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Supplementary Material. Data synthesis for secondary outcomes

Lifestyle hazards and secondary outcomes (Kidney Replacement Therapy, eGFR decline, and albuminuria)	
Kidney Replacement Therapy (KRT)	A total of 17 studies encompassing 990,723 participants reported associations of lifestyle behaviours to KRT. ***Diet behaviours:*** Six studies involving 701,627 participants reported associations of 13 different dietary factors to KRT. No meta-analysis was possible for any factor due to having less than 2 exposures for each diet factor, however 2 studies (100%) showed potassium intake and 1 study (50%) showed coffee intake to be significantly associated with decreased risks of KRT. In contrast, four diet factors were found to be potentially harmful to KRT, including protein, high red meat intake, sodium and diet beverages, with over 50% of studies reporting these outcomes demonstrating significant associations (see Supplemental Figure 1 and Supplemental Table 4). ***Physical activity:*** Three studies involving 70,058 reported associations of physical activity to KRT. One of these studies reported a significant reduced risk of KRT, and another study reported a significant increase risk of a composite outcome of treatment of KRT due to any cause, or death related to CKD in people with higher levels of physical activity compared to lower levels. However, these results could not be pooled in meta-analysis and are therefore reported in Supplemental Table 4. ***Alcohol consumption:*** Two studies involving 74,683 reported associations of alcohol consumption to KRT. One of the two studies (50%) reported significant reduced risk of KRT, however the results could not be pooled in meta-analysis and are therefore reported in Supplemental Table 4. ***Smoking exposures:*** Eight studies involving 1,230,390 participants reported associations of smoking to KRT. Meta-analysis of all studies reporting a smoking exposure (ever smoked) compared to never showed a significant increased risk of KRT (RR 1.59 [95% CI: 1.30, 1.94];

	I^2=68%; Evidence quality: Moderate) (see Supplemental Figure 1). Meta-analysis also showed that former (not current) smokers compared to current was significantly associated with increased risks of KRT (RR 1.25 [95% CI: 1.13, 1.39]; I^2=39%; Evidence quality: Moderate) (see Supplemental Figure 1).
GFR decline	***Diet behaviours:*** A total of 22 individual studies involving 77,274 participants reported associations of 24 different dietary factors to eGFR decline. Only potassium and protein intake exposures were able to be pooled into meta-analysis. Higher potassium intake was associated with a significant decreased risk of eGFR decline (RR 0.49 [95% CI: 0.31, 0.79]; I^2=90%; Evidence quality: Very low), whereas higher protein intake was not (Table 2; Supplemental Figure 2). Twenty-two other dietary factors and their associations to eGFR decline were reported across 17 studies, which did not have enough data to pool into meta-analysis and are therefore descriptively reported in Supplemental Figure 1 and Supplemental Table 4. Of these, only magnesium and vitamin A intake were potentially protective against eGFR decline, with over 50% of studies indicating a protective relationship. In contrast, 5 diet exposures, including sodium, saturated fat, carbohydrate intake, sodium-potassium ratio and diet beverages had at least 50% of studies demonstrating a potentially harmful relationship to eGFR decline (Supplemental Figure 4 and Supplemental Table 4). ***Physical activity:*** Seven studies involving 27,075 participants reported association of physical activity levels to GFR decline demonstrated a higher level of physical activity significantly reduced the odds of eGFR decline (5 studies; 15,161 participants; OR 0.77 [95% CI: 0.63, 0.93]; 75%; Evidence quality: Very low) (Table 2; Supplemental Figure 2). The results of the other two studies which could not be meta-analyzed concurred with this analysis, with 50% of the associations being significantly positive (Supplemental Table 4). ***Alcohol consumption:*** Seven studies involving 28,494 participants reported no association of alcohol consumption to GFR decline (Table 2; Supplemental Figure 2).

	Smoking exposures: No meta-analysis was possible for smoking exposures to GFR decline. Five studies reported smoking and associations to eGFR decline, with only 1 showing significant decreased GFR at follow up (Supplemental Figure 2; Supplemental Figure 4 and Supplemental Table 4).
Albuminuria	A total of 20 studies encompassing 512,403 participants reported associations of lifestyle behaviours to incident albuminuria. ***Alcohol consumption***: Seven studies involving 220,479 participants reported no significant association of alcohol consumption to incident albuminuria (Table 2; Supplemental Figure 3). ***Diet behaviours:*** Nine studies involving 36,642 participants reported associations of 19 different dietary factors to incident albuminuria. Only 1 meta-analysis was possible on sodium intake, demonstrating a non-significant increased odd of incident albuminuria (Table 2). Eighteen other dietary factors and their associations to incident albuminuria were reported across 9 studies, which did not have enough data to pool into meta-analysis and are therefore descriptively reported in Supplemental Table 4. Two diet factors, including fruit and dairy had at least 50% of studies demonstrating these to protective against incident albuminuria, whereas 5 diet factors, including, sugar-sweetened beverages, saturated fat, cholesterol, red and processed meat and energy intake had at least 50% of studies demonstrating a potentially harmful relationship to incident albuminuria (Supplemental Figure 3; Supplemental Figure 4 and Supplemental Table 4). ***Physical activity:*** Four studies involving 110,154 participants reported a significant reduced odds of incident albuminuria (OR 0.88 [95% CI: 0.81, 0.96]; 0%; Evidence quality: Low) in people participating in higher levels of physical activity compared to lower levels (Table 2; Supplemental Figure 3). ***Smoking exposures:*** Seven studies involving 184,302 participants reported associations of smoking to incident albuminuria. Meta-analysis of all studies of populations who had ever smoked compared to those who had never smoked showed a significant increased odds of

	incident albuminuria (OR 1.67 [95% CI: 1.23, 2.26]; I^2=88%; Evidence quality: Very low). There was no significant association in meta-analysis of former smokers compared to those who had never smoked, or former smokers compared to current smokers (Table 2; Supplemental Figure 3).
Subgroup analysis	A subgroup analysis by duration of exposure showed that physical activity and sodium intake exposures with durations less than 10 years to be more likely associated with lower risk of incident CKD compared with exposures greater than 10 years. In contrast, alcohol consumption and potassium intake exposures appeared to be associated with incident CKD when exposures were greater than 10 years, compared with exposures of less than 10 years. Sodium intake exposures were also more likely to be associated with lower risk of incident CKD in countries outside the US, whereas alcohol consumption was more likely to be associated with incident CKD in the US compared with other countries. Physical activity was not associated with incident CKD in the US or other countries. Studies reporting associations with incident CKD were also more likely to be significant if they reported associations using a risk ratio (RR) compared with an odds ratio (OR), including potassium intake, alcohol consumption and tobacco smoking. Other subgroup analyses either were consistent with the primary finding or were not possible because at least one subgroup had few than 3 studies available to analyze (Supplementary Table 5).
Sensitivity analysis	In a sensitivity analysis, repeating the analysis by rotating each study reporting associations to incident CKD from the same cohort of data one by one, there was no change to the primary finding for any lifestyle exposure, except fish intake, which became statistically significant when data from Haring et al (1) were substituted for those from Rebholz et al (2) (Supplemental Table 6). A total of 6 studies reported unadjusted associations which can be seen in Supplemental Table 3. One study in the tobacco smoking and incident CKD (3) analysis and one for tobacco smoking and albuminuria (4) reported unadjusted associations. One study in the

	physical activity incident CKD (5) analysis and one for GFR decline (6) reported unadjusted associations. We have completed a sensitivity analyses, removing these studies to test the robustness of analyses, where no change in the primary or secondary findings was observed. In a sensitivity analysis removing each of these studies from their respective analyses, the findings held robust on all four occasions.

Supplemental Table 1. MEDLINE search terms used across the electronic databases to identify eligible studies

Database	Terms
MEDLINE strategy	**DIET** **Line 1** "Diet"[Mesh] OR "Food"[Mesh] OR nutrition*[Title/Abstract] OR vegetable*[Title/Abstract] OR meat*[Title/Abstract] OR dairy[Title/Abstract] OR beverage*[Title/Abstract] OR fruit[Title/Abstract] OR fibre[Title/Abstract] OR fiber[Title/Abstract] OR fish[Title/Abstract] OR salt[Title/Abstract] OR sodium[Title/Abstract] **Line 2** "Kidney Failure, Chronic"[Mesh] OR "Renal Insufficiency, Chronic"[Mesh] OR "chronic kidney disease" OR "renal failure*" OR "kidney failure" OR "renal impairment" OR "kidney impairment" OR "kidney dysfunction" OR "renal dysfunction" OR "reduced renal function" OR "CKD" OR "progressive kidney" OR "Glomerular Filtration Rate"[Mesh] OR "GFR" OR "eGFR" OR "Proteinuria"[Mesh] OR "Proteinuri*" OR "Albuminuria"[Mesh] OR "Albuminuria" OR "microalbuminuria" OR "End Stage renal disease" OR "ESRD" OR "End-stage Kidney Disease" OR "ESKD" OR “dialysis” OR "Renal Replacement Therapy"[Mesh] **Line 3** cohort[Title/Abstract] OR incidence[Title/Abstract] OR development[Title/Abstract] OR progression[Title/Abstract] OR association[Title/Abstract] **PHYSICAL ACTIVITY** **Line 1** “Exercises”[Mesh] OR “Exercise” OR “physical activity”[Mesh] OR “physical activity” OR “physical activities” OR “Walking”[Mesh] OR “Walking” OR “Sedentary Behavior”[Mesh] OR “Sedentary” OR “Sitting” OR “Screen Time” OR “Computer Games” OR “Video Games” OR “Television” **Line 2** "Kidney Failure, Chronic"[Mesh] OR "Renal Insufficiency, Chronic"[Mesh] OR "chronic kidney disease" OR "renal failure*" OR "kidney failure" OR "renal impairment" OR "kidney impairment" OR "kidney dysfunction" OR "renal dysfunction" OR "reduced renal function" OR "CKD" OR "progressive kidney" OR "Glomerular Filtration Rate"[Mesh] OR "GFR" OR "eGFR" OR "Proteinuria"[Mesh] OR "Proteinuri*" OR "Albuminuria"[Mesh] OR "Albuminuria" OR "microalbuminuria" OR "End Stage renal disease" OR "ESRD" OR "End-stage Kidney Disease" OR "ESKD" OR “dialysis” OR "Renal Replacement Therapy"[Mesh] **Line 3** cohort[Title/Abstract] OR incidence[Title/Abstract] OR development[Title/Abstract] OR progression[Title/Abstract] OR association[Title/Abstract]

	SMOKING AND ALCOHOL **Line 1** Smoke [Mesh Terms] OR Smoke [All Fields] OR Smoke* [All Fields] OR Smok* [All Fields] OR Smoking. [All Fields] OR Smoker*[All Fields] OR cigar* [All Fields] OR cigarrete* [All Fields] or Tobacco* [All Fields] or smoking use [All Fields] exp Alcohol [Mesh Terms] OR Alcohol [All Fields] OR Alcohol* [All Fields] OR Alcoholism[Mesh Terms] OR Alcoholism [All Fields] OR Alcohol Drinking [Mesh Terms] OR Alcohol Drinking [All Fields] AND (dependen* or disorder* or drink* or misuse or abuse* or consumption)) [All Fields]) **Line 2** "Kidney Failure, Chronic"[Mesh] OR "Renal Insufficiency, Chronic"[Mesh] OR "chronic kidney disease" OR "renal failure*" OR "kidney failure" OR "renal impairment" OR "kidney impairment" OR "kidney dysfunction" OR "renal dysfunction" OR "reduced renal function" OR "CKD" OR "progressive kidney" OR "Glomerular Filtration Rate"[Mesh] OR "GFR" OR "eGFR" OR "Proteinuria"[Mesh] OR "Proteinuri*" OR "Albuminuria"[Mesh] OR "Albuminuria" OR "microalbuminuria" OR "End Stage renal disease" OR "ESRD" OR "End-stage Kidney Disease" OR "ESKD" OR “dialysis” OR "Renal Replacement Therapy"[Mesh] **Line 3** cohort[Title/Abstract] OR incidence[Title/Abstract] OR development[Title/Abstract] OR progression[Title/Abstract] OR association[Title/Abstract]

Supplemental Table 2. Summary of the methods relating to data extraction, risk of bias, meta-regression and planned subgroup and sensitivity analyses

Data extraction	Age, sex, sample size, country/region of study, date of publication, comorbidity (cardiac disease, diabetes, hypertension), exposure of interest (s), reference exposure, study risks of bias, date of publication, baseline kidney function, duration of follow up, statistical analysis approaches (including adjustment for confounding variables), and all data relating to our primary and secondary outcomes. Binary outcomes (incident chronic kidney disease, end-stage kidney disease, eGFR decline and albuminuria) were extracted as the most adjusted relative risks (RR), odds ratios (OR), or hazard ratios (HR). If data was reported in figures and could not be located in text, Supplemental material or through author contact, then we extracted the data directly from figures using Webplot designer (https://automeris.io/WebPlotDigitizer/).
Risk of bias	These were further subdivided into five key question criteria; Selection (representativeness of exposed cohort, non-exposed cohort, ascertainment of exposure, and demonstration that outcome of interest was not present at the start of the study); Comparability of cohorts on basis of design or analysis; Outcome (assessment, follow-up length, and adequacy of follow-up); Selective reporting of outcomes; and other bias
Dose-response meta-regression analysis	A dose-response random-effects meta-regression analysis was performed based on the natural log of HRs for different categories of alcohol intake (7, 8). There are four studies included in the meta-regression with at least three quantitative exposure categories of the estimate HRs and their variance. Because each study used different units of alcohol intake (grams or number of drinks per day or week), we converted alcohol intake in gram/day, by the formula alcohol (gram) = 1 drink*13g/drink, and the median level of each category was assigned to each corresponding HR (9). If the upper bound in the highest category was not provided, we assumed that it had the same value.
Subgroup and sensitivity analyses	To explore the sources of heterogeneity, *a priori* subgroup analyses were conducted exploring the type of ratio reported (risk ratio; odds ratio; hazard ratio). We also conducted subgroup analyses by country of study

	origin, other health conditions, dose of alcohol consumption, baseline GFR, and length of follow-up. For outcomes where there existed multiple reports of the same outcome from the same cohort dataset, we conducted a study-by-study sensitivity analysis substituting included studies which reported associations from the same cohort dataset, where one study cohort is removed and another study reporting an association from the same cohort added in, with the process repeated until all studies from the same cohort dataset have been rotated through the meta-analysis once. Subgroup analyses are only reported for analyses where at least 3 studies are in each subgroup.

Supplemental Table 3. Characteristics of the included studies

Citation	Population	Country	Lifestyle exposure / prognostic factor	Follow-up	Outcomes	Adjusted covariates in statistical models
Araki 2015	Shiga Prospective Observational Follow-up Study T2DM N=623 59 ±10 years 57.8% male 89 ± 19 mL/min/1.73	Japan	**Diet** - Urinary potassium excretion 24-hour urine collection	11 years	1. Incident CKD stage 4 2. eGFR decline	Age, sex, BMI, HbA1c, total cholesterol, log triglyceride, log HDL-cholesterol, LDL-cholesterol, systolic BP, renin-angiotensin system inhibitor, hypertension, log urinary albumin excretion rate, eGFR, current smoking, and urinary sodium excretion
Asghari 2017	Tehran Lipid and Glucose Study (TLGS). Follow-up data from 2009-2011 Healthy general population N=1179 43 years 49.5% male Baseline GFR NP	Iran	**Diet** - fruit; vegetable; whole grains; low-fat dairy; nuts & legumes; red & processed meats; sweetened beverages; sodium Captured using self-reported FFQ	6.1 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, smoking, total energy intake, BMI, eGFR, triglycerides, physical activity, hypertension and diabetes
Asghari 2018	Tehran Lipid and Glucose Study (TLGS). Follow-up data from 2009-2011 Healthy general population N=1630 49.6 ± 10.3 years 48.8% male 73.3 ± 8.6 mL/min/1.73	Iran	**Diet** – antioxidant capacity (vitamin C; vitamin E; beta-carotene) Captured using self-reported FFQ	3 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, smoking, total energy intake, BMI, eGFR, triglycerides, physical activity, hypertension and diabetes
Baggio 2005	Italian Longitudinal Study of Ageing (ILSA) Healthy general population N=678 73.5±6.0 years Gender NP Baseline GFR NP	Italy	**Current smokers** >20 cigarettes/day Captured in clinical interview	4 years	1. Incident CKD (>26.5 mmol/l of SCr)	Unadjusted

Bahadoran 2016	Tehran Lipid and Glucose Study (TLGS). Follow-up data from 2006/08 Healthy general population N=2,799 31 years 42.9% male 80.7 mL/min/1.73	Iran	**Diet** - Nitrite/Nitrate Captured using self-reported FFQ	5.8 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, diabetes, hypertension, eGFR, and smoking, protein intake, fat intake, potassium intake and sodium intake
Bahadoran 2017	Tehran Lipid and Glucose Study (TLGS) Healthy general population N=1780 68 years 40.9% male 74.8 mL/min/1.73	Iran	**Diet** - L-Arginine Captured using self-reported FFQ	6.3 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Sex and age, BMI, smoking, serum creatinine, diabetes mellitus, hypertension, medications use, CVD, daily energy intake, protein intake, fat intake, and sodium-potassium ratio.
Bahadoran 2017	Tehran Lipid and Glucose Study (TLGS) Healthy general population N=3052 40.3± 14.3 years 44.2% male 77.9 mL/min/1.73	Iran	**Diet** - Allium vegetables Captured using self-reported FFQ	6 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. GFR decline (change at follow-up)	Sex, age, BMI, smoking, type 2 diabetes, TG to HDL-C ratio, physical activity, dietary pattern scores
Barbato 2019	Olivetti Health Study (OHS) Healthy general population N=637 51 years Gender NP 90 mL/min/1.73	Italy	**Current smoker vs never smokers** (independently of the number or smoked cigarettes per day) Captured on self-reported questionnaire	7.8 years	1. Microalbuminuria (30mg/g to 300mg/g and greater that 300mg/g; 24-hour collection)	Unadjusted
Bash 2010	Atherosclerosis Risk in Communities (ARIC) Study Healthy general population N=15,324 54 ± 5.8 years 45% male 93 ± 21 mL/min/1.73	US	**Current, former and never smokers** Captured on self-reported questionnaire	16 years	1. Incident ESRD or Death (ESRD (ICD 9 and 10 kidney transplant or dialysis); eGFR < 15mL/min/1.73m2)	Age, sex, race, gender, diabetes, BP, CVD, LDL, center
Bomback 2010	Atherosclerosis Risk in Communities (ARIC) Study	US	Diet - Sugar sweetened beverages	9 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, body mass index, sodium intake, caloric intake,

