Supplementary Material

Supplement to

Phenotypic and genome-wide studies on dicarbonyls: major associations to glomerular filtration rate and gamma-glutamyltransferase activity

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Supplementary figures:
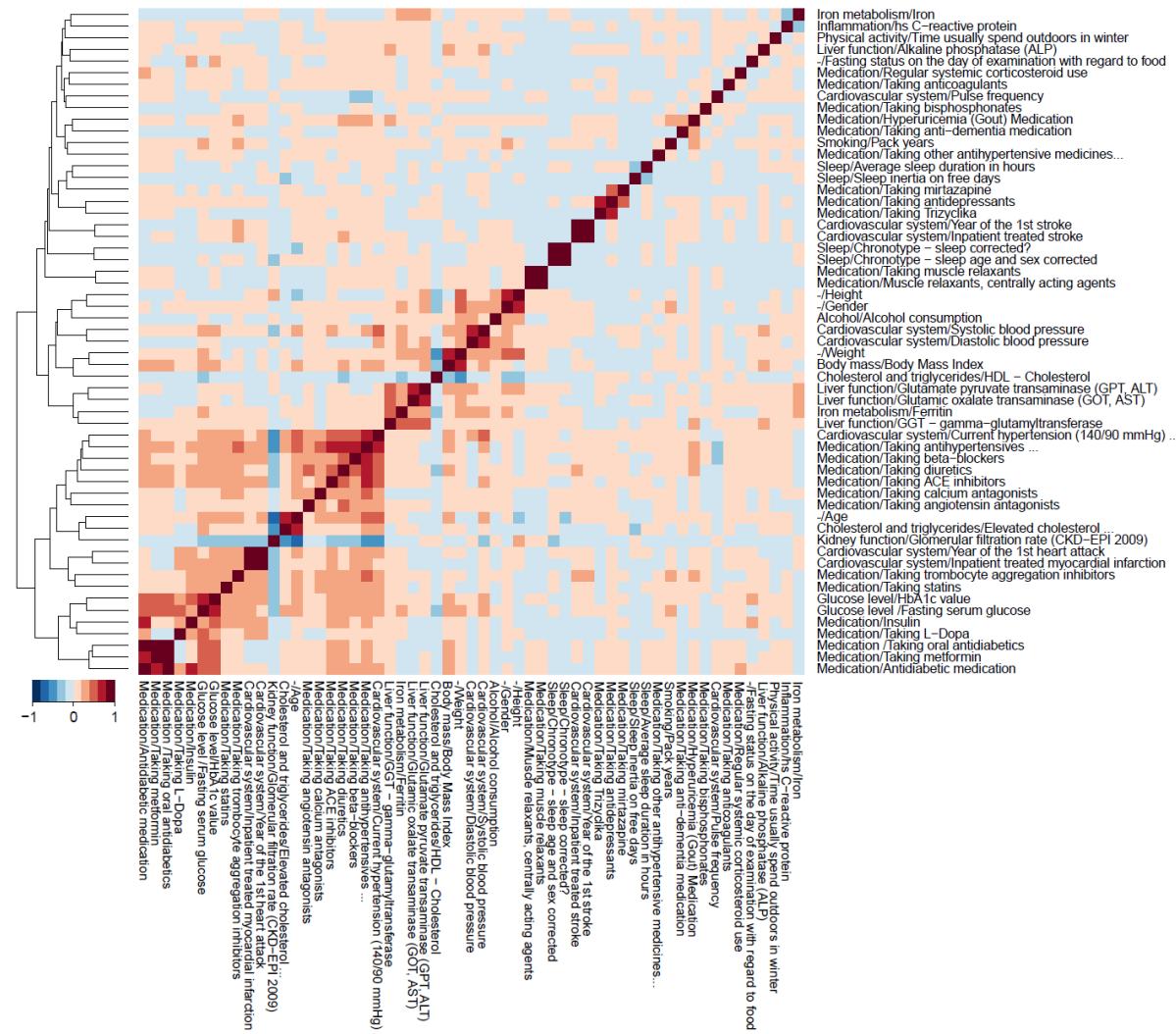
Supplementary figure 1: Hierarchical clustering of dicarbonyl-associated traits.
To illustrate the correlation structure of the dicarbonyl-associated traits, hierarchical clustering of the binary and continuous traits was performed using Murtagh and Legendre's criterion, and Pearson's correlation-based distance. The heatmap displays Pearson's correlation coefficients. Expectedly, this clustering matched some of our categories (e.g., "glucose level"), while some traits clustered across categories according to their physiological (e.g., "iron metabolism/iron" with "inflammation/C-reactive protein") or pharmacological relations (e.g., "cardiovascular system/hypertension" with "medication/taking antihypertensives").
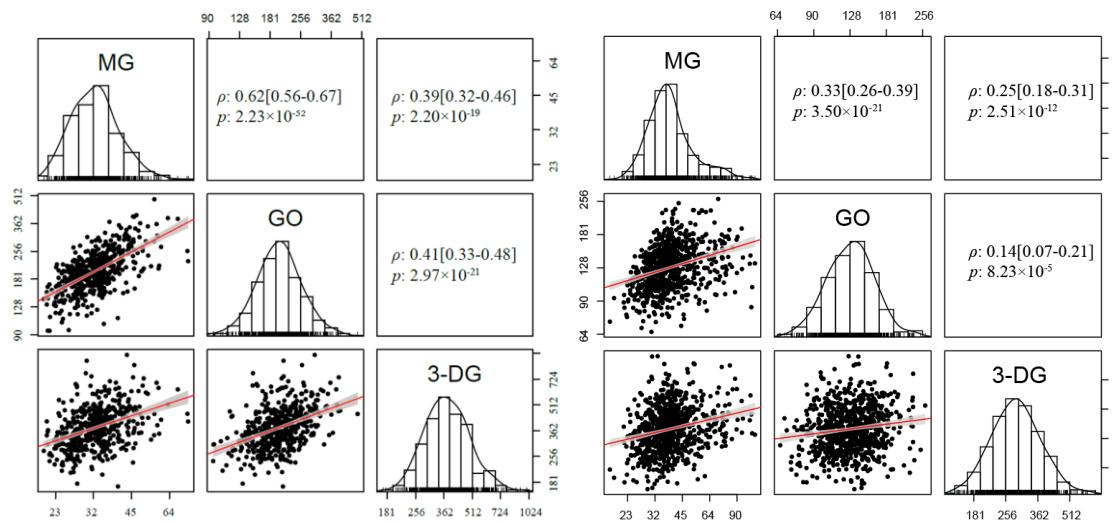
Supplementary figure 2: Correlation plots of MG, GO, and 3-DG.
Correlation plots of the three metabolites in KORA (right panel) and BiDirect (left panel). The frequency distributions of the concentrations [nM] of methylglyoxal (MG), glyoxal (MG), and 3-deoxyglucosone (3DG), as displayed on the diagonal, were approximately lognormal (appearing Gaussian due to logarithmic scaling). The lower left triangle displays the scatter plots with regression lines (red) and 95% confidence intervals (gray shades). The upper triangle shows the Pearson correlation coefficients with [95% confidence intervals] and correlation significance.
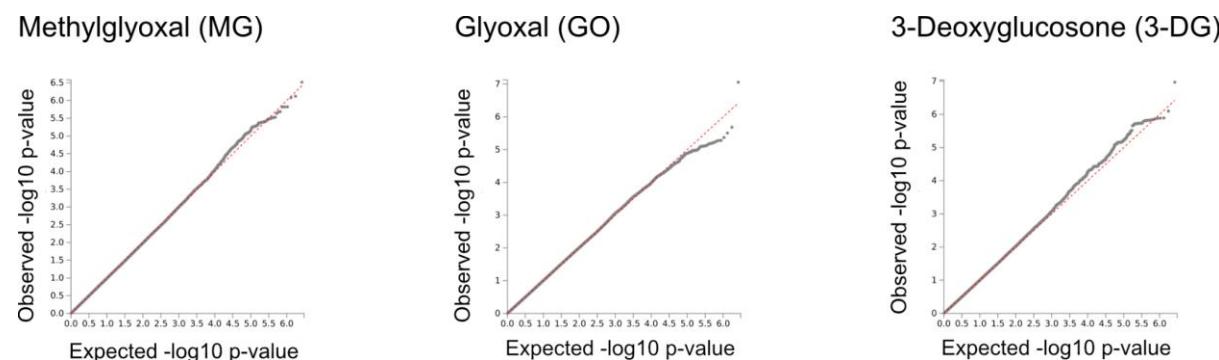
Supplementary figure 3: QQ-plots for GWAS of dicarbonyl metabolites controlled for intake and excretion.
QQ-plots of the GWAS of the different dicarbonyl metabolites controlled by BMI, age, sex, batch, PCA, GFR and glucose show no evidence of population stratification. They reflect the limited power of the study due to the small sample size.

Supplementary tables:

Supplementary table 1: Retention times, MRM transitions, and inter batch variances.
LC-MS/MS parameters of the measurements in KORA (*) and BiDirect (**).

Substance	Inter batch [CV%]	Retention time [min]	Precursor ion [m/z]	Fragment ion (quantifier/qualifier) [m/z]
3-Deoxyglucosone	25 (*)	5·9	239·13	161·1
	21 (**)			149·1
Glyoxal	15 (*)	6·9	135·09	81·06
	15 (**)			108·07
Methylglyoxal	12 (*)	7·4	149·1	81·06
	12 (**)			122·09

Supplementary table 2: Available phenotypic traits in KORA.
136 potentially relevant phenotypes were selected initially for the phenotypic association study in KORA.

Available phenotypic traits (KORA)	
Age at diagnosis of validated diabetes mellitus with type indication	Iron
Age Group	Kidney disease within last 12 month
Alcohol consumption	LDL - cholesterol
Alkaline phosphatase (ALP)	L-Dopa
Amount of cancers	Lithium
Angiotensin antagonists	Liver disease within last 12 month
Anticoagulants	Low potency neuroleptics
Anti-dementia medication	Medication taken in the last 7 days
Antidepressants	Metformin
Antidiabetic medication	Mirtazapine
Antiepileptic drugs	Muscle relaxants
Antihypertensives (Assignment according to recommendations of the German League)	Muscle relaxants, centrally acting agents
Anxiety or panic disorders within last 12 month	Neurological diseases (e.g. multiple sclerosis or Parkinson's disease) within the last 12 month
Atypical neuroleptics	Non-selective monoamine reuptake inhibitors
Average sleep duration in hours	Non-steroidal anti-inflammatory drugs
Benzodiazepines	Opioids (Analgesics)
Beta-blockers	Oral antidiabetics
Bisphosphonates	Oral contraceptives
Body Mass Index	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)
Body Mass Index Categories according to WHO	Pack years
Calcium antagonists	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)
Chronotyp - sleep corrected	Parkinson screening: Has anyone told you that you have Parkinson's disease (self-reported)
Chronotyp - sleep, age and sex corrected	Parkinson screening: Less facial expression (self-reported)
Classification of work or main occupation	Parkinson screening: Problems getting up from a chair (self-reported)
Coronary heart disease	Parkinson screening: Quieter voice (self-reported)
Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	Parkinson screening: Smaller handwriting (self-reported)
Current physical condition (self-reported)	Parkinson screening: Trembling of arms and legs (self-reported)
Dementia screening: Difficult to plan or organise everyday life, e.g. shopping, hobbies, invitations or trips (self-reported)	Parkinson screening: Unsteady walking (self-reported)
Dementia screening: Difficulties following programmes on television/radio or content of newspaper/articles/books (self-reported)	Passive smoker
Dementia screening: Difficulties with your memory, e.g. remembering events of the day or content of conversations (self-reported)	Peripheral atherosclerosis
Dementia screening: Gradual start of symptoms (self-reported)	Phlebitis in superficial veins within last 12 months
Dementia screening: Problems carrying out familiar activities (self-reported)	Physical Activity in Categories
Depression(Depression module of the Brief Patient Health Questionnaire)	Previous heart operations
Diagnosed cancer	Proton pump inhibitors
Diagnosed hyperthyroidism	Pulse frequency
Diagnosed hypothyroidism	Regular systemic corticosteroid use
Diagnosed hypothyroidism	Selective monoamine reuptake inhibitors
Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	Selective serotonin reuptake inhibitors
Diastolic blood pressure	Sex
Diuretics	Sleep inertia on free days
Dopamine agonists	Sleep latency on free days

Duration of cycling on weekdays (self-reported)	Smoking status
Elevated cholesterol or triglyceride levels within last 12 month	Statins
Examination date	Strong painkillers
Fasting serum glucose	Success rates of diets (self-reported)
Fasting status on the day of examination with regard to food	Systemic hormone therapy
Ferritin	Systolic blood pressure
Fibrates	Taking ACE inhibitors
Gamma-glutamyltransferase (GGT)	Thrombosis of the deep veins within last 12 month
Gastric or duodenal ulcer within last 12 month	Thyroid hormones
Gastritis within last 12 month	Thyrostatic drugs
Generalized Anxiety Disorder Scale	Time usually spend cycling on weekdays (self-reported)
Glomerular filtration rate (CKD-EPI 2009)	Time usually spend outdoors in summer (self-reported)
Glutamate pyruvate transaminase (GPT, ALT)	Time usually spend outdoors in winter (self-reported)
Glutamate receptor antagonists	Time usually spend walking on weekdays (self-reported)
Glutamic oxalate transaminase (GOT, AST)	Total - cholesterol
Gout, elevated uric acid levels within last 12 month	Total heart attacks
HbA1c value	Triglyceride-lowering medication
HDL - cholesterol	Triglycerides
Height	Trizyclika
High-potency neuroleptics	Trombocyte aggregation inhibitors
hs C-reactive protein	Validated diabetes mellitus with type indication
Hypertension classification (ISH-WHO 1999)	Waist hip ratio
Hyperuricemia medication	Weight
Inflammatory bowel disease within last 12 month	Weight loss diet within last 12 months
Inpatient treated myocardial infarction (self-reported)	Year of the 1st heart attack
Inpatient treated stroke (self-reported)	Year of the 1st stroke
Insulin	Zopiclone/zolpidem

Supplementary table 3: Results of phenotypic association study on dicarbonyls (Supplement to Figure 1).

