Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: **Association of dairy consumption with metabolic syndrome, hypertension and diabetes in 147,812 individuals from 21 countries**

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Supplementary Methods: The Prospective Urban Rural Epidemiological Study (PURE Study) Design

The Prospective Urban Rural Epidemiological Study (PURE Study) enrolled 186,790 individuals between 35 and 70 years of age from low, middle and high-income countries. The study includes population samples from 639 communities from 24 countries from 5 continents representing a broad range of economic and social circumstances (1). PURE includes countries in four income strata based on World Bank classification in 2006: five low-income countries (Bangladesh, India, Pakistan, Tanzania, and Zimbabwe), eleven middle-income countries (Argentina, Brazil, Chile, China, Colombia, Iran, Malaysia, Occupied Palestine Territory, Philippines, Poland, South Africa, and Turkey), and four high-income countries (Canada, Saudi Arabia, Sweden, and United Arab Emirates). The study is coordinated by the Population Health Research Institute, Hamilton Health Sciences and McMaster University, Canada.

Supplementary Methods: PURE Study Participant Selection Methodology as Excerpted from Teo et al[1].

Selection of Countries

The choice and number of countries selected in PURE reflects a balance between involving a large number of communities in countries at different economic levels, with substantial heterogeneity in social and economic circumstances and policies, and the feasibility of centers to successfully achieve long-term follow-up. Thus, PURE included sites in which investigators are committed to collecting good-quality data for a low-budget study over the planned 10-year follow-up period and did not aim for a strict proportionate sampling of the entire world.

Selection of Communities

Within each country, urban and rural communities were selected based on broad guidelines. A common definition for "community" that is applicable globally is difficult to establish (2). In PURE, a community was defined as a group of people who have common characteristics and reside in a defined geographic area. A city or large town was not usually considered to be a single community, rather communities from low-, middle-, and high-income areas were selected from sections of the city and the community area defined according to a geographical measure (e.g., a set of contiguous postal code areas or a group of streets or a village). The primary sampling unit for rural areas in many countries was the village. The reason for inclusion of both urban and rural communities is that for many countries, urban and rural 9 environments exhibit distinct characteristics in social and physical environment, and hence, by sampling both, we ensured considerable variation in societal factors across PURE communities. The number of communities selected in each country varied, with the aim to recruit communities with substantial heterogeneity in social and economic circumstances balanced against the capacity of local investigators to maintain follow-up. In some countries (e.g., India, China, Canada, and Colombia), communities from several states/provinces were included to capture regional diversity, in policy, socioeconomic status, culture, and physical environment. In other countries (e.g., Iran, Poland, Sweden, and Zimbabwe), fewer communities were selected.

Selections of Households and Individuals

Within each community, sampling was designed to achieve a broadly representative sample of that community of adults aged between 35 and 70 years. The choice of sampling frame within each center was based on both "representativeness" and feasibility of long-term follow-up, following broad study guidelines. Once a community was identified, where possible, common and standardized approaches were applied to the enumeration of households, identification of individuals, recruitment procedures, and data collection. The method of approaching households differed between regions. For example, in rural areas of India and China, a community announcement was made to the village through contact of a community leader, followed by in-person door-to-door visits of all households. In contrast in Canada, initial contact was by mail followed by telephone inviting members of the households to a central clinic. Households were eligible if at least 1 member of the household was between the 10 ages of 35 and 70 years and the household members intended to continue living in their current home for a further 4 years. For each approach, at least 3 attempts at contact were made. All individuals within these households between 35 and 70 years providing written informed consent were enrolled. When an eligible household or eligible individual in a household refused to participate, demographics and self-reported data about CVD risk factors, education, and history of CVD, cancers and deaths in the households within the two previous years were recorded. To ensure standardization and high data quality, we used a comprehensive operations manual, training workshops, DVDs, regular communication with study personnel and standardized report forms. We entered all data in a customized database programmed with range and consistency checks which was transmitted electronically to the Population Health Research Institute in Hamilton (Ontario, Canada) where further quality checks were implemented.

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Supplementary Methods: Collection of Demographics, Risk Factors and Outcome Events

CVD risk factors (smoking, history of hypertension, diabetes, psychosocial factors and alcohol consumption, diet, use of tobacco, physical activity) are recorded using standardized questions.

Urban and rural	In urban areas, communities from low-, middle- and high-income areas were selected based on known information of the geographical area such as a set of contiguous postal codes or groups of streets to obtain some representative population of each income area. Rural communities were villages at least 50 km from the cities. Many of these communities were remote with few health facilities.
Household wealth	Information on indicators of housing characteristics (e.g., type of windows and flooring, water and sanitation facilities) and assets (e.g., ownership of home, car, computer, and mobile phone) were weighted and combined with weights derived from a principal component analysis procedure. The resulting variable was standardized to a mean of 0 and standard deviation of 1 and using this index the household population was divided into thirds from poorest to richest.
Blood pressure measurements	Two BP readings are taken in the right arm in the sitting position and after a minimum of 5 minutes of rest by trained personnel with an Omron automatic digital blood pressure monitor (Omron HEM-757), using the mean of the 2 BP measures.
Hypertension	SBP >140, DBP >100, or diagnosed hypertension or medications of hypertension
Non-cholesterol INTERHEART Risk Score (IHRS)	Includes age, sex, smoking, diabetes (self-report or fasting glucose <7.0 mmol/L), high BP (measured BP >140/>90 or self-report), family history, waist to hip ratio, psychosocial factors, diet, and physical activity. The IHRS is calculated for each individual using a validated method (19).