	Healthy general population N=15,745 53 years 49.6% male 93.3 mL/min/1.73		Captured using self-reported FFQ			hypertension, diabetes, current tobacco and alcohol use, education, center, and race
Buja 2011	The Italian Longitudinal Study on Aging (ILSA) study Non-CKD elderly population N=1,542 65 – 84 years 92.7% male Baseline GFR NP	Italy	**Alcohol consumption** – Categories non-drinker vs, <12g/day, 12 to 24 g/Day, 24 to 47 g/day >48g/day Captured on self-reported questionnaire	3.5 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, education, antihypertensive, diabetes, blood, fibrinogen, TC, smoking, isolated systolic, HTN, lipid-lowering drugs
Chang 2013	The Coronary Artery Risk Development in Young Adults (CARDIA) study Healthy general population N=2,354 18 - 30 years 47.4% male 101.5 mL/min/1.73	US	**Diet** - Fruit; vegetables; wholegrains; nuts and legumes; low-fat dairy; sugar-sweetened beverages; red and processed meat; sodium; energy intake Captured using self-reported FFQ **Currently smoking** or not currently smoking Captured on self-reported questionnaire	15 years	1. Microalbuminuria (sex-race adjusted urine ACR ≥25mg/g at 2 separate times)	Age, sex, race, family history of kidney disease, education level, baseline ACD and energy intake
Cirillo 2018	Gubbio Study General population (5.2% diabetes; 34.5% HTN) N=2,845 50 years 43.9% male 97 mL/min/1.73	Italy	**Diet** – protein (urine urea nitrogen)	15.9 years	1. GFR decline (change from baseline to follow-up equal to or lower than Z-score of -1 (eGFR change < mean -1 standard deviation of eGFR	Sex, age, reduced kidney function, obesity, underweight, hypertension, hypercholesterolemia, smoking, ex-smoking, diabetes, previous CVD, urinary sodium/potassium ratio,

					change in the study cohort))	habitual physical activity, and habitual intakes of alcohol, milk or yogurt, and caffeine-containing beverages, baseline eGFR
Deriaz 2019	The Cohort Lausanne study Healthy general population (100% white) N=4141 51.5 years 45.7% male 88 ± 15 mL/min/1.73	Switzerland	**Diet** - Urinary sodium, potassium and sodium-to-potassium ratio Captured using spot urine collection using Kawasaki formulae	5.4 years	1. GFR decline (change at follow-up)	Age, sex, physical activity, smoking status, diabetes, antihypertensive medication, SBP, BMI, triglycerides, uric acid, CRP, 25-hydroxyvitamin D
Dunkler 2013	The ONgoing Telmisartan Alone and in combination with Ramipril Global Endpoint Trial (ONTARGET) study T2DM N=6,213 67 years Gender NP 71.5 mL/min/1.73	US	**Alcohol consumption –** measured by the number of drinks/week, with 1 drink equalling 1.5 ounces of hard liquor or 1 glass of beer or wine. **Diet** - animal protein; plant protein; CHO intake; vegetable; sodium; potassium; fruit Captured using self-reported FFQ	5.5 years	1. Albuminuria 2. GFR decline	Age, duration of diabetes, status of albuminuria, sex, ONTARGET randomization arms, GFR, and Δ-UACR to progression, BMI, mean arterial BP, glucose and previous use of angiotensin-converting enzyme inhibitors or angiotensin-receptor blockers, tobacco use, physical activity, and educational level to study the nutrition-specific effects of a healthier lifestyle and socioeconomic status.
Dunkler 2015	The ONgoing Telmisartan Alone and in combination with Ramipril Global Endpoint Trial (ONTARGET) study T2DM N=3,088 65 years 66.6% male 72.5 mL/min/1.73	US	**Diet** - Fruit, vegetable, fiber, protein, carbohydrates, trans fat, urine sodium, urine potassium Captured using FFQ (except sodium and potassium)	5.5 years	1. Composite outcome (defined as new micro-, or macro-albuminuria, a decline in the eGFR of more than 5% per year or end- stage kidney disease)	Age, gender, duration of diabetes, ONTARGET randomization arms, albuminuria status, GFR and δ-UACR and UACR at baseline on the log scale, respectively

Ejtahed 2016	Tehran Lipid and Glucose Study General population (10.7% diabetes, 16.2% HTN) N=1,692 43.4 ± 11.4 years 43% male 70.4 ± 10.8 mL/min/1.73	Iran	**Diet** - Glycation End Products Captured using self-reported FFQ	3 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, energy intakes, smoking, physical activity, body mass index, and sodium, diabetes and HTN
Esmeijer 2018	Alpha Omega Cohort Post-MI patients N=2255 69 years 80% male 82 ± 20 mL/min/1.73	Netherlands	**Diet** – Protein Captured using self-reported FFQ	3.4 years	1. GFR decline (change at follow-up)	Age, sex, total energy intake, education, alcohol, smoking, physical activity, RAS blocking drugs, fat intake, dietary sodium, diabetes and systolic blood pressure
Farhadnejad 2016	Tehran Lipid and Glucose Study (TLGS) follow up data from 2006-2008 Healthy general population N=1,692 43.3 ± 11.4 years 49.2% male Baseline GFR NP	Iran	**Diet** - Micronutrient intakes (B1, B2, B3, B6, B12, folate, Vitamin A, C, D, E, sodium, potassium, calcium, magnesium, phosphorous, selenium, zinc) Captured using self-reported FFQ	3.6 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, energy intake, serum triglycerides, serum cholesterol, BMI, hypertension, diabetes, physical activity, and smoking
Farhadnejad 2018	Tehran Lipid and Glucose Study (TLGS) Healthy general population N=1,797 37.7 ± 12.2 years 48% male 75.9 mL/min/1.73	Iran	**Diet** - Low CHO, high protein (CHO 51% compared to 64.1%; protein 15.8% compared to 12.9%) Captured using self-reported FFQ	6.1 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, energy intake, serum triglycerides, serum cholesterol, BMI, hypertension, diabetes, physical activity, and smoking
Forman 2012	Prevention of Renal and Vascular End-stage Disease (PREVEND) Healthy general population N=4146 43.3 years 47.6% male	Netherlands	**Diet** - Urinary sodium excretion, 24hr collection	6.4 years	1. Albuminuria (value at follow-up)	Age, BMI, sex, alcohol intake, smoking status, systolic and diastolic BP, GFR, plasma levels of glucose and cholesterol, and urinary levels of potassium,

	87 mL/min/1.73					calcium, and creatinine. Models were also mutually adjusted for baseline levels of serum uric acid and urinary albumin
Foster 2015	Framingham offspring study Healthy general population N= 1,802 59.9 ± 9 years 45.2% male Baseline GFR NP	US	**Alcohol consumption** - None (0 drinks/week); low-to-moderate (1–7 drinks/ week in women and 1–14 drinks/week in men); high intake (>7 drinks/week in women and >14 drinks/week in men) **Physical activity** - Physical Activity Index **Smoking** - Current ≥1 cigarette/day in the past year Captured on self-reported questionnaire	6.6 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, eGFR, BMI, hypertension, diabetes and dipstick proteinuria, dietary guidelines adherence index
Fox 2004	Framingham Heart Study Healthy general population N=2585 43 years 47.3% male 112 ± 57 mL/min/1.73	US	**Smoking** - yes vs no Captured on self-reported questionnaire	18.5 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age and sex
Gopinath 2011	Blue Mountains Eye Study Healthy general population N=2600 >50 years 43.2% male Baseline GFR NP	Australia	**Diet** - Carbohydrate intake Captured using self-reported FFQ	5 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age and sex, serum total homocysteine, haemoglobin, and haematocrit

Gopinath 2016	Blue Mountains Eye Study General population (6.8% DM, 41.6% HTN) N=1185 64.1 ± 8.7 years 44.9% male Baseline GFR NP	Australia	**Diet** – Dairy and calcium Captured using self-reported FFQ	10 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, receipt of pension, BMI, smoking, serum triglycerides, HTN, and history of diagnosed diabetes
Halbesma 2009	Prevention of Renal and Vascular End-stage Disease (PREVEND) Healthy general population N=8,461 50 years Gender NP 80.6 mL/min/1.73	US	**Diet** – protein (24-h urinary urea excretion (Maroni formula) Captured using self-reported FFQ	6.4 years	1. GFR decline (Change at follow-up)	Unadjusted
Hallan 2011	The Nord-Trøndelag Health (HUNT) II cohort General population N=65,589 47.8 years 45.8% male 98.1 mL/min/1.73	Norway	**Smoking** - Never, Former, current smoke Captured on self-reported questionnaire	10.3 years	1. End-stage kidney disease	Age, education physical activity, diabetes, CVD, lipids, waist circumference, eGFR, ACR, antihypertensive medication
Haring 2017	Atherosclerosis Risk in Communities (ARIC) Study Healthy general population N=11,952 53.8 years 43.7% male 103.1 mL/min/1.73	US	**Diet** – Protein Captured using self-reported FFQ	23 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, race, center, sex, education level, and total caloric intake, HDL cholesterol, LDL cholesterol, TG, TC, lipid-lowering medication use, systolic BP, antihypertensive medication use, alcohol intake, current smoker, physical activity index, leisure-related physical activity, total carbohydrate intake, BMI, and waist-to-hip ratio
Haroun 2003	Campaign Against Cancer and Stroke (CLUE) study Healthy general population N=23,534 41 years	US	**Smoking** - ever vs never and current vs former	20 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. End-stage kidney disease	Age, sex, treated diabetes, BP

	40.8% male Baseline GFR NP		Captured on self-reported questionnaire			
Hawkins 2015	The Health, Aging and Body Composition (Health ABC) study Healthy general population N=2435 73.6 ± 2.8 years 46.4%-49.8% male 79.8-82.5 mL/min/1.73	US	**Physical activity** - (0–48 vs >93 kcal/kg per week) Captured on self-reported questionnaire	10 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. GFR decline (annual loss of >3ml/min/1.73m2 per year eGFR)	Age, baseline GFR, sex, race, smoking status, study site, HTN medication use, CVD, heart failure, diabetes status, pulse pressure, BMI, HDL, TG, TC, CRP, television watching
Herber-Gast 2016	Doetinchem Cohort Study General population (28.7% HTN, 1.3% DM, 21.2% hypercholesterolemia) N=4722 45.5 ± 9.8 years 48% male 108 ± 14.7 mL/min/1.73	Netherlands	**Diet** - Coffee and tea Captured using self-reported FFQ	15 years	1. GFR decline (Change at follow-up)	Age, sex, highest attained level of education, time-dependent physical activity, BMI, smoking, alcohol consumption, daily energy intake, energy-adjusted intakes of fiber, vitamin C, total protein, fat, and saturated fat, intake of tea (for coffee analysis) or coffee (for tea analysis), hypercholesterolemia, HTN, and diabetes, energy-adjusted intakes of magnesium, potassium, and caffeine
Herber-Gast 2016	Doetinchem Cohort Study General population (1.2% DM, 28.4% HTN, 22% hypercholesterolemia, 8.8% obesity) N=3798 45.2 ± 9.7 years 52.2% male 108.6 ± 14.2 mL/min/1.73	Netherlands	**Diet** – Dairy Captured using self-reported FFQ	15 years	1. GFR decline (Change at follow-up)	Age, sex, highest attained level of education, time-dependent physical activity, BMI, smoking, alcohol consumption, daily energy intake, energy-adjusted intakes of fiber, vitamin C, total protein, fat, and saturated fat, intake of tea (for coffee analysis) or coffee (for tea analysis),

						hypercholesterolemia, HTN, and diabetes, energy-adjusted intakes of magnesium, potassium, and caffeine
Herber-Gast 2017	Doetinchem Cohort Study General population (28.2% HTN, 1.2% DM, 22.1 hypercholesterolemia) N=6,113 45 years 48% male 104.6 mL/min/1.73	Netherlands	**Diet** - Whole grains, fruit, vegetables Captured using self-reported FFQ	15 years	1. GFR decline (change at follow-up) 2. Albuminuria (ACR; change at follow-up)	Age, sex, highest attained levels of education, time-dependent physical activity, BMI, smoking, alcohol consumption, daily energy intake, and presence of diabetes, HTN, and hypercholesterolemia, energy-adjusted intake of monounsaturated fat, polyunsaturated fat, phosphorus, magnesium, vitamin D, and calcium
Hippisley-Cox 2010	Qresearch database Healthy general population N=788,320 35-74 years 50.6% male 86.2± 15.9 mL/min/1.73	England and Wales	**Smoking** - non-smoker, ex-smoker, light smoker <10 cigarettes day, moderate smoker 10-19 cigarettes per day, heavy smoker 20 or more cigarettes per day Captured on self-reported questionnaire	5 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. End-stage kidney disease	Age, BMI, systolic BP
Hirahatake 2019	The Coronary Artery Risk Development in Young Adults (CARDIA) study General population (58.7% white, 3.8% diabetes, 14.2% HTN, 3.2% albuminuria) N=2,152 40 years 50.9% male 109.3 mL/min/1.73	US	**Diet** - Serum Carotenoids, Tocopherols, and Ascorbic Acid	5 years	1. GFR decline (change at follow-up)	Age, race, sex, CARDIA center, education, smoking status, alcohol intake, physical activity, BMI, and lipids, incident diabetes, HTN, albuminuria, and CRP

Hu 2018	Atherosclerosis Risk in Communities (ARIC) Study Healthy general population (76% white) N=14,209 54.1 years 44.6% male 103 mL/min/1.73	US	**Diet** – Coffee consumption Captured using self-reported FFQ	24 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. End-stage kidney disease	Age, sex, race-center, education, total energy intake, physical activity, smoking, alcohol status, DASH diet score, diabetes status, BMI, systolic BP, antihypertensive medication use, baseline GFR
Hu 2019	Atherosclerosis Risk in Communities (ARIC) Study Healthy general population N=12692 52.5% male >100 mL/min/1.73	US	**Alcohol consumption** - never drinkers, former drinkers, ≤1 drink per week, 2 to 7 drink/week, 8 to 14 drinks/week and ≥ 15 drinks per week Captured using self-reported FFQ	24 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Total energy intake, age, ser, race-center, income, education level, health insurance, smoking, physical activity, diabetes status, HTN, BMI, eGFR
Jafar 2015	The Singapore Chinese Health Study Healthy general population N=59,552 56.1 years Gender NP Baseline GFR NP	Singapore	**Physical activity** - Never VS the active group defined as individuals who engaged in any moderate activity for 2 hours or more per week, or any strenuous activity on a weekly basis for at least 30 minutes Captured using the European Prospective Investigation in Cancer (EPIC) study physical activity questionnaire	15.3 years	1. End-stage kidney disease	Age, sex, interview year, body mass index, dialect (Hokkein, Cantonese), education level, self-reported history of physician diagnosed hypertension, diabetes, heart disease or stroke, alcohol use, smoking, intake of ginseng, protein intake

Jee 2005	Korea Medical Insurance Corporation (KMIC) Study General population (with HTN and diabetes) N= 157377 35-59 66.4% male Baseline GFR NP	Korea	**Smoking** - current smokers, ex-smokers, or non-smokers Captured on self-reported questionnaire	10 years	1. Proteinuria (albuminuria - dipstick finding of 1+ or greater)	Age, diabetes, BMI, cholesterol, BP
Jhee 2019	Korean Genome and Epidemiology Study database General population (14.4% HTN, 6.4% DM, 2.4 dyslipidaemia, 1.6% CVD) N=9,229 52.0 ± 8.8 years 48.1% male 93.9 ± 14.2 mL/min/1.73	Korea	**Diet** – Protein Captured using self-reported FFQ	11.5 years	1. GFR decline (defined as an annual eGFR decline rate 3mL/min/1.73 m^2/year)	Age, sex, eGFR and daily intake of total energy, carbohydrate intake, fat and sodium, smoking status, alcohol status education and income levels and physical activity, BMI, systolic BP, history of HTN and diabetes, fasting plasma glucose, serum albumin, TC and haemoglobin
Jhee 2019	Korean Genome and Epidemiology Study database General population (14.4% HTN, 6.4% DM, 2.4 dyslipidaemia, 1.6% CVD) N=9,229 52.0 ± 8.8 years 48.1% male 93.9 ± 14.2 mL/min/1.73	Korea	**Diet** – Vegetables and fruit Captured using self-reported FFQ	8.2 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, total energy intake, BMI, systolic BP, education level, smoking status, alcohol status, physical activity, history of HTN and diabetes, and red or non-red meat, fish, dairy, egg, legume, nut, and grain intake, serum albumin, LDL cholesterol, haemoglobin, and proteinuria levels
Jin 2013	Singapore Chinese Health Study General population (with diabetes and heart disease) N=63,257 55.6 years 44.2% male Baseline GFR NP	Singapore	**Smoking** - "never-smokers, former, current Captured using self-reported questionnaire	13.3 years	1. Kidney failure (At least one of: 1) serum creatinine level of more than or equal to 500µmol/l or 2) GFR < 15ml/min/1.73m2 or 3) undergoing dialysis, or 4) had	Age, BMI, dialect, education level, history of HTN, DM, known heart disease or stroke, alcohol use and intake of gingseng

					undergone kidney transplant)	
Kanda 2015	Saitama Cardiometabolic Disease and Organ Impairment Study Healthy general population N=7473 38.8±10.5 years 74.6% male 78.1±15.2 mL/min/1.73	Japan	**Alcohol consumption** – Measured by glasses of Sake and calculated as follows: an amount of alcohol consumed in a day (g of alcohol/day) **Physical activity** – More than 30-minute exercise with sweating. The categories of exercise frequency were as follows: 0= twice a month or less; 1= once a week; 2= >twice a week.	3 years	1. Incident CKD (<60 mL/min/1.73 m^2 or >25% reduction in GFR at follow-up) 2. GFR decline (loss per year)	Age, BMI, and eGFR were treated as time-dependent variables
Kieneker 2016	Prevention of Renal and Vascular End-stage Disease (PREVEND) General population (1.4% DM, 11.8% antihypertensive medicated patients) N=5,315 48.3 years 47.5% male 98.2 mL/min/1.73	US	**Diet** – Potassium and sodium Captured using self-reported FFQ	10.3 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. Albuminuria (>30 mg/24 hour)	Age, sex, height, weight, smoking status, alcohol consumption, parental history of CKD, race, diabetes, and urinary potassium, calcium, urea, and creatinine excretion, baseline eGFR and UAE
Kimura 2018	Retrospective cohort – cohort name NP Healthy general population N=177,572 40-75 years 49.9% male 77.5 mL/min/1.73	Japan	**Alcohol consumption** - rare drinkers, occasional drinkers, and daily drinker; with ethanol intake ≤19,20-39,40-59 and ≥60g/day	1.8 years	1. Proteinuria (albuminuria; dipstick urinary protein ≥ 1 +)	Age, current smokers, BMI, mean arterial pressure, HDL-cholesterol, haemoglobin A1c, eGFR, current treatment of HTN, dyslipidaemia, DM and history of CVD

			Captured using self-reported questionnaire			
Knight 2003	Nurses' health study Healthy general population N=1,658 30-55 years 100% women >89 mL/min/1.73	US	**Alcohol consumption** - daily alcohol was none, 0.1-4.9d/day, 5-14.9g/day, and 15-59.9g/day Captured using self-reported questionnaire **Diet** – protein Captured using self-reported FFQ	11 years	1. GFR decline (eGFR ≥20%, ≥25% and ≥30%)	Age, BMI, protein intake, hypercholesterolaemia, diabetes, HTN and smoking status
Koning 2015	Prevention of Renal and Vascular End-stage Disease (PREVEND) Healthy general population N=5476 48.4 ± 11.7 years 47.4% male 97.3 ± 14.8 mL/min/1.73	US	**Alcohol consumption** - no alcohol, occasional <10g/week, light 10-69.9 g/week, moderate 70-210g/week, heavier>210g/week	10.2 years	1. Incident CKD (eGFR < 60ml/min and/or UA >30mg mean of 2 measurements)	Age, sex, height, weight, smoking status, parental history of CVD, history of CVD, education level and potential mediators like homeostatic model assessment-insulin resistance, use of glucose-lowering drugs, TC to HDL cholesterol ratio, use of lipid-lowering drugs, BP drugs
Kronborg 2008	Tromsø Study General population (56.9% HTN, 2.3% DM, 11.8% CVD) N=4441 59 years 50.6% male 93 mL/min/1.73	Norway	**Alcohol consumption** – Self-reported as (1) alcohol abstention; (2), ≤ 3 units of alcohol/week; (3) >3 and ≤ 6 units of alcohol/week (4) > 6 units of alcohol/week. **Physical activity** – Self-reported active	6 years	1. eGFR decline (change at follow-up)	Baseline eGFR