136 potentially relevant phenotypes were selected initially for the PheWAS in KORA. 84 of these phenotypes passed the false discovery rate (FDR) threshold of 5% for at least one dicarbonyl compound and were therefore included in further analyses. Each phenotype was assigned to one of 21 categories ("Groups") according to general physiological and medical classifications. Aligned phenotypes (23 identical traits, 21 proxies) were available in the replication set (BiDirect) for 44 of the 84 phenotypes. In both cohorts the statistics were calculated for each dicarbonyl (MG, GO, 3-DG) seperately as well as for all 3 dicarbonyls combined.

To optimize the discovery of (marginal) correlations between dicarbonyls and traits, continuous variables were transformed such as to maximize the explained variance (R2), i.e., log2-transformed ("log"), subjected to rank-based inverse normal transformation ("irn") or left untransformed ("raw"). Linear and multivariate linear models were used for regression of traits on single and multiple dicarbonyls, respectively, to calculate significance levels. The assumptions of the regression models were assessed by Shapiro–Wilk normality test of the residuals and the Cook–Weisburg test for heteroskedasticity. One round of outlier filtering was performed excluding residual outliers (pBonferroni<0·05) and data points with a Cook's distance >4/N. If the regression assumptions were not met, the transformation type was adapted or, if the latter was unsuccessful, the significance of the Fisher-transformed Spearman rank correlation coefficient was determined. Similarly, the correlation with traits represented by binary, ordinal or nominal variables were analyzed without covariates by simple, ordinal, or multinomial logistic regression models, respectively. If the regression did not converge or outlier diagnostics were still not passed after the first round of outlier filtering, Kruskal-Wallis test was used instead. R2 and Nagelkerke's pseudo-R2 were reported for linear and logistic models, respectively.

Group	Type	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	MG (KORA)					MG (BiDirect)				
				Transformation	R2	Transformation p-value	p-value	N	Transformation	R2	Transformation p-value	p-value	N
Age	categorical	Age Group	Age Group	irn_cat	4·91E-02	irn_cat	1·03E-04	483	log_cat	1·02E-02	log_cat	5·93E-02	796
Baseline	binary	Sex	Sex	irn_cat	4·45E-02	irn_cat	3·25E-05	483	irn_cat	3·19E-03	irn_cat	1·64E-01	810
Physical activity	ordinal	Success rates of diets (self-reported)	NA	irn_cat	2·64E-02	irn_cat	9·15E-02	483	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Coronary heart disease	Diagnosed myocardial infarction	irn_cat	2·52E-02	irn_cat	2·99E-02	483	irn_cat	1·02E-02	irn_cat	1·70E-01	809
Physical activity	ordinal	Current physical condition (self-reported)	NA	log_cat	1·40E-02	log_cat	1·24E-01	483	NA	NA	NA	NA	NA
Cardiovascular system	ordinal	Total heart attacks	Diagnosed 1st -3rd myocardial infarction	irn_cat	4·16E-02	irn_cat	6·48E-03	483	irn_cat	1·02E-02	irn_cat	1·70E-01	809
Cardiovascular system	continuous	Year of the 1st heart attack	Diagnosed myocardial infarction	irn_cat	3·77E-02	irn_cat	5·69E-03	479	irn_cat	1·02E-02	irn_cat	1·70E-01	809
Cardiovascular system	binary	Year of the 1st stroke	Diagnosed stroke	irn_cat	2·05E-02	irn_cat	7·09E-02	480	irn_cat	9·13E-04	irn_cat	6·47E-01	809
Cancer	categorical	Diagnosed cancer	Diagnosed cancer	irn_cat	1·87E-02	irn_cat	7·08E-02	483	irn_cat	4·50E-04	irn_cat	6·60E-01	809
Cancer	categorical	Amount of cancers	Diagnosed 1st -3rd cancer	irn_cat	1·35E-02	irn_cat	1·27E-01	482	irn_cat	4·50E-04	irn_cat	6·60E-01	809
Cholesterol and triglycerides	continuous	Elevated cholesterol or triglyceride levels within last 12 month	NA	raw_irn	8·03E-03	raw_irn	2·93E-01	137	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Previous heart operations	Diagnosed myocardial infarction	irn_cat	3·76E-02	irn_cat	2·17E-02	483	irn_cat	1·02E-02	irn_cat	1·70E-01	809
Physical activity	categorical	Duration of cycling on weekdays (self-reported)	NA	irn_cat	1·81E-02	irn_cat	6·33E-02	483	NA	NA	NA	NA	NA
Baseline	categorical	Examination date	NA	log_cat	8·54E-03	log_cat	1·78E-01	483	NA	NA	NA	NA	NA
Inflammation	continuous	hs C-reactive protein	hs C-reactive protein	log_log	2·85E-02	irn_irn	5·08E-04	482	irn_log	4·54E-03	Spearman	2·42E-02	781
Iron metabolism	continuous	Iron	NA	log_log	3·83E-03	irn_irn	1·85E-01	483	NA	NA	NA	NA	NA
Iron metabolism	continuous	Ferritin	NA	log_log	1·82E-02	irn_irn	1·53E-03	483	NA	NA	NA	NA	NA
Liver function	continuous	Alkaline phosphatase (ALP)	NA	raw_irn	1·91E-03	irn_irn	5·72E-01	483	NA	NA	NA	NA	NA
Liver function	continuous	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	log_log	3·43E-02	irn_irn	1·79E-06	483	irn_log	3·02E-04	irn_irn	8·12E-01	790

Liver function	continuous	Glutamic oxalate transaminase (GOT, AST)	Glutamic oxalate transaminase (GOT, AST)	raw_irn	3·08E-02	irn_irn	3·97E-05	483	irn_log	3·87E-03	irn_irn	5·78E-02	789
Liver function	continuous	Glutamate pyruvate transaminase (GPT, ALT)	Glutamate pyruvate transaminase (GPT, ALT)	raw_irn	1·34E-02	irn_irn	9·27E-03	483	log_log	2·71E-02	irn_irn	4·76E-05	788
Glucose level	continuous	HbA1c value	HbA1c value	log_log	1·29E-02	irn_irn	2·37E-02	483	log_log	1·39E-03	irn_irn	6·33E-01	798
Cholesterol and triglycerides	continuous	HDL - cholesterol	HDL - cholesterol	log_log	1·24E-02	log_log	1·40E-02	483	irn_log	3·43E-03	irn_log	1·00E-01	787
Neurodegenerative disorders and neuropathies	categorical	Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	NA	log_cat	2·15E-03	log_cat	7·48E-01	212	NA	NA	NA	NA	NA
Inflammation	ordinal	Phlebitis in superficial veins within last 12 months	NA	log_cat	3·33E-03	log_cat	8·33E-01	382	NA	NA	NA	NA	NA
Kidney function	ordinal	Kidney disease within last 12 month	Glomerular filtration rate (CKD-EPI 2009)	log_cat	4·58E-02	log_cat	3·50E-02	381	irn_log	2·53E-02	Spearman	7·97E-05	788
Gout and hyperuricemia	ordinal	Gout, elevated uric acid levels within last 12 month	NA	irn_cat	3·02E-02	irn_cat	3·67E-02	382	NA	NA	NA	NA	NA
Anxiety	ordinal	Anxiety or panic disorders within last 12 month	NA	log_cat	4·23E-02	log_cat	1·71E-02	381	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	categorical	Parkinson screening: Unsteady walking (self-reported)	NA	log_cat	6·54E-03	log_cat	7·75E-01	99	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	ordinal	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)	NA	irn_cat	5·53E-02	irn_cat	8·25E-02	98	NA	NA	NA	NA	NA
Alcohol	continuous	Alcohol consumption	Average alcohol consumption (last week)	raw_irn	3·39E-03	Spearman	1·98E-01	483	irn_log	4·29E-03	Spearman	1·07E-01	741
Medication	binary	Antihypertensives (Assignment according to recommendations of the German League)	NA	log_cat	6·44E-02	log_cat	1·82E-06	483	NA	NA	NA	NA	NA
Body mass	continuous	Body Mass Index	Body Mass Index	raw_irn	8·02E-03	irn_irn	2·39E-02	480	irn_raw	5·05E-04	irn_irn	6·18E-01	792
Body mass	ordinal	Body Mass Index Categories according to WHO	Body Mass Index	irn_cat	8·51E-03	irn_cat	4·86E-01	480	irn_raw	5·05E-04	irn_irn	6·18E-01	792
Cardiovascular system	continuous	Diastolic blood pressure	Diastolic blood pressure	raw_irn	3·56E-03	raw_irn	1·89E-01	483	log_log	2·37E-03	log_log	1·66E-01	809
Diabetes	categorical	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	irn_cat	3·82E-02	irn_cat	1·92E-03	483	irn_cat	2·23E-03	irn_cat	4·11E-01	809
Diabetes	ordinal	Age at diagnosis of validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	irn_cat	7·71E-02	irn_cat	4·94E-02	483	irn_cat	2·23E-03	irn_cat	4·11E-01	809
Anxiety	ordinal	Generalized Anxiety Disorder Scale	NA	log_cat	4·49E-03	log_cat	7·00E-01	380	NA	NA	NA	NA	NA
Baseline	continuous	Weight	Weight	raw_irn	1·11E-02	irn_irn	1·46E-02	480	irn_raw	3·53E-03	irn_log	9·32E-02	808
Kidney function	continuous	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	log_log	2·40E-01	Spearman	4·84E-15	482	irn_log	2·53E-02	Spearman	7·97E-05	788
Glucose level	continuous	Fasting serum glucose	Fasting serum glucose	raw_irn	1·94E-02	irn_irn	8·09E-04	475	log_log	1·85E-03	irn_irn	6·00E-01	787
Baseline	continuous	Height	Height	raw_irn	2·30E-03	irn_irn	3·28E-01	482	irn_log	6·58E-03	irn_log	2·07E-02	810
Medication	categorical	Systemic hormone therapy	NA	irn_cat	4·88E-02	irn_cat	3·05E-05	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	Systolic blood pressure	irn_cat	9·17E-02	irn_cat	5·34E-09	483	irn_raw	1·11E-03	irn_irn	4·30E-01	809

