smoking; TAG, Triglycerides; Veg, Vegetables; WC, Waist circumference.



Supplemental figure 9. Network structure of dairy types (blue), food groups and energy intake (pink), health factors (yellow), socio-demographic characteristics (green), clinical markers (orange) and prediabetes (grey) of the study population with complete data for variables in the model with a nonparanormal transformation applied to non-normally distributed continuous variables (*n* = 6,162). In this semi-parametric copula Gaussian Graphical Model (GGM), the positioning of nodes and edge-weights were similar to Figure 1. The edges between nodes (variables) represent conditional independent relationships; blue and orange edges indicate positive and negative relationships respectively between two continuous nodes and grey edges indicate a relationship between at least one categorical variable. Edge thickness is proportional to the strength of the relationship between the nodes, with the highest edge weight being 1.08 (between nodes education and educational years). The absence of an edge indicates that two nodes are conditional independent in the network. The predictability is indicated by the rings around each node; blue rings indicate the proportion variance explained by neighbouring nodes with the full circle indicating a r2 of 1.0; the range/red rings indicate the accuracy for the categorical nodes, respectively the marginal of the variable and the additionally achieved accuracy by all other remaining variables, with the full circle indicating an accuracy of 100%. HT, Hypertension; LDL-C, Low Density Lipoprotein Cholesterol; LF, Low-fat; PA, Physical Activity; PD, Prediabetes; SSB, Sugar Sweetened Beverages; TAG, Triglycerides; WC, Waist circumference.

Chapter 7

Supplementary materials

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Supplemental figure 40. Contour-enhanced funnel plot and Doi plot for studies of the association between ice cream intake and prediabetes risk.

Supplemental table 1. Search strategy.

Database	Search terms	Hits
PubMed	**Filters: English** ("diabetes Mellitus"[MeSH Terms] OR diabetes[tiab] OR diabetic[tiab] OR NIDDM[tiab] OR "prediabetic state"[MeSH Terms] OR prediabetes[tiab] OR prediabetic OR "pre-diabetes"[tiab] OR "pre-diabetic" OR hyperglycemia[MeSH Terms] OR hyperglycemia[tiab] OR hyperglycaemia[tiab] OR "glucose intolerance"[MeSH Terms] OR glucose intolerance[tiab]OR metabolic syndrome[tiab] OR impaired glycemia[tiab] OR impaired glycaemia[tiab] OR impaired glucose tolerance[tiab] OR impaired fasting glucose[tiab] OR glucose[tiab] OR blood sugar[tiab] OR FPG[tiab] OR OGTT[tiab] OR "glycated hemoglobin"[MESH] OR glycated hemoglobin[tiab] OR "hemoglobin A"[tiab] OR HbA1c[tiab] OR A1c[tiab] OR "insulin resistance"[MeSH Terms] OR insulin[tiab] OR HOMA-IR[tiab] OR HOMO-IR[tiab] OR "Matsuda index"[tiab] OR ISI-M[tiab] OR "Stumvoll metabolic clearance rate"[tiab] OR "Stumvoll MCR"[tiab:~0] OR "Stumvoll insulin sensitivity index"[tiab] OR OGIS[tiab] OR "Gutt index"[tiab]) AND (dairy product[MeSH Terms] OR cultured milk product[MeSH Terms] OR cheese [MeSH Terms] OR yogurt[MeSH Terms] OR ice cream[MeSH Terms] OR milk[MeSH Terms] OR dairy[tiab] OR milk*[tiab] OR cheese*[tiab] OR yoghurt* [tiab] OR yogurt*[tiab] OR butter*[tiab] OR buttermilk*[tiab] OR cream*[tiab] OR sherbet*[tiab]OR quark*[tiab] OR custard*[tiab] OR curd*[tiab] OR pudding*[tiab] OR porridge*[tiab] OR ice cream*[tiab] OR icecream*[tiab] OR "ice-cream") AND (longitudinal[tiab] OR cohort[tiab] OR follow-up[tiab] OR prospective[tiab])	1,281
Scopus	**Filters: English** (TITLE-ABS-KEY (diabetes OR diabetic OR NIDDM OR "prediabetic state" OR prediabetes OR prediabetic OR "pre-diabetes" OR "pre-diabetic" OR "insulin resistance" OR hyperglycemia OR hyperglycaemia OR "glucose intolerance" OR "metabolic syndrome" OR "impaired glycemia" OR "impaired glycaemia" OR "impaired glucose tolerance" OR "impaired fasting glucose" OR glucose OR "blood sugar" OR FPG OR OGTT OR glycated hemoglobin OR "hemoglobin A" OR hba1c OR a1c OR "insulin resistance" OR insulin OR HOMA-IR OR HOMO-IR OR "Matsuda index" OR ISI-M OR "Stumvoll metabolic clearance rate" OR "Stumvoll MCR" OR "Stumvoll insulin sensitivity index" OR OGIS OR "Gutt index") AND TITLE-ABS-KEY (dairy OR milk* OR cheese* OR yoghurt* OR yogurt* OR butter* OR buttermilk* OR cream* OR sherbet* OR quark* OR custard* OR curd* OR pudding* OR porridge* OR "ice cream*" OR icecream* OR "ice-cream*") AND TITLE-ABS-KEY (longitudinal OR cohort OR follow-up OR prospective))	1,242
Web of Science	**Filters: English** TS=(diabetes OR diabetic OR NIDDM OR "prediabetic state" OR prediabetes OR prediabetic OR "pre-diabetes" OR "pre-diabetic" OR "insulin resistance" OR hyperglycemia OR hyperglycaemia OR "glucose intolerance" OR "metabolic syndrome" OR "impaired glycemia" OR "impaired glycaemia" OR "impaired glucose tolerance" OR "impaired fasting glucose" OR glucose OR "blood sugar" OR FPG OR OGTT OR "glycated hemoglobin" OR "hemoglobin A" OR HbA1c OR A1c OR "insulin resistance" OR insulin OR HOMA-IR OR HOMO-IR OR "Matsuda index" OR ISI-M OR "Stumvoll metabolic clearance rate" OR "Stumvoll MCR" OR "Stumvoll insulin sensitivity index" OR OGIS OR "Gutt index") AND TS=(dairy OR milk* OR cheese* OR yoghurt* OR yogurt* OR butter* OR buttermilk* OR cream* OR sherbet* OR quark* OR custard* OR curd* OR pudding* OR porridge* OR "ice cream*" OR icecream* OR "ice-cream") AND TS=(longitudinal OR cohort OR follow-up OR prospective)	1,867

Supplemental table 1. Search strategy. (continued)

Database	Search terms	Hits
Cochrane Library	#1 MeSH descriptor: [Diabetes Mellitus, Type 2] explode all trees #2 MeSH descriptor: [Prediabetic State] explode all trees #3 MeSH descriptor: [Insulin Resistance] explode all trees #4 MeSH descriptor: [Hyperglycemia] explode all trees #5 MeSH descriptor: [Glucose Intolerance] explode all trees #6 MeSH descriptor: [Glycated Hemoglobin] explode all trees #7 (diabetes OR diabetic OR NIDDM OR prediabetes OR prediabetic OR "pre-diabetes" OR "pre-diabetic" OR hyperglycemia OR hyperglycaemia OR "glucose intolerance" OR "metabolic syndrome" OR "impaired glycemia" OR "impaired glycaemia" OR "impaired glucose tolerance" OR "impaired fasting glucose" OR glucose OR "blood sugar" OR FPG OR OGTT OR "glycated hemoglobin" OR "hemoglobin A" OR HbA1c OR A1c OR insulin OR HOMA-IR OR HOMO-IR OR "Matsuda index" OR ISI-M OR "Stumvoll metabolic clearance rate" OR "Stumvoll MCR" OR "Stumvoll insulin sensitivity index" OR OGIS OR "Gutt index"):ti,ab,kw #8 MeSH descriptor: [Dairy Products] explode all trees #9 MeSH descriptor: [Cultured Milk Products] explode all trees #10 MeSH descriptor: [Cheese] explode all trees #11 MeSH descriptor: [Yogurt] explode all trees #12 MeSH descriptor: [Ice Cream] explode all trees #13 MeSH descriptor: [Milk] explode all trees #14 (dairy OR milk* OR cheese* OR yoghurt* OR yogurt* OR butter* OR buttermilk* OR cream* OR sherbet*OR quark* OR custard* OR curd* OR pudding* OR porridge* OR "ice cream*" OR icecream* OR "ice-cream*"):ti,ab,kw #15 (longitudinal OR cohort OR follow-up OR prospective):ti,ab,kw (Word variations have been searched) #16 #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 #17 #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 #18 #16 AND #17 AND #15	662
Google Scholar	(prediabetes OR insulin OR glycemia OR glucose OR hemoglobin OR HbA1c) AND (dairy OR milk OR cheese OR yogurt OR yoghurt OR ice OR cream) AND (longitudinal OR cohort OR follow-up OR prospective)	~1.310.000

Supplemental table 2. Definitions of dairy types included in each individual study included in the meta-analysis.

Dairy type	Definition
Hruby, 2017 [9]. Framingham Heart Study Offspring Cohort, United States.	
Total dairy	Foods made from milk that retain their calcium content, including milk, sherbet and ice milk, ice cream, yogurt, cottage and ricotta cheese, and other cheese
High-fat dairy	Skim milk, sherbet and ice milk, and yogurt
Low-fat dairy	Whole milk, ice cream, cottage and ricotta cheese, and other cheese
Total milk	Full-fat and skim and low-fat milk
High-fat milk	Full-fat milk
Low-fat milk	Skim and low-fat milk
Total yogurt	Yogurt
Total cheese	Cottage and ricotta cheese and other cheese
Cream	Foods made from milk that do not retain calcium, including cream, sour cream, cream cheese, and butter
Slurink, 2022 [4]. Hoorn Studies, The Netherlands	
Total dairy	All dairy products
High-fat dairy	All high-fat dairy products
Low-fat dairy	All low-fat dairy products
Fermented dairy	All fermented products
High-fat fermented dairy	HS1 and HS2: full fat yogurt, full fat fruit yogurt, full fat curd, high fat cheese, full fat luxury cheese; HS2: oatmeal porridge, rice porridge and full fat custard
Low-fat fermented dairy	HS1 and HS2: Semi-skimmed yogurt, skimmed yogurt, skimmed fruit yogurt, semi-skimmed curd, skimmed curd, semi-skimmed fruit curd, skimmed fruit curd, low fat cheese, low fat luxury cheese, buttermilk. HS1: buttermilk; HS2: buttermilk porridge and skimmed custard.
Total milk	All milk and milk products
High-fat milk	HS1 and HS2: Full fat milk, full fat chocolate milk, milk powder, full fat milk added to the coffee; HS2: drinking yogurt, fruit flavoured milk.
Low-fat milk	Semi-skimmed milk, skimmed milk, buttermilk, semi-skimmed chocolate milk, skimmed chocolate milk, semi-skimmed milk added to the coffee, skimmed milk added to the coffee, semi-skimmed fruit milk
Total yogurt	All yogurts
High-fat yogurt	Full fat yogurt, full fat fruit yogurt
Low-fat yogurt	Semi-skimmed yogurt, skimmed yogurt, skimmed fruit yogurt
Total cheese	All cheeses
High-fat cheese	HS1: regular cheese, cheese cubes; HS2: 40 + cheese (e.g. Edam), 48 + cheese (e.g. Gouda, cheddar, cheese spread, goat cheese), full fat luxury cheese (e.g. cream brie, cream cheese, mon chou), cheese cubes, grated cheese, feta, cheese fondue
Low-fat cheese	HS1: skimmed cheese; HS2: 20 + and 30 + cheese (e.g. cheese spread, cottage cheese), low fat luxury cheese (e.g. brie, goat cheese)
Cream	Whipped cream, coffee cream, semi-skimmed coffee cream, sour cream, crème fraiche, cooking cream
Ice cream	Ice cream

Supplemental table 2. Definitions of dairy types included in each individual study included in the meta-analysis. (continued)

Dairy type	Definition
Slurink, 2023 [6]. AusDiab, Australia	
Total dairy	All dairy products
High-fat dairy	High-fat milk, high-fat cheese, ice cream, yogurt (50% of intake)
Low-fat dairy	Low-fat milk, low-fat cheese, yogurt (50% of intake)
Fermented dairy	Yogurt, hard cheese, firm cheese, soft cheese, low-fat cheese
Total milk	High-fat milk, low-fat milk, flavoured milk
High-fat milk	Full-fat milk (full cream milk)
Low-fat milk	Reduced fat milk, skimmed milk
Yogurt	Yogurt
Total cheese	All cheeses
High-fat cheese	Hard cheese, firm cheese, soft cheese, cream cheese
Low-fat cheese	Low-fat cheese, ricotta, or cottage cheese
Ice cream	Ice cream
Slurink, 2022 [5]. Rotterdam Study, The Netherlands.	
Total dairy	All dairy products
High-fat dairy	All sub cohorts: all high-fat dairy products; RS-I and RS-III: full fat custard.
Low-fat dairy	All sub cohorts: all low-fat dairy products; RS-I: skimmed custard.
Fermented dairy	All fermented products
High-fat fermented dairy	All sub cohorts: high-fat yogurt, high-fat cheese, full fat curd, full fat fruit curd; RS-III: mousse and chipolata pudding.
Low-fat fermented dairy	Low-fat yogurt, low-fat cheese, semi-skimmed curd, skimmed curd, semi-skimmed fruit curd, skimmed fruit curd
Total milk	All milk and milk products
High-fat milk	Full fat milk, full fat chocolate milk, milk powder, full fat milk added to the coffee
Low-fat milk	Semi-skimmed milk, skimmed milk, buttermilk, semi-skimmed chocolate milk, skimmed chocolate milk, semi-skimmed milk added to the coffee, skimmed milk, added to the coffee
Total yogurt	All yogurts
High-fat yogurt	Full fat yogurt, full fat fruit yogurt
Low-fat yogurt	All sub-cohorts: Semi-skimmed yogurt, skimmed yogurt, semi-skimmed fruit yogurt skimmed fruit yogurt; RS-III: skimmed custard, semi-skimmed curd, skimmed curd, semi-skimmed fruit curd and skimmed fruit curd.
Total cheese	All cheeses
High-fat cheese	40+ cheese (e.g., Edam), 48+ cheese (e.g. Gouda, cheddar, cheese spread, goat cheese), full fat luxury cheese (e.g. cream brie, cream cheese, mon chou), cheese cubes, grated cheese, feta, cheese fondue
Low-fat cheese	20+ and 30+ cheese (e.g., cheese spread, cottage cheese), low-fat luxury cheese (e.g. brie, goat cheese)
Cream	Whipped cream, coffee cream, semi-skimmed coffee cream, sour cream, crème fraiche, cooking cream
Ice cream	Ice cream