			(>1-hour hard activity/week; and/or >3-h light activity; or inactive **Smoking** - Self-reported as current smokers; former smokers; or never smoked			
Krop 1999	The Atherosclerosis Risk in Communities (ARIC) Study Diabetes mellitus (Black & White ethnicities) N=1,434 56 years 43.1% male 97.2 mL/min/1.73	US	**Physical activity** - assessed by interview based on a modification of the questionnaire developed by Baecke and colleagues	3 years	1. GFR decline (change at follow-up)	Unadjusted
Lee 2012	The Strong Heart Study Healthy general population N=2,261 39 years 39.6% male 102.4 mL/min/1.73	US (Indians)	**Diet** – Fish intake Captured using self-reported FFQ	5.4 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. Albuminuria (Urinary ACR=30 to 299 mg/g), macroalbuminuria (urinary ACR>300 mg/g))	Age, sex, center, diabetes status, TG, systolic BP, WHR, baseline GFR, smoking, alcohol consumption, energy intake, protein intake, sodium intake
Lew 2018	Singapore Chinese Health Study Healthy general population N=63,257 56.5 years 44.3% male Baseline GFR NP	Singapore	**Diet** – Caffeine Captured using self-reported FFQ	16.8 years	1. End-stage kidney disease	Age, sex, dialect group, year of recruitment, and education, BMI, smoking status, physical activity, alcohol consumption, red meat intake, total protein intake, self-reported history of diabetes, HTN, stroke, and CVD, consumption of other caffeine-containing beverages (coffee, black tea, green tea, and soda)
Lew 2017	Singapore Chinese Health Study Healthy general population N=63,257	Singapore	**Diet** – Red meat, red & processed meats, protein,	15.5 years	1. End-stage kidney disease	Age, gender, dialect, educational level, year of interview, BMI, physical activity,

	56.5 years 44.3% male Baseline GFR NP		poultry, fish & shellfish, eggs, dairy, soy & legumes) Captured using self-reported FFQ			smoking status, alcohol use, history of disease (diabetes, HTN, stroke, heart attack) at baseline, and total energy intake
Lin 2011	Nurses' Health Study General population (54% HTN, 23% diabetes, 97% Caucasian) N=3,318 67 years 100% women 84 mL/min/1.73	US	**Diet** - Sugar sweetened beverages Captured using self-reported FFQ	11 years	1. Albuminuria (ACR of 25 to 355 ug/mg) 2. GFR decline (decline >30%)	Age, caloric intake, HTN, BMI, diabetes, cigarette smoking, activity, and CVD
Lin 2010	Nurses' Health Study General population (54% HTN, 23% diabetes, 97% Caucasian) N=3,348 67 years 100% women 76 mL/min/1.73	US	**Diet** - Animal protein; vegetable protein; low fat dairy; saturated fat; monounsaturated fat; animal fat; vegetable fat; cholesterol; sodium; vitamin E; vitamin C; folate Captured using self-reported FFQ	14 years	1. Albuminuria (ACR of 25 to 355 ug/mg) 2. GFR decline (decline >30%)	Age, hypertension, BMI, diabetes, cigarette smoking, activity, CVD, eGFR and angiotensin-converting enzyme inhibitor/angiotensin-type 2 receptor blocker medication use
Lin 2014	A retrospective cohort study – cohort name NP T2DM N=559 59±13 years 48.7% male Baseline GFR NP	Taiwan	**Physical activity** – self-reported questionnaire	2 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, urbanization, BMI, education, Marry, Household income, drinking, smoking, CCI index, dyslipidaemia drug, hypertension drug, family history of diabetes /hyperlipidaemia /HTN/heart disease
Lipworth 2012	Southern Community Cohort Study (SCCS) General population (with HTN, diabetes high cholesterol) N=79,943 40-79 years 47% male Baseline GFR NP	US	**Smoking** - ever and never Captured using self-reported questionnaire	4.1 years	1. End-stage kidney disease	age, recruitment, sex, race, education, annual household Income, HTN, diabetes, MI/CABG, stroke, hypercholesterolemia

Maeda 2011	Kansay Healthcare study General population (with HTN and diabetes) N=10,118 48.1 ± 4.2 100% male 84.3 ± 15.4 mL/min/1.73	Japan	**Smoking** – non-smokers, past-smokers and current-smokers. Current 1 to 20, and ≥21 cigarettes per day) Captured using self-reported questionnaire	6 years	1. Hyperfiltration or proteinuria (hyperfiltration was 117ml/mil per 1.73m2 or higher. Proteinuria 1+ or higher (30mg/dl or higher) for dipstick examination at follow-up))	eGFR, age, BP, antihypertensive medication, diabetes alcohol consumption, physical activity
Malhotra 2018	Jackson Heart Study General population (57% HTN, 19% DM) N=3,165 54.4 years 36% male 97.4 mL/min/1.73	US	Diet – Protein Captured using self-reported FFQ	8 years	1. GFR decline (change at follow-up)	Age, diabetes, energy from protein intake, sex, smoking, BMI, alcohol use, systolic BP, diastolic BP, years between creatinine measurements, total energy intake and percent energy from saturated fat, polyunsaturated fat, trans fat, and carbohydrate
Menon 2010	Cardiovascular health study General population (elderly) N=4,343 72 ± 5 years 48% male 79 ± 26 mL/min/1.73	US	**Alcohol consumption** - no alcohol, former, <1drink, 1-6drinks, 7-13 drinks and ≥ 14 drinks Captured using self-reported questionnaire	5.6 years	1. GFR decline (decline >3 ml/min)	Age, gender, race, smoking, diabetes, systolic blood pressure, diastolic BP, anti-HTN medications, LDL cholesterol, HDL, prevalent CVD, prevalent heart failure, CRP and fibrinogen
Michishita 2017	Cohort name NP Healthy general population N=336 52.5 ± 6.7 years 100% male 81.2 ±6.1 mL/min/1.73	Japan	**Smoking** – yes/ no Captured using self-reported questionnaire	5 years	1. Incident CKD (eGFR<60ml/min, proteinuria positive (1+ or greater) or both)	Unadjusted
Mirmiran 2016	Tehran Lipid and Glucose Study – study data from 2006/08-2009/11 Healthy general population N=1,546	Iran	**Diet** - Nitrate containing vegetables Captured using self-reported FFQ	3 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, BMI, smoking, education, physical activity, diabetes, and HTN, energy intake, fiber, and potassium

	38.0 ± 12.0 years 43% male 80 mL/min/1.73					
Mirmiran 2018	Tehran Lipid and Glucose Study General population (11.7% CVD, 19% HTN) N=1,780 34 years 40.8% male 74.8 mL/min/1.73	Iran	**Diet** - Sodium, Potassium, Sodium to Potassium Ratio Captured using self-reported FFQ	6.3 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. GFR decline (change at follow-up)	Sex, age, BMI, smoking, serum creatinine, diabetes, HTN, medications, CVD, history of kidney disease, daily energy intake, dietary intake of protein and total fat
Mirmiran 2018	Tehran Lipid and Glucose Study General population (8.2% diabetes, 12.5% HTN) N=1,630 42.8 ± 11.2 years 49.5% male 73.7 mL/min/1.73	Iran	**Diet** – Fiber Captured using self-reported FFQ	6.1 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, smoking, total energy intake, physical activity, diabetes and using angiotensin-converting-enzyme inhibitor
Miyatake 2010	Cohort name NP Healthy general population N=286 46.4 ± 9.2 years 100% male 86.3 ± 15.1 mL/min/1.73	Japan	**Smoking** – yes v no; non-current vs non-smokers Captured using self-reported questionnaire	5 years	1. Incident CKD (defined as an eGFR <60ml/min/1.73m2)	Unadjusted
Mun 2019	The Korean Multi-Rural Communities Cohort Study General population (Mix of normotension and hypertension) N=5,064 61.3 years 37.6% male NTN 75.8 mL/min/1.73; HTN 73.8 mL/min/1.73	Korea	**Diet** – Potassium Captured using self-reported FFQ	4 years	1. Incident CKD (<60 mL/min/1.73 m^2) 2. GFR decline (change at follow-up)	Age, sex, gender, BMI, smoking, alcohol and exercise, diabetes, total cholesterol, triglyceride and high-density lipoprotein, calorie, protein, and sodium intake
Nakanishi 2012	Sakasaki Health cohort Healthy general population N=1811 45.5 years 61.1% male 75.8 ± 11.1 mL/min/1.73	Japan	**Smoking** – current vs non-current Captured using self-reported questionnaire	7.7 years	1. Incident CKD (<60 mL/min/1.73 m^2)	Age, sex, BMI, systolic BP, glucose, cholesterol, uric acid, leukocyte count, fasting urine protein, pH

Nam 2019	Korean Genome Epidemiology Study General population (42.6% HTN, 3.6% CVD, 3% dyslipidaemia) N=7804 51.3 ± 8.6 years in non-diabetics; 55.4 ± 8.8 years in diabetics 49.7% male Baseline GFR NP	Korea	**Diet** - Carbohydrate intake Captured using self-reported FFQ	11.7 years	1. Incident CKD (<60 mL/min/1.73 m2 and/or the development of proteinuria)	Age, sex, baseline eGFR, WHR, education status, marital status, smoking status, exercise, hypertension, and CVD, haemoglobin, HOMA-IR, albumin, HDL cholesterol, and TG
Noborisaka 2012	Cohort name NP Healthy general population N=6998 41.7 years 58.9% male 83.8 mL/min/1.73	Japan	**Smoking** — non-smokers, ex-smokers, current smokers limit 1 pack/day or >1pack day Captured using self-reported questionnaire	6 years	1. Incident CKD (<60 mL/min/1.73 m2 and/or the development of proteinuria)	Sex, age, BMI, BP, IGR, TC, HDL, TG, GFR
O´Seaghdha 2010	Framingham Offspring Cohort Healthy general population N=1916 56 years 52.4% male 89.5 mL/min/1.73	US	**Smoking** – current vs non-current Captured using self-reported questionnaire	9.5 years	1. Albuminuria (UACR ≥17 mg/g men or ≥ 25mg/g women)	Age, sex, systolic BP, diastolic BP, mean arterial pressure, pulse pressure, diabetes, glucose, LDL and HDL, TG, BMI, waist circumference, WHR, UAR, GFR
Obeymayr 2008	Vienna Health Screening Project Healthy general population N=17375 20-89 years 53.6 93.8 mL/min/1.73	Vienna	**Smoking** – current smokers, non-smokers, ex-smoker Captured using self-reported questionnaire	7.1 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, CKD, BMI, Sports=no, uric acid, HDL, BP, HTN, glucose
Ogunmoroti 2016	The Multi-Ethnic Study of Atherosclerosis (MESA) Healthy general population N=6506 62.0 ± 10.2 years 47.2% male Baseline GFR NP	US	**Physical activity** - ideal, intermediate and poor Captured using self-reported questionnaire	10.2 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, race/ethnicity, education, and income

Ohta 2013	Cohort name NP HTN N=133 60±9 years 39.8% male 71.7±14.6 mL/min/1.73	Japan	**Diet** - 24h home sodium urine collection	10.5 years	1. GFR decline (mean change at visit 2 minus GFR at visit 1)	Unadjusted
Okada 2019	Kansay Healthcare study Healthy general population N=9116 48.2 ± 4.2 100% male 85.0 ± 14.1 mL/min/1.73	Japan	**Alcohol consumption** - non-drinker, light drinker, moderate drinker, heavy drinkers Captured using self-reported questionnaire	10.4 years	1. Incident CKD (<60 mL/min/1.73 m2 and/or the development of proteinuria)	GFR, age, BMI, systolic BP, diastolic BP, fasting plasma glucose, smoking habits and regular leisure-time physical activity
Pan 2018	Taiwans National Health Insurance cohort Healthy general population N=11639 >20 years 77.59% male Baseline GFR NP	Taiwan	**Alcohol use disorder** ICD-09-CM codes 303;305 Captured using verified health records	6.47 y and 7.23 y control group	1. Incident CKD (eGFR <60ml/min or urinary albumin excretion of 30 mg/day for more than 3 months)	Age, sex, comorbidities and nonsteroidal anti-inflammatory drugs
Park 2019	Coronary Artery Risk Development in Young Adults (CARDIA) study Healthy general population N=4,133 25.0 ± 3.6 46.7% male 123.5 ± 15.5 mL/min/1.73	US	Diet - Omega-3 polyunsaturated fatty acids Captured using 30-day food recall	25 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, race, study center, BMI, education, current smoker, alcohol consumption, physical activity, and total energy, personal kidney problems, dietary intakes of magnesium, calcium, sodium, potassium, and phosphorous, creatinine and glucose, toenail measurements of mercury, and cadmium, toenail selenium. Fried fish intake was adjusted only in models when the exposure was non-fried fish intake

Pscheidt 2015	Vorarlberg Health Monitoring and Prevention Program (VHM&PP) cohort Healthy general population N=185341 38.9 years 46.1% male Baseline GFR NP	Austria	**Smoking** - ever smoke yes vs no Captured using self-reported questionnaire	17.5 years	1. End-stage kidney disease	Age, sex, BMI, glucose, hypertension, triglycerides, cholesterol, Gamma-GT
Qin 2015	Cohort name NP Healthy general population N=2518 50.2 ± 5.9 years 53.1% male 108.3 ± 13.4 mL/min/1.73	China	**Smoking** - current smoke ≥ 10 packs in the past year Captured using self-reported questionnaire	7.13 years	1. GFR decline (25% or greater drop in eGFR or a sustained decline in eGFR of more than 5 ml/min/1.73m2/year)	Sex, age, obesity, alcohol, total cholesterol, triglyceride, HDL, self-reported health status, education, physical activity
Ramezankhani 2017	Tehran Lipid and Glucose Study Healthy general population N=8238 39.3 ± 13.3 years 46.1% male 75.6±10.5 mL/min/1.73	Iran	**Physical activity** - Doing exercise or labor less than three times a week or performing activities achieving < 600 metabolic equivalent of task (MET)] VS physical inactive Captured using self-reported questionnaire	12.4 years	1. Incident CKD (<60 mL/min/1.73)	Adjustment details NP
Rebholz 2015	Atherosclerosis Risk in Communities (ARIC) Study General population (26% African American; 11.4% diabetes; 34.2% HTN) N=15,055 54.2 years 44.1% male 103.1 mL/min/1.73	US	**Diet** - protein, potassium, calcium, phosphorus, magnesium, vegetables Captured using self-reported FFQ	21 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, race-center, total caloric intake, diabetes status, HTN status, overweight/obese status, smoking status, education level, physical activity, and baseline eGFR (modelled as linear spline terms with a knot at 90 mL/min/1.73 m2)
Rebholz 2016	Atherosclerosis Risk in Communities (ARIC) Study General population (25%	US	**Diet** - components of healthy eating score (fruit &	23 years	1. Incident CKD (<60 mL/min/1.73)	Total caloric intake, age, sex, race, baseline eGFR (linear spline

	African American; 11.5% DM; 34% HTN) N=14,832 54.2 years 44.1% male 103.1 mL/min/1.73		vegetables, sodium, sugar-sweetened beverages, fiber, sodium, fish) Captured using self-reported FFQ **Physical activity –** Ideal levels of physical activity: ≥150 minutes/week of physical activity; Poor levels of physical activity: None Captured in an Interview with health professional **Smoking** – ideal (Never smoker or former smoker and quit>12 months ago); intermediate (Former smoker and quit≤12 months ago); poor (current smoker)			terms with a knot at 90 mL/min per 1.73 m2), BMI, physical activity, diabetes, and HTN
Rebholz 2016	Atherosclerosis Risk in Communities (ARIC) Study General population (36% African American, 11.6% diabetes, 32.5% HTN) N=14,882 54 years 45% male 103.5 mL/min/1.73	US	**Diet** - components of healthy eating score (fruit & vegetables, sodium, sugar-sweetened beverages, red & processed meat, nuts & legumes, wholegrains sodium) Captured using self-reported FFQ	22 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, race, center, education level, smoking status, physical activity, total caloric intake, and all other factors in the DASH diet score, eGFR (linear spline terms with one knot at 90 mL/min/1.73 m2); overweight/obese status, diabetes, HTN, systolic BP, use of angiotensin-converting enzyme inhibitors or angiotensin receptor blockers.

Rebholz 2016	Healthy Aging in Neighbourhoods of Diversity across the Life Span study General population (57% African American, 16% HTN, 16% DM. Diet quality score in Tertile 1 was 35.2 (7.4), Diet quality score in Tertile 3 was 52.8 (12.1) (p<0.001)) N=1,252 47 years 41% male 96.8 mL/min/1.73	US	**Diet** – Magnesium Captured using 2 24-hour dietary recalls	5 years	1. GFR decline (3% eGFR decline per year)	Age, sex, race, education level, health insurance status, poverty status, smoking status, total energy intake, baseline eGFR, HTN status, diabetes status, BMI, haemoglobin A1c, diet quality score (Healthy Eating Index-2010), and dietary intake of fiber, sodium, calcium, potassium, and phosphate
Rebholz 2017	Jackson Heart Study General population (13.4% diabetes, 29.6% obese, 34.9% HTN, 27% black, 44.5 average diet quality score across the cohort) N=15,368 54 years 45% male 98 ± 18mL/min/1.73	US	**Diet** - Beverages: Diet beverages & Sugar-sweetened beverage Captured using self-reported FFQ	23 years	1. End-stage kidney disease	Age, sex, race-center, education level, smoking status, physical activity, total caloric intake, baseline eGFR (linear spline terms with one knot at 90 ml/min per 1.73 m2), BMI, diabetes, systolic BP, serum uric acid, dietary acid load, diet quality (modified Alternative Healthy Eating Index 2010), dietary sodium, dietary fructose, frequency of consumption of sugar-sweetened beverages, dietary phosphorus
Rebholz 2019	Jackson Heart Study Healthy general population N=3,003 54 ± 12 years 36% male 98 ± 18 mL/min/1.73	US	**Diet** - Beverages: Alcohol, Fruit and vegetable juice, Diet beverages & Sugar-sweetened beverage Captured using self-reported FFQ	8 years	1. Incident CKD (<60 mL/min/1.73)	Total energy intake, age, sex, education, BMI, smoking status, physical activity index, HTN, diabetes, HDL cholesterol, LDL cholesterol, history of CVD, and baseline eGFR, healthy dietary pattern and a Southern dietary pattern

Reynolds 2008	CHEFS cohort Healthy general population N=65601 >40 years 100% male Baseline GFR NP	China	**Alcohol consumption** - non-drinkers, <21 drinks per week and ≥ 21 drinks per week Captured using self-reported questionnaire	8 years	1. End-stage kidney disease (renal replacement therapy or death from renal failure)	Age, geographic region, urbanization, education, BMI, physical activity, current cigarette smoking, systolic BP, history of diabetes and CVD
Ryoma 2017	Cohort name NP Healthy general population N=303 52.2 ± 6.7 years 100% male 77.0 ± 10.3 ml/min/1.73 m^2	Japan	**Physical activity** - Exercise habits no exercise habit + no hyperglycaemia vs exercise habit + no hyperglycaemia Captured using self-reported questionnaire	6 years	1. Incident CKD (composite of eGFR or proteinuria)	Age, BMI, eGFR, the use of anti-hypertensive drugs and anti-hyperlipidemic agents, and smoking and drinking habits at baseline
Ryoo 2013	Cohort name NP Healthy general population N=18788 41.8 ± 6.3 years 100% male 81.5 ± 9.4 mL/min/1.73	Korea	**Alcohol consumption** - alcohol amount consumed on a daily basis ≥ 20g/day Captured using self-reported methods **Physical activity –** active ≥ 1 time/week **Smoking –** Yes / No	4 years	1. Incident CKD (<60 mL/min/1.73)	Age, eGFR, SBP, HOMA-IR, triglyceride, BMI, exercise, diabetes
Shaeffner 2005	The Physicians' Health Study Healthy general population N=11023 52.9 years 100% male Baseline GFR NP	US	**Alcohol consumption** - 1 or fewer, 2 to4, 5 to 6 and 7 or more drinks per weeks Captured using self-reported questionnaire	14 years	1. Incident CKD (eGFR as 55ml/min or less)	Age, BMI, smoking, physical exercise, diabetes, history of myocardial infarction, self-reported history of HTN