Physical activity	One-week recall of physical activity (PA) and sitting time were assessed using the long-form International Physical Activity Questionnaire, with high PA defined as metabolic equivalent task (MET) score ⩾ 3000, moderate as MET score 600–3000 and low as MET score o600 MET-minutes per week (2)

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Definitions of metabolic syndrome (MetS), incident hypertension and diabetes:

MetS was diagnosed if any 3 of the following criteria were present[2]:

1. Elevated blood pressure: blood pressure lowering medication or systolic blood pressure (SBP) ≥ 130 mmHg and/or diastolic blood pressure (DBP) ≥ 85 mmHg.
2. Elevated waist circumference: waist >80cm in a women, and ≥94 cm in men (except among Asians or South Americans in whom a waist circumference of ≥90 cm was used).
3. Reduced HDL-C: HDL-C < 1 mmol/dl (40 mg/dl), among males or HDL-C < 1.3 mmol/l (50 mg/dl) among females.
4. Elevated triglycerides: triglycerides >1.7 mmmol/dl (150 mg/dl).
5. Elevated fasting blood glucose: fasting glucose ≥ 5.5mmol/l (100mg/dl) or those on oral hypoglycaemic agents.

Metabolic syndrome was defined as presence of any three of the above five components[2]. Incident hypertension was defined as self-reported new diagnosis of hypertension with or without use of antihypertensive medications or a systolic blood pressure of >140 mmHg or a diastolic blood pressure of >90 mmHg[3]. Incident DM was defined as self-reported diabetes with or without use of oral hypoglycaemic agents or insulin, or having a documented fasting serum glucose level of ≥7.0 mmol/l[4].

Food groups:

Dairy included milk, yoghurt, various types of cheese, yoghurt drink, and mixed dishes prepared with dairy. Mixed dishes prepared with dairy were disaggregated into their constituents and a proportional weight was assigned to each component. Then each component was included in the related dairy group. We further grouped these foods into whole-fat dairy: whole milk, whole fat yoghurt, whole fat cheese,

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whole fat yoghurt drinks, and mixed dishes prepared with whole fat dairy products; and low-fat dairy: low-fat milk, skimmed milk, low-fat yoghurt, low-fat cheese, and low-fat yoghurt drink. To make the unit of consumption consistent between countries we used daily standard serving intake for each dairy product. Butter and cream were not included in the total dairy and whole fat dairy groups. Butter intakes were not recorded as an item on the FFQ in China, Malaysia, Pakistan, and Sweden, therefore, the association between butter and outcomes was assessed only in those countries where butter intake was recorded.

Fruit: includes all types of fruits, fresh, and canned fruits.

Vegetables: includes all types of vegetables cooked, canned, and raw. If a mixed dish is prepared with vegetable, the proportion of vegetable is included in this group.

Following WHO recommendation, potatoes, Yam and other roots are not included in vegetable group.

Red Meat: includes all types of red meat and mixed dishes prepared with red meat. Processed meats are not included in this group.

Starchy foods: includes all types of bread, rice, grains, and potatoes. Mixed dishes with some starches as ingredients were disaggregated, and a proportional weight was assigned to each component p

Mean follow-up duration in each country in PURE.

Country	Mean follow-up duration, years
India	10.8
China	9.0
South Africa	7.6
Colombia	9.1
UAE	9.6
Zimbabwe	8.2
Brazil	8.7
Sweden	9.5
Chile	9.1
Iran	9.1
Canada	9.4
Argentina	9.1
Poland	9.9
Malaysia	7.6
Bangladesh	6.0
Turkey	9.0
Pakistan	6.0
Tanzania	4.5
Palestine	3.2
Saudi Arabia	4.1
Philippines	3.0

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Approaches Used to Deal with Confounding in PURE

The issue of confounding by socioeconomic status in PURE has already been addressed several times in our previous papers including 8 papers published in The NEJM, The Lancet, and BMJ on sodium, fats, carbohydrates, fruits, vegetables, legumes, and dairy products) (1-9). As outlined in those papers, we employed standard analytical approaches to address the issue.

Foremost, in all of our multivariable models, we adjusted for study centre as a random effect (essentially equivalent to stratification analyses by centre) in which comparisons are within countries (ie, even finer – comparisons are within study centres). Additionally, our adjustment for socioeconomic variables together with centres (which automatically adjusts for country) accounts for the variation in socioeconomic factors both within and across countries. Therefore, we are NOT comparing poor countries versus rich countries. Instead, our comparison is within countries (ie, actually within study centers of each country).