Supplemental table 2. Definitions of dairy types included in each individual study included in the meta-analysis. (continued)

Dairy type	Definition
Slurink, 2023 [7]. Lifelines study, The Netherlands.	
Total dairy	All dairy products
High-fat dairy	All high-fat dairy products
Low-fat dairy	All low-fat dairy products
Fermented dairy	All fermented dairy products
High-fat fermented dairy	High-fat yogurt, high-fat cheese, curd cheese
Low-fat fermented dairy	Low-fat yogurt, low-fat cheese, buttermilk
Total milk	Full fat milk, skimmed milk, semi skimmed milk, buttermilk, chocolate milk, coffee milk, plain milk in coffee
High-fat milk	Full fat milk
Low-fat milk	Skimmed milk, semi skimmed milk
Total yogurt	All yogurts
High-fat yogurt	Full fat natural yogurt
Low-fat yogurt	Skimmed yogurt, skimmed fruit yogurt
Total cheese	All cheeses
High-fat cheese	40+ (spreadable) cheese, 48+ (spreadable) cheese, cream cheese, foreign cheeses, cheese cubes, (cream) cheese on baguette and on pieces of toast, grated cheese, diced cheese, feta cheese, cheese fondue
Low-fat cheese	20+/30+ (spreadable) cheese
Cream	Whip cream, coffee cream
Ice cream	Milk-based ice cream
Slurink, 2024 [10]. Fenland study, United Kingdom.	
Total dairy	All dairy products
High-fat dairy	High-fat milk; high-fat yogurt; high-fat cheese; total cream; ice cream; milk puddings, e.g. rice, custard, trifle; dairy desserts
Low-fat dairy	Low-fat milk; low-fat yogurt; low-fat cheese
Fermented dairy	High-fat fermented dairy; low-fat fermented dairy
High-fat fermented dairy	High-fat yogurt; high-fat cheese
Low-fat fermented dairy	Low-fat yogurt; low-fat cheese
Total milk	High-fat milk; low-fat milk
High-fat milk	Full cream, silver; Channel Islands, gold, non-specific milk (50%) of intake
Low-fat milk	Semi-skimmed, red/white; dried milk, non-specific milk (50%) of intake
Total yogurt	High-fat yogurt; low-fat yogurt
High-fat yogurt	Full fat or Greek yogurt
Low-fat yogurt	Low-fat yogurt, fromage frais
Total cheese	High-fat cheese; low-fat cheese
High-fat cheese	Cheese, e.g. Cheddar, Brie, Edam
Low-fat cheese	Cottage cheese, low-fat soft cheese
Cream	Double or clotted cream, individual or sour cream
Ice cream	Ice cream, choc ices

Abbreviations: HS, Hoorn Studies (1st and 2nd enrolment wave); RS, Rotterdam Studies (1st, 2nd, and 3rd enrolment wave).

Supplemental table 3. Characteristics and outcomes of separate two-stage random-effect meta-analyses comparing the highest versus lowest category of intake, per dairy exposure, for the scoring of the effect size (7) of NutriGrade.

Exposure	No. cohorts (articles)	Total N	N cases	Mean follow-up (years)	Intake highest category (servings/d)[1]	RR (95%CI) for highest. vs lowest intake category	Heterogeneity		
							I^2	Q test	p-value
Total dairy	9 (6)	95,844	6,653	9.6	3.7	0.88 (0.76-1.03)	77.6%	35.8	<0.001
High-fat dairy	9 (6)	95,844	6,653	9.6	2.0	0.98 (0.91-1.05)	0.0%	5.6	0.69
Low-fat dairy	9 (6)	95,844	6,653	9.6	2.6	0.94 (0.84-1.05)	51.8%	16.6	0.03
Fermented dairy	8 (5)	93,975	5,751	9.5	2.4	0.98 (0.90-1.06)	10.2%	7.8	0.35
High-fat fermented dairy	7 (4)	89,089	4,986	9.1	1.7	0.97 (0.90-1.05)	0.0%	2.6	0.86
Low-fat fermented dairy	7 (4)	89,089	4,986	9.1	0.7	0.99 (0.91-1.07)	0.0%	3.9	0.69
Total milk	9 (6)	95,844	6,653	9.6	2.4	0.97 (0.89-1.06)	28.5%	11.2	0.19
High-fat milk	9 (6)	95,844	6,653	9.6	1.3	0.92 (0.80-1.07)	75.5%	32.7	<0.001
Low-fat milk	9 (6)	95,844	6,653	9.6	1.5	1.01 (0.94-1.09)	4.6%	8.4	0.40
Total yogurt	9 (6)	95,844	6,653	9.6	0.5	0.96 (0.89-1.04)	16.6%	9.6	0.30
High-fat yogurt	7 (4)	89,086	4,986	9.6	0.4	0.76 (0.46-1.27)	95.4%	131	<0.001
Low-fat yogurt	7 (4)	89,086	4,986	9.6	0.4	1.03 (0.95-1.11)	0.0%	1.5	0.96
Total cheese	9 (6)	95,844	6,653	9.6	2.9	0.93 (0.87-1.01)	10.2%	8.9	0.35
High-fat cheese	8 (5)	93,977	5,751	9.5	2.4	0.90 (0.80-1.02)	55.6%	15.8	0.03
Low-fat cheese	8 (5)	93,977	5,751	9.5	1.0	1.01 (0.94-1.09)	0.0%	6.1	0.53
Cream	8 (5)	90,953	5,888	9,3	0.8	0.88 (0.82-0.95)	0.0%	6.2	0.51
Ice cream	8 (5)	96,239	6,562	9,5	0.06	0.91 (0.85-0.98)	0.0%	1.7	0.98

[1] For composite dairy types, serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods. For individual dairy types, serving sizes were 150 g for milk, yogurt, and ice cream; 20 g for cheese, and 15 g for cream.
Abbreviations: RR, Relative risk.

Supplemental table 4. Characteristics and outcomes of separate two-stage fixed-effects dose-response meta-analyses, per dairy exposure.

Exposure	No. cohorts (articles)	Total N	N cases	Mean follow-up (years)	Range median intake (servings/d)[1]	Model fit ($P_{nonlinearity}$)	RR (95%CI) at 1 serving/day	Lowest or highest RR of quadratic fit (95%CI)	Heterogeneity		
									I^2	Q test	p-value
Total dairy	9 (6)	95,844	6,653	9.6	1.1-3.7	Quadratic (p<0.0001)	0.87 (0.80-0.94)	0.75 (0.64-0.88) at 3.4 servings /d	18.0%	19.5	0.24
High-fat dairy	9 (6)	95,844	6,653	9.6	0.3-2.0	Linear	0.99 (0.96-1.02)		36.8%	12.7	0.12
Low-fat dairy	9 (6)	95,844	6,653	9.6	0.8-2.6	Quadratic (p<0.0001)	1.00 (0.95-1.05)	0.91 (0.72-1.14) at 5.2 servings/d	27.8%	22.1	0.14
Fermented dairy	8 (5)	93,975	5,751	9.5	0.7-2.4	Quadratic (p<0.0001)	0.93 (0.86-1.01)	0.91 (0.81-1.02) at 2 servings/d	0%	9.4	0.81
High-fat fermented dairy	7 (4)	89,089	4,986	9.1	0.8-1.7	Quadratic (p=0.001)	0.95 (0.88-1.02)	0.94 (0.86-1.03) at 1.7 servings/d	0%	7.9	0.79
Low-fat fermented dairy	7 (4)	89,089	4,986	9.1	0.2-0.7	Linear	0.98 (0.94-1.03)		0%	1.8	0.94
Total milk	9 (6)	95,844	6,653	9.6	0.9-2.4	Quadratic (p<0.0001)	1.00 (0.95-1.06)	0.98 (0.86-1.12) at 4.1 servings/d	36.7%	25.3	0.07
High-fat milk	9 (6)	95,844	6,653	9.6	0.03-1.3	Linear	0.97 (0.92-1.03)		58.5%	19.3	0.01
Low-fat milk	9 (6)	95,844	6,653	9.6	0.6-1.5	Quadratic (p<0.0001)	1.04 (0.99-1.09)	0.91 (0.77-1.08) at 4.1 servings/d	30.0%	22.8	0.12
Total yogurt	9 (6)	95,844	6,653	9.6	0.02-0.5	Linear	0.99 (0.91-1.07)		7.9%	8.7	0.37
High-fat yogurt	7 (4)	89,086	4,986	9.6	0.2-0.4	Linear	1.06 (0.90-1.24)		21.0%	7.6	0.27
Low-fat yogurt	7 (4)	89,086	4,986	9.6	0.09-0.4	Linear	1.01 (0.93-1.10)		0.0%	2.9	0.83
Total cheese	9 (6)	95,844	6,653	9.6	0.6-2.9	Quadratic (p<0.0001)	0.92 (0.88-0.97)	0.90 (0.83-0.97) at 2.1 servings/d	0.0%	12.6	0.70
High-fat cheese	8 (5)	93,977	5,751	9.5	0.4-2.4	Quadratic (p<0.0001)	0.94 (0.89-0.99)	0.92 (0.85-0.99) at 2.0 servings/d	11.6%	15.8	0.32
Low-fat cheese	8 (5)	93,977	5,751	9.5	0.2-1.0	Linear	1.05 (1.00-1.10)		48.0%	13.5	0.06
Cream	8 (5)	90,953	5,888	9,3	0.02-0.8	Linear	0.92 (0.85-0.99)		0.0%	6.2	0.51
Ice cream	8 (5)	96,239	6,562	9,5	0.02-0.06	Linear	0.50 (0.26-0.94)		0.0%	2.4	0.93

[1] For composite dairy types, serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods. For individual dairy types, serving sizes were 150 g for milk, yogurt, and ice cream; 20 g for cheese, and 15 g for cream.

Supplemental table 5. Quality assessment of cohort studies on dairy intake, prediabetes, and glycaemic outcomes[1]

Author, year	Cohort, location	Selection of cohorts				Comparability		Outcome		
		Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Demonstration that outcome of interest was not present at start of study	Comparability of cohorts on the basis of the design or analysis	Assessment of outcome	Was follow up long enough for outcomes to occur	Adequacy of follow up of cohorts	Total score[2]
Prediabetes outcome										
Hruby, 2017 [9]	Framingham Heart Study Offspring Cohort, United States	B★	A★	B★	A★	A★ B★	A★	A★	B★	**9**
Slurink, 2022 [4]	Hoorn Studies, The Netherlands	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**
Slurink, 2023 [6]	AusDiab, Australia	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**
Slurink, 2022 [5]	Rotterdam Study, The Netherlands	B★	A★	B★	A★	A★ B★	A★	A★	B★	**9**
Slurink, 2023 [7]	Lifelines study, The Netherlands	B★	A★	C	A★	A★ B★	A★	A★	C	**7**
Slurink, 2024 [10]	Fenland study, United Kingdom	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**
Glycaemic outcomes										
Feskens, 1995 [31]	Seven Countries Study, Finland, and The Netherlands.	B★	A★	B★	A★	A★	A★	A★	C	**7**
Ma, 2006 [32]	IRAS, United States.	A★	A★	B★	A★	A★ B★	A★	A★	B★	**9**
Snijder, 2008 [34]	Hoorn Study, The Netherlands.	B★	A★	B★	A★	A★	A★	A★	C	**7**
Fumeron, 2011 [38]	DESIR, France.	B★	A★	B★	A★	C	A★	A★	C	**6**
Struijk, 2012 [30]	Inter99, Denmark	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**
Samara, 2013 [33]	STANISLAS study, France	B★	A★	B★	B	A★ B★	A★	A★	D	**7**
Panahi, 2018 [29]	Quebec Family Study, Canada.	B★	A★	B★	A★	C	A★	A★	C	**6**
Huang, 2019 [27]	Meta-analysis of 18 studies, United States, Denmark, Spain, Australia, and Finland.	B★	A★	B★	A★	A★ B★	A★	A★	B★	**8**

Supplemental table 5. Quality assessment of cohort studies on dairy intake, prediabetes, and glycaemic outcomes[1] (continued)

Author, year	Cohort, location	Selection of cohorts				Comparability		Outcome			
		Representativeness of the exposed cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Demonstration that outcome of interest was not present at start of study	Comparability of cohorts on the basis of the design or analysis	Assessment of outcome	Was follow up long enough for outcomes to occur	Adequacy of follow up of cohorts	Total score[2]
Trichia, 2020 [37]	EPIC-Norfolk study, United Kingdom.	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**
Riseberg, 2022 [28]	Boston Puerto Rican Health Study, United States.	B★	A★	C	B	A★ B★	A★	B	B★	**6**
Slurink, 2022 [5]	Rotterdam Study, the Netherlands	B★	A★	B★	A★	A★ B★	A★	A★	B★	**9**
Yun, 2022 [35]	NHAPC, China	B★	A★	B★	B	A★ B★	A★	A★	C	**8**
Chatzidiakou, 2023 [36]	Caerphilly prospective cohort study, United Kingdom	B★	A★	B★	A★	A★	A★	A★	D	**7**
Slurink, 2024 [10]	Fenland study, United Kingdom	B★	A★	B★	A★	A★ B★	A★	A★	C	**8**

[1] The letters A, B, C and D refer to the selected score of the Newcastle-Ottawa Quality Scale, with a score of A corresponding to high quality and D to poor quality. A detailed description of each possible score is given on page 10.
[2] The total score is the total number of stars.