Shankar 2006	Census of the population of Beaver Dam Healthy general population N= 3392 62.3 years Gender NP 98 mL/min/1.73	US	**Alcohol consumption** - current drinker consumed alcohol in the past but not in the previous yea; former drinker; heavy drinker Captured using self-reported questionnaire **Smoking** – Non-smoker (<100 cigarettes in lifetime); former (stopped smoking 1 year prior); current (current smoker at time of examination).	5 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, education, BMI, non-steroidal use, HTN, diabetes, history of CVD
Smyth 2016	U.S. National Institutes of Health–American Association of Retired Persons Diet and Health Study General population (9.2% DM; 43.5% HTN, 14% heart disease, 2.1% stroke) N=544,635 62.2 ± 5.4 years 59.1% male Baseline GFR NP	US	**Diet** - sodium and potassium Captured using self-reported FFQ	14.3 years	1. End-stage kidney disease (self-reported dialysis)	Age, gender, BMI, smoking, education, ethnicity, physical activity, diabetes, heart disease, and stroke
Stengel 2003	NHANES II Healthy general population N=9082 49.13 ± 13.3 years 47% male 88.1 ± 2.6 mL/min/1.73	US	**Alcohol consumption** – never; less than once per week; weekly; 1 to 6 times per week; daily; one or more per day	13.2 years	1. End-stage kidney disease (Treatment ESRD due to any cause or death related to CKD)	Physical activity, BMI, age, gender, race, diabetes, CVD, HTN, Systolic BP, TC, eGFR

			Captured using self-reported methods			
Sugiura 2018	Cohort name NP General population (24.8% HTN, 7% DM) N=12,126 52.1 ± 11.9 61.3% male 80.8 ± 12.9 mL/min/1.73	Japan	**Diet** - 24-h urinary sodium excretion	4.8 years	1. Incident CKD (<60 mL/min/1.73)	Age, sex, BMI, heart rate, serum creatinine, uric acid, TG, haemoglobin, salt intake, proteinuria, alcohol consumption, smoker status, HTN, diabetes, dyslipidaemia, systolic BP, diastolic BP, fasting plasma glucose, eGFR, LDL-C, HDL-C
Tohidi 2012	Tehran Lipid and Glucose Study (TLGS) Healthy general population N=5082 37.3 years 45.1% male 73.8 mL/min/1.73	Iran	**Smoking** - never, past former smokers	9.9 years	1. Incident CKD (<60 mL/min/1.73)	eGFR, Impaired fast glucose, diabetes, HTN, CVD, BMI, dyslipidaemia, TG, lipid medication, obesity
Uehara 2015	Kansay Healthcare study Healthy general population N=9154 48.2 ± 4.2 100% male 84.7 ± 14 mL/min/1.73	Japan	**Alcohol consumption** – non-drinkers; 0.1 to 23 g ethanol/day; 23.1-46g ethanol/day; 46.1 to 69g ethanol/day; ≥69.1 g ethanol/day Captured using self-reported questionnaire	73,159 person-years	1. Proteinuria (albuminuria; dipstick urinalysis score of >1+)	Age, BMI, smoking habits, regular leisure-time physical activity, HTN, fasting plasma glucose, eGFR
Van Noordenne 2016	Cohort name NP Healthy general population N=901 48 ± 14 Gender NP 101 ± 27 mL/min/1.73	Netherlands	**Diet** - 24-h urinary potassium excretion	12.7 years	1. GFR decline (60% eGFR decline) 2. End-stage kidney disease (initiation of RRT	Age, sex, race, kidney function, diabetes, smoking, CVD history, 24h creatinine excretion, HTN, number of antihypertensive drugs, use of RAAS inhibitors, 24h sodium excretion

Waden 2015	Nationwide multicentre Finnish Diabetic Nephropathy (FinnDiane) Study T1DM N=1,424 37.0±12.4 years 48.5% male Baseline GFR NP	Finland	**Physical activity** - Leisure-time physical activity (LTPA) low vs. moderate and high intensity LTPA Captured using a validated self-reported questionnaire	6.4 years	1. Albuminuria (microalbuminuria, ≥20 and < 200 μ g / minor ≥ 3 0 a n d < 300 mg / 24h; and macroalbuminuria, ≥200 μg/min or ≥300 mg/24 h) 2. End-stage kidney disease	Sex, duration of diabetes and current smoking, HbA1c, mean arterial pressure, TG, BMI
Wakasugi 2013	Specific Health Check-ups and Guidance System (SHC) Healthy general population N=4902 66.7 ± 8.4 years 41.1% male 79 ± 13 mL/min/1.73	Japan	**Alcohol consumption** – alcohol <20g vs >20g ethanol/day Captured using self-reported questionnaire	1 year	1. Proteinuria (albuminuria; dipstick urinalysis score of >1+)	Age, sex, BMI, smoke, exercise, eating pattern, HTN, diabetes, hypercholesterolemia
Wakasugi 2017	Specific Health Check-ups and Guidance System (SHC) Healthy general population N=99,404 40-74 years 36.9% male Baseline GFR NP	Japan	**Physical activity** - more than 30 minutes at a time; 2 times weekly; daily walking equivalent amount of physical activity more than one hour a day Captured using self-reported questionnaire	1 year	1. Proteinuria (albuminuria; dipstick urinalysis score of >1+)	Age, HTN, diabetes, hypercholesterolemia, smoking status, BMI, alcohol intake, and healthy eating habits
Weiner 2009	Atherosclerosis Risks in Communities (ARIC) and the Cardiovascular Health Study (CHS) cohorts Healthy general population N=13338 58.4 years 43.4% male 90.4 ± 19.5 mL/min/1.73	US	**Alcohol consumption** – current use or not alcohol Captured using self-reported questionnaire	8.5 years	1. Incident CKD (eGFR decrease of ≥15ml/min/1.73 in and serum creatinine increase ≥0.4mg/dl)	Serum uric acid, age, gender, race, History of CVD, diabetes and HTN, education, TC, GFR, albumin, haematocrit
Wen 2018	Handan Eye Study Healthy general population N=3,574 50 ± 11 years	China	**Diet** – Fruit Captured using diet-related self-	5.6 years	1. Albuminuria (ACR<30 mg/g)	Age, sex, smoking, alcohol intake, regular consumption of fresh vegetables, BMI, waist

	45.4% male 96.3 ± 14.3 mL/min/1.73		reported questionnaire			circumference, physical activity, educational level, diabetes, HTN, CVD, antihypertensive drugs use, SBP, TC, HDL-C, TG, eGFR, ACR
White 2009	AusDiab study Healthy general population N=6259 >25 years 44.9% male Baseline GFR NP	Australia	**Alcohol consumption** – <10 g/d, ≥10g to 30 g/d and ≥30 g/d ethanol/day Captured using self-reported questionnaire	5 years	1. GFR decline (eGFR ≥10% and final eGFR >60ml/min) 2. Albuminuria (ACR ≥2.5) in males and ≥3.5mg/mmol in females)	Age, sex, log ACR, BP medication, diabetes, HbA1C, smoking status, physical activity, WHR
Yamagata 2007	Cohort name NP Healthy general population N= 123764 60 years 33.1% male 80.9 mL/min/1.73	Japan	**Alcohol consumption** – Non-alcohol consumption, occasional, less than 20g/day and more than 20g/day Captured using self-reported questionnaire **Smoking** - non-smoker; previous smoker; current smoker	10 years	1. Incident CKD (<60ml/min or dipstick proteinuria >1 +)	Age, eGFR, proteinuria, haematuria, BP, impaired glucose tolerance, serum lipids, obesity
Yoon 2018	Korean Genome and Epidemiology Study General population (14.6% DM, 3% CVD, analysis split by hypertensive status) N=4,871 51 years 48.6% male 94 mL/min/1.73	Korea	**Diet** – Sodium Captured using self-reported FFQ	10.2 years	1. Incident CKD (<60ml/min)	Age, sex, GFR, protein intake, fat intake, education, income, diabetes, TG, exercise, and serum albumin
Yoon 2017	Korean Genome and Epidemiology Study	Korea	**Diet** - Dietary phosphorus density Captured using self-reported FFQ	9 years	1. Incident CKD (<60ml/min)	Age, sex, WHR, average protein intake, education, income, marital status, smoking

	General population (20.3% HTN, 3.4% CVD, analysis split by diabetes status) N=6719 53.5 years 48.9% male 93 mL/min/1.73					status, history of HTN, eGFR, fasting glucose, serum albumin, and HDL cholesterol
Yuzbashian 2016	Tehran Lipid and Glucose Study General population (16.2% HTN, 10.7% DM) N=2,382 45 ± 12.4 years 45.5% male 70.4 ± 10.8 mL/min/1.73	Iran	**Diet** - Sugar sweetened beverages Captured using self-reported FFQ	3.3 years	1. Incident CKD (<60ml/min)	Age, sex, energy intakes, smoking, physical activity, BMI, sodium, diabetes and HTN

Abbreviations: ACD: Alveolar capillary dysplasia, BMI: body mass index, CABG: Coronary artery bypass grafting, CKD: chronic kidney disease, CRP: c-reactive protein, CVD: cardiovascular disease, FFQ: food frequency questionnaire, GFR: glomerular filtration rate, HbA1c: glycated haemoglobin, HOMA-IR: Homeostatic Model Assessment of Insulin Resistance, HTN: hypertension, IGR: Impaired glucose regulation, MI: myocardial infarction, NP: not published, NTN: normotension, RAS: **Renal** artery stenosis, RRT: renal replacement therapy, SCr: serum creatinine, T2DM: type 2 diabetes, TC: total cholesterol, TG: triglycerides, UAE: urine albumin excretion, WHR: waist-hip-ratio

Supplemental Table 4. Lifestyle hazards and kidney disease outcomes from individual studies which could not be statistically pooled into meta-analysis

Incident CKD				
Alcohol consumption exposure		**3 cohorts; 7 associations**	***≤2 studies from different cohorts with eligible data to pool; no meta-analysis***	**N=1 (14%) harmful**
Buja 2011 (men)	Abstainers alcohol vs former men	1,430	RR 0.2 [95% CI: 0.05, 0.87]	
Buja 2011 (women)	Abstainers alcohol vs former women	112	RR 1.25 [95% CI: 0.76, 1.88]	
Hu 2018	≤1 Drink per week vs former	12,692	HR 1.11 [95% CI: 1.00, 1.23]	
Kanda 2015	Non-obese male: No alcohol consumed vs >140g/week	7,473	Adjusted OR 1.226 [95% CI unable to determine]	
Kanda 2015	Non-obese female: No alcohol consumed vs >140g/week		Adjusted OR 1.92 [95% CI unable to determine]	
Kanda 2015	Obese male: No alcohol consumed vs >140g/week		Adjusted OR 1.398 [95% CI unable to determine]	
Kanda 2015	Obese female: No alcohol consumed vs >140g/week		Adjusted OR 1.371 [95% CI unable to determine]	
Diet exposures				
	Advanced Glycation End Products	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Ejtahed 2016	Total Advanced Glycation End Products (>9,908 compared to <6,218KU/d)	1,692	OR 1.45 [95% CI: 0.90, 2.35]	
	Amino acid (L-arginine)	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Bahadoran 2017	Total L-Arginine (1.33 compared to 2.92)	1,780	RR 1.30 [95% CI: 0.79, 2.00]	
	Animal protein	**3 cohorts**	***≤2 studies from different cohorts; no meta-analysis***	**N=1 (34%) harmful**
Dunkler 2015 (composite outcome)	Animal protein (Median 0.26 compared to 0.71g/kg/day)	3,088	OR 0.847 [95% CI: 0.727, 0.978]	

Haring 2017	Animal protein (<3.36 compared to >69.6g/day)	11,952	OR 0.91 [95% CI: 0.78, 1.06]	
Rebholz 2015	Animal protein (Q1 compared to Q4)	15,055	HR 1.06 [95% CI: 0.91, 1.23]	
	Bread & Cereal	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Gopinath 2011	Bread & Cereal intake (328 compared to 82g)	2,600	OR 0.52 [95% CI: 0.25, 1.08]	
	B-group (1-6) Vitamins	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Farhadnejad 2018	Thiamine (B1) - (2.99 compared to 1.11mg)	1,692	OR 1.11 [95% CI: 0.57, 2.16]	
	Riboflavin (B2) - (3.29 compared to 1.04mg)		OR 1.70 [95% CI: 0.92, 3.14]	
	Niacin (B3) - (34.41 compared to 12.52mg)		OR 1.56 [95% CI: 0.80, 3.07]	
	Pyridoxine (B6) - (3.08 compared to 1.11mg)		OR 1.60 [95% CI: 0.83, 3.09]	
	Calcium	**3 cohorts**	***≤2 studies with eligible data to pool; no meta-analysis***	**N=1 (34%) protective**
Gopinath 2016	Calcium (>1226 compared to <543.1mg)	2,600	Association not reported – p>0.05	
Farhadnejad 2018	Calcium (1660.2 compared to 619.9mg)	1,692	OR 0.79 [95% CI: 0.39, 1.57]	
Rebholz 2015	Calcium (Q1 compared to Q4)	15,055	HR 0.80 [95% CI: 0.69, 0.92]	
	Cereal fiber	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Gopinath 2011	Cereal fiber (13.3 compared to 2.9g)	2,600	OR 0.50 [95% CI: 0.24, 1.03]	
Mirmiran 2018	Cereal fiber (33.5 compared to 13.6g/day)	1,780	OR 0.68 [95% CI: 0.47, 0.98]	
	Coffee	**1 cohort**	***≤2 studies; no meta-analysis***	**N=2 (100%) protective**
Gopinath 2016	Coffee (>cups compared to never)	1,185	OR 0.83 [95% CI: 0.72, 0.97]	
Hu 2018	Coffee (>3 cups/day compared to none)	14,209	HR 0.84 [95% CI: 0.75, 0.94]	
	Dairy	**3 cohorts; 4 associations**	***≤2 studies from different cohorts; no meta-analysis***	**N=2 (50%) protective**
Asghari 2017	Low-fat dairy (Q1 compared to Q5)	1,630	HR 0.64 [95% CI: 0.38, 1.08]	
Haring 2017	High fat dairy (0.13 compared to 1.61 servings/day)	11,952	HR 0.93 [95% CI: 0.81, 1.06]	

Haring 2017	Low fat dairy (0 compared to 2.04 servings/day)		HR 0.75 [95% CI: 0.65, 0.85]	
Rebholz 2016	Low-fat dairy (<0.1 compared to 1.4-10.8 servings/day)	14,882	HR 0.84 [95% CI: 0.75, 0.95]	
	Diet beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Rebholz 2019	Diet beverages (T1 compared to T3)	3,003	OR 0.80 [95% CI: 0.51, 1.25]	
	Fiber	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Mirmiran 2018	Total fiber (33.5 compared to 13.6g/day)	1,780	OR 0.47 [95% CI: 0.28, 0.76]	
	Folate	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Farhadnejad 2018	Vitamin B9 (folate) - (628.2 compared to 245.8ug)	1,692	OR 0.44 [95% CI: 0.24, 0.80]	
	Fruit & Vegetable (combined intake)	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Rebholz 2015	Fruit and vegetable intake (<4.5 cups compared to >4.5 cups/day)	14,832	HR 0.97 [95%CI: 0.89, 1.07]	
	Fruit juice	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Rebholz 2019	Fruit and vegetable juice (T1 compared to T3)	3,003	OR 1.19 [95% CI: 0.75, 1.90]	
Yuzbashian 2016	Fruit juice (never compared to >2/week)	2,382	OR 1.04 [95% CI: 0.55, 1.96]	
	Legumes	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=2 (50%) protective**
Haring 2017	Legumes (0.07 compared to 0.68 servings/day)	11,952	OR 0.83 [95% CI: 0.72, 0.95]	
Mirmiran 2018	Legume fiber (0.3 compared to 2.34g/day)	1,780	OR 0.75 [95% CI: 0.50, 1.11]	
	Magnesium	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=2 (100%) protective**
Farhadnejad 2018	Magnesium (581.3 compared to 224.9mg)	1,692	OR 0.41 [95% CI: 0.22, 0.76]	
Rebholz 2016	Magnesium (Q1 compared to Q4)	15,055	HR 0.72 [95% CI: 0.60, 0.85]	
	Nitrates	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**

Bahadoran 2016	Nitrate (<7.69 compared to >10.7mg/day)	2,799	OR 0.50 [95% CI: 0.24, 0.89]	
	Nitrites	**1 cohort; 2 associations**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Mirmiran 2016	Total nitrate containing vegetables (<203 compared to >332g/day)	1,546	OR 0.93 [95% CI: 0.43, 2.02]	
Bahadoran 2016	Nitrite (<355 compared to >511mg/day)	2,799	OR 0.76 [95% CI: 0.43, 1.24]	
	Nuts	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Haring 2017	Nuts (0.03 compared to 0.86 servings/day)	11,952	OR 0.81 [95% CI: 0.72, 0.92]	
	Nuts & legumes	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Asghari 2017	Nuts & legumes (Q1 compared to Q5)	1,630	HR 0.52 [95% CI: 0.30, 0.90]	
Rebholz 2016	Nuts & legumes (<0.4 compared to 1.4-10.6 servings/day)	14,882	HR 0.91 [95% CI: 0.81, 1.03]	
	Plant protein	**3 cohorts**	***≤2 studies from different cohorts; no meta-analysis***	**N=2 (67%) protective**
Dunkler 2015 (composite outcome)	Plant protein (Median 0.26 compared to 0.71g/kg/day)	3,088	OR 0.903 [95% CI: 0.769, 1.060]	
Haring 2017	Vegetable protein (<12.2 compared to >24.5g/day)	11,952	OR 0.76 [95% CI: 0.64, 0.91]	
Rebholz 2015	Vegetable protein (Q1 compared to Q4)	15,055	HR 0.72 [95% CI: 0.61, 0.85]	
	Red & processed meats	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) harmful**
Asghari 2017	Red and processed meat (Q1 compared to Q5)	1,630	HR 1.162 [95% CI: 0.689, 1.960]	
Haring 2017	Red and processed meat (0.3 compared to 1.93 servings/day)	11,952	OR 1.23 [95% CI: 1.06, 1.42]	
	Selenium	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Farhadnejad 2018	Selenium (175.1 compared to 60ug)	1,692	OR 1.13 [95% CI: 0.62, 2.04]	
	Sodium-potassium ratio	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Mirmiran 2018	Sodium to potassium ratio (>1.29 compared to <0.80)	1,780	OR 1.52 [95% CI: 1.01, 2.30]	