Category	Type	Name	Reference	Method	p	Method	p	N	Method	p	Method	p	N
Medication	binary	Taking ACE inhibitors	NA	irn_cat	2·03E-02	irn_cat	5·18E-03	483	NA	NA	NA	NA	NA
Medication	binary	Insulin	Drugs used in diabetes	irn_cat	3·78E-02	irn_cat	1·74E-02	483	log_cat	2·42E-02	log_cat	5·24E-02	810
Medication	binary	Anticoagulants	NA	irn_cat	1·03E-02	irn_cat	1·86E-01	483	NA	NA	NA	NA	NA
Medication	binary	Trombocyte aggregation inhibitors		irn_cat	2·01E-02	irn_cat	9·49E-03	483	irn_cat	3·14E-03	irn_cat	4·47E-01	810
Medication	binary	Angiotensin antagonists	NA	irn_cat	1·27E-02	irn_cat	6·27E-02	483	NA	NA	NA	NA	NA
Medication	binary	Beta-blockers	NA	log_cat	4·42E-02	log_cat	1·93E-04	483	NA	NA	NA	NA	NA
Medication	binary	Bisphosphonates	NA	log_cat	4·39E-03	log_cat	5·20E-01	483	NA	NA	NA	NA	NA
Medication	binary	Calcium antagonists	NA	irn_cat	3·01E-03	irn_cat	3·09E-01	483	NA	NA	NA	NA	NA
Medication	binary	Anti-dementia medication	NA	irn_cat	1·73E-01	irn_cat	9·29E-03	483	NA	NA	NA	NA	NA
Medication	binary	Antidepressants	Antidepressants	irn_cat	5·27E-03	irn_cat	1·91E-01	483	log_cat	7·79E-03	log_cat	2·62E-01	810
Medication	binary	Diuretics	NA	irn_cat	3·41E-02	irn_cat	2·00E-04	483	NA	NA	NA	NA	NA
Medication	binary	Antidiabetic medication	Drugs used in diabetes	irn_cat	2·88E-02	irn_cat	6·13E-03	483	log_cat	2·42E-02	log_cat	5·24E-02	810
Medication	binary	Hyperuricemia medication	NA	irn_cat	1·25E-01	irn_cat	3·27E-07	483	NA	NA	NA	NA	NA
Medication	binary	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)	NA	irn_cat	3·55E-02	irn_cat	5·32E-02	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated myocardial infarction (self-reported)	Diagnosed myocardial infarction	irn_cat	3·36E-02	irn_cat	1·21E-02	483	irn_cat	1·02E-02	irn_cat	1·70E-01	809
Medication	binary	L-Dopa	Dopa and dopa derivates	irn_cat	8·53E-04	irn_cat	8·02E-01	483	irn_cat	2·87E-04	irn_cat	9·06E-01	810
Medication	binary	Muscle relaxants, centrally acting agents	NA	irn_cat	4·22E-04	irn_cat	8·50E-01	483	NA	NA	NA	NA	NA
Medication	binary	Metformin	Drugs used in diabetes	irn_cat	2·15E-03	irn_cat	4·18E-01	483	log_cat	2·42E-02	log_cat	5·24E-02	810
Medication	binary	Mirtazapine	Other antidepressants	irn_cat	2·85E-03	irn_cat	5·80E-01	483	log_cat	7·79E-03	log_cat	2·62E-01	810
Medication	binary	Oral antidiabetics	Drugs used in diabetes	irn_cat	1·06E-02	irn_cat	1·04E-01	483	log_cat	2·42E-02	log_cat	5·24E-02	810
Medication	binary	Muscle relaxants	NA	irn_cat	4·22E-04	irn_cat	8·50E-01	483	NA	NA	NA	NA	NA
Medication	binary	Statins	NA	irn_cat	9·65E-03	irn_cat	6·27E-02	483	NA	NA	NA	NA	NA
Medication	binary	Regular systemic corticosteroid use	NA	irn_cat	1·74E-02	irn_cat	1·53E-01	483	NA	NA	NA	NA	NA
Medication	binary	Trizyclika	Other antidepressants	irn_cat	1·06E-02	irn_cat	1·71E-01	483	log_cat	7·79E-03	log_cat	2·62E-01	810
Baseline	binary	Fasting status on the day of examination with regard to food	NA	log_cat	4·88E-03	log_cat	6·79E-01	483	NA	NA	NA	NA	NA
Medication	categorical	Oral contraceptives	NA	irn_cat	6·55E-02	irn_cat	1·25E-06	483	NA	NA	NA	NA	NA
Cardiovascular system	continuous	Pulse frequency	NA	log_log	5·75E-03	irn_irn	1·25E-01	483	NA	NA	NA	NA	NA
Smoking	continuous	Pack years	Pack years	log_log	1·76E-02	Spearman	1·22E-02	473	log_raw	1·11E-03	irn_irn	8·57E-02	456
Smoking	ordinal	Passive smoker	NA	irn_cat	2·55E-02	irn_cat	4·56E-02	380	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated stroke (self-reported)	NA	irn_cat	2·10E-02	irn_cat	6·45E-02	483	NA	NA	NA	NA	NA
Sleep	continuous	Average sleep duration in hours	PSQI sleep quality index	raw_irn	9·96E-05	raw_irn	8·93E-01	181	irn_raw	1·93E-03	Spearman	4·20E-01	794
Sleep	continuous	Sleep inertia on free days	PSQI sleep quality index	raw_log	1·10E-02	irn_irn	2·94E-01	178	irn_raw	1·93E-03	Spearman	4·20E-01	794
Sleep	continuous	Chronotyp – sleep, age and sex corrected	NA	raw_irn	1·56E-02	raw_irn	9·18E-02	181	NA	NA	NA	NA	NA
Sleep	continuous	Chronotyp - sleep corrected	NA	raw_irn	1·42E-02	raw_irn	1·07E-01	181	NA	NA	NA	NA	NA
Smoking	ordinal	Smoking status	Smoking status	log_cat	2·50E-02	log_cat	2·29E-02	483	irn_cat	4·61E-03	irn_cat	1·96E-01	806
Cardiovascular system	continuous	Systolic blood pressure	Systolic blood pressure	raw_log	3·36E-02	Spearman	3·23E-03	483	irn_raw	1·11E-03	irn_irn	4·30E-01	809

Group	Type	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	Transformation	R2	Transformation p-value	p-value	N	Transformation	R2	Transformation p-value	p-value	N
Cardiovascular system	ordinal	Hypertension classification (ISH-WHO 1999)	Systolic blood pressure	log_cat	5·31E-02	log_cat	1·72E-04	483	irn_raw	1·11E-03	irn_irn	4·30E-01	809
Body mass	continuous	Waist hip ratio	BMI	raw_irn	4·46E-02	raw_irn	2·78E-06	481	irn_raw	5·05E-04	irn_irn	6·18E-01	792
Hypothyroidism	ordinal	Diagnosed hypothyroidism	NA	log_cat	1·91E-02	log_cat	5·89E-02	483	NA	NA	NA	NA	NA
Physical activity	continuous	Time usually spend outdoors in winter (self-reported)	NA	log_log	6·62E-05	Spearman	3·61E-01	483	NA	NA	NA	NA	NA

Group	Type	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	GO (KORA)					GO (BiDirect)				
				Transformation	R2	Transformation p-value	p-value	N	Transformation	R2	Transformation p-value	p-value	N
Age	categorical	Age Group	Age Group	irn_cat	1·82E-01	irn_cat	3·23E-19	483	irn_cat	4·19E-02	irn_cat	8·63E-07	796
Baseline	binary	Sex	Sex	irn_cat	8·77E-02	irn_cat	6·14E-09	483	irn_cat	5·67E-02	irn_cat	3·00E-09	810
Physical activity	ordinal	Success rates of diets (self-reported)	NA	log_cat	2·16E-02	log_cat	1·64E-01	483	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Coronary heart disease	Diagnosed myocardial infarction	irn_cat	1·02E-01	irn_cat	1·07E-06	483	irn_cat	2·54E-02	irn_cat	3·04E-02	809
Physical activity	ordinal	Current physical condition (self-reported)	NA	irn_cat	2·79E-02	irn_cat	5·86E-03	483	NA	NA	NA	NA	NA
Cardiovascular system	ordinal	Total heart attacks	Diagnosed 1st -3rd myocardial infarction	irn_cat	1·19E-01	irn_cat	5·71E-07	483	irn_cat	2·54E-02	irn_cat	3·04E-02	809
Cardiovascular system	continuous	Year of the 1st heart attack	Diagnosed myocardial infarction	irn_cat	1·16E-01	irn_cat	6·56E-07	479	irn_cat	2·54E-02	irn_cat	3·04E-02	809
Cardiovascular system	binary	Year of the 1st stroke	Diagnosed stroke	irn_cat	5·01E-02	irn_cat	5·59E-03	480	irn_cat	2·50E-02	irn_cat	1·66E-02	809
Cancer	categorical	Diagnosed cancer	Diagnosed cancer	irn_cat	2·62E-02	irn_cat	1·72E-02	483	irn_cat	2·13E-03	irn_cat	3·37E-01	809
Cancer	categorical	Amount of cancers	Diagnosed 1st -3rd cancer	irn_cat	2·75E-02	irn_cat	1·45E-02	482	irn_cat	2·13E-03	irn_cat	3·37E-01	809
Cholesterol and triglycerides	continuous	Elevated cholesterol or triglyceride levels within last 12 month	NA	raw_log	4·64E-02	raw_log	1·07E-02	137	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Previous heart operations	Diagnosed myocardial infarction	irn_cat	1·30E-01	irn_cat	6·81E-06	483	irn_cat	2·54E-02	irn_cat	3·04E-02	809
Physical activity	categorical	Duration of cycling on weekdays (self-reported)	NA	log_cat	2·73E-02	log_cat	1·28E-02	483	NA	NA	NA	NA	NA
Baseline	categorical	Examination date	NA	irn_cat	2·33E-04	irn_cat	8·40E-01	483	NA	NA	NA	NA	NA
Inflammation	continuous	hs C-reactive protein	hs C-reactive protein	log_log	3·78E-02	irn_irn	2·99E-05	482	irn_log	3·15E-02	Spearman	7·52E-07	781
Iron metabolism	continuous	Iron	NA	log_log	6·90E-03	irn_irn	1·61E-01	483	NA	NA	NA	NA	NA
Iron metabolism	continuous	Ferritin	NA	log_log	9·25E-02	irn_irn	2·60E-11	483	NA	NA	NA	NA	NA
Liver function	continuous	Alkaline phosphatase (ALP)	NA	raw_log	3·43E-02	irn_irn	5·30E-05	483	NA	NA	NA	NA	NA
Liver function	continuous	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	log_log	9·11E-02	irn_irn	2·76E-13	483	irn_log	5·29E-02	irn_irn	2·25E-11	790
Liver function	continuous	Glutamic oxalate transaminase (GOT, AST)	Glutamic oxalate transaminase (GOT, AST)	log_log	4·49E-02	irn_irn	6·08E-07	483	irn_log	6·11E-02	irn_irn	3·92E-13	789
Liver function	continuous	Glutamate pyruvate transaminase (GPT, ALT)	Glutamate pyruvate transaminase (GPT, ALT)	log_log	1·85E-02	irn_irn	1·18E-03	483	irn_log	4·62E-02	irn_irn	1·41E-09	788
Glucose level	continuous	HbA1c value	HbA1c value	log_log	5·79E-02	irn_irn	1·93E-10	483	log_log	1·72E-02	irn_irn	1·82E-04	798
Cholesterol and triglycerides	continuous	HDL - cholesterol	HDL - cholesterol	raw_irn	5·92E-02	irn_irn	5·95E-09	483	irn_log	3·03E-02	irn_log	8·60E-07	787

Neurodegenerative disorders and neuropathies	categorical	Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	NA	log_cat	1·13E-03	log_cat	8·16E-01	212	NA	NA	NA	NA	NA
Inflammation	ordinal	Phlebitis in superficial veins within last 12 months	NA	log_cat	6·41E-03	log_cat	7·03E-01	382	NA	NA	NA	NA	NA
Kidney function	ordinal	Kidney disease within last 12 month	Glomerular filtration rate (CKD-EPI 2009)	irn_cat	1·95E-02	irn_cat	2·28E-01	381	log_log	1·06E-01	irn_irn	2·59E-18	788
Gout and hyperuricemia	ordinal	Gout, elevated uric acid levels within last 12 month	NA	log_cat	6·98E-02	log_cat	7·51E-04	382	NA	NA	NA	NA	NA
Anxiety	ordinal	Anxiety or panic disorders within last 12 month	NA	log_cat	1·25E-02	log_cat	3·04E-01	381	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	categorical	Parkinson screening: Unsteady walking (self-reported)	NA	irn_cat	1·86E-02	irn_cat	3·83E-01	99	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	ordinal	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)	NA	irn_cat	5·13E-02	irn_cat	9·12E-02	98	NA	NA	NA	NA	NA
Alcohol	continuous	Alcohol consumption	Average alcohol consumption (last week)	raw_irn	1·68E-02	Spearman	2·24E-02	483	irn_raw	8·35E-03	Spearman	1·50E-02	741
Medication	binary	Antihypertensives (Assignment according to recommendations of the German League)	NA	log_cat	1·74E-01	log_cat	1·12E-15	483	NA	NA	NA	NA	NA
Body mass	continuous	Body Mass Index	Body Mass Index	raw_irn	6·70E-02	irn_irn	6·44E-10	480	irn_raw	6·18E-02	irn_log	1·69E-12	792
Body mass	ordinal	Body Mass Index Categories according to WHO	Body Mass Index	irn_cat	5·72E-02	irn_cat	2·17E-05	480	irn_raw	6·18E-02	irn_log	1·69E-12	792
Cardiovascular system	continuous	Diastolic blood pressure	Diastolic blood pressure	raw_irn	6·62E-03	Spearman	7·91E-02	483	irn_log	2·97E-02	irn_log	7·71E-07	809
Diabetes	categorical	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	irn_cat	5·04E-02	irn_cat	1·03E-03	483	irn_cat	3·53E-02	irn_cat	1·02E-03	809
Diabetes	ordinal	Age at diagnosis of validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	irn_cat	9·40E-02	irn_cat	1·21E-02	483	irn_cat	3·53E-02	irn_cat	1·02E-03	809
Anxiety	ordinal	Generalized Anxiety Disorder Scale	NA	log_cat	2·72E-03	log_cat	8·35E-01	380	NA	NA	NA	NA	NA
Baseline	continuous	Weight	Weight	raw_irn	5·23E-02	irn_irn	1·20E-07	480	irn_log	7·43E-02	irn_log	2·83E-15	808
Kidney function	continuous	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	log_log	3·39E-01	Spearman	6·05E-28	482	log_log	1·06E-01	irn_irn	2·59E-18	788
Glucose level	continuous	Fasting serum glucose	Fasting serum glucose	log_log	9·27E-02	irn_irn	1·62E-15	475	log_log	3·44E-02	irn_irn	4·59E-07	787
Baseline	continuous	Height	Height	raw_irn	2·70E-04	irn_irn	8·26E-01	482	irn_log	1·68E-02	irn_log	2·16E-04	810
Medication	categorical	Systemic hormone therapy	NA	irn_cat	8·20E-02	irn_cat	4·00E-08	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	Systolic blood pressure	log_cat	2·58E-01	log_cat	7·52E-24	483	irn_log	3·85E-02	irn_irn	1·30E-08	809
Medication	binary	Taking ACE inhibitors	NA	irn_cat	7·35E-02	irn_cat	3·47E-07	483	NA	NA	NA	NA	NA
Medication	binary	Insulin	Drugs used in diabetes	irn_cat	5·25E-02	irn_cat	5·18E-03	483	log_cat	1·32E-02	log_cat	1·52E-01	810
Medication	binary	Anticoagulants	NA	irn_cat	4·75E-02	irn_cat	3·51E-03	483	NA	NA	NA	NA	NA
Medication	binary	Trombocyte aggregation inhibitors		irn_cat	7·61E-02	irn_cat	7·10E-07	483	log_cat	3·25E-03	log_cat	4·39E-01	810
Medication	binary	Angiotensin antagonists	NA	irn_cat	4·64E-02	irn_cat	8·65E-04	483	NA	NA	NA	NA	NA
Medication	binary	Beta-blockers	NA	log_cat	1·32E-01	log_cat	6·48E-11	483	NA	NA	NA	NA	NA
Medication	binary	Bisphosphonates	NA	irn_cat	2·46E-03	irn_cat	6·11E-01	483	NA	NA	NA	NA	NA