Second, to account for socioeconomic factors (and the things that correlate with it like access to care), we adjusted for socioeconomic variables in the multivariable models using several different approaches (education, wealth, occupation, urban/rural location), which is the most extensive adjustment of socioeconomic factors of any large study of diet and health outcomes that we are aware of in the literature. Of the four methods, education was the strongest predictor of events in our previous work which was the basis for analysis in our primary models. When we used household wealth, occupation, or urban/rural location as covariates, our results were essentially unchanged.

Thirdly, we conducted subgroup analyses based on country gross national income and geographic regions with high and low dairy intake (representing a broad range of dairy intake), whereby we examined associations within high, middle and low income countries and by geographic regions with high and low dairy consumption. By investigating dairy intake within regions (and with more homogenous dairy intakes than in analyses involving multiple regions), we are able to virtually eliminate the possibility of an ecological fallacy bias in our analysis. In these subgroup analyses by region, we found that higher dairy intake is associated with a lower risk of diabetes and hypertension globally and consistently within all regions (both economic and geographic regions). These findings suggest that confounding by socioeconomic status was not a major factor in our study.

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Table S1: PURE food frequency validation studies

Country	Validated	Reference dietary method	Reference
Argentina	Yes	Multiple dietary recalls	Dehghan et al. PLoS One· 2012;7(5):e37958
Brazil	Yes	Multiple dietary recalls	Under preparation
Canada	Yes	Multiple dietary recalls	Kelemen L et al. J Am Diet Assoc. 2003 103(9):1178-84
Chile	Yes	Multiple dietary recalls	Dehghan et al. Public Health Nutr. 2013;16 (10):1782-8.
China	Yes	Multiple dietary recalls	Zhao WH et al. Biomedical and environmental sciences. 2010; 23(suppl.), 1-38.
Colombia	Yes	Multiple dietary recalls	Dehghan et al. J Nutr Educ Behav. 2012;44(6):609-13.
Iran	Yes	Multiple dietary recalls	Under preparation
India	Yes	Multiple dietary recalls	Iqbal R et al. Public Health Nutr. 2009; 12(1):12-18 Bharati A et al. Asia Pac J Clin Nutr 2008; 14(1):178-185. Mahajan R et al. The National Medical Journal of India vol. 26, no. 5, 2013
Malaysia	Yes	Multiple dietary recalls	Book chapter
Palestine	Yes	Multiple dietary recalls	Under preparation
Poland	Yes	Multiple dietary recalls	Dehghan et al. J Hum Nutr Diet. 2012; 25(3):225-32
Sweden	Yes	Multiple dietary recalls	Khani B et al. J Nutr. 2004, 134:1541-1545
South Africa	Yes	Multiple dietary recalls	MacIntyre UE et al. Public health nutr. 2000; 4(1), 63-71
Turkey	Yes	Multiple dietary recalls	Gunes eat al. J Pak Med Assoc. 2015; 65(7):756-63.
UAE	Yes	Multiple dietary recalls	Dehghan et al. Nutr J. 2005;4:18
Kuwait/UAE	Yes	Multiple dietary recalls	Dehghan et al. Saudi Med J 2009; Vol30(1)
Zimbabwe	No	FFQ development	Development of FFQ Merchant et al. Nutr J. 2005;4:37

Table S2: Comparison of baseline characteristics among participants who had follow up blood pressure measured and those on whom follow up BP was not available:

	Follow up BP Not available (n=25,287)	Follow up BP available (n=57,547)
Age, years(SD)	47.4 (9.5)	48.2 (9.3)
Male, n (%)	10,771 (42.6)	22,764 (40.0)
Current smoker, n (%)	2034 (8.0)	6389 (11)
Urban, n (%)	14,492 (57.3)	28,925 (50.3)
BMI, kg/m^2 (SD)	24.1 (4.9)	24.9 (4.9)
College education, n (%)	4900 (19.4)	12,222 (21.2)
High physical activity, n (%)	10,232 (40.5)	25,279 (44)
Energy, kilocalories (SD)	2068 (811)	2190 (811)

The Table includes only participants who did not have hypertension at baseline and are therefore at risk for developing hypertension.