	Sugar	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Gopinath 2011	Sugar intake (169 compared to 86.2g)	2,600	OR 2.07 [95% CI: 0.93, 4.59]	
	Trans-saturated fat intake	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2015 (composite outcome)	Trans-fat (yes v no)	3,088	OR 1.004 [95% CI: 0.845, 1.193]	
	Unsaturated fatty acids	**1 cohort**	***≤2 studies; no meta-analysis***	**N=3 (100%) protective**
Park 2019	Omega 3 FA (every SD = 0.19 g/day increase)	4,133	HR 0.72 [95% CI: 0.58, 0.90]	
	DHA (every SD = 0.09 g/day increase)		HR 0.68 [95% CI: 0.56, 0.84]	
	EPA (every SD = 0.08 g/day increase)		HR 0.77 [95% CI: 0.61, 0.95]	
	Vitamin A	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Asgari 2017	Beta-carotene (1156±129 compared to 2185±141ug/1000kcal)	1,179	OR 0.91 [95% CI: 0.59, 1.42]	
Farhadnejad 2018	Vitamin A (859.9 compared to 197.4ug)	1,692	OR 1.15 [95% CI: 0.61, 2.16]	
	Vitamin B12	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Farhadnejad 2018	Vitamin B12 - (7.4 compared to 2.2ug)	1,692	OR 0.57 [95% CI: 0.34, 0.93]	
	Vitamin C	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=2 (100%) protective**
Asgari 2017	Vitamin C (57.8±31.9 compared to 94.3±46.8mg/1000kcal)	1,179	OR 0.60 [95% CI: 0.38, 0.93]	
Farhadnejad 2018	Vitamin C (268.2 compared to 52.2mg)	1,692	OR 0.38 [95% CI: 0.21, 0.69]	
	Vitamin D	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Farhadnejad 2018	Vitamin D (4.09 compared to 0.61ug)	1,692	OR 0.39 [95% CI: 0.21, 0.70]	
	Vitamin E	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Asgari 2017	Vitamin E (5.0±1.7 compared to 5.0±1.5mg/1000kcal)	1,179	OR 0.79 [95% CI: 0.48, 1.32]	
Farhadnejad 2018	Vitamin E (17.61 compared to 6.06mg)	1,692	OR 0.45 [95% CI: 0.22, 0.92]	
	Zinc	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**

Farhadnejad 2018	Zinc (17.4 compared to 6.5mg)	1,692	OR 1.29 [95% CI: 0.65, 2.58]	
Physical activity		**1 cohort; 4 associations**	***≤2 studies from different cohorts; no meta-analysis***	**N=2 of 4 associations (50%) harmful**
Kanda 2015	Non-obese male: <2 times/month vs >2 times/week	7,473	Adjusted OR 1.417 [95% CI unable to determine]	
Kanda 2015	Non-obese female: <2 times/month vs >2 times/week		Adjusted OR 1.494 [95% CI unable to determine]	
Kanda 2015	Obese male: <2 times/month vs >2 times/week		Adjusted OR 1.842 [95% CI unable to determine]	
Kanda 2015	Obese female: <2 times/month vs >2 times/week		Adjusted OR 1.576 [95% CI unable to determine]	
Smoking exposure		**2 cohorts; 3 associations**	***≤2 studies from different cohorts; no meta-analysis***	**N=1 (34%) protective**
Noborisaka 2012	Ex smoker vs continuous - male	6,998	OR 1.17 [95% CI: 0.51, 2.69]	
Noborisaka 2012	Ex smoker vs continuous - female		OR 0.61 [95% CI: 0.44, 0.84]	
Rebholz 2016	Former smoker and quit ≤ 12 months ago compared to current	14,832	OR 1.03 [95% CI: 0.76, 1.40]	
GFR decline				
Alcohol consumption		**2 cohorts; 6 associations**	***≤2 studies from different cohorts; no meta-analysis***	**N=3 of 6 associations (50%) harmful**
Kanda 2015	Non-obese male: ln(alcohol), natural logarithm values of an amount of alcohol consumed and decrease in GFR	7,473	Parameter estimate = 0.0925 (SEM 0.0377) p = 0.014	
Kanda 2015	Non-obese female: ln(alcohol), natural logarithm values of an amount of alcohol consumed and decrease in GFR		Parameter estimate = 0.0897 (SEM 0.0795) p = 0.260	

Kanda 2015	Obese male: ln(alcohol), natural logarithm values of an amount of alcohol consumed and decrease in GFR		Parameter estimate = 0.204 (SEM 0.061) p = 0.0009	
Kanda 2015	Obese female: ln(alcohol), natural logarithm values of an amount of alcohol consumed and decrease in GFR		Parameter estimate = 0.203 (SEM 0.250) p = 0.42	
Kronborg 2008	Males: >6 units of alcohol/week vs abstinence	4,441	*β 0.40 (95% CI: 0.05 to 0.76)*	
Kronborg 2008	Females: >6 units of alcohol/week vs abstinence		*β −0.13 (95% CI: −0.78 to 0.53)*	
Diet exposures				
	Animal protein	**3 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Animal protein (0.81 compared to 0.27/kg/day)	6,213	OR 1.093 [95% CI: 0.990, 1.244]	
Esmeijer 2018	Animal protein (Per 0.1 g/kg actual body weight)	2,255	*β annual change in eGFR: -0.12 [95% CI: -0.27, 0.11]*	
Lin 2010	Animal protein (61.2 compared to 41.9g/day)	3,348	OR 0.91 [95% CI: 0.65, 1.27]	
	Antioxidants	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=2 (29%) protective**
Hirahatake 2017	Total antioxidant (118.1 compared to 30.5)	2,152	OR 0.51 [95% CI: 0.32, 0.80]	
	Lycopene (44.1 compared to 34.5)		OR 0.84 [95% CI: 0.58, 1.24]	
	a-Tocopherol (1.48 compared to 1.09)		OR 0.76 [95% CI: 0.48, 1.20]	
	y-Tocopherol (0.22 compared to 0.28)		OR 0.96 [95% CI: 0.63, 1.47]	
	Ascorbic acid (10.3 compared to 6.77)		OR 0.74 [95% CI: 0.50, 1.09]	
	Carbohydrates	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Dunkler 2013	High CHO food (2 compared to 21.46 servings/day)	6,213	OR 1.246 [95% CI: 1.071, 1.449]	

	Cholesterol	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Cholesterol (316 compared to 184g/day)	3,348	OR 1.12 [95% CI: 0.81, 1.56]	
	Coffee	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Herber-Gast 2017	Coffee (<1 compared to >6cups/day)	6,113	*β annual change in eGFR: -0.01 [95% CI: -0.25, 0.09]*	
	Dairy	**2 cohorts; 3 associations**	***≤2 studies with associations; no meta-analysis***	**N=1 (34%) protective**
Herber-Gast 2017	Milk and milk products (610.2 compared to 159.4g)	6,113	*β annual change in eGFR: 0.06 [95% CI: -0.08, 0.19]*	
	Low-fat dairy (410.5 compared to 48.1g)		*β annual change in eGFR: 0.07 [95% CI: -0.05, 0.19]*	
Lin 2010	Low fat dairy protein (4.6 compared to 0.82g/day)	3,348	OR 0.71 [95% CI: 0.52, 0.97]	
	Diet beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Lin 2010	Artificial sweetened soda (>2/day compared to <1/month)	3,348	OR 2.02 [95% CI: 1.36, 3.01]	
	Folate	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Folate (398 compared to 244ug/day)	3,348	OR 1.22 [95% CI: 0.80, 1.88]	
	Fruit	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Fruit and fruit juice (4 compared to 17.32 serves)	6,213	OR 0.945 [95% CI: 0.862, 1.035]	
Herber-Gast 2017	Fruit (330.1 compared to 54g)	6,113	*β annual change in eGFR: 0.03 [95% CI: -0.06, 0.11]*	
	Magnesium	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Rebholz 2016	Magnesium (46.9-101.4 compared to 131.9-468.2mg/1,000 kcal)	1,252	OR 0.50 [95% CI: 0.26, 0.95]	

	Plant protein	**3 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Plant protein (0.3 compared to 0.14g/kg/day)	6,213	OR 1.136 [95% CI: 0.997, 1.295]	
Esmeijer 2018	Plant protein (Per 0.1 g/kg actual body weight)	2,255	*β annual change in eGFR: -0.14 [95% CI: -0.37, 0.08]*	
Lin 2010	Vegetable protein (24.9 compared to 17.5/day)	3,348	OR 0.93 [95% CI: 0.66, 1.30]	
	Protein	**5 cohorts; 8 associations**	***≤2 studies with associations; no meta-analysis***	**N=2 (19%) harmful**
Dunkler 2013	Animal protein (0.81 compared to 0.27/kg/day)	6,213	OR 1.093 [95% CI: 0.990, 1.244]	
Dunkler 2013	Plant protein (0.3 compared to 0.14g/kg/day)		OR 1.136 [95% CI: 0.997, 1.295]	
Esmeijer 2018	Total protein (Per 0.1 g/kg actual body weight)	2,255	*β annual change in eGFR: -0.12 [95% CI: -0.04, -0.19]*	
Halbesma 2009	Protein (0.26-0.99 compared to 1.38-3.27g/kg/day)	8,461	*Mean change: Q1: -0.45 vs Q4: -0.41*	
Hirahatake 2017	Total protein (82.4±10.5 compared to 88.8±9.6g/day)	3,798	Reported not significant *(p>0.1; data not reported)*	
Jhee 2019	Protein (1.7g/kg/day compared to 0.6g/kg/day)	9,226	OR 1.32 [95% CI: 1.02, 1.73]	
Lin 2010	Animal protein (61.2 compared to 41.9g/day)	3,348	OR 0.91 [95% CI: 0.65, 1.27]	
	Vegetable protein (24.9 compared to 17.5/day)		OR 0.93 [95% CI: 0.66, 1.30]	
	Low fat dairy protein (4.6 compared to 0.82g/day)		OR 0.71 [95% CI: 0.52, 0.97]	
Malhotra 2018 – non-diabetes	Protein (18.7 compared to 10.7% total energy from protein)	3,165	*Mean ±SD Q1: -15.9 ±2.8 vs Q4: -20 ±1.7*	
Malhotra 2018 – diabetes	Protein (18.7 compared to 10.7% total energy from protein)		*Mean ±SD Q1: -11.1 ±0.8 vs Q4: -11.3 ±1.0*	
	Saturated fat	**1 cohort**	***≤2 studies; no meta-analysis***	**N=2 (100%) harmful**

Lin 2010	Saturated fat (22.9 compared to 14.9g/day)	3,348	OR 1.62 [95% CI: 1.02, 2.59]	
	Animal fat (37.9 compared to 22.3g/day)		OR 1.49 [95% CI: 1.08, 2.07]	
	Sodium	**4 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=3 (75%) harmful**
Deriaz 2019	Sodium (each 1 SD increase in sodium intake)	4,141	*β annual change in eGFR: -0.07 [95% CI: -0.11, -0.04]*	
Dunkler 2013	Sodium (24 hour urine) (3.46 compared to 6.41g/day)	6,213	OR 1.029 [95% CI: 0.901, 1.177]	
Lin 2010	Sodium (2.4 compared to 1.7g/day)	3,348	OR 1.53 [95% CI: 1.11, 2.09]	
Ohta 2013	Sodium (<8 compared to >8g/day)	133	*Mean ±SD <8g/day: -0.41 ±1.10 vs >8g/day: -0.83 ±1.19* *- correlation to salt intake R= -0.19, p=0.03*	
	Sodium to Potassium ratio	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) harmful**
Deriaz 2019	Sodium to Potassium ratio (each 1 SD increase in sodium intake)	4,141	*β annual change in eGFR: -0.05 [95% CI: -0.02, -0.08]*	
Mirmiran 2018	Sodium to Potassium ratio	1,780	*β annual change in eGFR:* -0.81 (p=0.12)	
	Sugar-sweetened beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Sugar soda (>1/day compared to <1/day)	3,348	OR 1.56 [95% CI: 0.84, 2.91]	
	Tea	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Herber-Gast 2017	Tea (<1 compared to >6cups/day)	6,113	*β annual change in eGFR: -0.01 [95% CI: -0.11, 0.04]*	
	Unsaturated fats	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (0%)**
Lin 2010	Monounsaturated fat (25.1 compared to 16.9g/day)	3,348	OR 1.06 [95% CI: 0.64, 1.76]	
	Vegetable fat (Q4 compared to Q1)		OR 1.06 [95% CI: 0.78, 1.45]	

	Vitamin A	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) protective**
Lin 2010	Vitamin A (b-carotene) (5.3 compared to 2.2mg/day)	3,348	OR 0.60 [95% CI: 0.42, 0.85]	
	Vitamin E	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Vitamin E (292.9 compared to 4.9mg/day)	3,348	OR 0.68 [95% CI: 0.47, 1.00]	
	Vegetables	**4 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=1 (25%) protective**
Behadoran 2017	Allium vegetable 39g compared to 1g/week	3,052	*Mean (95% CI) change:* (-7.8 (95% CI: -6.8, -8.7) in T1 versus (-4.6 (95% CI: -4.1, -5.3) in T	
Dunkler 2013	Vegetables (5 compared to 21 serves)	6,213	OR 0.956 [95% CI: 0.827, 1.106]	
Herber-Gast 2017	Vegetable (168.7 compared to 72.7g)	6,113	*β annual change in eGFR: 0.01 [95% CI: -0.08, 0.11]*	
Lin 2010	Vegetable protein (24.9 compared to 17.5/day)	3,348	OR 0.93 [95% CI: 0.66, 1.30]	
	Whole grains	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Herber-Gast 2017	Whole grains (139 compared to 0.27g)	6,113	*β annual change in eGFR: 0.01 [95% CI: -0.08, 0.09]*	
Physical activity		**2 cohorts; 6 associations**	***≤2 studies; no meta-analysis***	**N=3 of 6 associations (50%) harmful**
Kanda 2015	Non-obese male: Exercise frequency (1 increase in the score)	7,473	Parameter estimate = -0.491 (SEM 0.104) p = 0.0001	
Kanda 2015	Non-obese female: Exercise frequency (1 increase in the score)		Parameter estimate = -0.847 (SEM 0.214) p = 0.0001	
Kanda 2015	Obese male: Exercise frequency (1 increase in the score)		Parameter estimate = -0.326 (SEM 0.170) p = 0.056	

Kanda 2015	Obese female: Exercise frequency (1 increase in the score)		Parameter estimate = -0.949 (SEM 0.519) p = 0.072	
Kronborg 2008	Males: active versus inactive	4,441	*β −0.01 (95% CI: −0.17 to 0.16)*	
Kronborg 2008	Females: active versus inactive		*β 0.30 (95% CI: 0.13 to 0.47)*	
Smoking exposures				
	Smokers Current or Former vs Never	**4 cohorts**	***≤2 studies with associations with can be statistically pooled; no meta-analysis***	**N=1 (25%) protective**
Barbato 2019	Smokers vs never smokers	637	*Smokers mean GFR change: -15 (*95% CI: *-16.5, -13.5) Non-smokers mean GFR change: -15.8 (*95% CI: *-17.1, -14.5)*	
Foster 2015	Current smoker yes vs no	1,803	OR 1.19 [95% CI: 0.78, 1.81]	
Miyatake 2010	Current smoker yes vs no	286	*Smokers mean GFR change: -1.9 ± 12.3 Non-smokers mean GFR change: -5.0 ± 12.1 P=0.03*	
Kronborg 2008	Males: Current smokers versus non-smokers	4,441	*β 0.16 (95% CI: −0.08 to 0.39)*	
Kronborg 2008	Females: Current smokers versus non-smokers		*β 0.29 (95% CI: 0.07 to 0.50)*	
Qin 2015	Current smoker yes vs no	5,244	OR 0.90 [95% CI: 0.61, 1.33]	
	Former smokers versus non-smokers	**1 cohort; 2 associations**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Kronborg 2008	Males: Former smokers versus non-smokers	4,441	*β 0.08 (95% CI: −0.14 to 0.30)*	
Kronborg 2008	Females: Former smokers versus non-smokers		*β 0.04 (95% CI: −0.18 to 0.25)*	
Incident albuminuria				
Diet exposures				

	Animal protein	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Animal protein (0.27 compared to 0.81g/kg/day)	6,213	OR 0.931 [95% CI: 0.807, 1.074]	
Lin 2010	Animal protein (61.2 compared to 41.9g/day)	3,348	OR 1.43 [95% CI: 0.88, 2.31]	
	Carbohydrates	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	High CHO food (2 compared to 21.46 servings/day)	6,213	OR 1.106 [95% CI: 0.934, 1.310]	
	Cholesterol	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Lin 2010	Cholesterol (316 compared to 184g/day)	3,348	OR 1.64 [95% CI: 1.06, 2.55]	
	Dairy	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Chang 2013	Low fat dairy servings/day	2,354	*Median (IQR): 0.8 (0.2-1.4) in people with microalbuminuria; Median (IQR): 0.7 (0.3-1.8) in people without microalbuminuria; P=0.02*	
Lin 2010	Low fat dairy protein (4.6 compared to 0.82g/day)	3,348	OR 0.91 [95% CI: 0.59, 1.39]	
	Diet beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2011	Artificial sweetened soda (>2/day compared to <1/month)	3,318	OR 0.92 [95% CI: 0.52, 1.65]	
	Energy intake	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Chang 2013	Energy intake (kcal/day)	2,354	*Median (IQR): 3210.1 (±1442.4) in people with microalbuminuria; Median (IQR): 2714.2 (±1171.7) in people without microalbuminuria; P=0.01*	
	Fish	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**

Lee 2015	Fish (>15 compared to 0g per day)	2,261	OR 1.21 [95% CI: 0.77, 1.92]	
	Fruit	**3 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=3 (75%) protective**
Chang 2013	Fruit servings/day	2,354	*Median (IQR): 0.9 (0.3-2.0) in people with microalbuminuria; Median (IQR): 1.2 (0.6-2.2) in people without microalbuminuria; P=0.05*	
Dunkler 2013	Fruit and fruit juice (4 compared to 17.32 serves)	6,213	OR 0.904 [95% CI: 0.818, 0.999]	
Herber-Gast 2016	Fruit (330.1 compared to 54g)	6,113	*β annual change in eGFR: 0.03 [95% CI: -0.06, 0.11]*	
Wen 2018 (ACR)	Fruit (never compared to >3/weekly)	3,574	OR 0.56 [95% CI: 0.38, 0.83]	
	Micronutrients	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Folate (398 compared to 244ug/day)	3,348	OR 0.78 [95% CI: 0.46, 1.34]	
	Potassium	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Potassium (24h urine) (1.7 compared to 2.71g/day)	6,213	OR 0.862 [95% CI: 0.732, 1.015]	
	Red and processed meat	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Chang 2013	Red and processed meat (servings/day)	2,354	*Median (IQR): 3.6 (2.4-5.6) in people with microalbuminuria; Median (IQR): 2.4 (1.4-4.0) in people without microalbuminuria; P=<0.001*	
	Saturated fats	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (50%) harmful**
Lin 2010	Saturated fat (22.9 compared to 14.9g/day)	3,348	OR 0.16 [95% CI: 0.86, 2.99]	
	Animal fat (37.9 compared to 22.3g/day)		OR 1.66 [95% CI: 1.08, 2.57]	

