SUPPLEMENTARY DATA

Supplementary Table 1. Study characteristics of 21 independent studies (extracted from 15 eligible articles) of blood 25(OH)D Levels and incident type 2 diabetes

Author, Publication year	Source	Study population	Study Design	Age, year	N	Follow-up years	Diabetes Ascertainment	Main Outcome (Highest vs. Lowest Category Comparison)	
					(cases/controls or participants, gender)			25(OH)D ranges (median or mean); Relative Risk (95% CI) and P for linear trend*	variates adjusted in the model†
Knekt P et al, 2008	The Finnish Mobile Clinic Health Examination Survey, Finland	Population-based	Nested case-control	40-74	Cases: 105 men and 125 women; Controls: 206 men and 246 women	22	egister health information	Men: 74.5 vs. 23.5 nmol/L; 0.49 (0.15-1.64), P=0.06 Women: 62.5 vs. 22.6 nmol/L; 0.91 (0.37-2.23), P=0.66	Age BMI, physical activity, smoking status, and education.
Knekt P et al, 2008	The Mini-Finland Health Survey, Finland	Population-based	Nested case-control	40-69	Cases: 83 men and 99 women; Controls: 245 men and 289 women	17	egister health information	Men: 75.6 vs. 23.9 nmol/L; 0.17 (0.05-0.52), P<0.001 Women: 62.4 vs. 20.4 nmol/L; 1.45 (0.58-3.62), P=0.83	Age BMI, physical activity, smoking status, and education.

Pittas AG, et al, 2010	The Nurses' Health Study, United States	.S. female nurses	Nested case-control	56.4 (mean) 43-70	608 cases and 559 controls	14	elf-reported	3.5 vs. 36.0 nmol/L 52 (0.33-0.83), P=0.008	Age, race, fasting status, month of blood draw, and laboratory batch for plasma 25OHD, latitude, history of hypercholesterolemia, history of hypertension, family history of diabetes, smoking status, physical activity, alcohol consumption, multivitamin use, and dietary intakes of caffeine, trans fat, cereal fiber, heme iron, magnesium, fish, and calcium.
Grimnes, G et al, 2010	The Tromsø study, Norway	Population-based	Cohort	50-74	4,157 non-smokers (183 cases) and 1,962 smokers (64 cases)	11	elf-reported questionnaire,g lycemic status, and hospital-confirmed diagnosis	Non-smokers: 72.8 vs. 34.5 nmol/L; 0.73 (0.48-1.12), P<0.05 Smokers: 98.6 vs. 73.0 nmol/L; 0.68 (0.29-1.61), P<0.05	Age, sex, BMI, physical activity, number of cigarettes smoked and years of smoking (in current smokers).
Anderson JL et al, 2010	Intermount ain Healthcare system, United States	Healthcare population	Cohort	55±21	913 cases from 41,504 women and men	1.3 (mean), 9.3 (max)	Clinical diagnosis	92.5 vs. 20 nmol/L; 0.53 (0.43-0.65); P, NA	Age, gender, history of hypertension, hyperlipidemia, diabetes mellitus, peripheral vascular disease, and other clinical conditions.

SUPPLEMENTARY DATA

Bolland MJ et al, 2010	A randomized trial of calcium supplements, New Zealand	Healthy community-dwelling women	Cohort	>55 y (mean: 74 y)	29 cases from 1,471 postmenopausal women	5 (max)	elf-reported, verified using medical records	5 vs. 38 nmol/L; 9 (0.4-1.9); P, NA	Age, body weight, smoking status, treatment allocation (calcium or placebo), and season.
Gagnon C et al, 2011	AusDiab study, Australia	Population-based	Cohort	50.6 ±12.5	199 cases from 5,200 men and women	5	reatment, fasting glucose, or 2-h OGTT	56 vs. 28.5 nmol/L; 56 (0.36-0.86); P=0.001	Age, ethnicity, waist circumference, family history of diabetes, smoking status, physical activity, and season and latitude.
Robinson, JG et al, 2011	The Women's Health Initiative, United States	Postmenopausal Women	Nested case-control	50-79 (mean: 66y)	317 cases and 4,823 controls	7.3 (mean)	ewly treated clinical diabetes	64.2 vs. <34.7 nmol/L; 1.05 (0.62-1.76); P=0.935	Age, ethnicity, latitude, month of blood draw, WHI ancillary study indicators, BMI, hypertension, fiber intake, magnesium intake, and physical activity.
Thorand, B et al, 2011	The MONICA/ KORA Augsburg study, German	Population-based	Case-cohort study	35-74	Cases: 231 men and 185 women; Noncases: 657 men and 610 women	11.0 (mean)	uestionnaires or interviews validated by physician or medical chart review	Ien: 68.0 vs. 27.7 nmol/L; Women: 58.0 vs. 27.0 nmol/L Total: 0.63 (0.44-0.90); P=0.010	Age, sex, survey, season, BMI, smoking status, alcohol intake, physical activity, systolic BP, total cholesterol/HDL cholesterol, parental history of diabetes.
Pittas, AG et al, 2012	The Diabetes Prevention Program, United States	Adults at high risk for type 2 diabetes	Prospective cohort from a randomized trial	>=25 (mean: 51y)	426 cases from 2039 participants (1,022 in the combined placebo group and 1,017 in intensive lifestyle group)	2.7 (mean)	GTT	5.3 vs. 32 nmol/L; 0.72 (0.56-0.90); P=0.005	Recruitment location, age, sex, BMI, race, physical activity, family history of diabetes, history of hypertension, smoking status, alcohol consumption, multivitamin use, CRP, kidney function, calcium intake, and treatment arm (intensive lifestyle or placebo).