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Table S3: Association of total dairy with prevalent metabolic syndrome and its components (Odds Ratio, 95%CI)

		OR (95% CI)					**OR (95%CI per one serving/d increment**
		0 (ref)	**<1 serving**	**1-2 servings**	**>2 servings**	**P-trend**	
Total dairy							
Model 1 ***Adjusted for <u>starchy foods</u>, in addition to other factors***	Metabolic syndrome	1	0.93 (0.90, 0.97)	0.90 (0.86, 0.95)	0.78 (0.74, 0.83)	<0.0001	**0.92 (0.91, 0.94)**
	Elevated blood pressure	1	0.92 (0.88, 0.95)	0.86 (0.81, 0.90)	0.80 (0.75, 0.84)	<0.0001	0.93 (0.91, 0.95)
	Elevated waist circumference	1	0.92 (0.89, 0.96)	0.90 (0.86, 0.94)	0.80 (0.76, 0.85)	<0.0001	0.93 (0.92, 0.95)
	Elevated triglycerides	1	0.99 (0.95, 1.03)	1.02 (0.96, 1.07)	0.90 (0.85, 0.96)	0.006	0.97 (0.95, 0.99)
	Low HDL	1	0.98 (0.95, 1.02)	0.98 (0.94, 1.04)	1.00 (0.95, 1.07)	0.88	1.00 (0.98, 1.02)
	Elevated blood glucose	1	1.05 (1.00, 1.09)	1.05 (0.99, 1.11)	0.97 (0.91, 1.04)	0.47	0.99 (0.97, 1.01)
Total dairy							
Model 2 ***Adjusted for <u>percent energy from carbohydrates</u>, in addition to other factors***	Metabolic syndrome	1	0.91 (0.88, 0.95)	0.87 (0.83, 0.92)	0.76 (0.71, 0.80)	<0.0001	0.92 (0.90, 0.93)
	Elevated blood pressure	1	0.92 (0.89, 0.96)	0.86 (0.82, 0.91)	0.81 (0.76, 0.86)	<0.0001	0.93 (0.92, 0.95)
	Elevated waist circumference	1	0.90 (0.86, 0.93)	0.87 (0.83, 0.91)	0.78 (0.73, 0.82)	<0.0001	0.92 (0.91, 0.94)
	Elevated triglycerides	1	0.98 (0.94, 1.03)	1.01 (0.96, 1.07)	0.89 (0.84, 0.96)	0.004	0.97 (0.95, 0.99)
	Low HDL	1	1.04 (0.97, 1.04)	1.01 (0.96, 1.07)	1.04 (0.98, 1.10)	0.231	1.01 (0.99, 1.03)
	Elevated blood glucose	1	1.00 (0.96, 1.05)	0.99 (0.94, 1.05)	0.92 (0.86, 0.98)	0.01	0.97 (0.95, 0.99)

Model 1: adjusted for age (continuous), sex, BMI (continuous), smoking status, location, education, physical activity, energy intake, quintiles of **<u>starchy food intake</u>**, fruit and vegetable intake and study centre as random effect.

Model 2: adjusted for age (continuous), sex, BMI (continuous), smoking status, location, education, physical activity, energy intake, quintiles of **<u>percent energy from carbohydrates</u>**, fruit and vegetable intake and study centre as random effect

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Table S4. Participant characteristics according to level of dairy intake (n=147,812).

Characteristics	**0 Serving/day**	**0-1 Serving/day**	**1-2 Serving/day**	**>2 Serving/day**
Age, Mean (SD)	50.3 (9.7)	50.2 (10.1)	50.7 (10.0)	51.6 (9.7)
Body mass index, kg/m^2 Mean (SD)	24.3 (4.3)	25.2 (5.3)	26.8 (23.2)	27.6 (23.9)
Waist circumference, cm Mean (SD)	80.6 (11.7)	83.3 (13.5)	87.7 (13.8)	89.8 (13.9)
Systolic blood pressure, mmHg Mean (SD)	132.9 (22.9)	131.2 (22.8)	130.7 (22.0)	130.4 (21.3)
Diastolic blood pressure, mmHg Mean (SD)	82.6 (14.4)	81.8 (14.2)	81.8 (15.3)	81.5 (18.2)
HDL-C, mmol/L, Mean (SD)	1.2 (0.32)	1.2 (0.33)	1.20 (0.33)	1.27 (0.35)
Triglycerides, mmol/L, Mean (SD)	1.47 (1.0)	1.54 (1.06)	1.63 (1.09)	1.55 (1.03)
Male (%)	13,041 (42.4)	25,164 (41.7)	10,809 (41.2)	12,991 (42.7)
Urban location (%)	9,491 (30.9)	33,218 (55)	17,204 (65.6)	18,829 (61.8)
College Education (%)	2,017 (6.6)	9,452 (15.7)	6,686 (25.5)	10,400 (34.2)
Region, N (%)				
North America & Europe	75 (0.24)	1,688 (2.9)	3,416 (13.0)	14,533 (47.7)
South America	1,033 (3.4)	8,532 (14.1)	6,928 (26.5)	7,213 (23.7)
Africa	1,234 (4.0)	4,222 (7.0)	569 (2.2)	162 (0.53)
Middle East	67 (0.22)	2,359 (3.9)	3,968 (15.1)	4,016 (13.2)
South Asia	4,843 (15.8)	18,220 (30.2)	5,380 (20.5)	2,151 (7.1)
South East Asia	2,131 (6.9)	6,256 (10.4)	2,020 (7.7)	1,306 (4.3)
China	21,348 (69.5)	19,120 (31.7)	3,936 (15.0)	1,075 (3.5)