	Sugar-sweetened beverages	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) harmful**
Chang 2013	Sugar-sweetened beverages (servings/day)	2,354	*Median (IQR): 1.2 (0.3-2.3) in people with microalbuminuria; Median (IQR): 0.6 (0.1-1.6) in people without microalbuminuria; P=0.004*	
Lin 2011	Sugar soda (>1/day compared to <1/day)	3,318	OR 0.79 [95% CI: 0.23, 2.68]	
	Unsaturated fats	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Monounsaturated fat (25.1 compared to 16.9g/day)	3,348	OR 1.40 [95% CI: 0.71, 2.74]	
	Vegetable fat (Q4 compared to Q1)		OR 0.76 [95% CI: 0.49, 1.17]	
	Vegetables	**3 cohorts**	***≤2 studies with associations; no meta-analysis***	**N=0 (0%)**
Chang 2013	Vegetable servings/day	2,354	*Median (IQR): 3.3 (2.1-4.5) in people with microalbuminuria; Median (IQR): 2.9 (1.8-4.5) in people without microalbuminuria*	
Dunkler 2013	Vegetables (5 compared to 21 serves)	6,213	OR 0.974 [95% CI: 0.828, 1.147]	
Herber-Gast 2016	Vegetable (168.7 compared to 72.7g)	6,113	*β annual change in eGFR: 0.01 [95% CI: -0.08, 0.11]*	
Lin 2010	Vegetable protein (24.9 compared to 17.5/day)	3,348	OR 0.65 [95% CI: 0.42, 1.02]	
	Vegetable protein	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Dunkler 2013	Plant protein (0.14 compared to 0.3g/kg/day)	6,213	OR 1.031 [95% CI: 0.894, 1.188]	
Lin 2010	Vegetable protein (24.9 compared to 17.5/day)	3,348	OR 0.65 [95% CI: 0.42, 1.02]	
	Vitamin A	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**

Lin 2010	Vitamin A (b-carotene) (5.3 compared to 2.2mg/day)	3,348	OR 1.07 [95% CI: 0.66, 1.72]	
	Vitamin E	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lin 2010	Vitamin E (292.9 compared to 4.9mg/day)	3,348	OR 1.57 [95% CI: 0.97, 2.57]	
	Whole grains	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Chang 2013	Whole grains servings/day	2,354	*Median (IQR): 1.4 (0.6-2.3) in people with microalbuminuria; Median (IQR): 1.5 (0.7-2.7) in people without microalbuminuria*	
Herber-Gast 2017	Whole grains (139 compared to 0.27g)	6,113	*β annual change in eGFR: 0.01 [95% CI: -0.08, 0.09]*	
Smoking exposures				
	Smoker former v current	**2 cohorts; 3 associations**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Jee 2005	Non-smoker vs ex-smoker women	104,523	RR 0.97 [95% CI: 0.46, 2.03]	
Jee 2005	Non-smoker vs ex-smoker men		RR 0.97 [95% CI: 0.88, 1.06]	
Noborisaka 2012	Ex-smoker vs non-smokers	6,998	OR 1.29 [95% CI: 0.48, 3.42]	
End-stage kidney disease				
Alcohol consumption exposure				
	Alcohol - high vs low intake	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Stengel 2003	Alcohol never vs daily	65,601	RR 0.90 [95% CI: 0.40, 2.20]	
Reynolds 2008	Non-drinkers vs ≥ 21 drinks per wk	9,082	RR 0.51 [95% CI: 0.29, 0.87]	
Diet exposures				
	Caffeine	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Caffeine (>300mg/day compared to none-<100mg/day)	63,257	HR 0.93 [95% CI: 0.73, 1.18]	
	Coffee	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (50%) protective**
Hu	Coffee (>3 cups/day compared to none)	14,209	HR 0.83 [95% CI: 0.54, 1.29]	

Lew 2018	Coffee (>2 cups/day compared to none-<1cup/day)	63,257	HR 0.82 [95% CI: 0.71, 0.96]	
	Dairy	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Dairy (Q1 lowest compared to Q4 highest)	63,257	HR 1.11 [95% CI: 0.92, 1.35]	
	Diet beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Rebholtz 2017	Diet soda consumption (<1 compared to >7 per week)		HR 1.64 [95% CI: 1.18, 2.28]	
	Eggs	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Eggs (Q1 lowest compared to Q4 highest)	63,257	HR 1.00 [95% CI: 0.83, 1.30]	
	Fish & Shellfish	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Fish & Shellfish (Q1 lowest compared to Q4 highest)	63,257	HR 1.07 [95% CI: 0.89, 1.30]	
	Potassium	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=2 (100%) protective**
Smyth 2016	Potassium (<2.3 compared to >4.3g/day)	544,635	HR 1.27 [95% CI: 1.02, 1.57]	
Van Noordenne 2016	Potassium (>80 compared to <60mmol/day)	901	HR 0.06 [95% CI: 0.007, 0.47]	
	Protein	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Lew 2018	Total protein (53.1g/day compared to >57.6g/day)	63,257	HR 1.24 [95% CI: 1.05, 1.46]	
	Red meat	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Lew 2018	Red meat (48.8/day compared to 12.5g/day)	63,257	HR 1.40 [95% CI: 1.15, 1.71]	
	Sodium	**1 cohort**	***≤2 studies; no meta-analysis***	**N=1 (100%) harmful**
Smyth 2016	Sodium (<1.7 compared to >3.6g/day)	544,635	HR 1.29 [95% CI: 1.02, 1.62]	
	Soy & Legumes	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Soy & legumes (Q1 lowest compared to Q4 highest)	63,257	HR 0.83 [95% CI: 0.39, 1.01]	

	Sugar-sweetened beverages	**2 cohorts**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2017	Soda (>1 cup/day compared to none-<monthly)	63,257	HR 1.08 [95% CI: 0.75, 1.55]	
	Tea	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Lew 2018	Black tea (>2 cups/day compared to less than weekly)	63,257	HR 0.88 [95% CI: 0.62, 1.26]	
	Green tea (>2 cups/day compared to less than weekly)		HR 0.69 [95% CI: 0.28, 1.71]	
Physical activity exposure		**3 cohorts**	***≤2 studies reporting solely ESKD; no meta-analysis***	**N=2 (67%) protective**
Jafar 2015	Never VS strenuous aerobic activity	59,552	HR 0.58 [95% CI: 0.37, 0.90]	
Stengel 2003	Low physical activity VS. high physical activity	9,082	RR 0.45 [95% CI: 0.24, 0.83]	
Waden 2015	Low VS. moderate and high intensity LTPA	1,424	HR 0.71 [95% CI: 0.34, 1.49]	
Incident hyperuricemia				
Diet exposures				
	Sugar-sweetened beverages	**1 cohort**	***≤2 studies; no meta-analysis***	**N=0 (0%)**
Bomback 2010	Sugar sweetened beverages (Comparing >1 soda to >1 soda)	15,745	OR 1.17 [95% CI: 0.95, 1.43]	

Supplement Table 5. Summary of the studies between alcohol intake and incident CKD

Author	Alcohol intake, g/day	Assigned Dose, g/day	No. cases	No. Total	Adjusted HR (95% CI)	SE	Type of study
Foster	0.0	0.0	64	536	1	.	Cohort
	1.86-19.5	10.68	81	945	0.84(0.78,0.91)	.20	
	19.5	19.5	26	321	0.80(0.74,0.87)	.27	
Hu	0.0	0.0	1007	3118	1	.	Cohort
	1.86g	0.93	810	2960	0.98(0.97,0.99)	.05	
	3.72-13g	8.36	683	2592	0.86(0.81,0.92)	.06	
	14.86-26g	20.43	247	1029	0.80(0.73,0.87)	.07	
	27.86g	34.35	193	754	0.77(0.70,0.85)	.09	
Koning	0.0	0.0	100	1285	1	.	Cohort
	1.43g	0.72	50	860	0.99(0.98,0.99)	.18	
	1.43-10g	5.72	96	1949	0.90(0.86,0.94)	.15	
	10-30g	20.0	45	1121	0.80(0.73,0.87)	.19	
	30g	45.0	9	261	0.76(0.66,0.86)	.36	
Okada	0.0	0.0	224	1377	1	.	Cohort
	0.1-23g	11.55	571	3847	0.83(0.77,0.90)	.08	
	23.1-46g	34.55	317	2871	0.77(0.70,0.85)	.09	
	46.1g	57.55	118	1021	0.73(0.62,0.87)	.12	

Supplemental Table 6: Subgroup analysis for Incident CKD

Variable (No of studies)	Odds Ratio (95% CI)
Vegetables	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	NA
>10 years	NA
Country of origin:	
USA	NA
Other	NA
Association estimate:	
Odds Ratio	NA
Hazard Ratio	NA
Baseline GFR:	
GFR ≤89.9 mL/min/1.73	0.76 (0.60, 0.97)
GFR ≥90 mL/min/1.73	0.77 (0.70, 0.85)
Potassium intake	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	0.77 (0.62-0.95)
>10 years	0.72 (0.42-1.25)
Country of origin:	
USA	0.88 (0.78-0.99)
Other	0.58 (0.36-0.93)
Association estimate:	
Odds Ratio	0.81 (0.63-1.03)
Hazard Ratio	0.73 (0.51-1.05)
Baseline GFR:	
GFR ≤89.9 mL/min/1.73	0.68 (0.49, 0.95)
GFR ≥90 mL/min/1.73	0.89 (0.76, 1.04)
Sodium intake	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	1.32 (1.02-1.70)
>10 years	1.14 (0.98-1.31)
Country of origin:	
USA	1.10 (0.98-1.24)
Other	1.28 (1.04-1.58)
Association estimate:	
Odds Ratio	NA
Hazard Ratio	NA
Baseline GFR:	

GFR ≤89.9 mL/min/1.73	1.34 (1.08-1.67)
GFR ≥90 mL/min/1.73	1.08 (0.94-1.25)
Physical activity	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	0.66 (0.45-0.97)
>10 years	0.78 (0.78-1.10)
Country of origin:	
USA	0.89 (0.74-1.09)
Other	0.67 (0.44-1.01)
Association estimate:	
Odds Ratio	NA
Hazard Ratio	NA
Baseline GFR:	
GFR ≤89.9 mL/min/1.73	1.02 (0.89, 1.16)
GFR ≥90 mL/min/1.73	0.77 (0.56, 1.06)
Alcohol consumption	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	0.88 (0.77-1.01)
>10 years	0.83 (0.72-0.95)
Country of origin:	
USA	0.78 (0.69-0.88)
Other	0.90 (0.81-1.01)
Association estimate:	
Odds Ratio	0.88 (0.73-1.06)
Hazard Ratio	0.86 (0.78-0.93)
Baseline GFR:	
GFR ≤89.9 mL/min/1.73	0.87 (0.78, 0.98)
GFR ≥90 mL/min/1.73	0.94 (0.55, 1.61)
Tobacco smoking	
Population:	
Healthy	NA
Type 2 diabetes	NA
Duration:	
<10 years	1.27 (1.09-1.49)
>10 years	1.13 (1.04-1.23)
Country of origin:	
USA	1.49 (1.38-1.61)
Other	1.12 (1.06-1.19)
Association estimate:	
Odds Ratio	1.22 (0.93-1.59)
Hazard Ratio	1.20 (1.11,1.29)
Baseline GFR:	
GFR ≤89.9 mL/min/1.73	1.11 (1.04, 1.18)
GFR ≥90 mL/min/1.73	1.41 (1.21, 1.63)

Supplemental Table 7. Results from sensitivity analysis substituting data from secondary publications of the same cohort dataset. The shaded rows represent the study citation included in the primary analysis.

Study ID	Cohort	Result to incident CKD
Smoking		
Rebholz 2016	ARIC n=14,832	RR 1.18 [1.10, 1.27]
Weiner 2009	ARIC n=13,338	RR 1.16 (1.09, 1.23)
Alcohol		
Weiner 2009	ARIC n=13,338	RR 0.85 [0.77, 0.93]
Hu 2019	ARIC n=12,692	RR 0.87 [0.79, 0.95]
Physical activity		
NA		
Diet factors		
Vegetables		
Asghari 2017	TLGS n=1,630	OR 0.79 [0.70, 0.90]
Bahadoran 2017	TLGS n=3,052	OR 0.80 [0.70, 0.92]
Mirmiran 2016	TLGS n=1,546	OR 0.78 [0.67, 0.90]
Rebholz 2015	ARIC n=15,055	OR 0.80 [0.70, 0.92]
Haring 2017	ARIC n=11,952	OR 0.81 [0.72, 0.91]
Rebholz 2016	ARIC n=14,832	OR 0.85 [0.75, 0.95]
Potassium		
NA		
Sodium		
Farhadnejad 2016	TLGS n=1,692	OR 1.21 [1.06, 1.38]
Asghari 2017	TLGS n=1,630	OR 1.22 [1.06, 1.40]
Mirmiran 2016	TLGS n=1,546	OR 1.21 [1.06, 1.38]
Rebholz 2015	ARIC n=15,055	OR 1.21 [1.06, 1.38]
Rebholz 2016	ARIC n=14,832	OR 1.18 [1.01, 1.39]
Fruit		
Mirmiran 2016	TLGS n=1,630	OR 0.91 [0.79 1.06]
Asghari 2017	TLGS n=1,630	OR 0.85 [0.68, 1.06]
Fish		
Rebholz 2015	ARIC n=15,055	OR 0.94 [0.86, 1.02]
Haring 2017	ARIC n=11,952	OR 0.88 [0.79, 0.97]*
Phosphate		
NA		
Sugar-sweetened beverages		
Bomback 2010	ARIC n=15,745	OR 1.45 [0.97, 2.15]
Rebholz 2016	ARIC n=14,832	OR 1.47 [1.00, 2.17]
Carbohydrates		
NA		
Protein		
Rebholz 2015	ARIC n=15,055	OR 1.08 [0.91, 1.28]
Haring 2017	ARIC n=11,952	OR 1.04 [0.83, 1.29]

* change to the primary finding.

Supplemental Table 8: GRADE table summarizing the quality of the evidence for each outcome in the meta-analysis

Certainty assessment						Effect	Certainty
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Relative (95% CI) I^2	
Incident CKD							
Fish intake and incident CKD							
3	observational studies	not serious	serious [a]	not serious	not serious	**OR 0.94** (0.86 to 1.02)	⊕⊕◯◯ LOW
Fruit intake and incident CKD							
4	observational studies	serious [b]	serious [c]	not serious	not serious	**OR 0.91** (0.79 to 1.06)	⊕◯◯◯ VERY LOW
Vegetable intake and incident CKD							
5	observational studies	not serious	not serious	serious [d]	not serious	**OR 0.79** (0.70 to 0.90)	⊕⊕◯◯ LOW
Sugar-sweetened beverage consumption and incident CKD							
4	observational studies	not serious	serious [c]	not serious	serious [e]	**OR 1.45** (0.97 to 2.15)	⊕◯◯◯ VERY LOW
Carbohydrate intake and incident CKD							
3	observational studies	serious [b]	serious [c]	not serious	serious [e]	**OR 1.08** (0.85 to 1.36)	⊕◯◯◯ VERY LOW
Protein intake and incident CKD							
3	observational studies	serious [b]	serious [c]	not serious	not serious	**OR 1.08** (0.91 to 1.28)	⊕◯◯◯ VERY LOW
Phosphate intake and incident CKD							
3	observational studies	not serious	serious [c]	not serious	serious [e]	**RR 1.00** (0.75 to 1.32)	⊕◯◯◯ VERY LOW
Potassium intake and incident CKD							
7	observational studies	serious [b]	not serious	not serious	not serious	**OR 0.78** (0.65 to 0.94)	⊕⊕◯◯ LOW
Sodium intake and incident CKD							
6	observational studies	not serious	not serious	not serious	not serious	**RR 1.21** (1.06 to 1.38)	⊕⊕⊕◯ MODERATE
Physical activity levels and incident CKD							
9	observational studies	serious [b]	serious [f]	not serious	not serious	**RR 0.82** (0.69 to 0.98)	⊕◯◯◯ VERY LOW
Alcohol and incident CKD - higher vs lower intake							
13	observational studies	serious [b]	not serious	not serious	not serious	**RR 0.85** (0.77 to 0.93)	⊕⊕◯◯ LOW

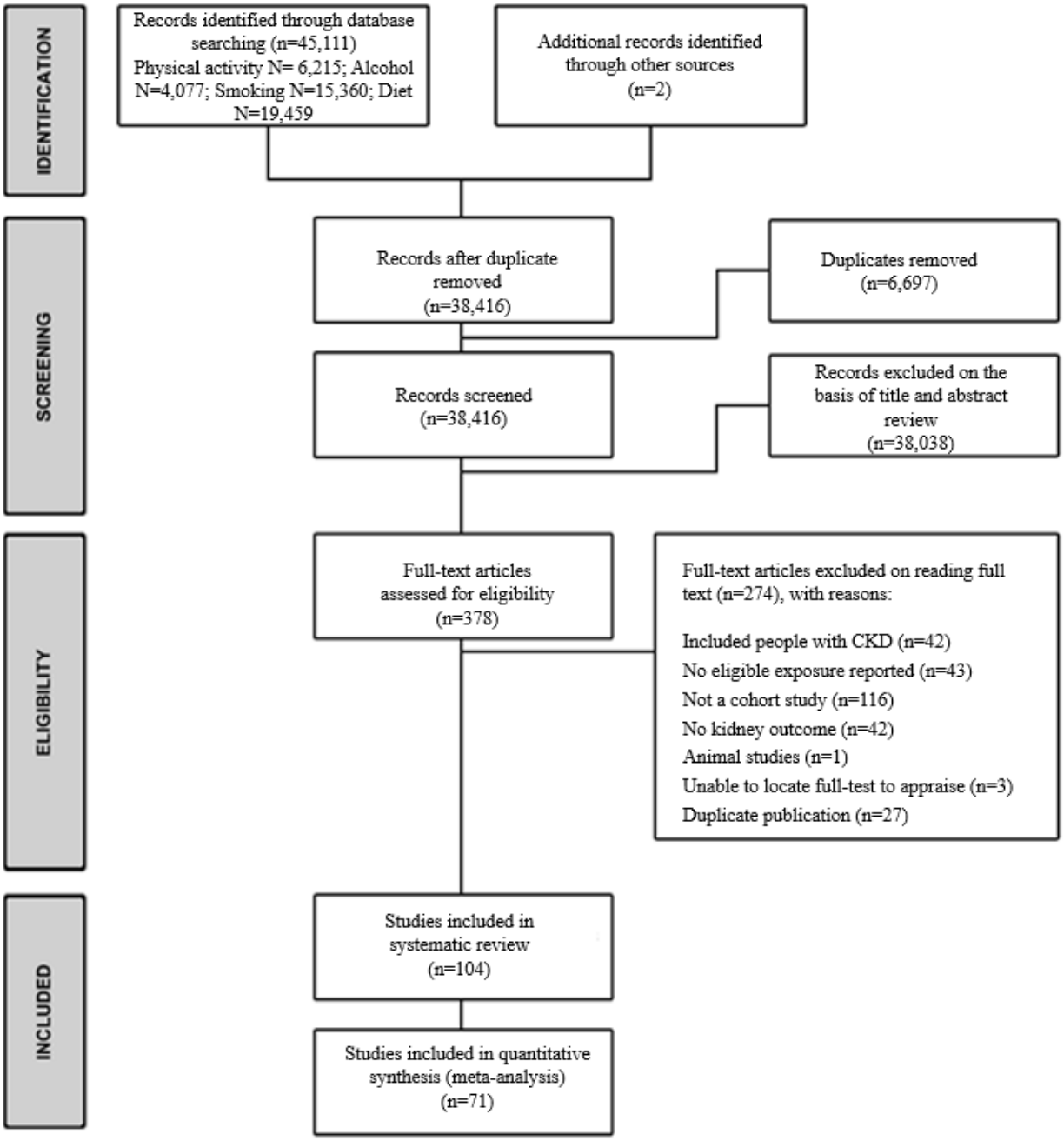
Alcohol consumption and incident CKD - Low vs Moderate consumption							
7	observational studies	not serious	not serious	not serious	not serious	**RR 0.86** (0.79 to 0.93)	⊕⊕⊕◯ MODERATE
Smoking and incident CKD – Current or Former vs Never							
12	observational studies	serious [g]	serious [h]	not serious	not serious	**OR 1.18** (1.10 to 1.29)	⊕◯◯◯ VERY LOW
Smoking and incident CKD - Never vs Former							
6	observational studies	serious [g]	serious [h]	not serious	not serious	**OR 1.09** (1.01 to 1.17)	⊕◯◯◯ VERY LOW
GFR decline							
Potassium intake and GFR decline							
4	observational studies	very serious [i]	serious [h]	serious [j]	not serious	**RR 0.49** (0.31 to 0.79)	⊕◯◯◯ VERY LOW
Protein intake and GFR decline							
4	observational studies	not serious	serious [c]	not serious	not serious	**OR 1.07** (0.96 to 1.19)	⊕⊕◯◯ LOW
Physical activity levels and GFR decline							
5	observational studies	serious [b]	not serious	serious [k]	not serious	**OR 0.77** (0.63 to 0.93)	⊕◯◯◯ VERY LOW
Alcohol consumption and GFR decline- higher vs lower intake							
5	observational studies	not serious	serious [a]	serious [k]	not serious	**OR 0.88** (0.72 to 1.07)	⊕◯◯◯ VERY LOW
Albuminuria							
Sodium intake and incident albuminuria							
3	observational studies	serious [b]	serious [a]	not serious	not serious	**OR 1.01** (0.89 to 1.14)	⊕◯◯◯ VERY LOW
Physical activity levels and incident albuminuria							
4	observational studies	serious [b]	not serious	not serious	not serious	**OR 0.88** (0.81 to 0.96)	⊕⊕◯◯ LOW
Alcohol consumption and incident albuminuria - Higher vs Lower intake							
7	observational studies	serious [l]	not serious	not serious	not serious	**RR 1.03** (0.88 to 1.20)	⊕⊕◯◯ LOW
Smoking and incident albuminuria - Current or Former vs Never							
7	observational studies	serious [l]	serious [h]	not serious	not serious	**OR 1.67** (1.23 to 2.26)	⊕◯◯◯ VERY LOW
End-stage kidney disease							
Smoking and end-stage kidney disease - Current or Former vs Never							
8	observational studies	not serious	not serious	not serious	not serious	**RR 1.59** (1.30 to 1.94)	⊕⊕⊕◯ MODERATE
Smoking and end-stage kidney disease - Former vs current							