Medication	binary	Calcium antagonists	NA	irn_cat	6·06E-02	irn_cat	8·71E-05	483	NA	NA	NA	NA	NA
Medication	binary	Anti-dementia medication	NA	irn_cat	5·00E-02	irn_cat	8·31E-02	483	NA	NA	NA	NA	NA
Medication	binary	Antidepressants	Antidepressants	irn_cat	3·74E-03	irn_cat	4·59E-01	483	log_cat	1·44E-03	log_cat	6·29E-01	810
Medication	binary	Diuretics	NA	irn_cat	1·39E-01	irn_cat	2·41E-12	483	NA	NA	NA	NA	NA
Medication	binary	Antidiabetic medication	Drugs used in diabetes	irn_cat	3·85E-02	irn_cat	2·91E-03	483	log_cat	1·32E-02	log_cat	1·52E-01	810
Medication	binary	Hyperuricemia medication	NA	irn_cat	1·92E-01	irn_cat	5·42E-09	483	NA	NA	NA	NA	NA
Medication	binary	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)	NA	irn_cat	4·56E-02	irn_cat	3·56E-02	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated myocardial infarction (self-reported)	Diagnosed myocardial infarction	irn_cat	1·02E-01	irn_cat	6·16E-06	483	irn_cat	2·54E-02	irn_cat	3·04E-02	809
Medication	binary	L-Dopa	Dopa and dopa derivates	irn_cat	3·84E-02	irn_cat	2·02E-01	483	irn_cat	8·31E-03	irn_cat	5·24E-01	810
Medication	binary	Muscle relaxants, centrally acting agents	NA	irn_cat	2·07E-02	irn_cat	2·85E-01	483	NA	NA	NA	NA	NA
Medication	binary	Metformin	Drugs used in diabetes	irn_cat	5·40E-03	irn_cat	3·49E-01	483	log_cat	1·32E-02	log_cat	1·52E-01	810
Medication	binary	Mirtazapine	Other antidepressants	irn_cat	3·92E-03	irn_cat	6·07E-01	483	log_cat	1·44E-03	log_cat	6·29E-01	810
Medication	binary	Oral antidiabetics	Drugs used in diabetes	irn_cat	1·82E-02	irn_cat	6·03E-02	483	log_cat	1·32E-02	log_cat	1·52E-01	810
Medication	binary	Muscle relaxants	NA	irn_cat	2·07E-02	irn_cat	2·85E-01	483	NA	NA	NA	NA	NA
Medication	binary	Statins	NA	irn_cat	5·18E-02	irn_cat	6·69E-05	483	NA	NA	NA	NA	NA
Medication	binary	Regular systemic corticosteroid use	NA	irn_cat	6·51E-03	irn_cat	4·61E-01	483	NA	NA	NA	NA	NA
Medication	binary	Trizyclika	Other antidepressants	irn_cat	9·81E-03	irn_cat	3·23E-01	483	log_cat	1·44E-03	log_cat	6·29E-01	810
Baseline	binary	Fasting status on the day of examination with regard to food	NA	log_cat	2·76E-02	log_cat	3·25E-01	483	NA	NA	NA	NA	NA
Medication	categorical	Oral contraceptives	NA	irn_cat	8·15E-02	irn_cat	3·44E-08	483	NA	NA	NA	NA	NA
Cardiovascular system	continuous	Pulse frequency	NA	log_log	1·62E-02	Spearman	1·30E-02	483	NA	NA	NA	NA	NA
Smoking	continuous	Pack years	Pack years	raw_log	1·63E-02	Spearman	2·92E-01	473	log_raw	1·17E-03	irn_irn	6·02E-02	456
Smoking	ordinal	Passive smoker	NA	log_cat	8·96E-03	log_cat	5·15E-01	380	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated stroke (self-reported)	NA	irn_cat	4·78E-02	irn_cat	7·04E-03	483	NA	NA	NA	NA	NA
Sleep	continuous	Average sleep duration in hours	PSQI sleep quality index	raw_irn	2·15E-03	raw_irn	5·32E-01	181	log_raw	2·56E-04	Spearman	8·55E-01	794
Sleep	continuous	Sleep inertia on free days	PSQI sleep quality index	log_log	1·30E-02	log_log	1·26E-01	178	log_raw	2·56E-04	Spearman	8·55E-01	794
Sleep	continuous	Chronotyp – sleep, age and sex corrected	NA	log_log	9·66E-03	Spearman	6·38E-01	181	NA	NA	NA	NA	NA
Sleep	continuous	Chronotyp - sleep corrected	NA	log_log	3·48E-03	Spearman	6·96E-01	181	NA	NA	NA	NA	NA
Smoking	ordinal	Smoking status	Smoking status	log_cat	3·04E-02	log_cat	7·71E-03	483	irn_cat	1·34E-02	irn_cat	8·62E-03	806
Cardiovascular system	continuous	Systolic blood pressure	Systolic blood pressure	raw_log	8·65E-02	Spearman	8·59E-09	483	irn_log	3·85E-02	irn_irn	1·30E-08	809
Cardiovascular system	ordinal	Hypertension classification (ISH-WHO 1999)	Systolic blood pressure	log_cat	9·45E-02	log_cat	1·76E-08	483	irn_log	3·85E-02	irn_irn	1·30E-08	809
Body mass	continuous	Waist hip ratio	BMI	raw_irn	1·51E-01	raw_irn	6·59E-19	481	irn_raw	6·18E-02	irn_log	1·69E-12	792
Hypothyroidism	ordinal	Diagnosed hypothyroidism	NA	irn_cat	1·50E-02	irn_cat	1·15E-01	483	NA	NA	NA	NA	NA
Physical activity	continuous	Time usually spend outdoors in winter (self-reported)	NA	log_log	7·67E-03	Spearman	5·01E-02	483	NA	NA	NA	NA	NA

Group	Type	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	3-DG (KORA)					3-DG (BiDirect)				
				Transformation	R2	Transformation p-value	p-value	N	Transformation	R2	Transformation p-value	p-value	N
Age	categorical	Age Group	Age Group	log_cat	4·52E-02	log_cat	6·09E-04	483	log_cat	1·64E-02	log_cat	7·31E-03	796
Baseline	binary	Sex	Sex	irn_cat	3·27E-02	irn_cat	4·99E-04	483	log_cat	3·64E-03	log_cat	1·37E-01	810
Physical activity	ordinal	Success rates of diets (self-reported)	NA	irn_cat	4·44E-02	irn_cat	8·44E-03	483	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Coronary heart disease	Diagnosed myocardial infarction	log_cat	5·85E-02	log_cat	1·39E-03	483	log_cat	9·56E-02	log_cat	2·43E-05	809
Physical activity	ordinal	Current physical condition (self-reported)	NA	log_cat	1·06E-02	log_cat	2·27E-01	483	NA	NA	NA	NA	NA
Cardiovascular system	ordinal	Total heart attacks	Diagnosed 1st -3rd myocardial infarction	log_cat	1·36E-01	log_cat	2·98E-06	483	log_cat	9·56E-02	log_cat	2·43E-05	809
Cardiovascular system	continuous	Year of the 1st heart attack	Diagnosed myocardial infarction	log_cat	8·79E-02	log_cat	2·67E-04	479	log_cat	9·56E-02	log_cat	2·43E-05	809
Cardiovascular system	binary	Year of the 1st stroke	Diagnosed stroke	irn_cat	6·94E-03	irn_cat	3·68E-01	480	log_cat	3·48E-02	log_cat	4·64E-03	809
Cancer	categorical	Diagnosed cancer	Diagnosed cancer	log_cat	4·63E-03	log_cat	5·81E-01	483	irn_cat	3·05E-03	irn_cat	2·51E-01	809
Cancer	categorical	Amount of cancers	Diagnosed 1st -3rd cancer	log_cat	3·80E-03	log_cat	6·50E-01	482	irn_cat	3·05E-03	irn_cat	2·51E-01	809
Cholesterol and triglycerides	continuous	Elevated cholesterol or triglyceride levels within last 12 month	NA	raw_irn	1·45E-02	raw_irn	1·57E-01	137	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Previous heart operations	Diagnosed myocardial infarction	log_cat	1·41E-01	log_cat	1·78E-04	483	log_cat	9·56E-02	log_cat	2·43E-05	809
Physical activity	categorical	Duration of cycling on weekdays (self-reported)	NA	irn_cat	5·96E-03	irn_cat	5·65E-01	483	NA	NA	NA	NA	NA
Baseline	categorical	Examination date	NA	log_cat	2·83E-03	log_cat	5·65E-01	483	NA	NA	NA	NA	NA
Inflammation	continuous	hs C-reactive protein	hs C-reactive protein	raw_irn	2·13E-03	Spearman	6·94E-01	482	log_raw	1·69E-03	Spearman	8·31E-01	781
Iron metabolism	continuous	Iron	NA	raw_log	9·43E-04	irn_irn	5·61E-01	483	NA	NA	NA	NA	NA
Iron metabolism	continuous	Ferritin	NA	log_log	6·33E-03	irn_irn	9·42E-02	483	NA	NA	NA	NA	NA
Liver function	continuous	Alkaline phosphatase (ALP)	NA	raw_irn	5·39E-03	irn_irn	1·54E-01	483	NA	NA	NA	NA	NA
Liver function	continuous	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	log_log	3·58E-02	irn_irn	1·17E-04	483	log_log	7·10E-03	irn_irn	5·19E-02	790
Liver function	continuous	Glutamic oxalate transaminase (GOT, AST)	Glutamic oxalate transaminase (GOT, AST)	raw_irn	7·34E-03	Spearman	1·16E-01	483	irn_log	6·47E-04	irn_irn	4·96E-01	789
Liver function	continuous	Glutamate pyruvate transaminase (GPT, ALT)	Glutamate pyruvate transaminase (GPT, ALT)	raw_log	2·52E-03	irn_irn	5·69E-01	483	log_raw	1·52E-03	irn_irn	7·64E-01	788
Glucose level	continuous	HbA1c value	HbA1c value	raw_log	1·43E-01	Spearman	1·87E-09	483	log_raw	1·17E-01	irn_irn	4·19E-12	798
Cholesterol and triglycerides	continuous	HDL - cholesterol	HDL - cholesterol	log_log	1·32E-02	log_log	1·11E-02	483	log_log	1·64E-03	irn_log	3·83E-01	787
Neurodegenerative disorders and neuropathies	categorical	Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	NA	irn_cat	6·00E-02	irn_cat	7·46E-02	212	NA	NA	NA	NA	NA
Inflammation	ordinal	Phlebitis in superficial veins within last 12 months	NA	log_cat	1·86E-02	log_cat	3·59E-01	382	NA	NA	NA	NA	NA
Kidney function	ordinal	Kidney disease within last 12 month	Glomerular filtration rate (CKD-EPI 2009)	log_cat	3·21E-02	log_cat	9·62E-02	381	irn_log	4·28E-03	irn_irn	5·87E-02	788
Gout and hyperuricemia	ordinal	Gout, elevated uric acid levels within last 12 month	NA	irn_cat	2·05E-02	irn_cat	1·15E-01	382	NA	NA	NA	NA	NA