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	OR (95% CI)					OR (95%CI per one serving/d increment
	0 (ref)	**<1 serving**	**1-2 servings**	**>2 servings**	**P-trend**	
Total dairy						
Metabolic syndrome	1	0.93 (0.90, 0.97)	0.90 (0.86, 0.95)	0.78 (0.74, 0.83)	<0.0001	0.92 (0.91, 0.94)
Elevated blood pressure	1	0.92 (0.88, 0.95)	0.86 (0.81, 0.90)	0.80 (0.75, 0.84)	<0.0001	0.93 (0.91, 0.95)
Elevated waist circumference	1	0.92 (0.89, 0.96)	0.90 (0.86, 0.94)	0.80 (0.76, 0.85)	<0.0001	0.93 (0.92, 0.95)

Table S5: Association between total dairy, whole fat dairy, and low fat dairy with prevalent metabolic syndrome and its components (Odds Ratio 95%CI)

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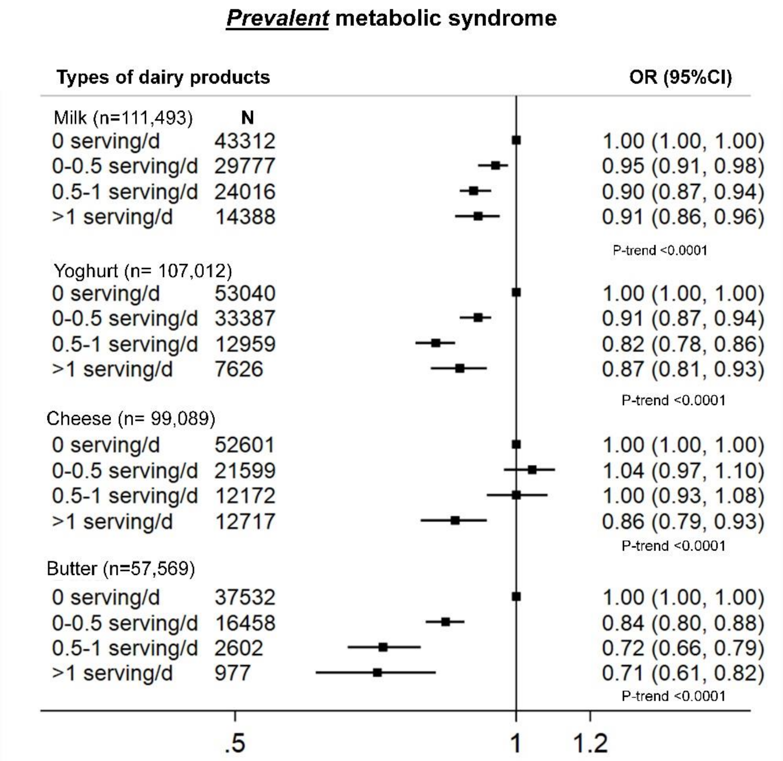
Elevated triglycerides	1	0.99 (0.95, 1.03)	1.02 (0.96, 1.07)	0.90 (0.85, 0.96)	0.006	0.97 (0.95, 0.99)
Low HDL	1	0.98 (0.95, 1.02)	0.98 (0.94, 1.04)	1.00 (0.95, 1.07)	0.88	1.00 (0.98, 1.02)
Elevated blood glucose	1	1.05 (1.00, 1.09)	1.05 (0.99, 1.11)	0.97 (0.91, 1.04)	0.47	0.99 (0.97, 1.01)
Whole fat dairy						
Metabolic syndrome	1	0.96 (0.92, 1.00)	0.86 (0.81, 0.91)	0.80 (0.76, 0.85)	<0.0001	0.93 (0.91, 0.94)
Elevated blood pressure	1	0.92 (0.88, 0.95)	0.86 (0.81, 0.90)	0.83 (0.78, 0.88)	<0.0001	0.94 (0.92, 0.96)
Elevated waist circumference	1	0.93 (0.90, 0.97)	0.86 (0.82, 0.91)	0.82 (0.77, 0.87)	<0.0001	0.93 (0.92, 0.95)
Low HDL	1	1.00 (0.96, 1.04)	0.96 (0.91, 1.01)	0.98 (0.92, 1.04)	0.0001	0.96 (0.94, 0.98)
Elevated triglycerides	1	0.99 (0.95, 1.03)	0.94 (0.89, 1.00)	0.88 (0.83, 0.94)	0.23	0.99 (0.97, 1.00)
Elevated blood glucose	1	0.99 (0.95, 1.04)	0.98 (0.92, 1.04)	0.97 (0.90, 1.04)	0.28	0.99 (0.97, 1.01)
Low fat dairy						
Metabolic syndrome	1	1.05 (1.01, 1.10)	1.07 (1.00, 1.14)	1.04 (0.97, 1.13)	0.05	1.02 (1.00, 1.05)
Elevated blood pressure	1	1.01 (0.97, 1.05)	1.03 (0.96, 1.10)	0.96 (0.89, 1.04)	0.76	1.00 (0.97, 1.02)
Elevated waist circumference	1	1.05 (1.01, 1.09)	1.04 (0.97, 1.10)	1.02 (0.94, 1.10)	0.24	1.01 (0.99, 1.04)
Elevated triglycerides	1	0.98 (0.94, 1.03)	0.92 (0.85, 0.98)	0.94 (0.87, 1.02)	0.04	0.97 (0.95, 1.00)
Low HDL	1	1.00 (0.97, 1.05)	1.08 (1.00, 1.15)	1.14 (1.05, 1.23)	0.001	1.04 (1.02, 1.06)
Elevated blood glucose	1	1.04 (0.99, 1.09)	1.05 (0.97, 1.13)	0.95 (0.87, 1.04)	0.87	1.00 (0.97, 1.02)