NEWCASTLE – OTTAWA QUALITY ASSESSMENT SCALE COHORT STUDIES

Note: A study can be awarded a maximum of one star for each numbered item within the Selection and Outcome categories. A maximum of two stars can be given for Comparability.

Selection

1. Representativeness of the exposed cohort
   A. truly representative of the average healthy adults in the community★
   B. somewhat representative of the average healthy adults in the community★
   C. selected group of users e.g. nurses, volunteers
   D. no description of the derivation of the cohort

2. Selection of the non-exposed cohort
   A. drawn from the same community as the exposed cohort★
   B. drawn from a different source
   C. no description of the derivation of the non-exposed cohort

3. Ascertainment of exposure
   A. secure record (e.g. 7-day food diary) ★
   B. structured interview/≥ 2 dietary recalls/ diet history/ food frequency questionnaire including at least 50 items, validated for dairy components★
   C. written self-report (e.g. <2 dietary recalls/non-validated food frequency questionnaire or not reported whether food frequency questionnaire was validated)
   D. no description

4. Demonstration that outcome of interest was not present at start of study
   A. yes★
   B. no

Comparability

1. Comparability of cohorts on the basis of the design or analysis
   A. study controls for age, sex, and total energy intake ★
   B. study controls for multiple additional domains, i.e., sociodemographic factors (e.g., SES/education, ethnicity), health factors (e.g. physical activity, alcohol intake, smoking, family history of diabetes), dietary factors and cardiovascular risk factors (e.g. body mass index) ★

Outcome

1. Assessment of outcome
   A. Prediabetes: independent blind assessment/FPG/2hPG/HbA1c. Glycaemic outcomes: blood sampling or OGTT after 12h or overnight fast★
   B. record linkage/medical record or validated self-report.
   C. non-validated self-report
   D. no description

2. Was follow-up long enough for outcomes to occur (at least 3 years)
   A. yes★
   B. no

3. Adequacy of follow-up of cohorts
   A. complete follow-up - all subjects accounted for★
   B. subjects lost to follow-up unlikely to introduce bias - small number lost ≤20% follow-up, or description provided of those lost★
   C. follow-up rate <80% or no description of those lost
   D. no statement

Supplemental table 6. NutriGrade grading of evidence from separate meta-analyses, per dairy exposure.[1]

	Risk of bias in individual cohort studies (0-2 points)	Precision of the estimate (0-1 points)	Heterogeneity (0-1 points)[2]	Directness (0-1 points)	Publication bias (0-1 points)	Funding bias (0-1 points)	Effect size (0-2 points)[3]	Dose response association[4] (0-1 points)	**NutriGrade Score**	**Grading of evidence based on the meta-analysis**
Total dairy	2	1	0.5	1	0.5	0	0	1	6.0	Moderate
High-fat dairy	2	1	0.5	1	0.5	0	0	0	5.0	Low
Low-fat dairy	2	1	0.5	1	0.5	0	0	0	5.0	Low
Fermented dairy	2	1	0.5	1	0.5	0	0	0	5.0	Low
High-fat fermented dairy	2	1	0.5	1	0.5	0	0	0	5.0	Low
Low-fat fermented dairy	2	1	0.5	1	0.5	0	0	0	5.0	Low
Total milk	2	1	0.5	1	0.5	0	0	0	5.0	Low
High-fat milk	2	1	0.4	1	0.5	0	0	0	4.9	Low
Low-fat milk	2	1	0.5	1	0.5	0	0	0	5.0	Low
Total yogurt	2	1	0.5	1	0.5	0	0	0	5.0	Low
High-fat yogurt	2	0	0.5	1	0.5	0	0	0	4.0	Low
Low-fat yogurt	2	1	0.5	1	0	0	0	0	4.5	Low
Total cheese	2	1	0.5	1	0	0	0	1	5.5	Low
High-fat cheese	2	1	0.5	1	0	0	0	1	5.5	Low
Low-fat cheese	2	1	0.4	1	0.5	0	0	0	4.9	Low
Cream	2	0	0.5	1	0	0	0	0	3.5	Very low
Ice cream	2	1	0.5	1	0.5	0	0	1	6.0	Moderate

[1] A detailed description of each possible score is given on page 12.
[2] Based on visual inspection of the Funnel plot and major asymmetry in the Doi plot.
[3] To grade this component, a random effects meta-analysis comparing the highest versus lowest intake category of each study was conducted (Supplemental table 4).
[4] Based on the dose-response meta-analyses presented in Table 2.

NutriGrade Scoring system for meta-evidence based on prospective cohort studies

1. Risk of bias/ study quality/ study limitations (2 P)
   A. No information available (0 P)
   B. Risk of bias (2 P)
      i. Ascertainment of exposure[1]
      ii. Adjusted basic & outcome relevant model[1]
      iii. Assessment of outcome[1]
      iv. Adequacy of follow-up duration[1]
   C. Study quality (2 P)[2]

2. Precision (1 P)
   A. <500 events OR ≥500 events but 95% CI overlaps the null, and includes important benefit (RR: <0.8) or harm (RR: >1.2) (0 P)
   B. ≥500 events and the 95% CI excludes the null values; ≥500 events but 95% CI overlaps the null, and excludes important benefit (RR: <0.8) or harm (RR: >1.2) (1 P)

3. Heterogeneity (1 P)
   A. ≤ 5 studies (0 P)
   B. 6-9 studies (if ≥10 studies; multiply by 2):
      i. I^2 (0.1 P)
      ii. CIs for I^2 (0.1 P)
      iii. If I^2 <40% (0.3 P) skip iv
      iv. Modelling detected heterogeneity (I^2 ≥40%) with random effects model (0.1 P)
         1. Exploring detected heterogeneity with subgroup analysis or meta-regression (0.1 P)
         2. Sensitivity analyses with higher levels of heterogeneity (I^2 ≥75%) (0.1 P)

4. Directness (1 P)
   A. Differences in population; differences in intervention; surrogate markers; network meta-analysis (0 P)
   B. No important differences in population or intervention; hard clinical outcome (1 P)

5. Publication bias (1 P)
   A. studies OR evidence for severe bias with test or plot OR publication bias not assessed (0 P)
   B. No evidence for publication bias with test or plot (5-9 studies) OR evidence for moderate/small amount of publication bias with test or plot (0.5 P)
   C. No evidence for publication bias with test or plot (≥10 studies) (1 P)

6. Funding bias (1 P)
   A. Industry funding OR conflict of interest (0 P)
   B. Private institutions, foundations, non-governmental organizations (0.5 P)
   C. Academic institutions, research institutions (1 P)

7. Effect size of highest vs. lowest category (2 P)
   A. No effect (HR/RR: 0.80-1.20) (0 P)
   B. Moderate effect size (HR/RR: 1.2-2.00) (1 P)
   C. Large effect size (HR/RR: 2.00) (2 P)

8. Dose-response (1 P)
   A. No dose-response relationship (corresponding statistical test non-significant) (0 P)
   B. Linear and/ or nonlinear dose-response relationship (corresponding statistical test significant) (1 P)
   C. Abbreviations: P, point(s); RR, risk ratio.

[1] ≥2/3 of studies low risk of bias = 0.5 P; >1/3 of studies high risk of bias OR not assessed = 0 P; unclear risk of bias = 0.25 P).
[2] cut-off for Newcastle-Ottawa Scale (mean): ≥7= 2 P; 4-6.9= 1 P; 0-3.9= 0 P.

Supplemental table 7. Sensitivity analyses of associations between dairy foods and prediabetes risk based on one-stage random-effects dose-response meta-analysis.[1]

Dairy type	Study excluded	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit
Total dairy			
Lowest RR excluding:	HS-I	0.84 (0.76-0.93)	0.71 (0.57-0.88) at 3.4 servings/d
Highest RR excluding:	FHS-OC	0.90 (0.83-0.98)	0.82 (0.68-0.97) at 3.4 servings/d
High-fat dairy			
Lowest RR excluding:	Lifelines	0.98 (0.94-1.02)	
Highest RR excluding:	FHS-OC	0.99 (0.96-1.02)	
Low-fat dairy			
Lowest RR excluding:	Lifelines	1.00 (0.91-1.11)	0.84 (0.59-1.19) at 5.2 servings/d
Highest RR excluding:	RS-III	0.99 (0.88-1.10)	0.98 (0.87-1.11) at 2.6 servings/d
Fermented dairy			
Lowest RR excluding:	Fenland	0.92 (0.85-1.00)	0.89 (0.79-1.00) at 2.0 servings/d
Highest RR excluding:	Lifelines	0.95 (0.86-1.05)	0.93 (0.80-1.08) at 1.9 servings/d
High-fat fermented dairy			
Lowest RR excluding:	HS-II	0.94 (0.87-1.02)	0.93 (0.84-1.03) at 1.7 servings/d
Highest RR excluding:	HS-I	0.96 (0.89-1.04)	0.95 (0.87-1.05) at 1.6 servings/d
Low-fat fermented dairy			
Lowest RR excluding:	RS-I	0.98 (0.94-1.03)	
Highest RR excluding:	RS-III	0.99 (0.95-1.04)	
Total milk			
Lowest RR excluding:	RS-I	0.95 (0.87-1.05)	0.92 (0.81-1.05) at 2.9 servings/d
Highest RR excluding:	Fenland	0.99 (0.89-1.10)	0.98 (0.85-1.13) at 2.6 servings/d
High-fat milk			
Lowest RR excluding:	HS-I	0.95 (0.84-1.08)	
Highest RR excluding:	RS-II	1.00 (0.92-1.09)	
Low-fat milk			
Lowest RR excluding:	RS-I	1.01 (0.94-1.09)	1.01 (0.94-1.09) at 1.0 servings/d
Highest RR excluding:	FHS-OC	1.07 (1.01-1.13)	1.07 (1.01-1.14) at 1.5 servings/d
Total yogurt			
Lowest RR excluding:	HS-I	0.95 (0.87-1.04)	
Highest RR excluding:	RS-I	1.01 (0.93-1.09)	
High-fat yogurt			
Lowest RR excluding:	HS-I	0.97 (0.75-1.28)	
Highest RR excluding:	RS-I	1.11 (0.94-1.31)	

Supplemental table 7. Sensitivity analyses of associations between dairy foods and prediabetes risk based on one-stage random-effects dose-response meta-analysis.[1] (continued)

Dairy type	Study excluded	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit
Low-fat yogurt			
Lowest RR excluding:	Lifelines	0.98 (0.89-1.09)	
Highest RR excluding:	Fenland	1.02 (0.93-1.11)	
Total cheese			
Lowest RR excluding:	Lifelines	0.88 (0.82-0.95)	0.83 (0.74-0.93) at 2.3 servings/d
Highest RR excluding:	FHS-OC	0.90 (0.85-0.97)	0.87 (0.79-0.97) at 2.1 servings/d
High-fat cheese			
Lowest RR excluding:	Lifelines	0.90 (0.84-0.97)	0.86 (0.76-0.97) at 2.3 servings/d
Highest RR excluding:	HS-I	0.95 (0.90-1.00)	0.93 (0.87-1.01) at 1.8 servings/d
Low-fat cheese			
Lowest RR excluding:	HS-I	1.02 (0.97-1.07)	
Highest RR excluding:	HS-II	1.07 (0.99-1.16)	
Cream			
Lowest RR excluding:	FHS-OC	0.73 (0.52-1.02)	
Highest RR excluding:	HS-II	0.92 (0.85-1.00)	
Ice cream			
Lowest RR excluding:	RS-II	0.46 (0.23-0.88)	
Highest RR excluding:	HS-II	0.53 (0.27-1.02)	

[1] A one-stage meta-analysis was performed as the two-stage required at least two non-referent observations per individual study, thus limiting the assessment of study heterogeneity.
[2] For composite dairy types, serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods. For individual dairy types, serving sizes were 150 g for milk, yogurt, and ice cream; 20 g for cheese, and 15 g for cream.
Abbreviations: FHS-OC, Framingham Heart Study-Offspring Cohort; HS, Hoorn Study; RS, Rotterdam Study.