Anxiety	ordinal	Anxiety or panic disorders within last 12 month	NA	log_cat	3·31E-03	log_cat	7·30E-01	381	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	categorical	Parkinson screening: Unsteady walking (self-reported)	NA	log_cat	1·23E-01	Kruskal_Wallis	4·95E-02	99	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	ordinal	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)	NA	irn_cat	1·72E-01	Kruskal_Wallis	1·64E-01	98	NA	NA	NA	NA	NA
Alcohol	continuous	Alcohol consumption	Average alcohol consumption (last week)	raw_irn	9·75E-03	Spearman	4·15E-02	483	irn_raw	5·98E-03	Spearman	5·59E-02	741
Medication	binary	Antihypertensives (Assignment according to recommendations of the German League)	NA	log_cat	5·53E-02	log_cat	1·01E-05	483	NA	NA	NA	NA	NA
Body mass	continuous	Body Mass Index	Body Mass Index	raw_irn	1·52E-03	irn_irn	3·66E-01	480	log_log	3·96E-03	irn_irn	1·59E-01	792
Body mass	ordinal	Body Mass Index Categories according to WHO	Body Mass Index	irn_cat	7·64E-03	irn_cat	5·99E-01	480	log_log	3·96E-03	irn_irn	1·59E-01	792
Cardiovascular system	continuous	Diastolic blood pressure	Diastolic blood pressure	raw_irn	1·80E-04	Spearman	5·11E-01	483	log_raw	1·24E-04	log_raw	7·51E-01	809
Diabetes	categorical	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	log_cat	2·62E-01	log_cat	3·06E-14	483	log_cat	9·49E-02	log_cat	6·10E-08	809
Diabetes	ordinal	Age at diagnosis of validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	irn_cat	2·72E-01	irn_cat	1·40E-10	483	log_cat	9·49E-02	log_cat	6·10E-08	809
Anxiety	ordinal	Generalized Anxiety Disorder Scale	NA	log_cat	2·17E-02	log_cat	7·38E-02	380	NA	NA	NA	NA	NA
Baseline	continuous	Weight	Weight	raw_irn	1·55E-04	irn_irn	7·46E-01	480	log_raw	3·64E-03	irn_log	1·86E-01	808
Kidney function	continuous	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	log_log	7·37E-02	Spearman	5·12E-07	482	irn_log	4·28E-03	irn_irn	5·87E-02	788
Glucose level	continuous	Fasting serum glucose	Fasting serum glucose	raw_log	1·54E-01	Spearman	3·19E-12	475	log_raw	1·34E-01	Spearman	4·22E-18	787
Baseline	continuous	Height	Height	raw_log	1·03E-03	irn_irn	4·90E-01	482	log_log	7·05E-05	log_log	8·11E-01	810
Medication	categorical	Systemic hormone therapy	NA	log_cat	3·30E-02	log_cat	1·45E-03	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	Systolic blood pressure	log_cat	8·40E-02	log_cat	3·01E-08	483	log_raw	1·74E-03	irn_irn	4·59E-01	809
Medication	binary	Taking ACE inhibitors	NA	log_cat	4·99E-02	log_cat	1·82E-04	483	NA	NA	NA	NA	NA
Medication	binary	Insulin	Drugs used in diabetes	irn_cat	2·69E-01	irn_cat	4·31E-08	483	log_cat	1·55E-01	log_cat	7·59E-07	810
Medication	binary	Anticoagulants	NA	log_cat	2·23E-02	log_cat	8·09E-02	483	NA	NA	NA	NA	NA
Medication	binary	Trombocyte aggregation inhibitors		log_cat	3·11E-02	log_cat	3·13E-03	483	irn_cat	4·32E-03	irn_cat	3·72E-01	810
Medication	binary	Angiotensin antagonists	NA	irn_cat	4·03E-02	irn_cat	7·35E-03	483	NA	NA	NA	NA	NA
Medication	binary	Beta-blockers	NA	log_cat	2·45E-02	log_cat	5·64E-03	483	NA	NA	NA	NA	NA
Medication	binary	Bisphosphonates	NA	log_cat	5·59E-02	log_cat	2·13E-02	483	NA	NA	NA	NA	NA
Medication	binary	Calcium antagonists	NA	log_cat	5·77E-02	log_cat	4·96E-04	483	NA	NA	NA	NA	NA
Medication	binary	Anti-dementia medication	NA	log_cat	1·33E-04	log_cat	9·45E-01	483	NA	NA	NA	NA	NA
Medication	binary	Antidepressants	Antidepressants	log_cat	1·38E-02	log_cat	1·56E-01	483	log_cat	4·59E-03	log_cat	3·89E-01	810
Medication	binary	Diuretics	NA	log_cat	4·12E-02	log_cat	5·18E-04	483	NA	NA	NA	NA	NA
Medication	binary	Antidiabetic medication	Drugs used in diabetes	log_cat	2·19E-01	log_cat	3·01E-11	483	log_cat	1·55E-01	log_cat	7·59E-07	810
Medication	binary	Hyperuricemia medication	NA	log_cat	7·57E-02	log_cat	1·24E-03	483	NA	NA	NA	NA	NA

Medication	binary	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)	NA	irn_cat	9·86E-02	irn_cat	6·20E-03	483	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated myocardial infarction (self-reported)	Diagnosed myocardial infarction	log_cat	1·45E-01	log_cat	7·11E-06	483	log_cat	9·56E-02	log_cat	2·43E-05	809
Medication	binary	L-Dopa	Dopa and dopa derivates	irn_cat	1·46E-01	irn_cat	3·90E-02	483	irn_cat	9·03E-03	irn_cat	5·06E-01	810
Medication	binary	Muscle relaxants, centrally acting agents	NA	irn_cat	1·74E-01	irn_cat	3·13E-03	483	NA	NA	NA	NA	NA
Medication	binary	Metformin	Drugs used in diabetes	log_cat	8·33E-02	log_cat	5·68E-04	483	log_cat	1·55E-01	log_cat	7·59E-07	810
Medication	binary	Mirtazapine	Other antidepressants	irn_cat	1·27E-01	irn_cat	1·41E-02	483	log_cat	4·59E-03	log_cat	3·89E-01	810
Medication	binary	Oral antidiabetics	Drugs used in diabetes	log_cat	1·19E-01	log_cat	9·76E-06	483	log_cat	1·55E-01	log_cat	7·59E-07	810
Medication	binary	Muscle relaxants	NA	irn_cat	1·74E-01	irn_cat	3·13E-03	483	NA	NA	NA	NA	NA
Medication	binary	Statins	NA	log_cat	3·57E-02	log_cat	2·51E-03	483	NA	NA	NA	NA	NA
Medication	binary	Regular systemic corticosteroid use	NA	log_cat	1·76E-01	log_cat	4·96E-04	483	NA	NA	NA	NA	NA
Medication	binary	Trizyclika	Other antidepressants	log_cat	1·06E-04	log_cat	9·23E-01	483	log_cat	4·59E-03	log_cat	3·89E-01	810
Baseline	binary	Fasting status on the day of examination with regard to food	NA	irn_cat	1·34E-01	irn_cat	2·46E-02	483	NA	NA	NA	NA	NA
Medication	categorical	Oral contraceptives	NA	irn_cat	3·15E-02	irn_cat	1·60E-03	483	NA	NA	NA	NA	NA
Cardiovascular system	continuous	Pulse frequency	NA	log_log	2·49E-03	Spearman	5·10E-01	483	NA	NA	NA	NA	NA
Smoking	continuous	Pack years	Pack years	raw_log	3·90E-02	Spearman	6·53E-05	473	log_raw	1·19E-02	irn_irn	1·09E-02	456
Smoking	ordinal	Passive smoker	NA	irn_cat	5·37E-02	irn_cat	3·94E-04	380	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated stroke (self-reported)	NA	irn_cat	5·94E-03	irn_cat	4·00E-01	483	NA	NA	NA	NA	NA
Sleep	continuous	Average sleep duration in hours	PSQI sleep quality index	log_log	4·78E-03	log_log	3·52E-01	181	log_log	5·18E-04	Spearman	6·10E-01	794
Sleep	continuous	Sleep inertia on free days	PSQI sleep quality index	raw_irn	5·34E-03	Spearman	4·96E-01	178	log_log	5·18E-04	Spearman	6·10E-01	794
Sleep	continuous	Chronotyp – sleep, age and sex corrected	NA	log_log	9·39E-04	irn_irn	8·63E-01	181	NA	NA	NA	NA	NA
Sleep	continuous	Chronotyp - sleep corrected	NA	log_log	9·40E-05	irn_irn	9·76E-01	181	NA	NA	NA	NA	NA
Smoking	ordinal	Smoking status	Smoking status	irn_cat	3·40E-02	irn_cat	2·80E-03	483	log_cat	9·50E-03	log_cat	3·42E-02	806
Cardiovascular system	continuous	Systolic blood pressure	Systolic blood pressure	raw_irn	4·03E-02	Spearman	2·90E-05	483	log_raw	1·74E-03	irn_irn	4·59E-01	809
Cardiovascular system	ordinal	Hypertension classification (ISH-WHO 1999)	Systolic blood pressure	irn_cat	5·64E-02	irn_cat	4·50E-05	483	log_raw	1·74E-03	irn_irn	4·59E-01	809
Body mass	continuous	Waist hip ratio	BMI	raw_irn	3·13E-02	raw_irn	9·27E-05	481	log_log	3·96E-03	irn_irn	1·59E-01	792
Hypothyroidism	ordinal	Diagnosed hypothyroidism	NA	log_cat	2·70E-02	log_cat	1·46E-02	483	NA	NA	NA	NA	NA
Physical activity	continuous	Time usually spend outdoors in winter (self-reported)	NA	raw_log	3·88E-03	Spearman	2·12E-01	483	NA	NA	NA	NA	NA

Group	Type	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	Combined (KORA)					Combined (BiDirect)				
				Transformation	R2	Transformation p-value	p-value	N	Transformation	R2	Transformation p-value	p-value	N
Age	categorical	Age Group	Age Group	log_raw	8·34E-02	log_raw	4·51E-15	473	log_raw	1·35E-02	log_raw	2·10E-08	771
Baseline	binary	Sex	Sex	log_raw	3·92E-02	log_raw	1·75E-08	475	log_raw	1·53E-02	log_raw	1·33E-09	787
Physical activity	ordinal	Success rates of diets (self-reported)	NA	log_raw	5·68E-03	log_raw	3·77E-01	472	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Coronary heart disease	Diagnosed myocardial infarction	log_raw	1·81E-02	log_raw	2·66E-04	474	log_raw	1·68E-03	log_raw	1·16E-02	797
Physical activity	ordinal	Current physical condition (self-reported)	NA	log_raw	1·45E-02	log_raw	3·56E-02	471	NA	NA	NA	NA	NA
Cardiovascular system	ordinal	Total heart attacks	Diagnosed 1st -3rd myocardial infarction	log_raw	1·19E-02	log_raw	1·18E-03	469	log_raw	1·68E-03	log_raw	1·16E-02	797
Cardiovascular system	continuous	Year of the 1st heart attack	Diagnosed myocardial infarction	log_raw	1·57E-02	log_raw	2·21E-04	464	log_raw	1·68E-03	log_raw	1·16E-02	797
Cardiovascular system	binary	Year of the 1st stroke	Diagnosed stroke	log_raw	1·31E-03	log_raw	7·43E-02	470	log_raw	1·32E-03	log_raw	1·32E-02	794
Cancer	categorical	Diagnosed cancer	Diagnosed cancer	log_raw	3·88E-03	log_raw	6·54E-03	474	log_raw	1·63E-03	log_raw	1·15E-02	784
Cancer	categorical	Amount of cancers	Diagnosed 1st -3rd cancer	log_raw	3·37E-03	log_raw	1·03E-02	473	log_raw	1·63E-03	log_raw	1·15E-02	784
Cholesterol and triglycerides	continuous	Elevated cholesterol or triglyceride levels within last 12 month	NA	log_irn	3·30E-02	log_irn	4·25E-03	133	NA	NA	NA	NA	NA
Cardiovascular system	categorical	Previous heart operations	Diagnosed myocardial infarction	log_raw	1·15E-02	log_raw	1·26E-03	474	log_raw	1·68E-03	log_raw	1·16E-02	797
Physical activity	categorical	Duration of cycling on weekdays (self-reported)	NA	log_raw	4·58E-03	log_raw	2·28E-01	479	NA	NA	NA	NA	NA
Baseline	categorical	Examination date	NA	log_raw	-1·86E-03	log_raw	1·66E-01	477	NA	NA	NA	NA	NA
Inflammation	continuous	hs C-reactive protein	hs C-reactive protein	log_raw	2·16E-02	log_raw	1·16E-05	478	log_irn	1·07E-02	log_irn	1·02E-06	758
Iron metabolism	continuous	Iron	NA	log_log	1·38E-03	log_log	6·90E-02	471	NA	NA	NA	NA	NA
Iron metabolism	continuous	Ferritin	NA	log_irn	3·35E-02	log_irn	2·31E-08	473	NA	NA	NA	NA	NA
Liver function	continuous	Alkaline phosphatase (ALP)	NA	log_irn	1·06E-02	log_irn	7·50E-04	470	NA	NA	NA	NA	NA
Liver function	continuous	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	log_irn	4·62E-02	log_irn	3·90E-10	474	log_irn	1·66E-02	log_irn	2·42E-11	770
Liver function	continuous	Glutamic oxalate transaminase (GOT, AST)	Glutamic oxalate transaminase (GOT, AST)	log_irn	2·23E-02	log_irn	7·47E-06	473	log_irn	1·65E-02	log_irn	6·38E-11	776
Liver function	continuous	Glutamate pyruvate transaminase (GPT, ALT)	Glutamate pyruvate transaminase (GPT, ALT)	log_log	8·98E-03	log_log	2·11E-03	475	log_raw	1·74E-02	log_raw	2·63E-15	782
Glucose level	continuous	HbA1c value	HbA1c value	log_irn	5·42E-02	log_irn	4·66E-12	477	log_log	1·81E-02	log_log	7·77E-13	784
Cholesterol and triglycerides	continuous	HDL - cholesterol	HDL - cholesterol	log_raw	2·78E-02	log_raw	8·14E-07	475	log_log	1·09E-02	log_log	1·51E-06	772
Neurodegenerative disorders and neuropathies	categorical	Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	NA	log_raw	-4·51E-03	log_raw	5·74E-01	206	NA	NA	NA	NA	NA
Inflammation	ordinal	Phlebitis in superficial veins within last 12 months	NA	log_raw	-3·96E-03	log_raw	6·98E-01	377	NA	NA	NA	NA	NA
Kidney function	ordinal	Kidney disease within last 12 month	Glomerular filtration rate (CKD-EPI 2009)	log_raw	-1·81E-03	log_raw	5·98E-01	374	log_irn	3·35E-02	log_irn	6·23E-17	773
Gout and hyperuricemia	ordinal	Gout, elevated uric acid levels within last 12 month	NA	log_raw	8·58E-03	log_raw	3·33E-02	372	NA	NA	NA	NA	NA