7	observational studies	not serious	not serious	not serious	not serious	**RR 1.25** (1.13 to 1.39)	⊕⊕⊕◯ MODERATE

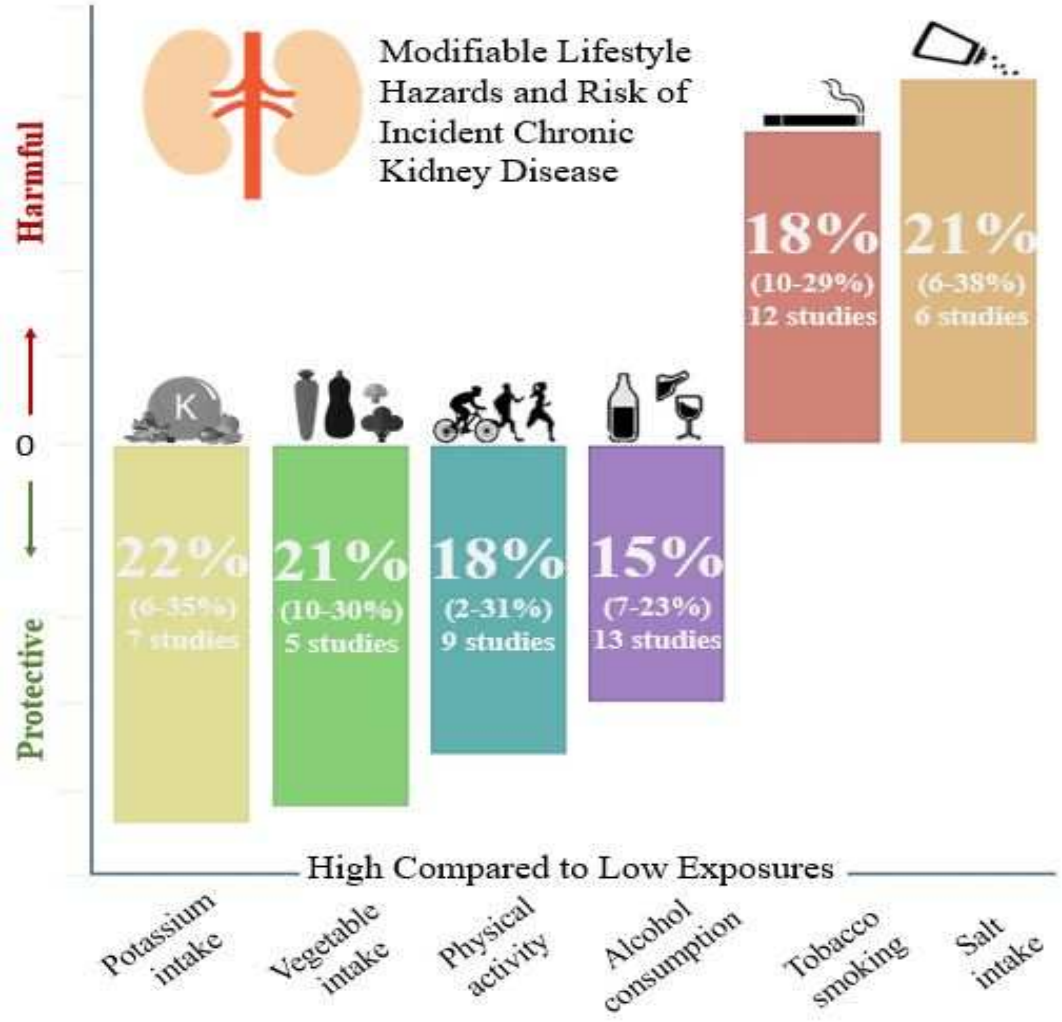
Abbreviations: CI: Confidence interval; **OR:** Odds ratio; **RR:** Risk ratio

Explanations

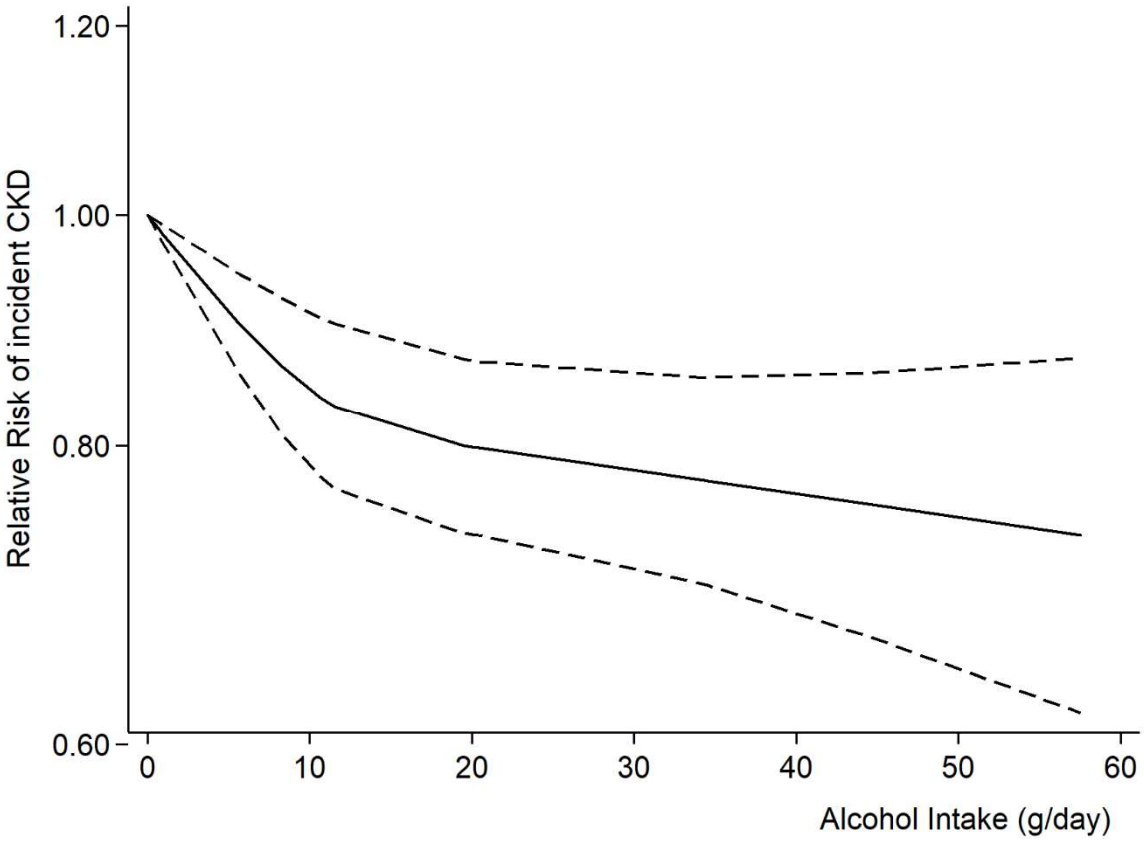
a. Confidence intervals overlap
b. Sample population not all general population and not all appropriate confounders adjusted for in primary analyses
c. Moderate heterogeneity and confidence intervals overlap
d. Outcome assessed in non-standardized manner across the included studies
e. Very wide confidence intervals
f. Moderate heterogeneity
g. Unclear risk of bias across the studies for statistical analysis
h. High heterogeneity
i. High risk of bias for sample population, prognostic indicator and outcomes
j. Less than 50% of studies conducted in disease free populations
k. 2/5 studies conducted in diseased populations
l. High risk of bias across multiple domains



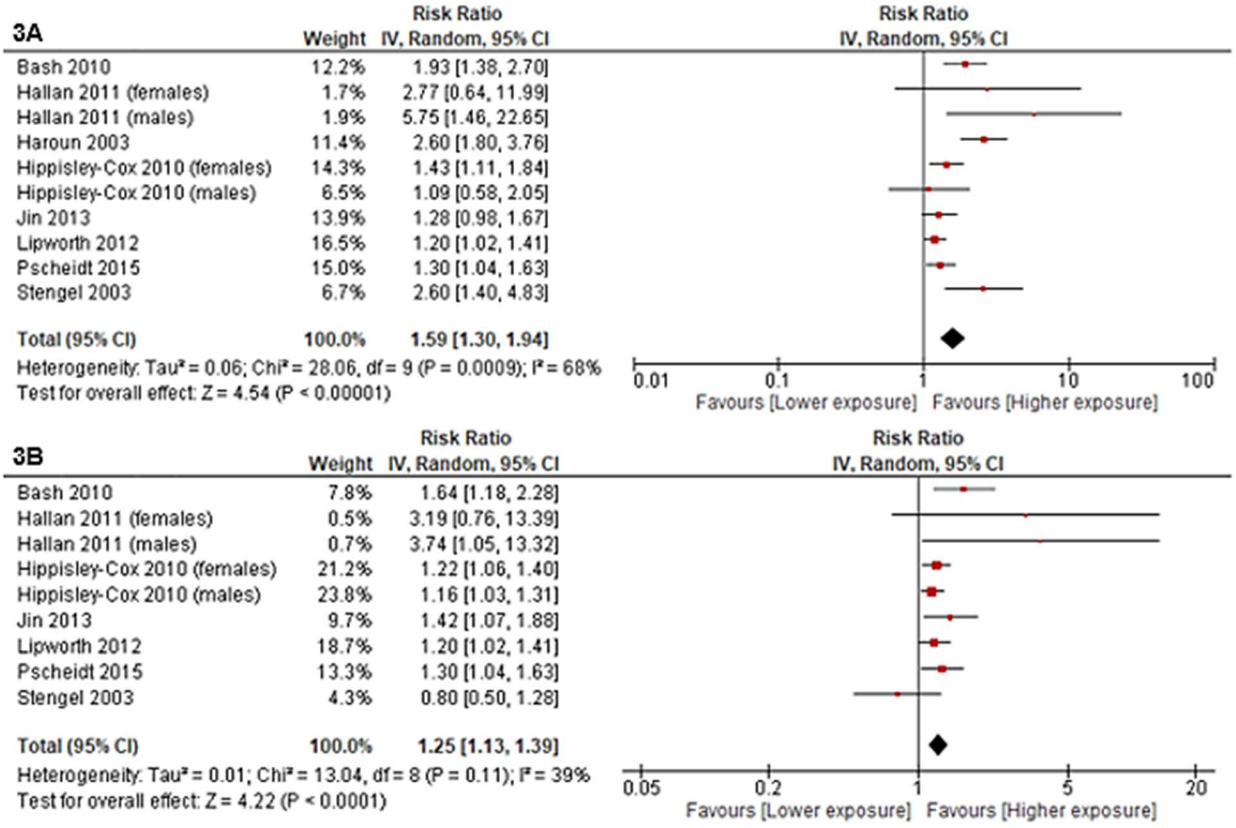
Supplemental Figure 1. Study flow diagram showing the selection of studies



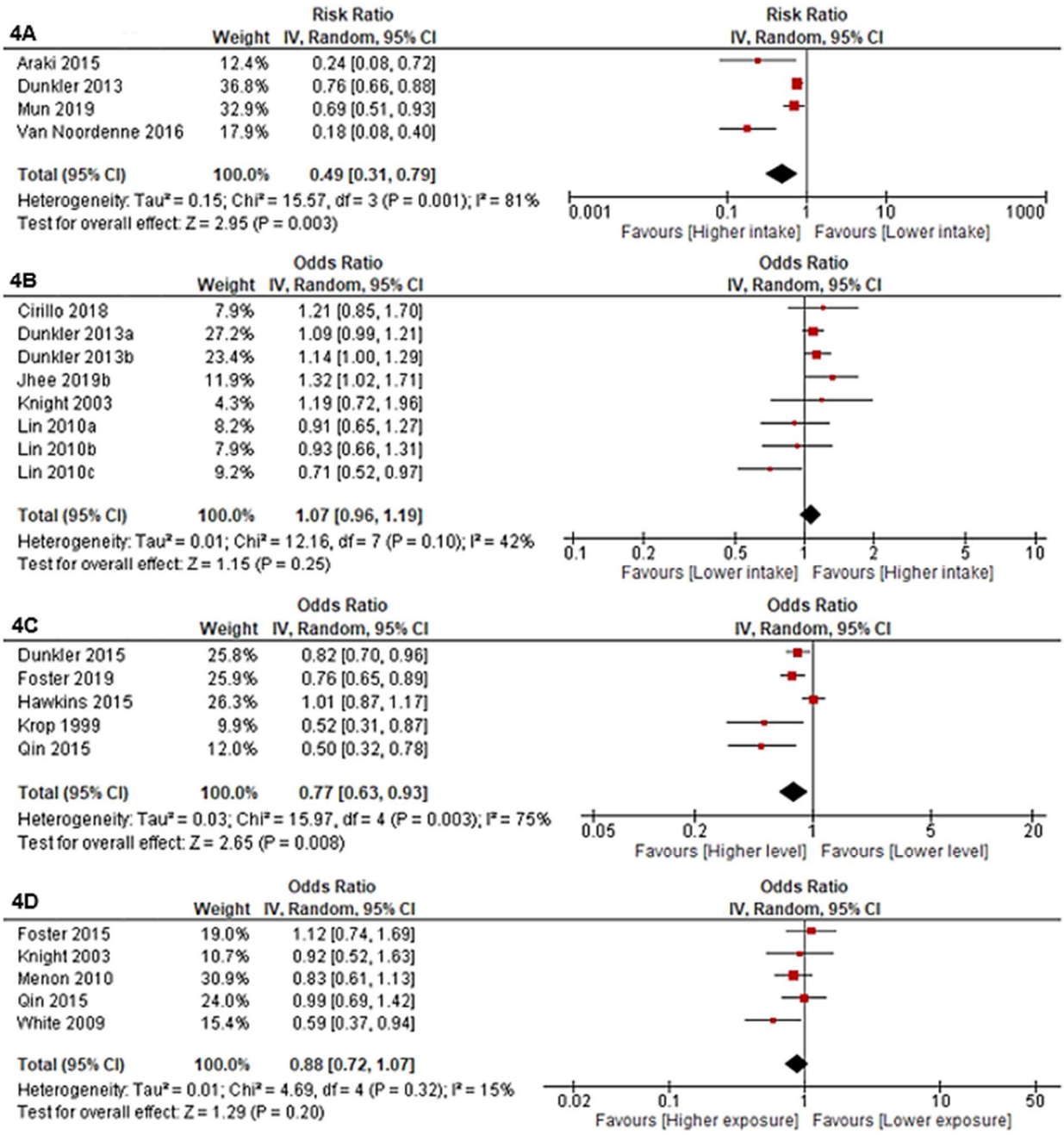
Supplemental Figure 2. Summary of the associations between modifiable lifestyle risk and protective factors and risk of incident CKD, based on observational evidence. The association estimate and 95% CI for each lifestyle factor are expressed as a percentage.



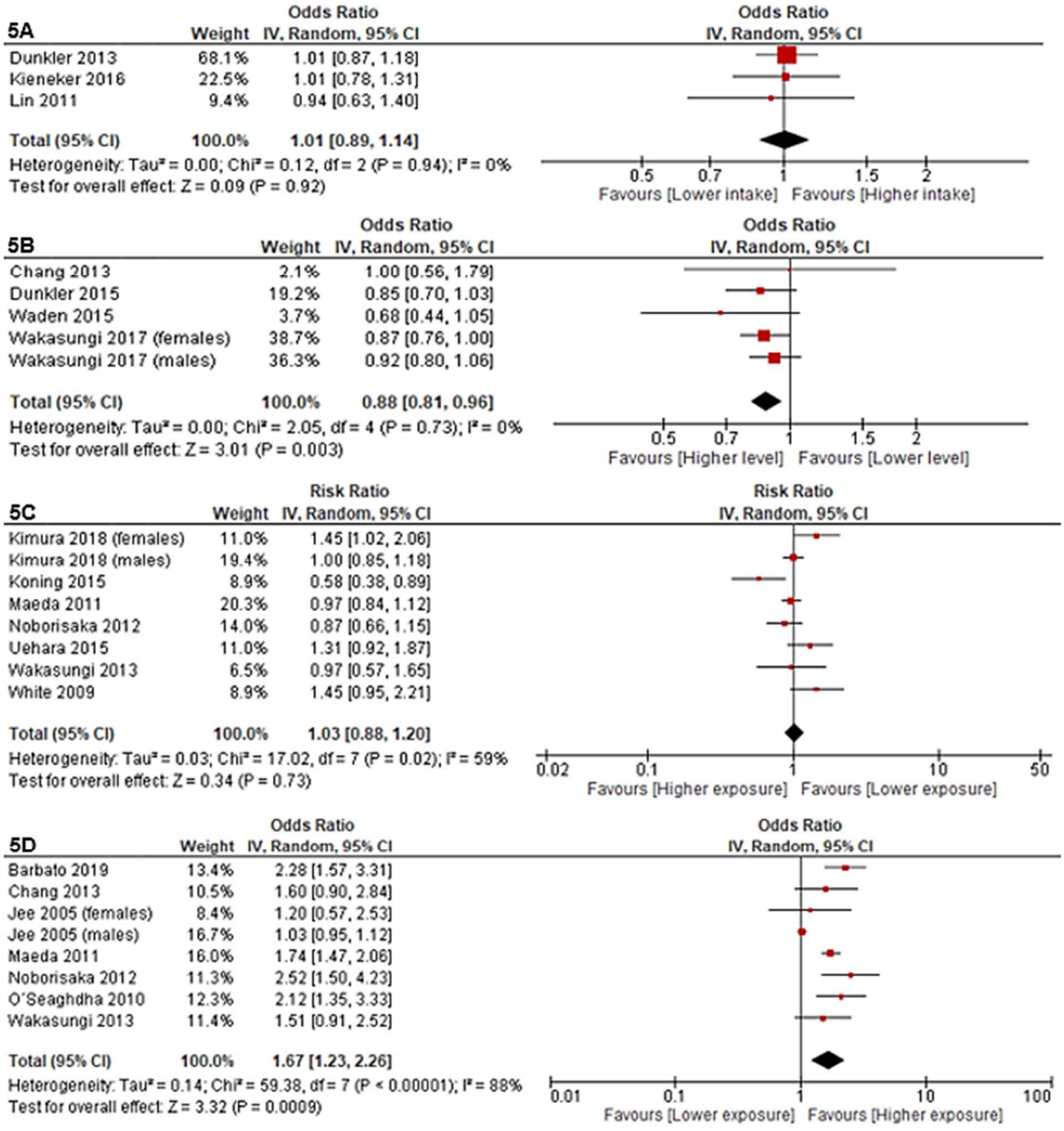
Supplement Figure 3. Dose–response relationship between alcohol intake (gram per day) and incident CKD estimated with a random-effect meta-regression-restricted cubic spline model. The dash line represents the 95% confidence limits for the fitted curve. $P_{nonlinearity}=0.03$.