Supplemental table 8. Goodness-of fit tests for models with potential moderators of the association between dairy foods and prediabetes risk based on one-stage linear or quadratic dose-response meta-regression.[1]

Dairy type	Linear fit			Quadratic fit		
	Deviance	P-value	R^2	Deviance	P-value	R^2
Total dairy						
Model 4	37.8	0.048	0.04	26.8	0.31	0.32
+ follow-up duration	35.1	0.067	1.06	25.4	0.33	0.35
+ year of dairy intake assessment	37.1	0.043	0.06	26.7	0.27	0.32
+ prediabetes definition	28.0	0.139	0.29	23.3	0.28	0.41
High-fat dairy						
Model 4	33.9	0.14	0.02			
+ follow-up duration	33.1	0.13	0.04			
+ year of dairy intake assessment	31.1	0.19	0.10			
+ prediabetes definition	25.6	0.27	0.26			
Low-fat dairy						
Model 4	28.1	0.36	0.02	27.8	0.32	0.03
+ follow-up duration	25.8	0.42	0.10	26.0	0.35	0.09
+ year of dairy intake assessment	28.0	0.31	0.02	27.8	0.27	0.03
+ prediabetes definition	18.8	0.67	0.34	21.9	0.41	0.23
Fermented dairy						
Model 4	19.2	0.63	0.01	15.0	0.82	0.22
+ follow-up duration	19.1	0.58	0.01	15.0	0.78	0.22
+ year of dairy intake assessment	18.1	0.64	0.06	14.9	0.78	0.23
+ prediabetes definition	17.0	0.59	0.12	14.1	0.72	0.27
High-fat fermented dairy						
Model 4	10.8	0.95	0.03	9.4	0.97	0.15
+ follow-up duration	10.8	0.93	0.03	9.3	0.95	0.16
+ year of dairy intake assessment	10.7	0.93	0.04	9.0	0.96	0.19
+ prediabetes definition	10.6	0.91	0.05	8.1	0.96	0.27

Supplemental table 8. Goodness-of fit tests for models with potential moderators of the association between dairy foods and prediabetes risk based on one-stage linear or quadratic dose-response meta-regression.[1] (continued)

Dairy type	Linear fit			Quadratic fit		
	Deviance	P-value	R^2	Deviance	P-value	R^2
Low-fat fermented dairy						
Model 4	17.1	0.65	0.03			
+ follow-up duration	16.9	0.60	0.04			
+ year of dairy intake assessment	16.8	0.60	0.04			
+ prediabetes definition	17.1	0.52	0.03			
Total milk						
Model 4	40.4	0.04	0.001	40.4	0.03	0.002
+ follow-up duration	40.4	0.03	0.001	40.3	0.02	0.004
+ year of dairy intake assessment	40.1	0.03	0.008	40.3	0.02	0.002
+ prediabetes definition	33.1	0.08	0.18	33.5	0.04	0.17
High-fat milk						
Model 4	38.5	0.02	0.03			
+ follow-up duration	36.3	0.02	0.08			
+ year of dairy intake assessment	37.4	0.02	0.05			
+ prediabetes definition	26.6	0.09	0.33			
Low-fat milk						
Model 4	39.5	0.04	0.003	36.9	0.06	0.07
+ follow-up duration	39.3	0.04	0.01	36.5	0.05	0.08
+ year of dairy intake assessment	39.5	0.03	0.004	36.0	0.06	0.09
+ prediabetes definition	34.2	0.05	0.14	35.8	0.03	0.11
Total yogurt						
Model 4	38.1	0.05	0.002			
+ follow-up duration	36.2	0.05	0.05			
+ year of dairy intake assessment	37.9	0.04	0.008			
+ prediabetes definition	33.4	0.04	0.13			

Supplemental table 8. Goodness-of fit tests for models with potential moderators of the association between dairy foods and prediabetes risk based on one-stage linear or quadratic dose-response meta-regression.[1] (continued)

Dairy type	Linear fit			Quadratic fit		
	Deviance	P-value	R^2	Deviance	P-value	R^2
High-fat yogurt						
Model 4	23.9	0.25	0.02			
+ follow-up duration	20.7	0.35	0.15			
+ year of dairy intake assessment	23.9	0.20	0.02			
+ prediabetes definition	17.2	0.51	0.29			
Low-fat yogurt						
Model 4	15.4	0.75	0.002			
+ follow-up duration	15.0	0.72	0.03			
+ year of dairy intake assessment	15.4	0.70	0.002			
+ prediabetes definition	14.5	0.69	0.06			
Total cheese						
Model 4	27.8	0.27	0.004	15.2	0.90	0.46
+ follow-up duration	27.7	0.23	0.01	14.8	0.87	0.47
+ year of dairy intake assessment	26.6	0.27	0.05	15.0	0.98	0.46
+ prediabetes definition	22.9	0.29	0.18	8.9	0.97	0.68
High-fat cheese						
Model 4	29.0	0.15	0.04	23.9	0.30	0.21
+ follow-up duration	28.2	0.13	0.06	23.2	0.28	0.23
+ year of dairy intake assessment	27.9	0.14	0.07	23.8	0.25	0.21
+ prediabetes definition	25.1	0.16	0.17	19.0	0.40	0.37
Low-fat cheese						
Model 4	17.1	0.76	0.17			
+ follow-up duration	16.7	0.73	0.20			
+ year of dairy intake assessment	10.3	0.98	0.50			
+ prediabetes definition	14.5	0.75	0.30			

Supplemental table 8. Goodness-of fit tests for models with potential moderators of the association between dairy foods and prediabetes risk based on one-stage linear or quadratic dose-response meta-regression.[1] (continued)

Dairy type	Linear fit			Quadratic fit		
	Deviance	P-value	R^2	Deviance	P-value	R^2
Cream						
Model 4	23.7	0.42	0.16			
+ follow-up duration	19.4	0.62	0.31			
+ year of dairy intake assessment	21.2	0.51	0.25			
+ prediabetes definition	18.4	0.56	0.35			
Ice cream						
Model 4	18.0	0.20	0.71			
+ follow-up duration	18.0	0.20	0.65			
+ year of dairy intake assessment	17.7	0.22	0.67			
+ prediabetes definition	17.8	0.21	0.54			

[1] A one-stage meta-analysis was performed as the two-stage required at least two non-referent observations per moderator.

Supplemental table 9. Associations between dairy foods and prediabetes risk based on linear or quadratic two-stage random-effects dose-response meta-analysis for different confounder models.[1]

Dairy type	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit[2]	Heterogeneity		
			I^2	Q test	p-value
Total dairy					
Model 1	0.84 (0.77-0.92)	0.69 (0.55-0.85) at 3.8 servings/d	24.9%	21.3	0.17
Model 2	0.86 (0.78-0.95)	0.74 (0.60-0.90) at 3.5 servings/d	17.4%	19.4	0.25
Model 3	0.88 (0.81-0.96)	0.77 (0.65-0.93) at 3.4 servings/d	12.3%	18.3	0.31
Model 4	0.87 (0.78-0.96)	0.75 (0.60-0.93) at 3.4 servings/d	18.0%	19.5	0.24
High-fat dairy					
Model 1	0.97 (0.94-0.99)		17.4%	9.7	0.29
Model 2	0.97 (0.95-1.01)		40.7%	13.5	0.10
Model 3	0.98 (0.95-1.01)		36.4%	12.6	0.13
Model 4	0.99 (0.96-1.02)		36.8%	12.7	0.12
Low-fat dairy					
Model 1	0.99 (0.91-1.09)	0.99 (0.71-1.37) at 5.2 servings/d	31.7%	23.4	0.10
Model 2	1.01 (0.94-1.09)	1.01 (0.75-1.35) at 5.2 servings/d	25.4%	21.4	0.16
Model 3	1.02 (0.95-1.10)	1.02 (0.79-1.33) at 5.2 servings/d	20.6%	20.2	0.21
Model 4	1.00 (0.91-1.09)	0.93 (0.66-1.32) at 5.2 servings/d	27.8%	22.1	0.14
Fermented dairy					
Model 1	0.89 (0.82-0.96)	0.84 (0.75-0.94) at 2.4 servings/d	0%	10.9	0.69
Model 2	0.92 (0.85-0.99)	0.88 (0.79-0.99) at 2.1 servings/d	0%	9.9	0.77
Model 3	0.93 (0.86-1.01)	0.91 (0.82-1.02) at 1.9 servings/d	0%	8.5	0.86
Model 4	0.93 (0.86-1.01)	0.91 (0.81-1.02) at 2.0 servings/d	0%	9.4	0.81
High-fat fermented dairy					
Model 1	0.92 (0.86-0.99)	0.90 (0.83-0.98) at 2.0 servings/d	0%	8.0	0.78
Model 2	0.95 (0.89-1.02)	0.94 (0.86-1.02) at 1.9 servings/d	0%	9.5	0.66
Model 3	0.95 (0.89-1.02)	0.94 (0.86-1.02) at 1.9 servings/d	0%	9.1	0.69
Model 4	0.95 (0.88-1.02)	0.94 (0.86-1.03) at 1.7 servings/d	0%	7.9	0.79

Supplemental table 9. Associations between dairy foods and prediabetes risk based on linear or quadratic two-stage random-effects dose-response meta-analysis for different confounder models.[1] (continued)

Dairy type	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit[2]	Heterogeneity		
			I^2	Q test	p-value
Low-fat fermented dairy					
Model 1	0.98 (0.94-1.02)		0%	2.8	0.94
Model 2	1.00 (0.96-1.04)		0%	2.2	0.90
Model 3	1.01 (0.97-1.05)		0%	1.9	0.93
Model 4	0.98 (0.94-1.03)		0%	1.8	0.94
Total milk					
Model 1	0.96 (0.87-1.07)	0.94 (0.82-1.10) at 2.4 servings/d	45.9%	29.5	0.02
Model 2	0.98 (0.88-1.08)	0.97 (0.83-1.12) at 2.4 servings/d	45.5%	29.4	0.02
Model 3	0.99 (0.91-1.09)	0.98 (0.85-1.13) at 4.1 servings/d	35.5%	24.8	0.07
Model 4	0.98 (0.88-1.08)	0.96 (0.84-1.09) at 3.5 servings/d	36.7%	25.3	0.07
High-fat milk					
Model 1	0.98 (0.86-1.10)		65.8%	23.4	0.003
Model 2	0.96 (0.85-1.08)		62.2%	21.2	0.007
Model 3	0.94 (0.85-1.05)		56.7%	18.5	0.02
Model 4	0.97 (0.88-1.08)		58.5%	19.3	0.01
Low-fat milk					
Model 1	1.03 (0.95-1.13)	0.89 (0.75-1.04) at 4.1 servings/d	46.3%	29.8	0.02
Model 2	1.05 (0.97-1.14)	0.91 (0.77-1.07) at 4.1 servings/d	43.6%	28.3	0.03
Model 3	1.06 (0.98-1.14)	0.91 (0.77-1.08) at 4.1 servings/d	38.8%	26.1	0.05
Model 4	1.03 (0.95-1.12)	0.87 (0.73-1.04) at 4.1 servings/d	30.0%	22.8	0.12
Total yogurt					
Model 1	0.90 (0.81-0.99)		31.4%	11.7	0.17
Model 2	0.93 (0.85-1.02)		21.9%	10.2	0.25
Model 3	0.96 (0.88-1.05)		5.5%	8.5	0.39
Model 4	0.98 (0.90-1.07)		7.9%	8.7	0.37

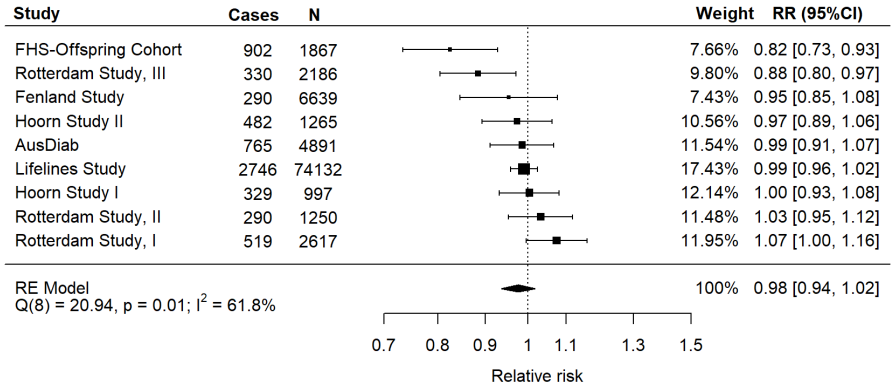
Supplemental table 9. Associations between dairy foods and prediabetes risk based on linear or quadratic two-stage random-effects dose-response meta-analysis for different confounder models.[1] (continued)

Dairy type	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit[2]	Heterogeneity		
			I^2	Q test	p-value
High-fat yogurt					
Model 1	0.86 (0.66-1.11)		51.6%	12.4	0.05
Model 2	0.91 (0.70-1.18)		48.5%	11.6	0.07
Model 3	0.92 (0.72-1.18)		45.7%	11.1	0.09
Model 4	1.04 (0.87-1.25)		21.0%	7.6	0.27
Low-fat yogurt					
Model 1	0.96 (0.89-1.05)		0%	4.6	0.60
Model 2	0.99 (0.91-1.08)		0%	5.3	0.50
Model 3	1.01 (0.93-1.10)		0%	4.3	0.64
Model 4	0.97 (0.82-1.15)		0%	2.9	0.83
Total cheese					
Model 1	0.89 (0.84-0.95)	0.86 (0.78-0.94) at 2.1 servings/d	0.0%	13.0	0.67
Model 2	0.91 (0.85-0.96)	0.88 (0.80-0.96) at 2.1 servings/d	0.0%	12.3	0.72
Model 3	0.92 (0.86-0.97)	0.89 (0.82-0.98) at 1.9 servings/d	0.0%	11.6	0.77
Model 4	0.89 (0.84-0.95)	0.86 (0.78-0.94) at 2.1 servings/d	0.0%	12.6	0.70
High-fat cheese					
Model 1	0.92 (0.86-0.97)	0.88 (0.81-0.97) at 2.2 servings/d	21.2%	17.8	0.22
Model 2	0.92 (0.86-0.98)	0.89 (0.80-0.99) at 2.2 servings/d	24.1%	18.4	0.19
Model 3	0.93 (0.88-0.99)	0.91 (0.83-1.00) at 2.1 servings/d	9.2%	15.4	0.35
Model 4	0.92 (0.87-0.98)	0.90 (0.81-0.99) at 2.1 servings/d	11.6%	15.8	0.32
Low-fat cheese					
Model 1	1.07 (0.99-1.17)		57.0%	16.3	0.03
Model 2	1.08 (1.00-1.17)		51.0%	14.3	0.05
Model 3	1.10 (1.02-1.19)		51.6%	14.5	0.04
Model 4	1.05 (0.98-1.14)		48.0%	13.5	0.06