Model for metabolic syndrome and waist circumference: Adjusted for age (continuous), sex, smoking status, location, education, physical activity, energy intake, quintiles of percent energy from carbohydrates, fruit and vegetable intake and study centre as random effect

Model for elevated blood pressure, elevated triglycerides, low HDL-C and elevated blood glucose: Adjusted for all above factors, and BMI (continuous).

Note: Models for whole dairy intake are adjusted for low fat dairy intake and vice versa.

Figure S1: Association of types of dairy foods with prevalent metabolic syndrome (Odds Ratio, 95%CI)



One serving is equivalent to a glass of milk (244 g);

One serving is equivalent to a cup of yoghurt (244 g);

One serving is equivalent to one slice of cheese (15 g);

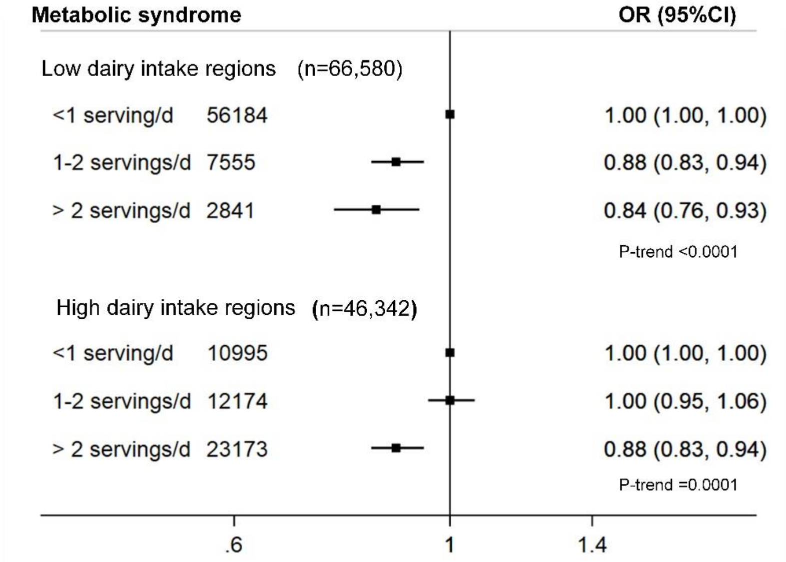
One serving is equivalent to a teaspoon of butter (5 g).

Butter intake was not recorded in China, Malaysia, the occupied Palestinian territory, and Sweden.

Odds Ratio models are adjusted for age (continuous), sex, smoking status, education, location, physical activity, energy intake, quintiles of percent energy from carbohydrate, fruit and vegetable intake and study centre as random effect

Panel shows a significant inverse association between metabolic syndrome and consumption of different types of dairy products.

Figure S2: Association of total dairy intake with <u>prevalent</u> metabolic syndrome by region of low versus high dairy intake (Odds Ratio, 95%CI).