Anxiety	ordinal	Anxiety or panic disorders within last 12 month	NA	log_raw	-3·16E-03	log_raw	8·34E-01	369	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	categorical	Parkinson screening: Unsteady walking (self-reported)	NA	log_raw	7·10E-03	log_raw	1·16E-01	95	NA	NA	NA	NA	NA
Neurodegenerative disorders and neuropathies	ordinal	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)	NA	log_raw	-5·43E-04	log_raw	1·99E-01	94	NA	NA	NA	NA	NA
Alcohol	continuous	Alcohol consumption	Average alcohol consumption (last week)	log_raw	8·49E-03	log_raw	4·33E-03	477	log_log	5·90E-03	log_log	1·01E-03	720
Medication	binary	Antihypertensives (Assignment according to recommendations of the German League)	NA	log_raw	6·35E-02	log_raw	3·60E-13	478	NA	NA	NA	NA	NA
Body mass	continuous	Body Mass Index	Body Mass Index	log_irn	2·71E-02	log_irn	2·54E-07	471	log_irn	1·47E-02	log_irn	4·01E-11	781
Body mass	ordinal	Body Mass Index Categories according to WHO	Body Mass Index	log_raw	1·47E-02	log_raw	4·72E-04	474	log_irn	1·47E-02	log_irn	4·01E-11	781
Cardiovascular system	continuous	Diastolic blood pressure	Diastolic blood pressure	log_log	3·27E-03	log_log	3·54E-02	477	log_raw	7·98E-03	log_raw	6·02E-07	784
Diabetes	categorical	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	log_raw	4·63E-02	log_raw	5·41E-11	472	log_raw	4·59E-03	log_raw	6·87E-05	795
Diabetes	ordinal	Age at diagnosis of validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	log_raw	3·14E-02	log_raw	5·18E-04	471	log_raw	4·59E-03	log_raw	6·87E-05	795
Anxiety	ordinal	Generalized Anxiety Disorder Scale	NA	log_raw	-3·01E-03	log_raw	6·72E-01	376	NA	NA	NA	NA	NA
Baseline	continuous	Weight	Weight	log_log	1·86E-02	log_log	1·57E-05	472	log_log	2·19E-02	log_log	2·59E-13	793
Kidney function	continuous	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	log_log	1·61E-01	log_log	6·30E-33	477	log_irn	3·35E-02	log_irn	6·23E-17	773
Glucose level	continuous	Fasting serum glucose	Fasting serum glucose	log_irn	1·00E-01	log_irn	1·50E-19	467	log_raw	3·73E-02	log_raw	9·31E-25	776
Baseline	continuous	Height	Height	log_log	-9·18E-04	log_log	2·09E-01	476	log_irn	6·80E-03	log_irn	2·02E-04	793
Medication	categorical	Systemic hormone therapy	NA	log_raw	3·52E-02	log_raw	4·08E-06	474	NA	NA	NA	NA	NA
Cardiovascular system	binary	Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	Systolic blood pressure	log_raw	1·02E-01	log_raw	1·65E-20	479	log_irn	8·69E-03	log_irn	3·21E-07	792
Medication	binary	Taking ACE inhibitors	NA	log_raw	2·21E-02	log_raw	7·81E-06	470	NA	NA	NA	NA	NA
Medication	binary	Insulin	Drugs used in diabetes	log_raw	1·51E-02	log_raw	1·18E-04	474	log_raw	5·21E-03	log_raw	6·81E-06	800
Medication	binary	Anticoagulants	NA	log_raw	5·24E-03	log_raw	1·52E-02	472	NA	NA	NA	NA	NA
Medication	binary	Trombocyte aggregation inhibitors		log_raw	1·90E-02	log_raw	2·70E-05	468	log_raw	-9·34E-04	log_raw	4·86E-01	796
Medication	binary	Angiotensin antagonists	NA	log_raw	6·04E-03	log_raw	1·13E-02	474	NA	NA	NA	NA	NA
Medication	binary	Beta-blockers	NA	log_raw	3·36E-02	log_raw	4·01E-08	477	NA	NA	NA	NA	NA
Medication	binary	Bisphosphonates	NA	log_raw	-9·68E-04	log_raw	2·41E-01	473	NA	NA	NA	NA	NA
Medication	binary	Calcium antagonists	NA	log_raw	1·27E-02	log_raw	5·09E-04	472	NA	NA	NA	NA	NA
Medication	binary	Anti-dementia medication	NA	log_raw	2·65E-03	log_raw	3·29E-02	483	NA	NA	NA	NA	NA
Medication	binary	Antidepressants	Antidepressants	log_raw	7·80E-03	log_raw	3·15E-03	474	log_raw	-1·08E-03	log_raw	4·61E-01	798
Medication	binary	Diuretics	NA	log_raw	4·34E-02	log_raw	7·26E-10	473	NA	NA	NA	NA	NA
Medication	binary	Antidiabetic medication	Drugs used in diabetes	log_raw	3·73E-02	log_raw	4·33E-09	473	log_raw	5·21E-03	log_raw	6·81E-06	800
Medication	binary	Hyperuricemia medication	NA	log_raw	2·17E-02	log_raw	1·76E-05	471	NA	NA	NA	NA	NA

Category	Type	Variable	Proxy										
Medication	binary	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)	NA	log_raw	8·87E-04	log_raw	1·25E-01	479	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated myocardial infarction (self-reported)	Diagnosed myocardial infarction	log_raw	1·56E-02	log_raw	2·19E-04	470	log_raw	1·68E-03	log_raw	1·16E-02	797
Medication	binary	L-Dopa	Dopa and dopa derivates	log_raw	2·60E-03	log_raw	3·70E-02	483	NA	NA	NA	NA	NA
Medication	binary	Muscle relaxants, centrally acting agents	NA	log_raw	3·90E-03	log_raw	1·46E-02	483	NA	NA	NA	NA	NA
Medication	binary	Metformin	Drugs used in diabetes	log_raw	2·39E-03	log_raw	4·50E-02	473	log_raw	5·21E-03	log_raw	6·81E-06	800
Medication	binary	Mirtazapine	Other antidepressants	log_raw	-1·15E-03	log_raw	2·63E-01	479	log_raw	-1·08E-03	log_raw	4·61E-01	798
Medication	binary	Oral antidiabetics	Drugs used in diabetes	log_raw	1·35E-02	log_raw	3·31E-04	474	log_raw	5·21E-03	log_raw	6·81E-06	800
Medication	binary	Muscle relaxants	NA	log_raw	3·90E-03	log_raw	1·46E-02	483	NA	NA	NA	NA	NA
Medication	binary	Statins	NA	log_raw	1·38E-02	log_raw	3·06E-04	471	NA	NA	NA	NA	NA
Medication	binary	Regular systemic corticosteroid use	NA	log_raw	2·39E-03	log_raw	5·58E-02	478	NA	NA	NA	NA	NA
Medication	binary	Trizyclika	Other antidepressants	log_raw	7·00E-04	log_raw	1·48E-01	474	log_raw	-1·08E-03	log_raw	4·61E-01	798
Baseline	binary	Fasting status on the day of examination with regard to food	NA	log_raw	-1·86E-04	log_raw	6·33E-02	481	NA	NA	NA	NA	NA
Medication	categorical	Oral contraceptives	NA	log_raw	4·36E-02	log_raw	6·70E-10	473	NA	NA	NA	NA	NA
Cardiovascular system	continuous	Pulse frequency	NA	log_irn	3·70E-03	log_irn	2·40E-02	475	NA	NA	NA	NA	NA
Smoking	continuous	Pack years	Pack years	log_raw	2·02E-02	log_raw	3·75E-05	463	log_raw	7·72E-04	log_raw	3·31E-02	444
Smoking	ordinal	Passive smoker	NA	log_raw	2·14E-02	log_raw	9·29E-04	370	NA	NA	NA	NA	NA
Cardiovascular system	binary	Inpatient treated stroke (self-reported)	NA	log_raw	1·17E-03	log_raw	7·74E-02	473	NA	NA	NA	NA	NA
Sleep	continuous	Average sleep duration in hours	PSQI sleep quality index	log_log	-1·66E-03	log_log	2·10E-01	177	log_raw	9·02E-04	log_raw	7·13E-02	778
Sleep	continuous	Sleep inertia on free days	PSQI sleep quality index	log_log	8·46E-03	log_log	3·42E-02	175	log_raw	9·02E-04	log_raw	7·13E-02	778
Sleep	continuous	Chronotyp – sleep, age and sex corrected	NA	log_log	-6·91E-04	log_log	1·90E-01	174	NA	NA	NA	NA	NA
Sleep	continuous	Chronotyp - sleep corrected	NA	log_raw	-2·19E-03	log_raw	1·66E-01	175	NA	NA	NA	NA	NA
Smoking	ordinal	Smoking status	Smoking status	log_raw	1·99E-02	log_raw	1·36E-03	474	log_raw	2·64E-03	log_raw	5·24E-03	784
Cardiovascular system	continuous	Systolic blood pressure	Systolic blood pressure	log_raw	4·22E-02	log_raw	4·89E-09	478	log_irn	8·69E-03	log_irn	3·21E-07	792
Cardiovascular system	ordinal	Hypertension classification (ISH-WHO 1999)	Systolic blood pressure	log_raw	3·51E-02	log_raw	6·45E-04	479	log_irn	8·69E-03	log_irn	3·21E-07	792
Body mass	continuous	Waist hip ratio	BMI	log_log	8·29E-02	log_log	1·11E-16	471	log_irn	1·47E-02	log_irn	4·01E-11	781
Hypothyroidism	ordinal	Diagnosed hypothyroidism	NA	log_raw	1·02E-02	log_raw	1·34E-01	466	NA	NA	NA	NA	NA
Physical activity	continuous	Time usually spend outdoors in winter (self-reported)	NA	log_raw	3·85E-03	log_raw	1·98E-02	480	NA	NA	NA	NA	NA

Supplementary table 4: Meta-analysis of lead traits.

A phenotype was considered to be a lead trait of a category if in KORA

i) the association of that trait reached Bonferroni-corrected significance for at least one of the 3 dicarbonyls (MG, GO, 3-DG)

and

ii) that association was more significant than the respective associations of other traits in that category.

12 of the 15 lead traits were available in both population samples (exactly or as a proxy) and could be included in the meta-analysis.