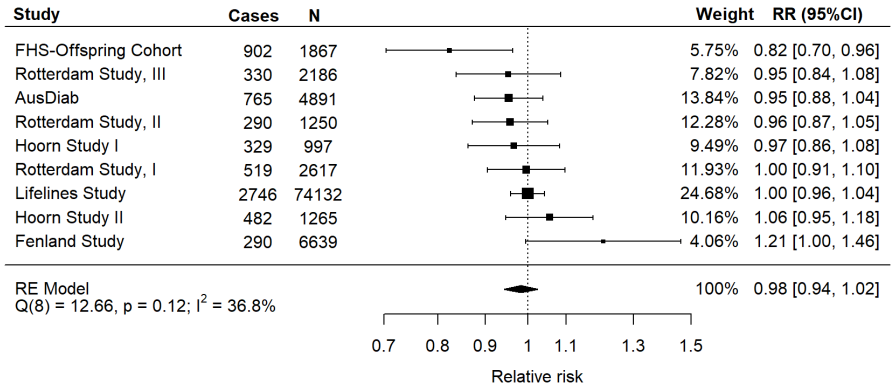
Supplemental table 9. Associations between dairy foods and prediabetes risk based on linear or quadratic two-stage random-effects dose-response meta-analysis for different confounder models.[1] (continued)

Dairy type	Relative risk (95%CI) at 1 serving/day[2]	Lowest or highest relative risk (95%CI) for quadratic fit[2]	Heterogeneity		
			I^2	Q test	p-value
Cream					
Model 1	0.64 (0.40-1.02)		69.9%	23.2	0.002
Model 2	0.83 (0.63-1.08)		5.8%	7.4	0.39
Model 3	0.78 (0.58-1.03)		16.6%	8.4	0.30
Model 4	0.85 (0.69-1.05)		0.0%	6.2	0.51
Ice cream					
Model 1	0.51 (0.27-0.96)		0.0%	1.99	0.96
Model 2	0.63 (0.34-1.19)		0.0%	2.6	0.92
Model 3	0.57 (0.30-1.08)		0.0%	2.1	0.95
Model 4	0.50 (0.26-0.94)		0.0%	2.4	0.93

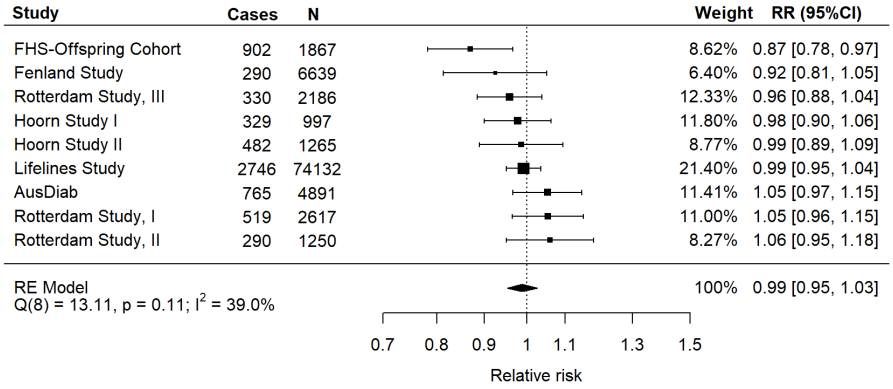
[1] Relative risks (95%CIs) were adjusted as follows: Model 1 included age, sex, and energy intake. Model 2 additionally adjusted for educational level, smoking behaviour, physical activity, alcohol intake and family history of diabetes. Model 3 additionally adjusted for intake of food groups. Model 4 additionally adjusted for waist circumference or BMI, hypertension, and dyslipidaemia. [2] For composite dairy types, serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods. For individual dairy types, serving sizes were 150 g for milk, yogurt, and ice cream; 20 g for cheese, and 15 g for cream.



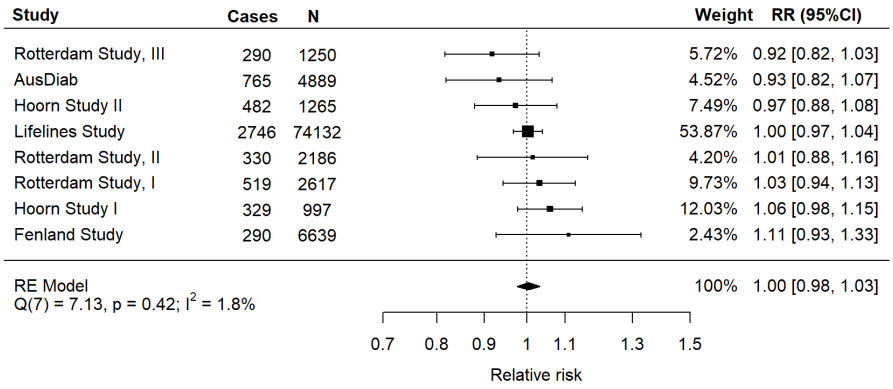
Supplemental Figure 1. Forest plot for the association between total dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



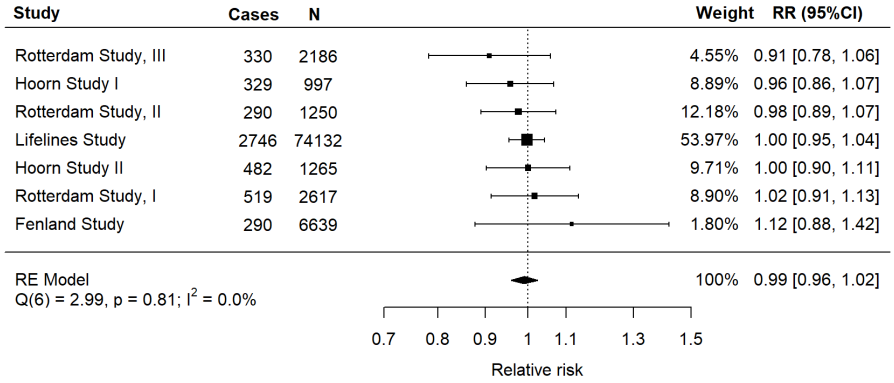
Supplemental Figure 2. Forest plot for the association between high-fat dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



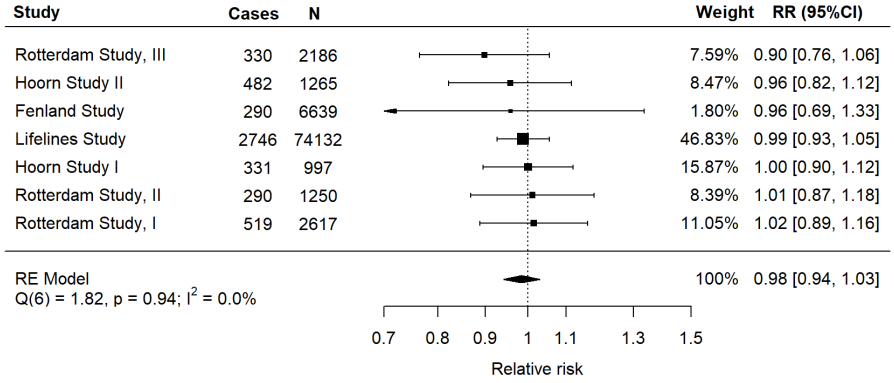
Supplemental Figure 3. Forest plot for the association between low-fat dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



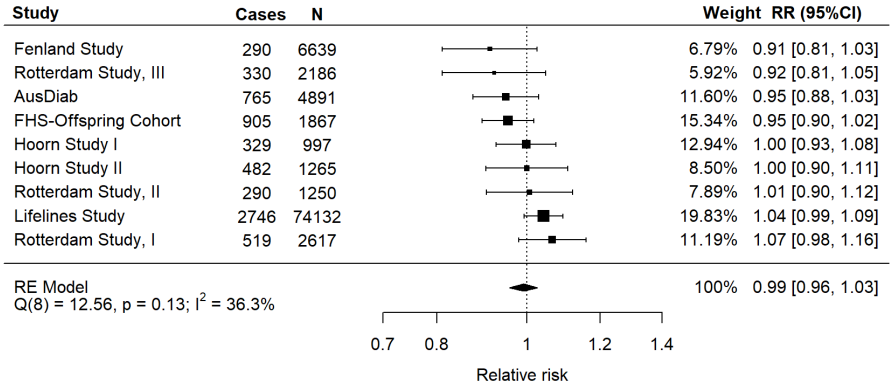
Supplemental Figure 4. Forest plot for the association between fermented dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



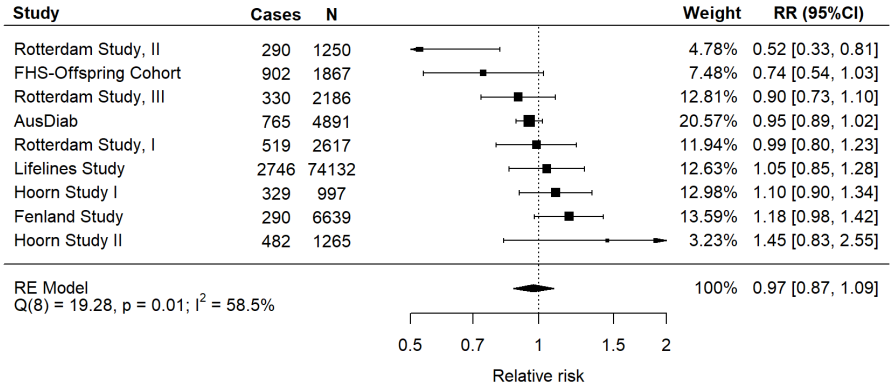
Supplemental Figure 5. Forest plot for the association between high-fat fermented dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



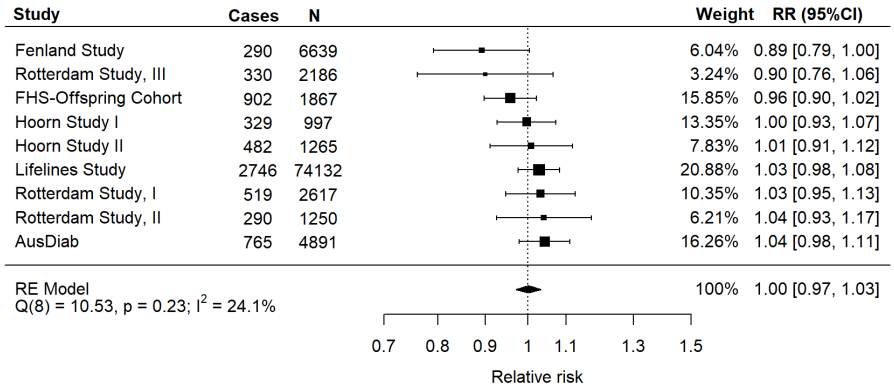
Supplemental Figure 6. Forest plot for the association between low-fat fermented dairy intake (per increment of 1 serving/day, with serving sizes defined as 200 g for liquid dairy foods and 20 g for solid dairy foods) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



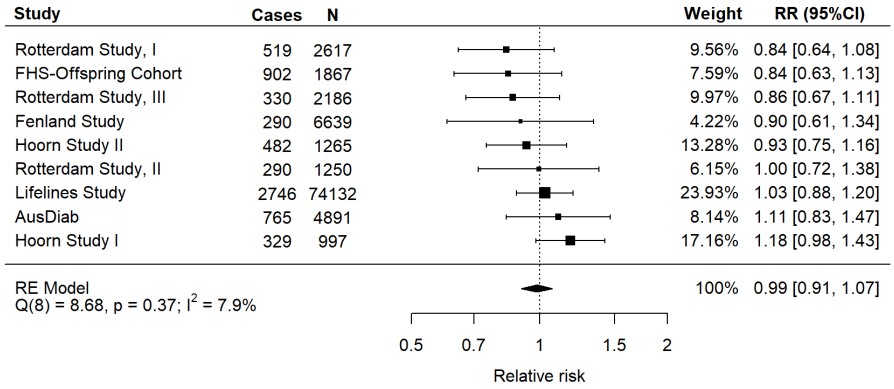
Supplemental Figure 7. Forest plot for the association between total milk intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



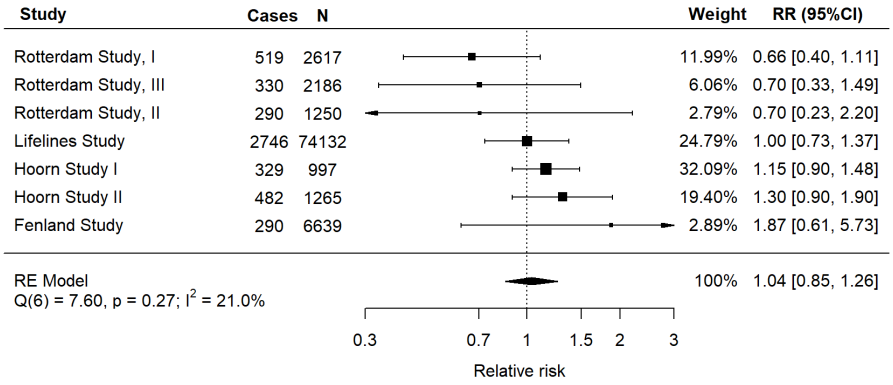
Supplemental Figure 8. Forest plot for the association between high-fat milk intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