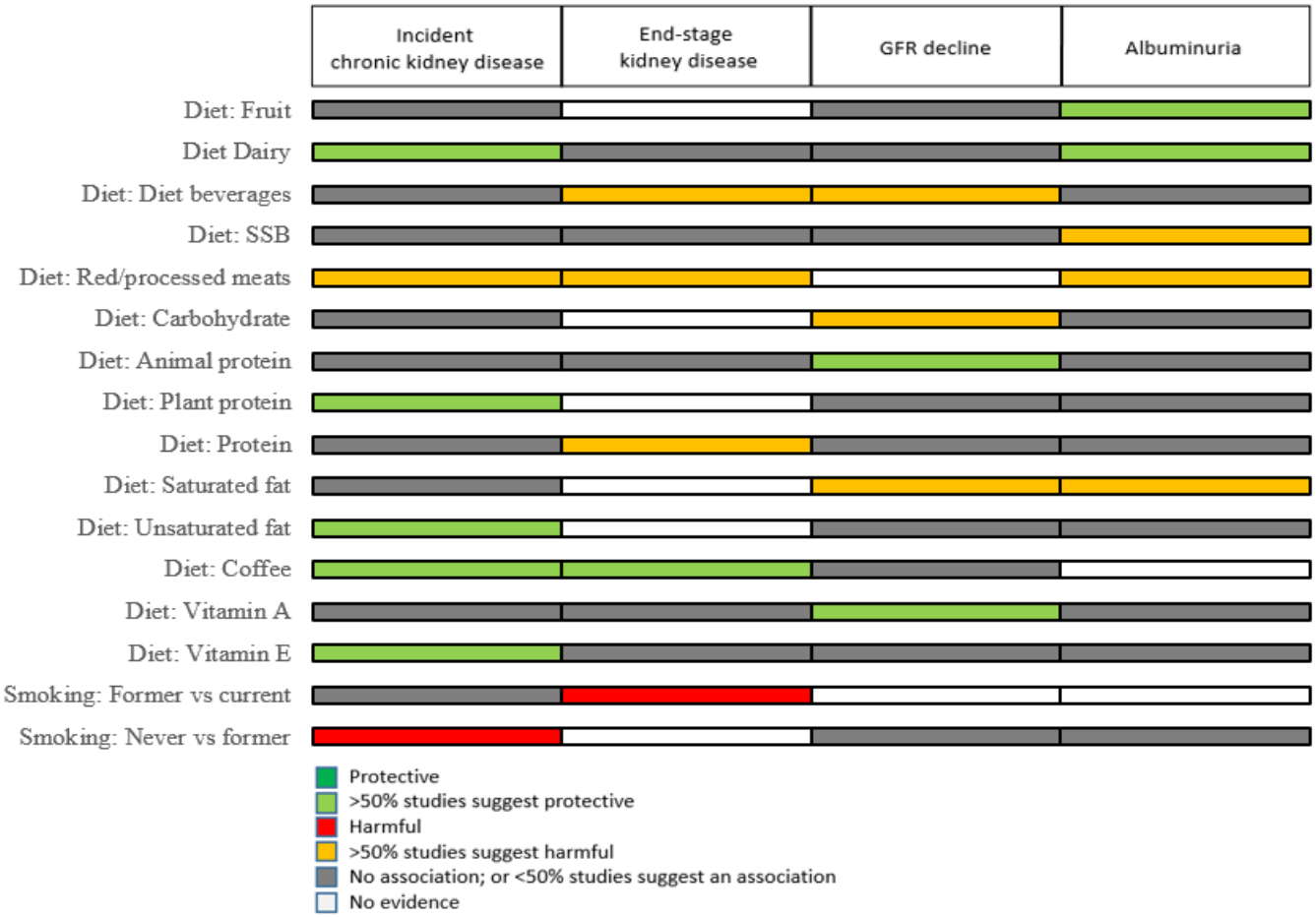
Supplemental Figure 4: Association of 3A Tobacco smoking (Current v Never), 3B Tobacco smoking (Former v current) and ESKD.



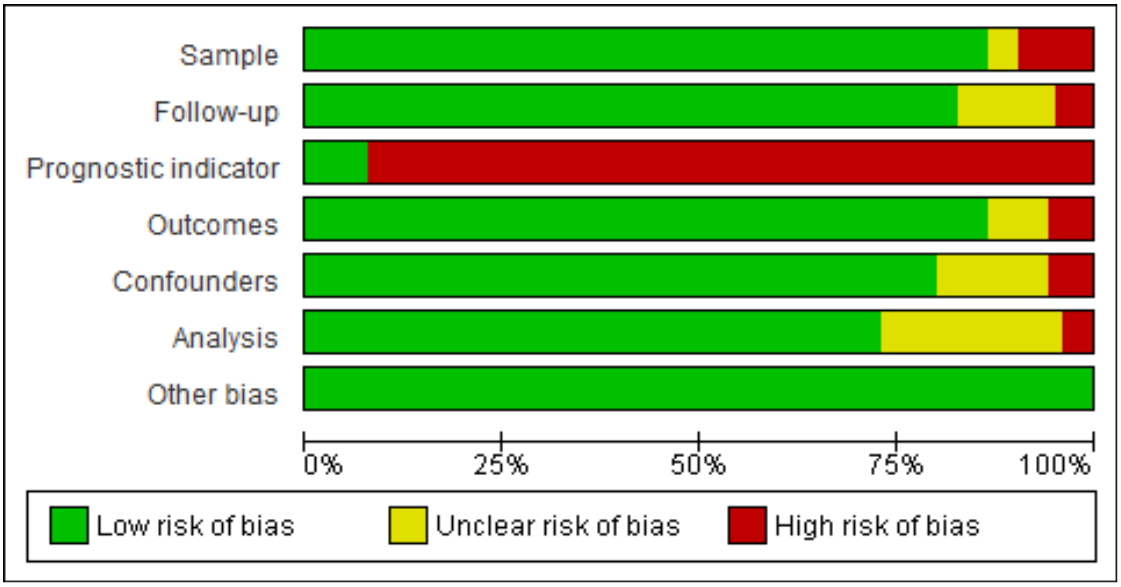
Supplemental Figure 5: Association of 4A Potassium intake, 4B Protein intake, 4C Physical activity level, 4D Alcohol consumption and GFR decline**.** Note the association estimate for each lifestyle factor is presented on the ratio (OR or RR) which was predominantly used in the included studies.



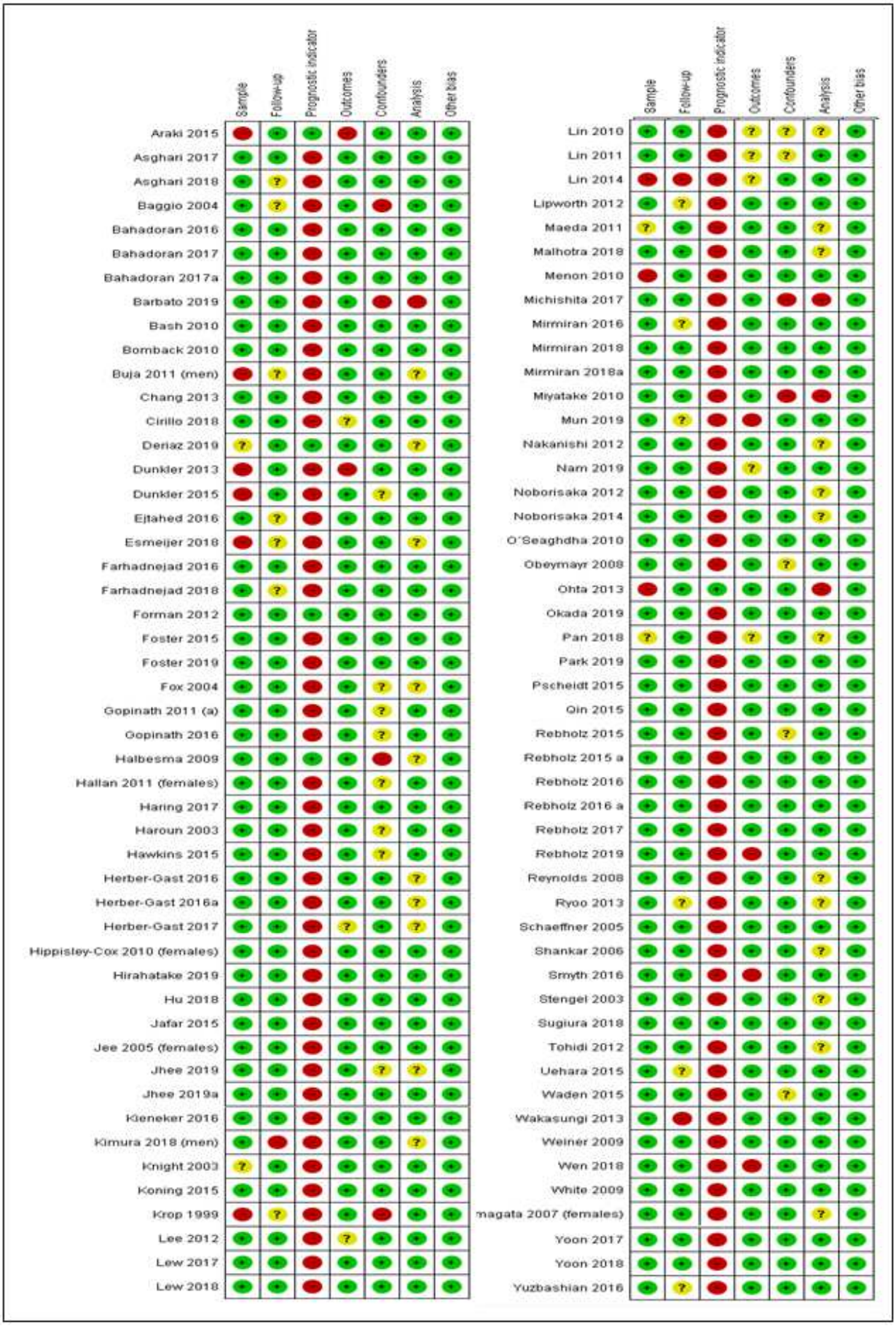
Supplemental Figure 6: Association of 5A Sodium intake, 5B Physical activity level, 5C Alcohol consumption, 5D Tobacco smoking and Albuminuria. Note the association estimate for each lifestyle factor is presented on the ratio (OR or RR) which was predominantly used in the included studies.



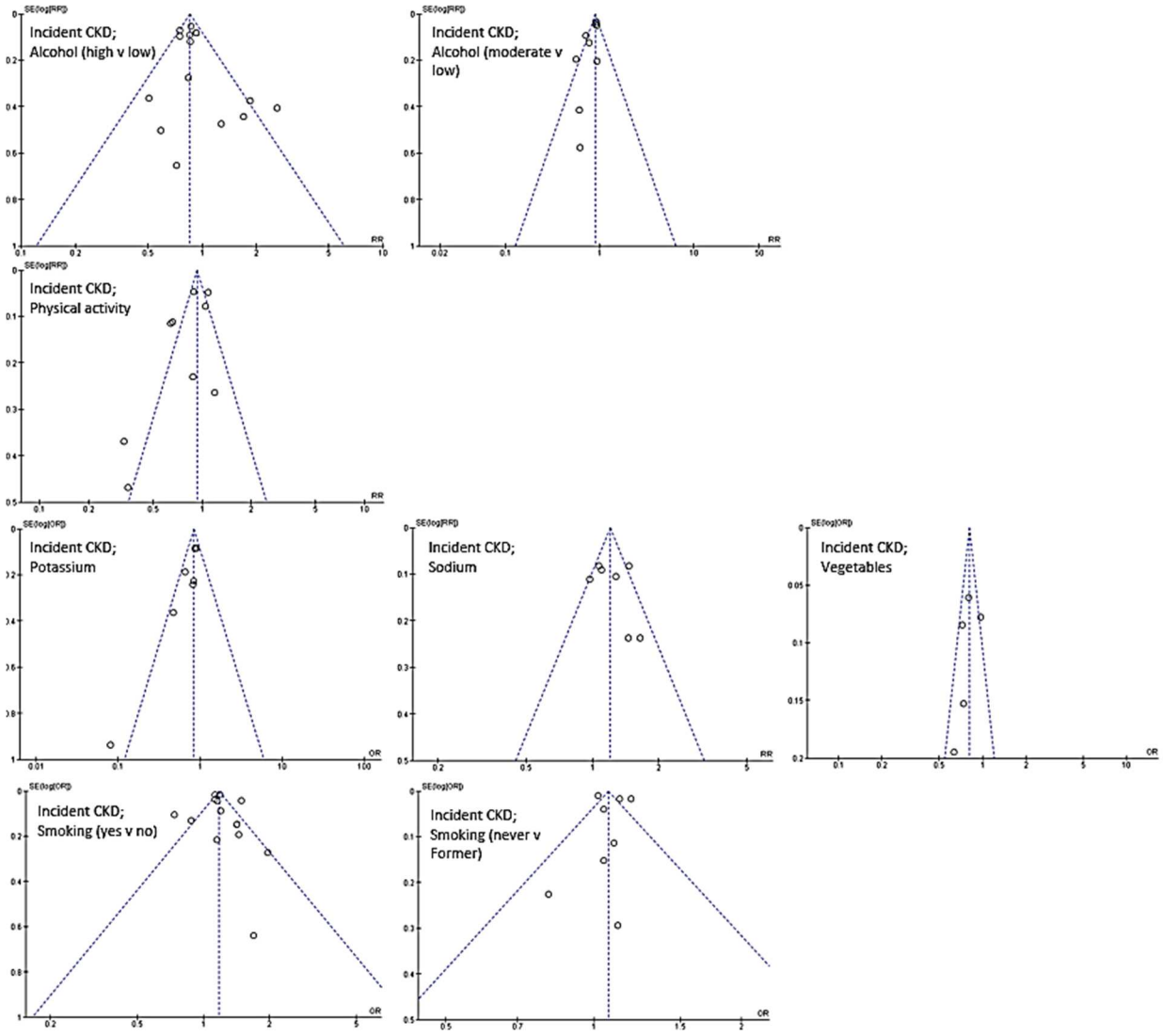
Supplemental Figure 7. Consistency of associations in lifestyle factors which could not be statistically pooled across the markers of kidney function decline. Summary of the number and proportion of studies showing protective and harmful relationships is further detailed in Supplemental Table 4.



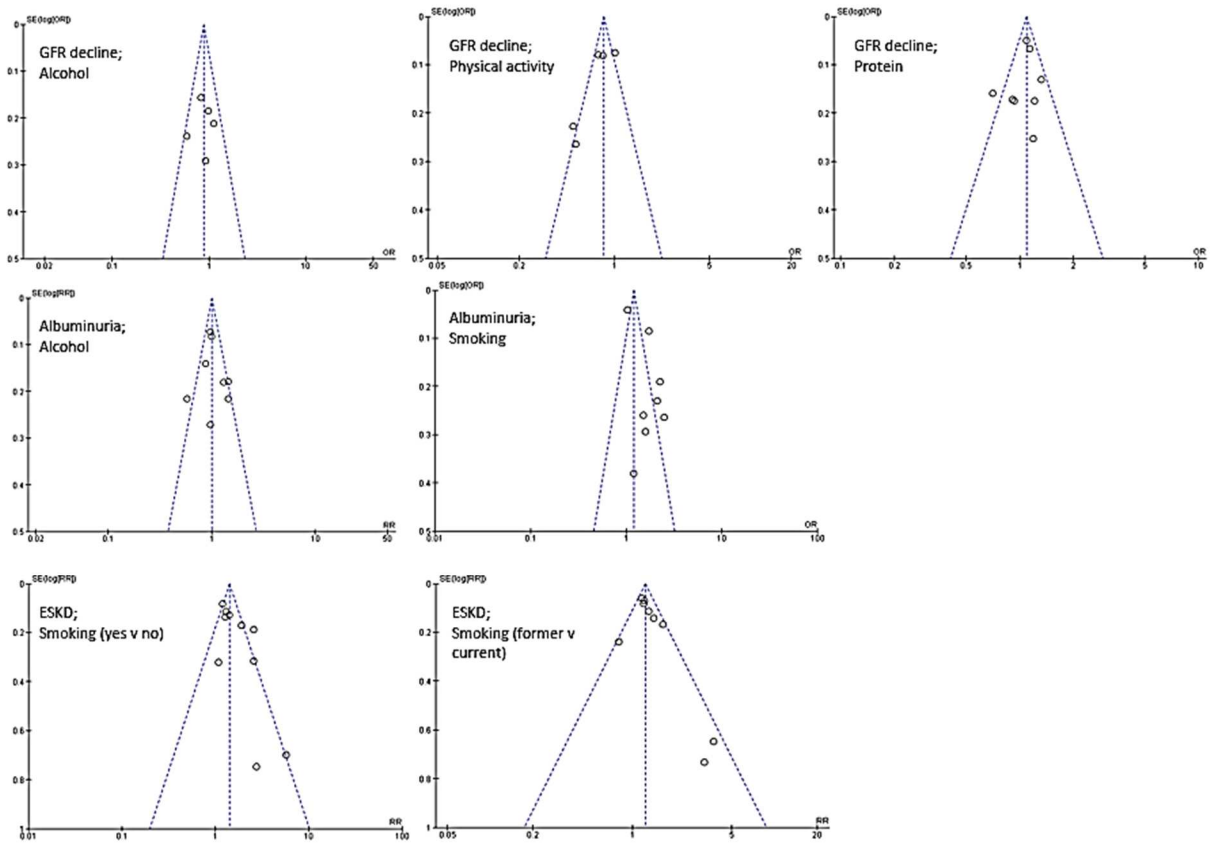
Supplemental Figure 8. Risk of bias across the included studies



Supplemental Figure 9: Individual assessment of risk of bias across the included studies



Supplemental Figure 10: Funnel plots for outcomes with at least 5 studies reporting associations to a lifestyle hazard and incident CKD



Supplemental Figure 11: Funnel plots for outcomes with at least 5 studies reporting associations to a lifestyle hazard and secondary outcomes (ESKD, GFR decline and albuminuria)

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