Group	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	MG													
			KORA			BiDirect			Meta random effect					Meta fixed effect		
			beta	SE	p-value	beta	SE	p-value	p-value_het	I2	beta	SE	p-value	beta	SE	p-value
Age	Age Group	Age Group	0·005	0·001	6·90E-06	-0·002	0·002	1·91E-01	6·21E-04	91·461	0·001	0·004	7·02E-01	0·003	0·001	1·09E-03
Baseline	Sex (female)	Sex (female)	-0·113	0·031	2·68E-04	-0·040	0·030	1·79E-01	9·12E-02	64·943	-0·076	0·036	3·54E-02	-0·076	0·021	4·21E-04
Body mass	BMI	BMI	0·005	0·003	1·47E-01	0·001	0·003	7·02E-01	4·74E-01	0·000	0·003	0·002	1·87E-01	0·003	0·002	1·87E-01
Cardiovascular system	Systolic blood pressure	Systolic blood pressure	0·003	0·001	1·59E-04	0·002	0·001	1·14E-01	1·60E-01	49·242	0·003	0·001	6·70E-03	0·003	0·001	1·05E-04
Cholesterol and triglycerides	HDL - cholesterol	HDL - cholesterol	-0·002	0·001	2·33E-02	-0·614	0·462	1·84E-01	1·85E-01	42·957	-0·134	0·251	5·94E-01	-0·002	0·001	2·26E-02
Diabetes	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	0·158	0·054	3·76E-03	0·026	0·064	6·85E-01	1·13E-01	60·133	0·096	0·066	1·46E-01	0·102	0·041	1·33E-02
Glucose level	Fasting serum glucose	Serum glucose	0·003	0·001	2·52E-03	-0·001	0·001	1·19E-01	8·62E-04	90·993	0·001	0·002	7·01E-01	0·000	0·001	4·55E-01
Inflammation	hs C-reactive protein	hs C-reactive protein	0·015	0·004	6·18E-04	0·009	0·007	2·42E-01	4·16E-01	0·000	0·014	0·004	3·88E-04	0·014	0·004	3·88E-04
Kidney function	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	-0·009	0·001	6·06E-22	-0·002	0·001	1·79E-02	2·71E-06	95·457	-0·006	0·003	7·47E-02	-0·006	0·001	1·80E-20
Liver function	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	0·090	0·027	8·72E-04	-0·008	0·026	7·56E-01	9·15E-03	85·279	0·041	0·049	4·06E-01	0·040	0·019	3·34E-02
Medication	Antidiabetic medication	Drugs used in diabetes	0·155	0·061	1·09E-02	-0·214	0·106	4·48E-02	2·59E-03	88·981	-0·019	0·184	9·17E-01	0·065	0·053	2·20E-01
Smoking	Pack years	Pack years	0·053	0·039	1·81E-01	0·066	0·052	2·09E-01	8·40E-01	0·000	0·057	0·031	6·78E-02	0·057	0·031	6·78E-02

Group	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	GO													
			KORA			BiDirect			Meta random effect					Meta fixed effect		
			beta	SE	p-value	beta	SE	p-value	p-value_het	I2	beta	SE	p-value	beta	SE	p-value
Age	Age Group	Age Group	0·011	0·001	8·29E-22	0·007	0·007	1·76E-07	5·94E-01	0·000	0·011	0·001	4·71E-24	0·011	0·001	4·71E-24
Baseline	Sex (female)	Sex (female)	-0·194	0·034	2·86E-08	-0·160	0·023	2·75E-12	4·15E-01	0·000	-0·171	0·019	1·66E-19	-0·171	0·019	1·66E-19
Body mass	BMI	BMI	0·017	0·004	3·39E-06	0·019	0·003	2·47E-13	5·88E-01	0·000	0·018	0·002	1·44E-18	0·018	0·002	1·44E-18
Cardiovascular system	Systolic blood pressure	Systolic blood pressure	0·006	0·001	2·15E-09	0·005	0·001	5·61E-10	2·53E-01	23·505	0·005	0·001	5·28E-14	0·005	0·001	3·91E-18
Cholesterol and triglycerides	HDL - cholesterol	HDL - cholesterol	-0·006	0·001	3·29E-06	-0·280	0·353	4·28E-01	4·37E-01	0·000	-0·006	0·001	2·48E-06	-0·006	0·001	2·48E-06
Diabetes	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	0·203	0·062	1·04E-03	0·142	0·049	3·93E-03	4·34E-01	0·000	0·166	0·038	1·58E-05	0·166	0·038	1·58E-05
Glucose level	Fasting serum glucose	Serum glucose	0·005	0·001	7·19E-09	0·002	0·001	4·90E-06	5·30E-03	87·137	0·004	0·001	9·38E-03	0·003	0·000	3·98E-12
Inflammation	hs C-reactive protein	hs C-reactive protein	0·015	0·005	3·48E-03	0·028	0·006	5·85E-07	8·38E-02	66·558	0·021	0·007	1·08E-03	0·021	0·004	2·55E-08
Kidney function	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	-0·012	0·001	2·53E-36	-0·006	0·001	1·56E-16	3·97E-07	96·110	-0·009	0·003	1·72E-03	-0·009	0·001	1·06E-52
Liver function	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	0·118	0·030	1·12E-04	0·102	0·020	5·38E-07	6·58E-01	0·000	0·107	0·017	1·93E-10	0·107	0·017	1·93E-10
Medication	Antidiabetic medication	Drugs used in diabetes	0·191	0·069	5·85E-03	0·000	0·083	9·99E-01	7·59E-02	68·260	0·101	0·095	2·90E-01	0·113	0·053	3·30E-02
Smoking	Pack years	Pack years	0·040	0·045	3·74E-01	-0·042	0·041	2·98E-01	1·74E-01	45·821	-0·003	0·041	9·34E-01	-0·005	0·030	8·64E-01

Group	Detailed phenotype (KORA)	Aligned phenotype (BiDirect)	3-DG													
			KORA			BiDirect			Meta random effect					Meta fixed effect		
			beta	SE	p-value	beta	SE	p-value	p-value_het	I2	beta	SE	p-value	beta	SE	p-value
Age	Age Group	Age Group	0·005	0·001	1·10E-05	0·005	0·002	1·68E-03	8·84E-01	0·000	0·005	0·001	5·15E-08	0·005	0·001	5·15E-08
Baseline	Sex (female)	Sex (female)	-0·111	0·036	1·88E-03	-0·043	0·027	1·12E-01	1·29E-01	56·646	-0·073	0·034	2·99E-02	-0·068	0·022	1·57E-03
Body mass	BMI	BMI	0·002	0·004	5·84E-01	0·002	0·003	5·28E-01	9·88E-01	0·000	0·002	0·002	4·03E-01	0·002	0·002	4·03E-01
Cardiovascular system	Systolic blood pressure	Systolic blood pressure	0·004	0·001	4·32E-04	0·001	0·001	5·40E-01	2·20E-02	80·938	0·002	0·002	1·87E-01	0·002	0·001	5·54E-03
Cholesterol and triglycerides	HDL - cholesterol	HDL - cholesterol	-0·003	0·001	1·09E-02	0·680	0·423	1·09E-01	1·06E-01	61·625	0·207	0·316	5·11E-01	-0·003	0·001	1·08E-02
Diabetes	Validated diabetes mellitus with type indication	Diagnosed diabetes mellitus	0·467	0·060	2·89E-14	0·219	0·057	1·31E-04	2·71E-03	88·877	0·342	0·124	5·60E-03	0·338	0·041	2·37E-16
Glucose level	Fasting serum glucose	Serum glucose	0·008	0·001	1·33E-18	0·005	0·001	1·48E-17	7·36E-03	86·077	0·007	0·001	3·82E-06	0·006	0·000	3·03E-35
Inflammation	hs C-reactive protein	hs C-reactive protein	0·005	0·005	3·70E-01	0·001	0·007	8·61E-01	6·76E-01	0·000	0·003	0·004	4·16E-01	0·003	0·004	4·16E-01
Kidney function	Glomerular filtration rate (CKD-EPI 2009)	Glomerular filtration rate (CKD-EPI 2009)	-0·006	0·001	1·76E-07	-0·002	0·001	3·56E-02	9·76E-03	85·026	-0·004	0·002	3·95E-02	-0·004	0·001	3·67E-07
Liver function	Gamma-glutamyltransferase (GGT)	Gamma-glutamyltransferase (GGT)	0·110	0·031	3·92E-04	0·035	0·024	1·41E-01	5·56E-02	72·716	0·070	0·037	5·99E-02	0·064	0·019	7·95E-04
Medication	Antidiabetic medication	Drugs used in diabetes	0·470	0·067	7·84E-12	0·408	0·096	2·23E-05	5·95E-01	0·000	0·450	0·055	2·58E-16	0·450	0·055	2·58E-16
Smoking	Pack years	Pack years	0·187	0·045	3·27E-05	0·096	0·048	4·32E-02	1·63E-01	48·695	0·143	0·045	1·65E-03	0·145	0·033	8·87E-06

Supplementary table 5: Stepwise conditional analysis of traits in KORA that passed the false discovery rate (FDR) threshold of 5% for at least one dicarbonyl compound (MG, GO, 3-DG).

Stepwise conditional phenotypic association study of a dicarbonyl started with using the most significantly associated trait as a covariate in the repetition of the analyses of all other traits. The most significant trait in the repetition was then added as covariate for another round of analyses. This procedure was repeated until no further trait passed the Bonferroni-corrected significance threshold in the likelihood-ratio-test (P Lrtest≤0·05/84) anymore (of note, p-values usually do not represent the significance of an unconditioned analysis). Permutation p-values (P perm.) are calculated based on the simulated null distribution of the likelihood-ratio statistic, providing a robust reference for possible complex collinearity and data distribution in this study.

N indicates the number of traits that were conditioned on. If N=2, for instance, the analysis of the respective trait was conditioned on the trait with N=0 and the trait with N=1.

Group	Type	Detailed phenotype (KORA)	Shapiro-Wilk	MG					GO					3-DG				
				R2	R2 SE	P Lrtest	P perm.	N	R2	R2 SE	P Lrtest	P perm.	N	R2	R2 SE	P Lrtest	P perm.	N
Kidney function	continous	Glomerular filtration rate (CKD-EPI 2009)	1·94E-04	2·40E-01	7·14E-02	8·80E-19	0·00E+00	0	3·39E-01	6·32E-02	6·05E-28	0·00E+00	0	2·91E-02	1·45E-02	1·12E-05	2·00E-04	1
Cardiovascular system	ordinal	Hypertension classification (ISH-WHO 1999)	NA	1·82E-02	6·00E-03	1·47E-02	1·22E-01	2	1·34E-02	3·95E-03	1·97E-02	2·68E-01	4	1·78E-02	7·22E-03	5·30E-02	1·53E-01	3
Cardiovascular system	binary	Current hypertension (140/90 mmHg) or known hypertension controlled by medication (ISH-WHO 1999)	NA	1·43E-03	4·26E-03	2·96E-01	4·11E-01	2	1·22E-02	8·22E-03	5·57E-04	1·74E-02	3	4·82E-03	4·96E-03	1·13E-01	1·88E-01	3
Baseline	catological	Examination date	NA	1·53E-03	2·65E-03	5·57E-01	6·84E-01	2	3·82E-03	4·34E-03	1·51E-01	3·98E-01	4	1·71E-02	6·71E-03	1·12E-02	4·10E-02	3
Age	catological	Age Group	NA	3·08E-03	3·85E-03	7·98E-01	9·14E-01	2	3·07E-03	4·05E-03	6·95E-01	9·17E-01	4	7·66E-03	4·86E-03	4·06E-01	5·92E-01	3
Glucose level	continous	HbA1c value	4·40E-23	1·98E-03	3·04E-03	2·18E-01	3·25E-01	2	2·18E-03	2·80E-03	1·42E-01	3·02E-01	4	5·41E-03	6·88E-03	9·31E-02	1·55E-01	3
Body mass	continous	Waist hip ratio	1·58E-01	3·87E-04	2·69E-03	5·88E-01	6·67E-01	2	5·79E-02	1·51E-02	1·07E-12	0·00E+00	1	3·91E-03	6·58E-03	1·56E-01	2·31E-01	3
Diabetes	catological	Validated diabetes mellitus with type indication	NA	1·34E-03	2·16E-03	3·12E-01	4·04E-01	2	1·13E-03	1·76E-03	2·90E-01	4·61E-01	4	1·01E-02	4·41E-03	2·16E-02	5·56E-02	3
Medication	binary	Antihypertensives (Assignment according to recommendations of the German League)	NA	3·02E-04	2·00E-03	6·31E-01	6·94E-01	2	5·75E-03	3·25E-03	1·69E-02	9·84E-02	4	1·56E-04	1·92E-03	7·76E-01	8·17E-01	3
Medication	binary	Antidiabetic medication	NA	1·50E-03	1·88E-03	2·84E-01	3·89E-01	2	1·67E-03	1·89E-03	1·99E-01	3·64E-01	4	3·69E-03	2·76E-03	1·66E-01	2·53E-01	3
Glucose level	continous	Fasting serum glucose	8·46E-28	2·77E-04	1·89E-03	6·50E-01	7·15E-01	2	6·00E-05	1·51E-03	8·09E-01	8·69E-01	4	1·54E-01	3·71E-02	5·10E-19	0·00E+00	0
Medication	binary	Insulin	NA	4·11E-04	9·43E-04	5·75E-01	6·56E-01	2	1·06E-03	9·67E-04	3·07E-01	4·75E-01	4	1·09E-02	2·46E-03	1·72E-02	4·64E-02	3
Medication	binary	Diuretics	NA	1·89E-04	1·31E-03	7·03E-01	7·65E-01	2	6·82E-05	1·02E-03	7·95E-01	8·52E-01	4	2·64E-03	2·47E-03	2·42E-01	3·25E-01	3
Cardiovascular system	continous	Year of the 1st heart attack	NA	3·70E-04	1·41E-03	5·97E-01	6·69E-01	2	5·00E-04	1·19E-03	4·86E-01	6·13E-01	4	5·06E-04	7·39E-04	6·08E-01	6·63E-01	3
Medication	binary	Beta-blockers	NA	5·83E-04	2·35E-03	5·04E-01	5·93E-01	2	3·29E-04	1·11E-03	5·69E-01	6·92E-01	4	8·76E-03	6·31E-03	3·25E-02	6·66E-02	3
Cardiovascular system	ordinal	Total heart attacks	NA	5·82E-04	1·28E-03	8·00E-01	8·64E-01	2	7·67E-04	1·19E-03	6·85E-01	8·18E-01	4	6·06E-05	2·25E-04	8·60E-01	8·77E-01	3
Cardiovascular system	binary	Inpatient treated myocardial infarction (self-reported)	NA	6·15E-05	6·74E-04	8·28E-01	8·62E-01	2	9·04E-04	1·57E-03	3·45E-01	5·09E-01	4	4·95E-05	2·92E-04	8·73E-01	8·98E-01	3
Cardiovascular system	continous	Systolic blood pressure	2·03E-05	9·49E-04	2·09E-03	3·94E-01	4·95E-01	2	9·84E-04	2·96E-03	3·25E-01	4·84E-01	4	3·68E-03	4·08E-03	1·67E-01	2·42E-01	3
Alcohol	continous	Alcohol consumption	3·03E-28	8·81E-04	3·03E-03	4·11E-01	5·19E-01	2	3·47E-03	3·76E-03	6·41E-02	2·02E-01	4	7·10E-03	6·23E-03	5·43E-02	1·08E-01	3
Cardiovascular system	continous	Diastolic blood pressure	6·34E-01	1·75E-05	1·31E-03	9·08E-01	9·26E-01	2	6·14E-04	2·25E-03	4·37E-01	5·83E-01	4	1·04E-06	1·87E-03	9·81E-01	9·81E-01	3
Baseline	continous	Weight	1·73E-04	3·93E-04	1·82E-03	5·85E-01	6·68E-01	2	6·32E-04	2·34E-03	4·32E-01	5·85E-01	4	2·17E-02	1·07E-02	7·71E-04	3·80E-03	3
Iron metabolism	continous	Iron	2·41E-07	2·04E-03	3·77E-03	2·11E-01	3·22E-01	2	4·91E-03	4·63E-03	2·74E-02	1·22E-01	4	3·93E-06	2·28E-03	9·64E-01	9·70E-01	3
Body mass	continous	Body Mass Index	3·75E-09	2·79E-04	1·93E-03	6·46E-01	7·19E-01	2	2·23E-06	1·36E-03	9·63E-01	9·72E-01	4	1·93E-02	1·01E-02	1·54E-03	6·60E-03	3
Iron metabolism	continous	Ferritin	1·17E-29	2·22E-05	1·89E-03	8·96E-01	9·14E-01	2	5·81E-03	4·72E-03	1·64E-02	8·98E-02	4	1·09E-03	2·85E-03	4·52E-01	5·32E-01	3
Baseline	continous	Height	2·47E-02	2·49E-05	1·84E-03	8·90E-01	9·14E-01	2	1·19E-03	2·21E-03	2·79E-01	4·51E-01	4	2·74E-03	4·30E-03	2·33E-01	3·17E-01	3