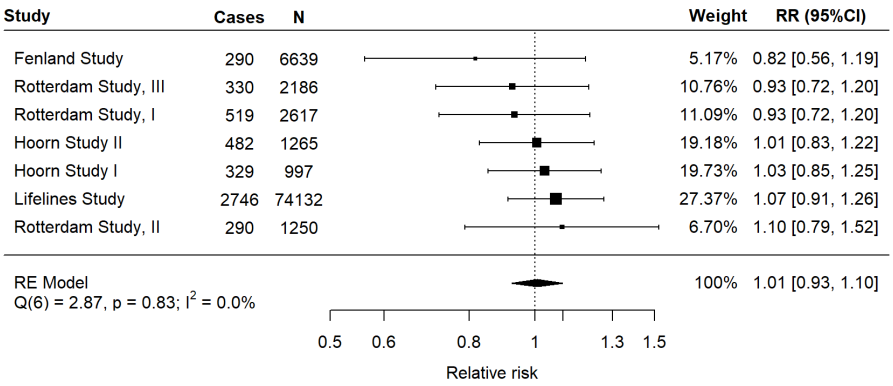
Supplemental Figure 9. Forest plot for the association between low-fat milk intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



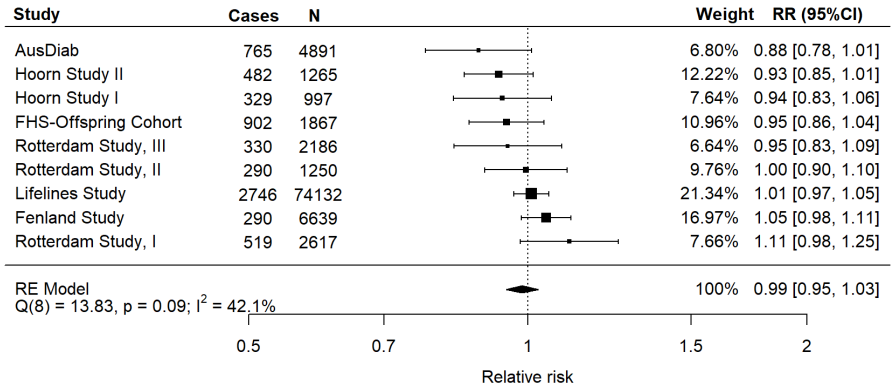
Supplemental Figure 10. Forest plot for the association between total yogurt intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



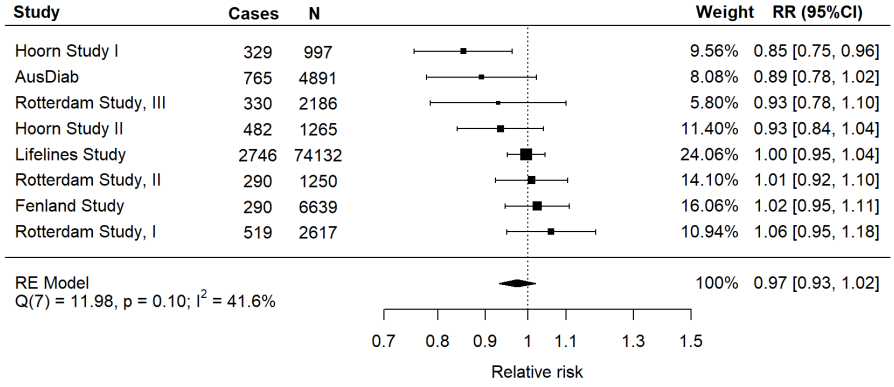
Supplemental Figure 11. Forest plot for the association between high-fat yogurt intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



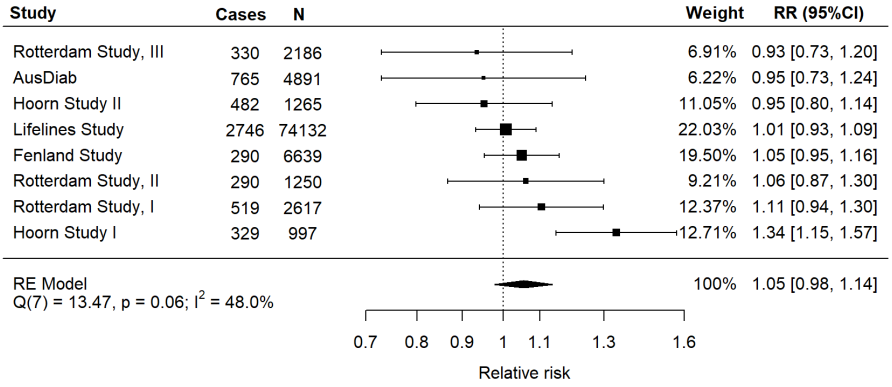
Supplemental Figure 12. Forest plot for the association between low-fat yogurt intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



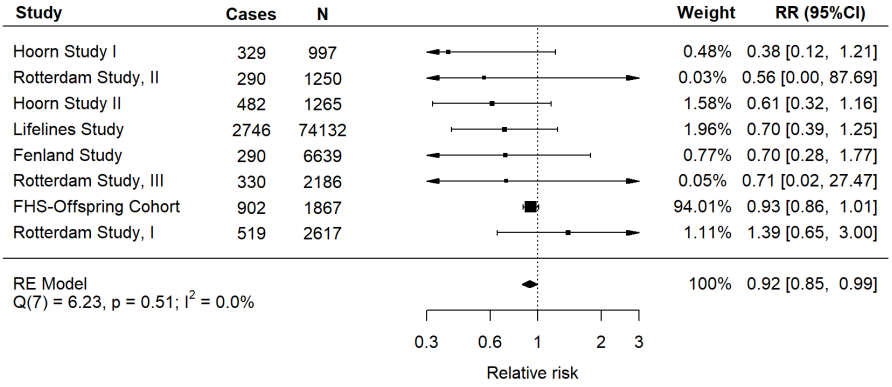
Supplemental Figure 13. Forest plot for the association between total cheese intake (per increment of 1 serving/day, with a serving size defined as 20 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



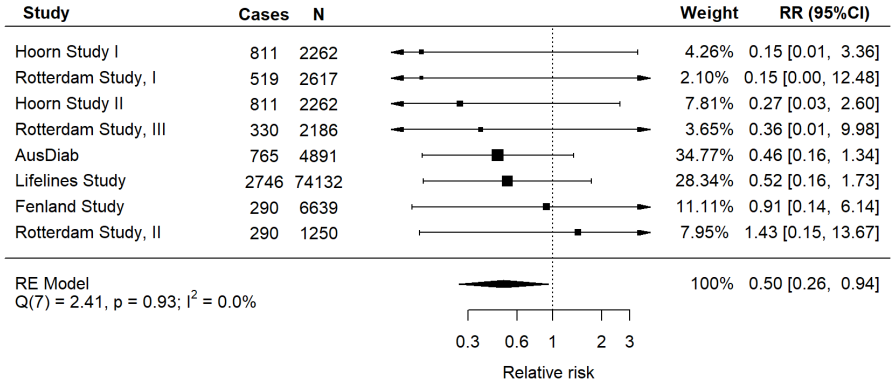
Supplemental Figure 14. Forest plot for the association between high-fat cheese intake (per increment of 1 serving/day, with a serving size defined as 20 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



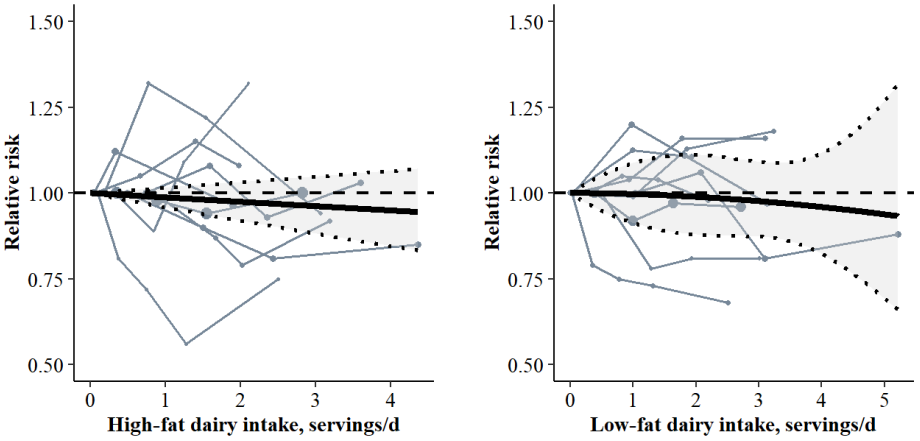
Supplemental Figure 15. Forest plot for the association between low-fat cheese intake (per increment of 1 serving/day, with a serving size defined as 20 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



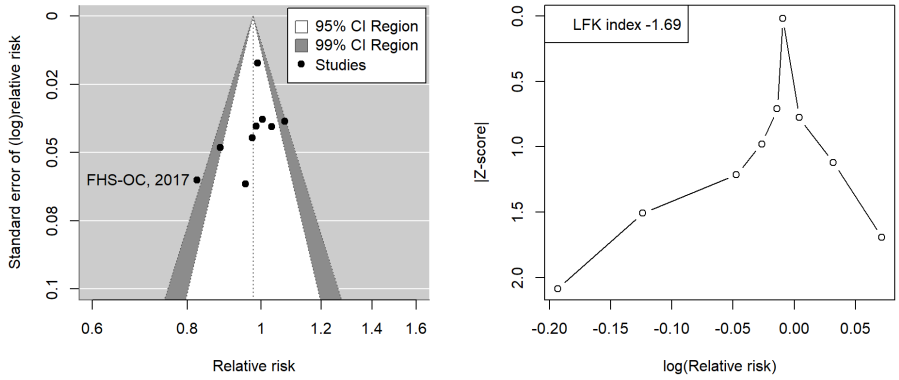
Supplemental Figure 16. Forest plot for the association between cream intake (per increment of 1 serving/day, with a serving size defined as 15 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



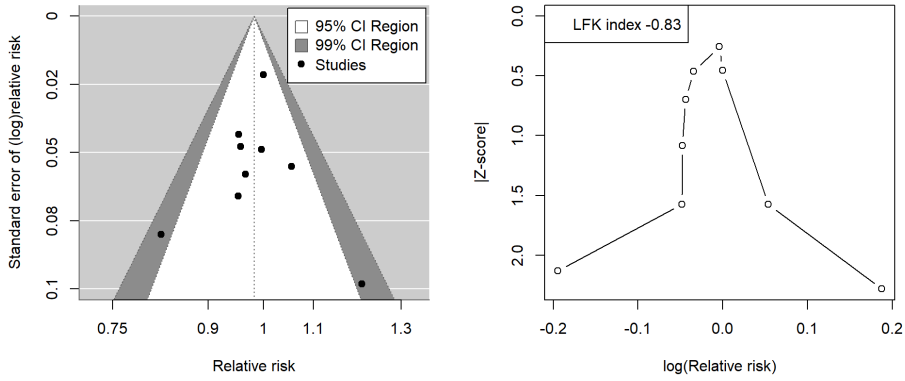
Supplemental Figure 17. Forest plot for the association between ice cream intake (per increment of 1 serving/day, with a serving size defined as 150 g) and prediabetes risk and study variation as shown by the I^2 and p-value for the Q test based on two-stage linear meta-analysis. The study-specific RRs and 95% CIs are visualized in squares. The area of the squares is proportional to the specific study weight of the overall meta-analysis. The diamond represents the pooled RR and 95% CI.



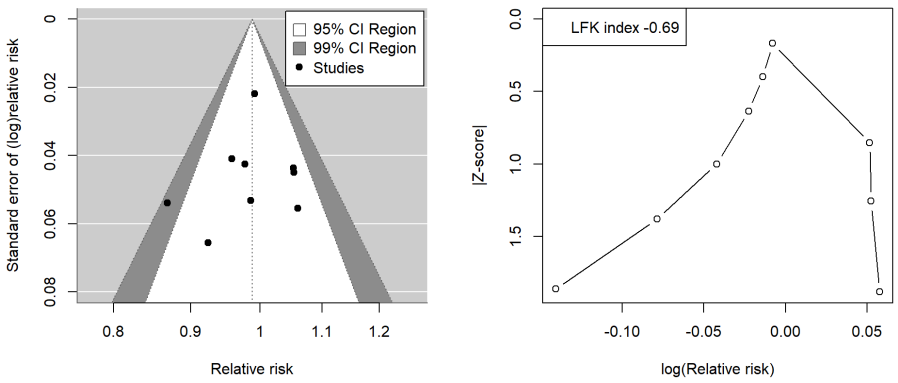
Supplemental figure 18. Spaghetti plot based on dose-response meta-analysis including 6 studies and 9 cohorts (6,653 cases among 95,844 participants) for the associations between **high-fat dairy** ($RR_{serving/day}$ 0.99, 95%CI 0.96-1.02, I^2 = 37%)(left), and **low-fat dairy** (lowest RR at 5.2 servings/day: 0.93, 95%CI 0.66-1.32, I^2 = 28%)(right) intake and prediabetes risk. The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. Serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods.



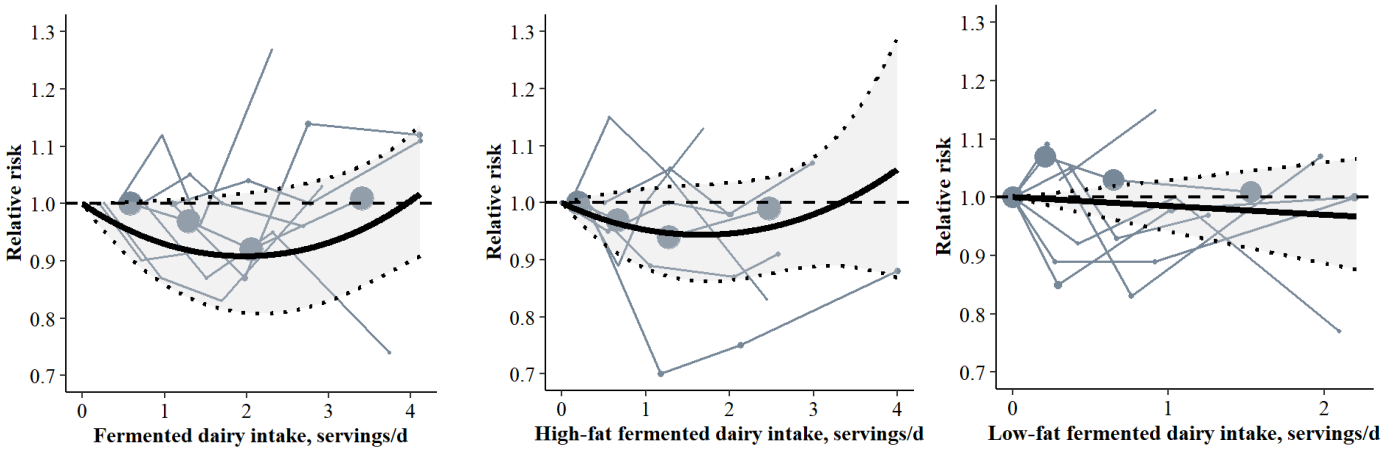
Supplemental figure 19. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between total dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.11. LFK index = 1.69 indicating minor asymmetry.