SUPPLEMENTARY DATA

Gonzalez-Molero, I et al, 2012	Pizarra Study (Southern Spain)	Population-based	Prospective study	50.3 (mean)	26 new cases among 412 individuals	5 (max)	GTT and glycosylated hemoglobin	46.25 vs. <46.25 nmol/L; 0.17 (0.05-0.61); P=0.007	Age, sex, obesity (BMI>30), smoking, outdoor activity, alcohol intake, month of blood sampling, PTH, phosphorus and creatinine.
Deleskog, A et al, 2012	The Stockholm Diabetes Prevention Program, Sweden	Population-based	Nested case-control study	35-56	Cases: 179 men and 100 women; Controls: 607 men and 404 women	8-10	GTT	>71.0 vs. <43.2 nmol/L; Men: 0.52 (0.30-0.90); P=0.02; Women: 0.79 (0.36-1.73); P=0.23	Age, BMI, family history of diabetes, physical activity, and blood pressure.
Forouhi, NG, 2012	European Prospective Investigation into Cancer (EPIC)-Norfolk study, UK	Population-based	Nested case-cohort study	40-75	Cases:621; non-case control subcohort:826	9-13	Medical record linkage with general practice,hospital and death registries.	80.0 vs. <48.8 nmol/L; 0.50 (0.32-0.76); P<0.001	Age, sex, season, BMI, family history of diabetes, smoking, physical activity, education, alcohol intake, and supplement and/or cod liver oil use.
	The Medical Research Council (MRC) Ely study	Population-based	Prospective study	40-69	37 cases among 740 non-diabetic participants	10 (median)	WHO criteria (OGTT)	NA; 0.69 (0.17-2.91); P, NA	Age, sex, season, BMI, family history of diabetes, alcohol intake, smoking, socioeconomic status, and physical activity.

SUPPLEMENTARY DATA

Husemoen, LLN et al, 2012	Inter99 Study	Population-based	Prospective cohort from a randomized trial	30-65 (mean:46.3y)	3,759 men and women; 133 incident cases	5	GTT, glycosylated hemoglobin, known history of diabetes, and/or use of diabetes medication	≥75 vs. <25 nmol/L; 0.61 (0.28-1.33); P=0.18	Age, sex, BMI, season of blood collection, family history of diabetes, change in weight during the follow-up, physical activity, dietary habits, alcohol intake, smoking status, total energy intake, social class, and randomization group and self-reported changes in dietary habits, physical activity, smoking status, and alcohol intake during the follow-up
Husemoen, LLN et al, 2012	MONICA 1 population survey	Population-based	Prospective study	41-71	1,276 men and 1,295 women; 288 incident cases	16.4	Information on hospitalization, diabetes registration, blood glucose levels, or anti-diabetic medication use	142.35 vs. 28.75 nmol/L; 0.57 (0.38-0.85); P=0.006	Age, sex, season of blood collection, history of CVD, family history of diabetes, waist circumference, physical activity, healthy food index, fish intake, supplement use, smoking status, alcohol intake and educational level.
Pilz, S et al, 2012	The Hoorn study	Population-based	Prospective study	50-75	280 men and women; 45 incident cases	7.5 (mean)	GTT, glycosylated hemoglobin, and/or hypoglycemic drugs	≥75 vs. <50 nmol/L; 0.52 (0.13-2.10); P, NA.	Age, sex, season, BMI, physical activity, hypertension, fasting glucose, HDL-C and triglycerides.

* NA, not available; OGTT, oral glucose tolerance test; MONICA/KORA, the Monitoring of Trends and Determinants in Cardiovascular Disease /Cooperative Health Research in the Region of Augsburg cohort.

† The results were extracted from multivariate-adjusted models without variables that could be intermediate phenotypes between vitamin D and type 2 diabetes.