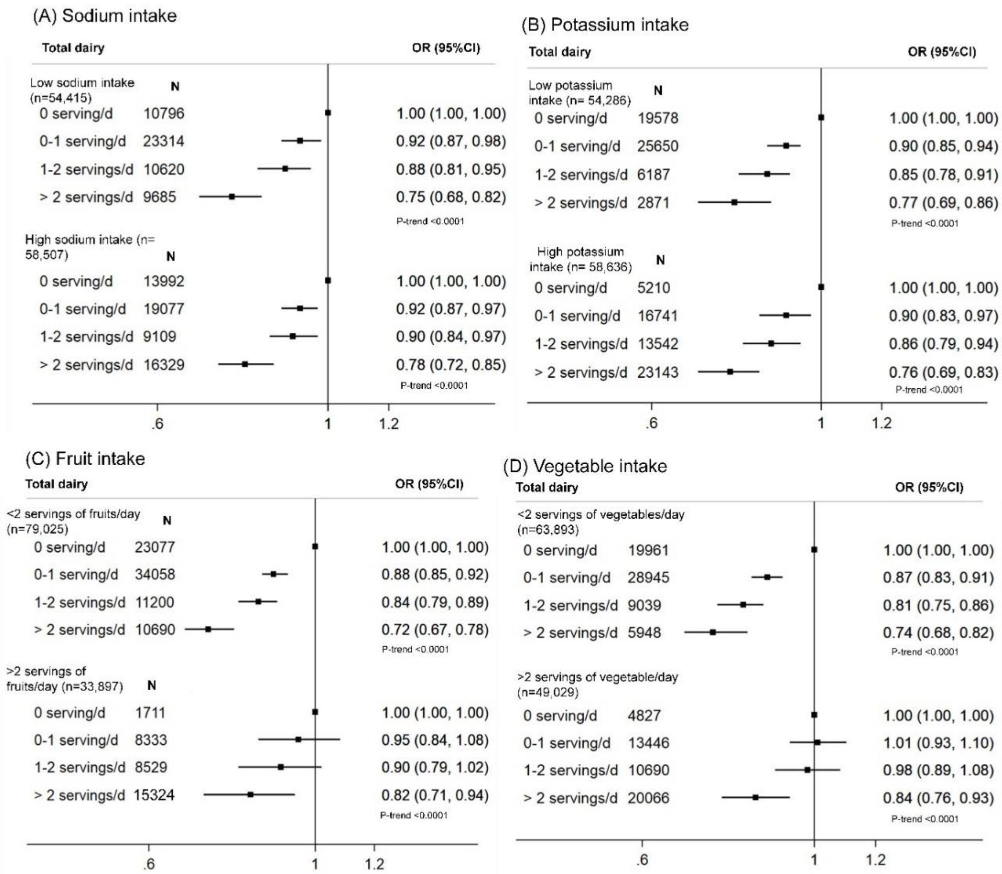
Low dairy intake regions are China, South East Asia, South Asia and Africa (n= 66,580). Note: The type of dairy consumed in low dairy intake as mainly whole fat

High dairy intake regions are North America, Europe, South America, and Middle East (n =46,342) Note: The type of dairy consumed in high dairy intake region was mainly low-fat.

Odds Ratio models are adjusted for age (continuous), sex, smoking status, education, location, physical activity, energy intake, quintiles of percent energy from carbohydrate, fruit and vegetable intake and study centre as random effect

Panel shows a significant inverse association in regions of low dairy intake regions (China, South East Asia, South Asia and Africa) and a trend towards lower prevalence in regions of high dairy intake (North America, Europe, South America and Middle East.

Figure S3: Association of total dairy intake with prevalent metabolic syndrome by level of sodium (Panel A) and potassium (Panel B), fruit (Panel C) and vegetable (Panel D) intake. (Odds Ratio 95%CI)



Low sodium intake defined as: Sodium consumption <3066 mg, High sodium intake defined as sodium consumption >=3066 mg

Low potassium intake defined as potassium consumption < 2532 mg; High potassium intake defined as potassium consumption >=2532 mg

Odds Ratio models are adjusted for age (continuous), sex, smoking status, education, location, physical activity, energy intake, quintiles of percent energy from carbohydrates, fruit and vegetable intake and study centre as random effect

(Panel A) shows significant inverse association between metabolic syndrome and total dairy intake, with no difference among those who consume low sodium or high sodium
(Panel B) shows significant inverse association between metabolic syndrome and total dairy intake, with no difference among those who consume low potassium or high potassium
(Panel C) shows significant inverse association between metabolic syndrome and total dairy intake, with no difference among those consume >2 or fewer servings of fruits a day.
(Panel D) shows significant inverse association between metabolic syndrome and total dairy intake, with no difference among those consume >2 or fewer servings of vegetables a day.

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Table S5: Association between total dairy, whole fat dairy, and low fat dairy with incident hypertension and diabetes (Hazards Ratio 95%CI)

	HR (95% CI)					HR (95%CI per one serving/d increment
	0 (ref)	**<1 serving**	**1-2 servings**	**>2 servings**	**P-trend**	
Total dairy						
Hypertension	1	0.944 (0.88-0.99)	0.96 (0.89-1.03)	0.89 (0.82-0.97)	0.02	0.97 (90.94-0.99)
Diabetes	1	1.05 (0.95-1.17)	0.91 (0.80-1.04)	0.88 (0.76-1.02)	0.01	0.94 (0.90-0.99)
Whole fat dairy						
Hypertension	1	0.97 (0.91-1.04)	0.99 (0.91-1.07)	0.94 (0.86-1.04)	0.3	0.98 (0.96-1.01)
Diabetes	1	1.03 (0.92-1.14)	0.98 (0.86-1.13)	0.84 (0.72-0.98)	0.01	0.94 (0.89-0.99)
Low fat dairy						
Hypertension	1	0.96 (0.91-1.02)	0.96 (0.87-1.05)	0.92 (0.82-1.02)	0.09	0.97 (0.94-1.00)
Diabetes	1	0.92 (0.84-1.00)	0.92 (0.80-1.06)	0.92 (0.77-1.09)	0.15	0.96 (0.92-1.01)

Incident hypertension: model adjusted for age (continuous), sex, smoking status, location, education, physical activity, starchy food intake, energy intake and quintiles of vegetable and fruit intake and study centre as random effect

Incident diabetes: model adjusted for age (continuous), sex, smoking status, family history of diabetes, location, education, physical activity, energy intake, quintiles of percent energy from carbohydrate, vegetable and fruit intake and study centre as random effect

Note: Models for whole dairy intake are adjusted for low fat dairy intake and vice versa.