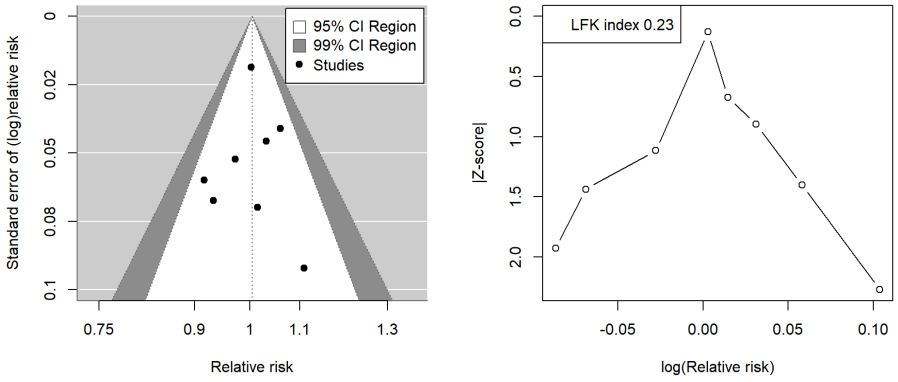
Supplemental figure 20. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between high-fat dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.94. LFK index = -0.83 indicating no asymmetry.



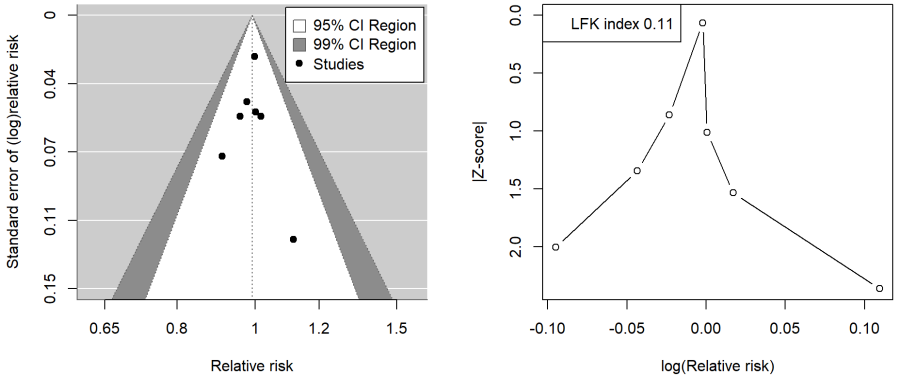
Supplemental figure 21. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between low-fat dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.57. LFK index = -0.69 indicating no asymmetry.



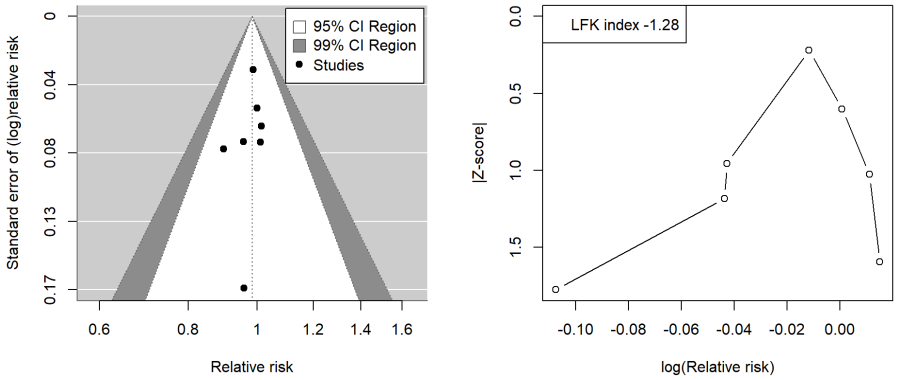
Supplemental figure 22. Spaghetti plot based on dose-response meta-analysis for the associations between **fermented dairy** (lowest RR at 2 servings/day: 0.91, 95%CI 0.81-1.02, I^2 = 0%, including 5 studies and 8 cohorts, 5,751 cases among 93,975 participants)(left), **high-fat fermented dairy** (lowest RR at 1.7 servings/day: 0.94, 95%CI 0.81-1.02, I^2 = 0%, including 4 studies and 7 cohorts, 4,986 cases among 89,089 participants)(middle), and **low-fat fermented dairy** (RR serving/day: 0.98, 95%CI 0.94-1.03, I^2 = 28%, including 4 studies and 7 cohorts, 4,986 cases among 89,089 participants)(right) intake and prediabetes risk. The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. Serving sizes were 200 g for liquid dairy foods and 20 g for solid dairy foods.



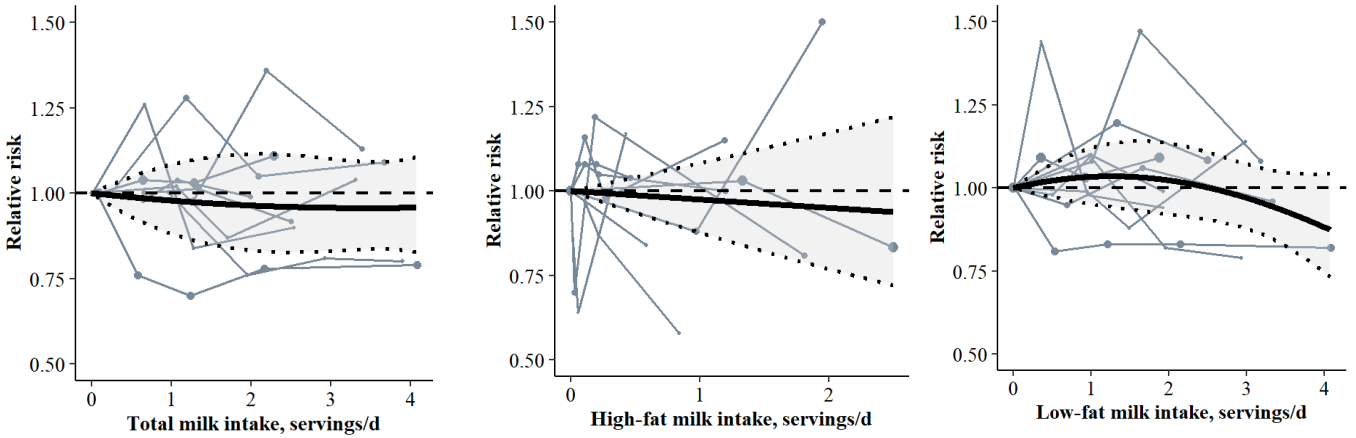
Supplemental figure 23. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between fermented dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.86. LFK index = 0.23 indicating no asymmetry.



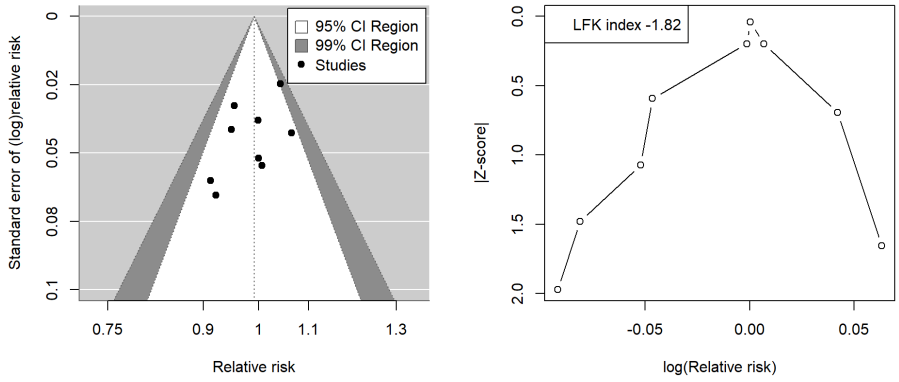
Supplemental figure 24. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between high-fat fermented dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.89. LFK index = 0.11 no asymmetry.



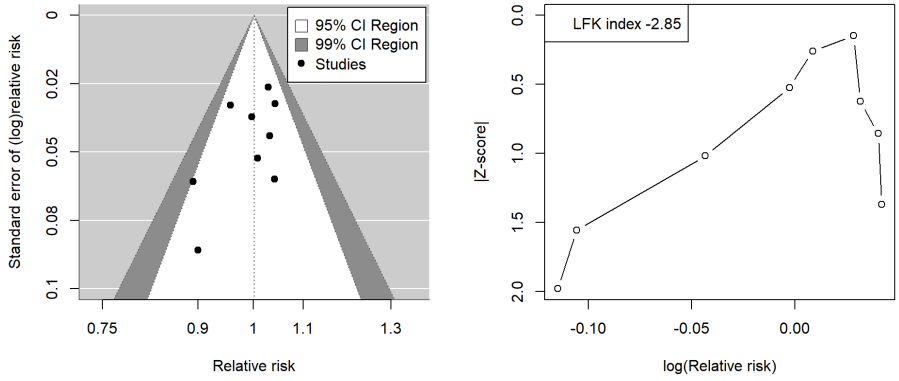
Supplemental figure 25. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between low-fat fermented dairy intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.67. LFK index = -1.28 indicating minor asymmetry.



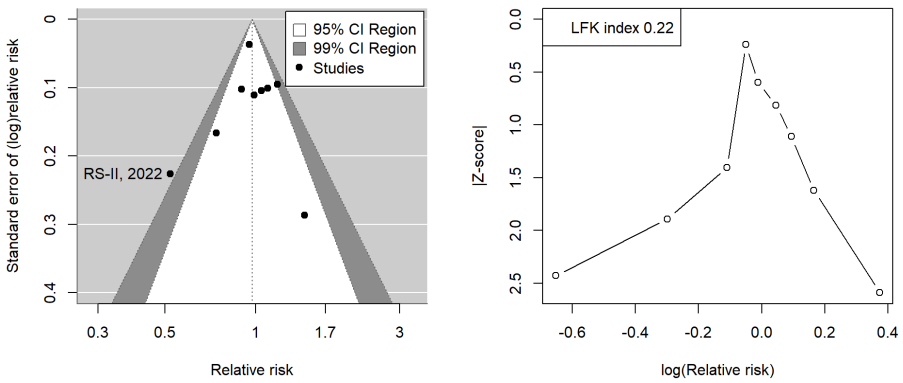
Supplemental figure 26. Spaghetti plot based on dose-response meta-analysis including 6 studies and 9 cohorts (6,653 cases among 95,844 participants) for the associations between **total milk** (lowest RR at 3.5 servings/day: 0.96, 95%CI 0.84-1.09, I^2 = 37%)(left), **high-fat milk** (RR servings/day: 0.97 95%CI 0.88-1.08, I^2 = 59%)(middle), and **low-fat milk** (lowest RR at 4.1 serving/day: 0.87, 95%CI 0.73-1.04, I^2 = 30%)(right) intake and prediabetes risk. The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. A serving size of milk was 150 g.



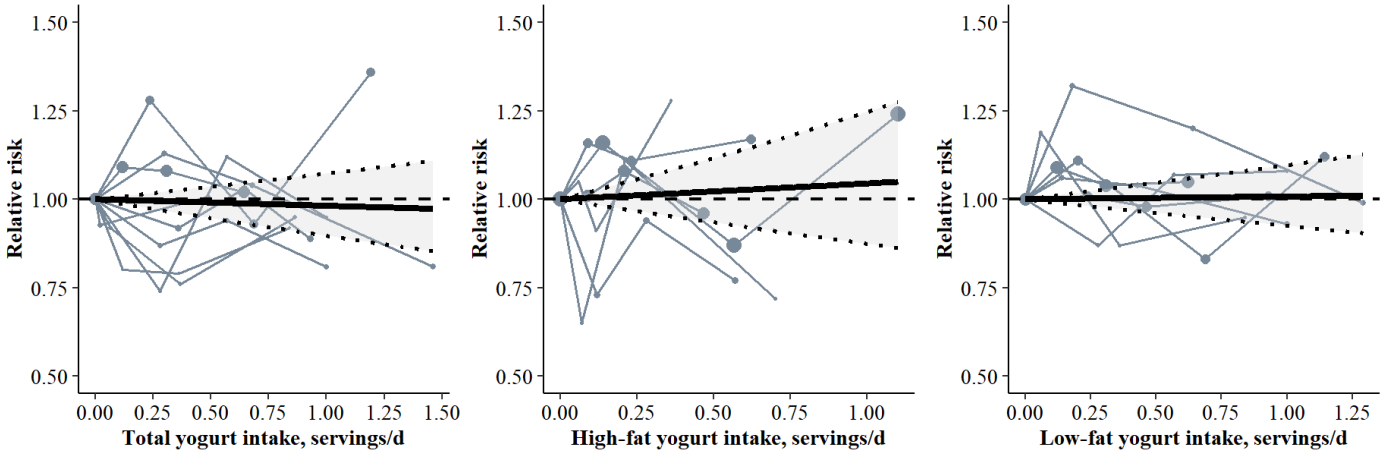
Supplemental figure 27. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between total milk intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.13. LFK index = -1.82 indicating minor asymmetry.