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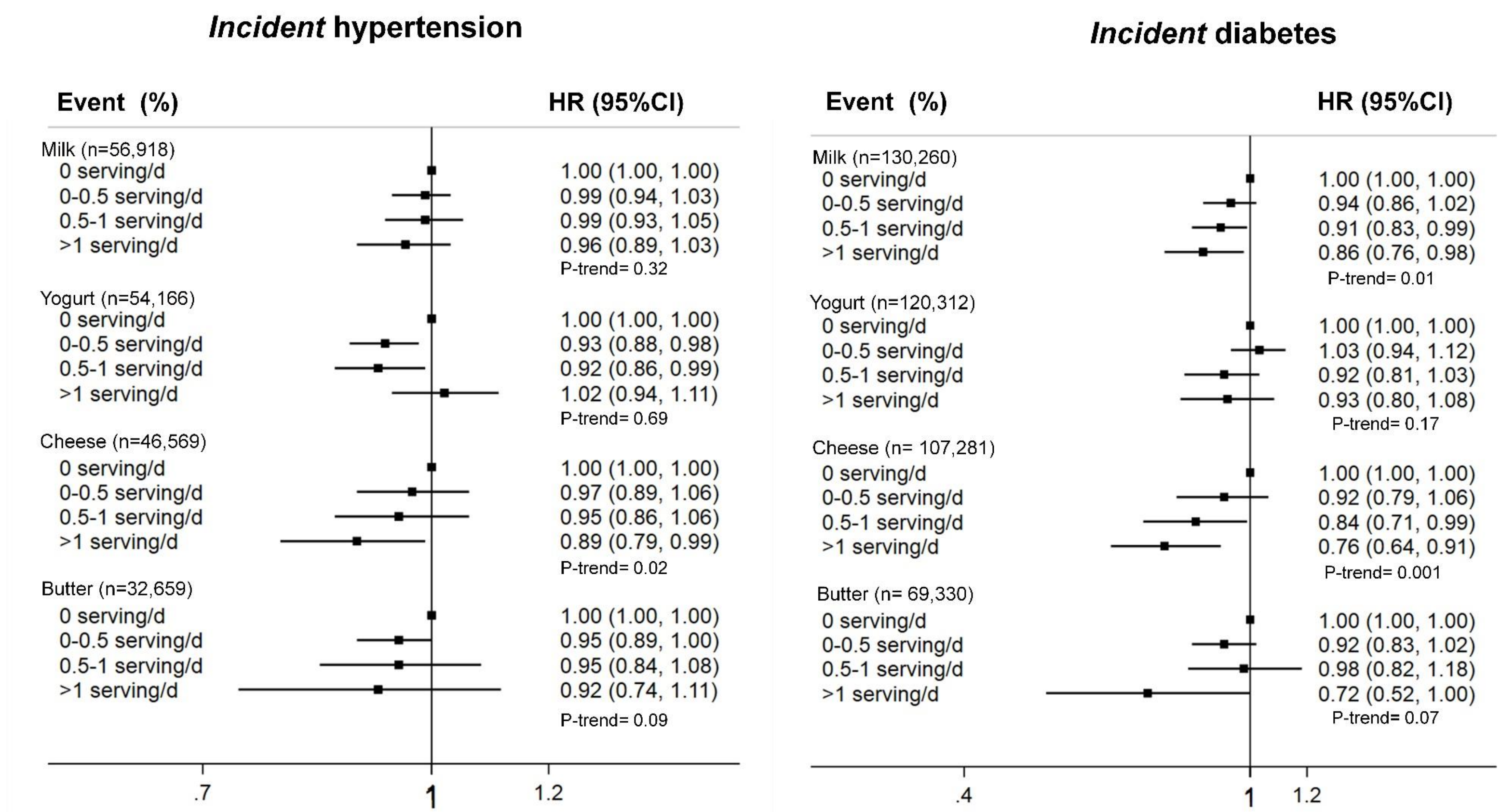
Figure S4: Associations of types of dairy with incident hypertension and incident diabetes (Hazards Ratio, 95%CI)



Incident hypertension: model adjusted for age (continuous), sex, smoking status, location, education, physical activity, energy intake, quintiles of percent energy from carbohydrate, vegetable and fruit intake and study centre as random effect

Incident diabetes: model adjusted for age (continuous), sex, smoking status, family history of diabetes, location, education, physical activity, energy intake, quintiles of percent energy from carbohydrate, vegetable and fruit intake and study centre as random effect

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