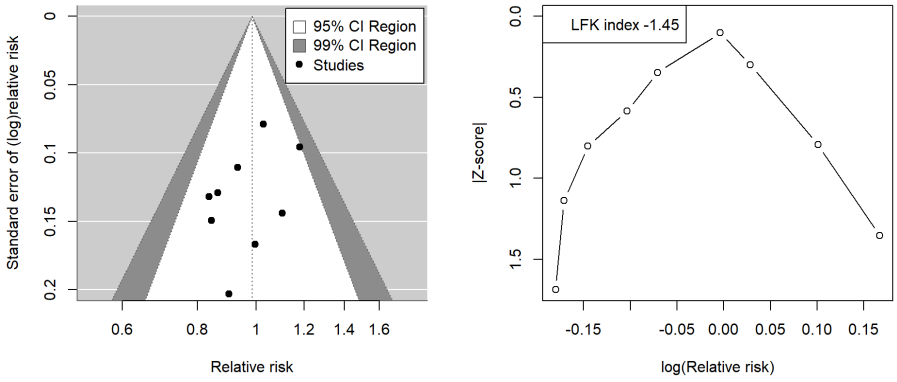
Supplemental figure 28. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between low-fat milk intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.11. LFK index = 1.69 indicating minor asymmetry.



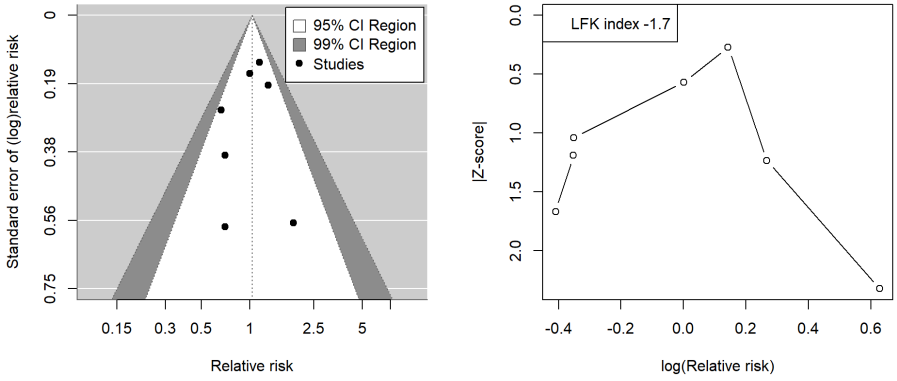
Supplemental figure 29. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between high-fat milk intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.45. LFK index = 0.22 indicating no asymmetry.



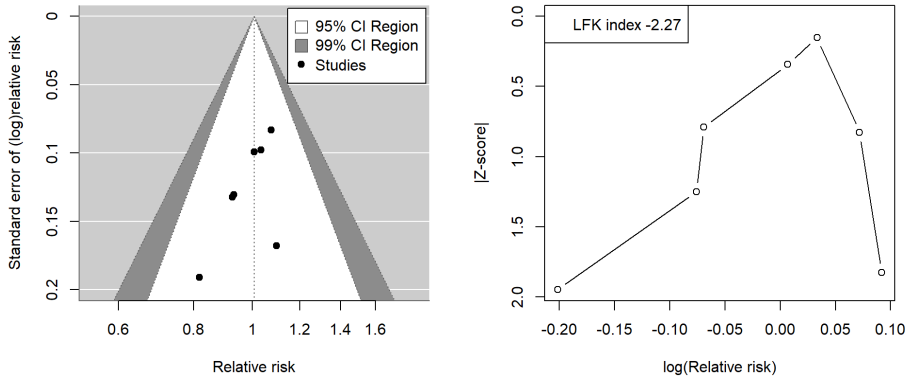
Supplemental figure 30. Spaghetti plot based on dose-response meta-analysis for the associations between **total yogurt** (RR servings/day: 0.98, 95%CI 0.90-1.07, I^2 = 8%, including 6 studies and 9 cohorts, 6,653 cases among 95,844 participants)(left), **high-fat yogurt** (RR servings/day: 1.04 95%CI 0.87-1.25, I^2 = 21%, including 4 studies and 7 cohorts, 4,986 cases among 89,089 participants)(middle), and **low-fat yogurt** (RR serving/day: 0.97, 95%CI 0.82-1.15, I^2 = 0%, including 4 studies and 7 cohorts, 4,986 cases among 89,089 participants)(right) intake and prediabetes risk. The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. A serving size of yogurt was 150 g.



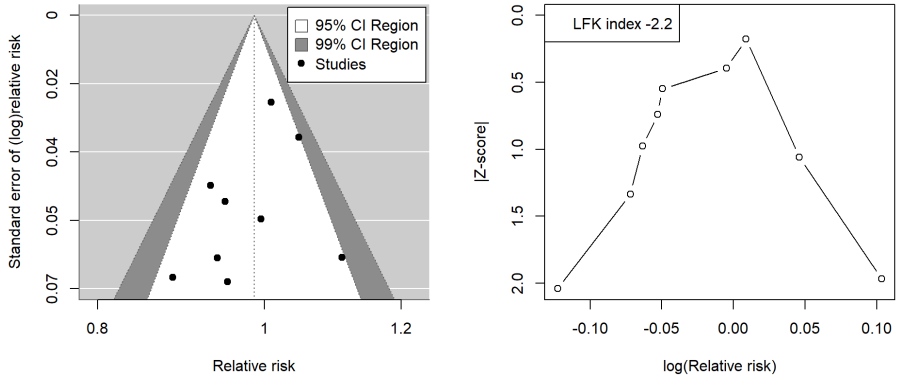
Supplemental figure 31. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between total yogurt intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.16. LFK index = -1.45 indicating minor asymmetry.



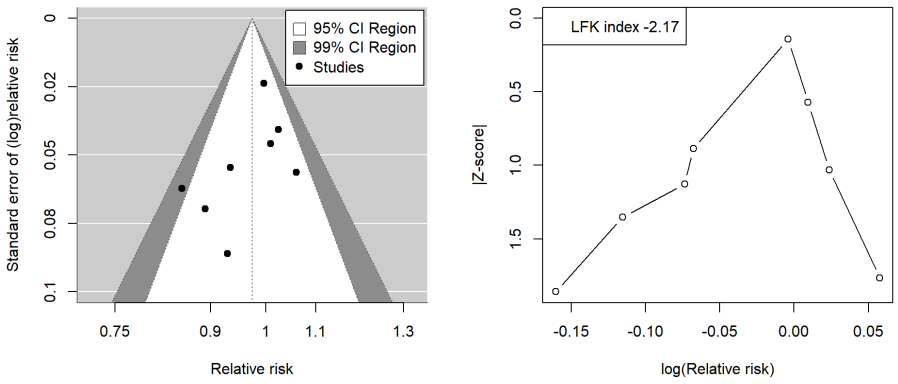
Supplemental figure 32. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between high-fat yogurt intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.50. LFK index = -1.70 indicating minor asymmetry.



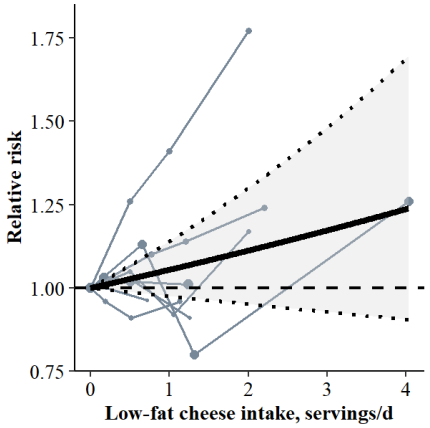
Supplemental figure 33. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between low-fat yogurt intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.27. LFK index = -2.27 indicating major asymmetry.



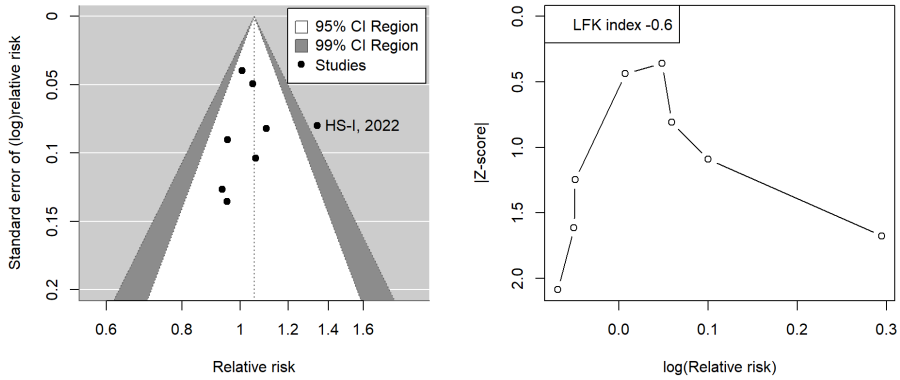
Supplemental figure 34. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between total cheese intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.24. LFK index = -2.2 indicating major asymmetry.



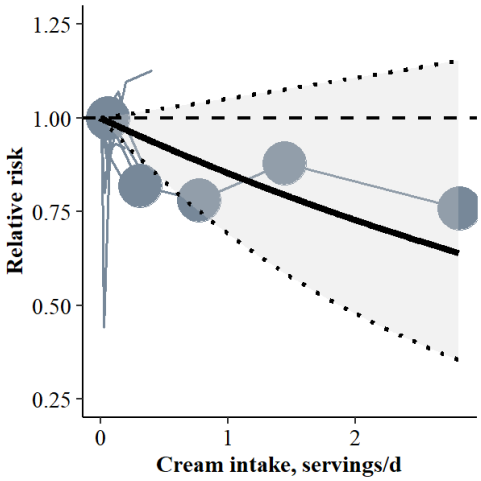
Supplemental figure 35. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between high-fat cheese intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.12. LFK index = -2.17 indicating major asymmetry.



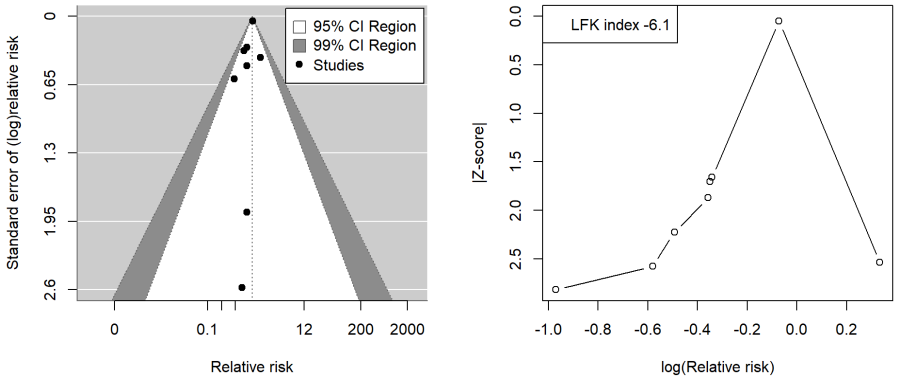
Supplemental figure 36. Spaghetti plot based on dose-response meta-analysis including 5 studies and 8 cohorts (5,751 cases among 93,977 participants) for the associations between l**ow-fat cheese** and prediabetes risk ($RR_{serving/day}$ 1.05, 95%CI 0.98-1.14, I^2 = 48%). The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. A serving size of cheese was 20 g.



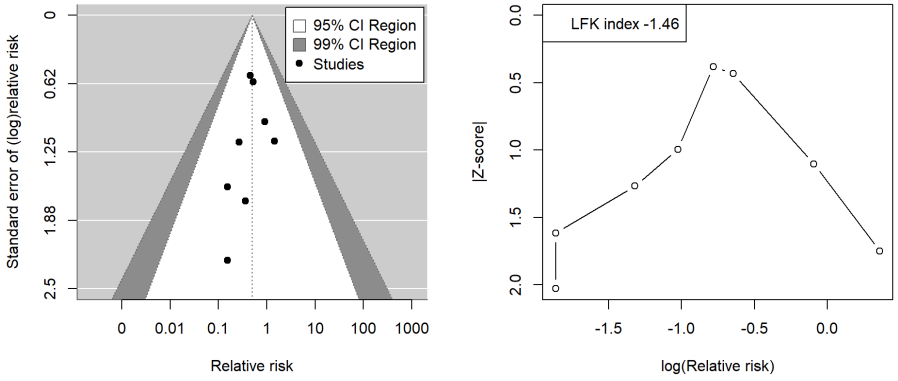
Supplemental figure 37. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between low-fat cheese intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.69. LFK index = -0.6 indicating no asymmetry.



Supplemental figure 38. Spaghetti plot based on dose-response meta-analysis including 5 studies and 8 cohorts (5,888 cases among 90,953 participants) for the associations between **cream** intake and prediabetes risk ($RR_{serving/day}$ 0.85, 95%CI 0.69-1.05, I^2 = 0%). The solid black line represents the pooled RR at each quantity of intake. The light grey coloured area between the dotted black lines indicates the 95% confidence interval. The dashed grey line at RR = 1.00 represents the reference line. Each solid grey line represents a cohort with circles placed at the cohort-specific RRs at the corresponding intake level. The area of the circle is proportional to the study-specific weight. The associations were adjusted for age, sex, energy intake, educational level, smoking behaviour, physical activity, alcohol intake, family history of diabetes, intake of food groups, waist circumference or BMI, hypertension, and dyslipidaemia. A serving size of cream was 15 g.



Supplemental figure 39. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between cream intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.19. LFK index = -6.1 indicating major asymmetry.



Supplemental figure 40. Contour-enhanced funnel plot (left) and Doi plot (right) for studies of the association between ice cream intake and prediabetes risk. Each dot indicates a study population. Egger's test, P=0.66. LFK index = -1.46 indicating minor asymmetry.