Liver function	continous	Glutamate pyruvate transaminase (GPT, ALT)	1·03E-28	5·90E-03	5·35E-03	3·32E-02	9·68E-02	2	1·32E-03	2·28E-03	2·53E-01	4·33E-01	4	9·41E-05	3·27E-03	8·25E-01	8·57E-01	3
Medication	binary	Hyperuricemia medication	NA	1·01E-02	6·37E-03	5·22E-03	3·18E-02	2	6·89E-03	3·67E-03	8·92E-03	6·76E-02	4	2·96E-03	1·72E-03	2·14E-01	2·93E-01	3
Liver function	continous	Glutamic oxalate transaminase (GOT, AST)	1·04E-32	9·29E-03	7·06E-03	7·45E-03	3·80E-02	2	5·01E-03	5·03E-03	2·60E-02	1·22E-01	4	5·70E-03	6·12E-03	8·47E-02	1·49E-01	3
Inflammation	continous	hs C-reactive protein	6·23E-40	4·04E-03	4·23E-03	7·87E-02	1·70E-01	2	5·07E-06	1·44E-03	9·44E-01	9·59E-01	4	9·00E-04	7·40E-03	4·94E-01	5·60E-01	3
Liver function	continous	Alkaline phosphatase (ALP)	3·56E-10	5·89E-04	2·33E-03	5·02E-01	5·99E-01	2	1·25E-03	2·45E-03	2·66E-01	4·32E-01	4	8·44E-04	3·33E-03	5·08E-01	5·77E-01	3
Smoking	continous	Pack years	1·73E-29	7·49E-03	5·29E-03	1·75E-02	5·22E-02	2	8·49E-04	2·92E-03	3·67E-01	5·25E-01	4	1·02E-02	7·33E-03	2·20E-02	5·40E-02	3
Medication	catological	Systemic hormone therapy	NA	4·38E-03	3·15E-03	6·69E-02	1·42E-01	2	6·50E-03	5·40E-03	3·98E-02	2·07E-01	4	2·51E-03	2·29E-03	5·21E-01	6·30E-01	3
Medication	catological	Oral contraceptives	NA	4·85E-02	1·62E-02	1·76E-08	0·00E+00	1	6·20E-03	5·00E-03	4·61E-02	2·24E-01	4	8·23E-04	2·65E-03	8·08E-01	8·53E-01	3
Medication	binary	ACE inhibitors	NA	1·51E-03	2·57E-03	2·82E-01	3·92E-01	2	3·71E-03	3·41E-03	5·55E-02	1·84E-01	4	5·81E-04	1·32E-03	5·83E-01	6·36E-01	3
Medication	binary	Trombocyte aggregation inhibitors	NA	2·73E-05	1·41E-03	8·85E-01	9·11E-01	2	8·44E-05	1·29E-03	7·73E-01	8·45E-01	4	7·23E-04	1·62E-03	5·40E-01	6·09E-01	3
Cardiovascular system	catological	Coronary heart disease	NA	7·36E-04	9·01E-04	7·55E-01	8·22E-01	2	2·52E-03	2·13E-03	2·89E-01	5·39E-01	4	1·06E-03	8·64E-04	7·59E-01	8·27E-01	3
Medication	binary	Oral antidiabetics	NA	8·70E-04	1·21E-03	4·15E-01	5·08E-01	2	4·66E-04	8·90E-04	4·98E-01	6·27E-01	4	7·87E-04	1·32E-03	5·23E-01	5·93E-01	3
Cardiovascular system	catological	Previous heart operations	NA	4·75E-05	5·35E-04	9·82E-01	9·87E-01	2	4·98E-03	2·33E-03	8·48E-02	2·91E-01	4	1·56E-03	8·81E-04	3·68E-01	4·41E-01	3
Medication	binary	Regular systemic corticosteroid use	NA	4·54E-04	4·91E-04	5·56E-01	6·27E-01	2	3·37E-06	7·29E-05	9·54E-01	9·61E-01	4	1·90E-02	2·87E-03	1·55E-03	8·40E-03	3
Smoking	ordinal	Passive smoker	NA	2·18E-02	9·19E-03	2·66E-02	7·86E-02	2	4·84E-03	5·13E-03	5·37E-01	7·69E-01	4	4·79E-02	1·69E-02	7·79E-05	1·40E-03	2
Medication	binary	Calcium antagonists	NA	5·95E-04	1·31E-03	5·00E-01	5·90E-01	2	2·18E-03	2·42E-03	1·43E-01	3·01E-01	4	1·18E-02	5·97E-03	1·29E-02	4·10E-02	3
Medication	binary	Angiotensin antagonists	NA	9·69E-05	6·04E-04	7·85E-01	8·28E-01	2	2·31E-04	1·19E-03	6·34E-01	7·42E-01	4	1·05E-04	6·21E-04	8·16E-01	8·40E-01	3
Medication	binary	Statins	NA	1·15E-03	1·97E-03	3·48E-01	4·54E-01	2	8·21E-05	1·13E-03	7·76E-01	8·45E-01	4	4·36E-05	9·16E-04	8·80E-01	9·03E-01	3
Body mass	ordinal	Body Mass Index Categories according to WHO	NA	1·72E-03	2·78E-03	9·34E-01	9·72E-01	2	8·72E-03	4·06E-03	1·27E-01	5·06E-01	4	2·97E-02	7·24E-03	8·21E-03	5·24E-02	3
Sleep	continous	Average sleep duration in hours	9·50E-01	4·08E-05	4·58E-03	9·21E-01	9·32E-01	2	7·36E-04	4·94E-03	6·11E-01	7·15E-01	4	7·00E-03	7·87E-03	1·66E-01	2·63E-01	3
Medication	binary	Metformin	NA	1·96E-04	6·14E-04	6·98E-01	7·59E-01	2	1·43E-03	1·09E-03	2·35E-01	4·00E-01	4	7·75E-05	5·31E-04	8·41E-01	8·71E-01	3
Sleep	continous	Chronotyp - sleep corrected	2·43E-01	2·76E-03	6·51E-03	4·12E-01	4·85E-01	2	5·21E-04	3·67E-03	6·69E-01	7·62E-01	4	5·02E-03	5·83E-03	2·41E-01	3·37E-01	3
Liver function	continous	Gamma-glutamyltransferase (GGT)	1·89E-38	5·11E-03	5·83E-03	4·76E-02	1·16E-01	2	1·99E-02	8·75E-03	1·52E-05	1·40E-03	2	3·05E-05	1·67E-03	9·00E-01	9·14E-01	3
Gout and hyperuricemia	ordinal	Gout, elevated uric acid levels within last 12 month	NA	6·55E-03	4·15E-03	1·95E-01	2·80E-01	2	6·53E-03	3·00E-03	1·22E-01	2·79E-01	4	7·09E-03	4·69E-03	1·57E-01	2·68E-01	3
Sleep	continous	Chronotyp - sleep, age and sex corrected	6·81E-01	2·07E-03	6·09E-03	4·78E-01	5·29E-01	2	6·66E-05	4·19E-03	8·78E-01	9·13E-01	4	5·47E-03	5·90E-03	2·21E-01	3·15E-01	3
Anxiety	ordinal	Anxiety or panic disorders within last 12 month	NA	1·79E-02	8·71E-03	1·13E-02	3·70E-02	2	9·57E-04	1·95E-03	7·37E-01	8·41E-01	4	1·03E-03	1·02E-03	7·66E-01	8·15E-01	3
Cancer	catological	Amount of cancers	NA	1·75E-03	2·08E-03	5·11E-01	6·39E-01	2	1·71E-03	1·66E-03	4·31E-01	6·46E-01	4	3·19E-03	2·27E-03	4·39E-01	5·55E-01	3
Kidney function	ordinal	Kidney disease within last 12 month	NA	1·15E-02	3·05E-03	5·67E-02	1·13E-01	2	2·20E-03	1·14E-03	4·96E-01	6·57E-01	4	6·26E-03	3·54E-03	1·97E-01	3·11E-01	3
Cardiovascular system	continous	Pulse frequency	1·23E-01	1·02E-04	1·70E-03	7·80E-01	8·32E-01	2	1·23E-03	2·15E-03	2·71E-01	4·41E-01	4	7·04E-04	3·36E-03	5·45E-01	6·11E-01	3
Smoking	ordinal	Smoking status	NA	1·22E-02	5·86E-03	5·19E-02	2·16E-01	2	2·63E-03	2·50E-03	6·27E-01	8·67E-01	4	9·84E-03	6·36E-03	7·64E-02	1·64E-01	3
Anxiety	ordinal	Generalized Anxiety Disorder Scale	NA	7·78E-03	3·88E-03	2·79E-01	3·95E-01	2	9·25E-04	2·28E-03	9·00E-01	9·46E-01	4	1·67E-02	3·44E-03	3·39E-02	9·60E-02	3
Medication	binary	L-Dopa	NA	2·69E-04	2·15E-04	6·50E-01	7·04E-01	2	NA	NA	1·00E+00	1·00E+00	4	NA	NA	1·00E+00	1·00E+00	3
Medication	binary	Antidepressants	NA	3·12E-04	6·93E-04	6·25E-01	6·85E-01	2	2·51E-05	2·73E-04	8·75E-01	9·06E-01	4	7·32E-03	4·17E-03	5·07E-02	1·08E-01	3
Neurodegenerative disorders and neuropathies	catological	Parkinson screening: Unsteady walking (self-reported)	NA	1·08E-02	1·58E-02	2·06E-01	5·72E-01	2	3·51E-03	3·84E-03	6·05E-01	8·34E-01	4	NA	NA	1·00E+00	1·00E+00	3

Cancer	catological	Diagnosed cancer	NA	2·53E-03	2·66E-03	3·79E-01	5·20E-01	2	1·52E-04	1·08E-03	9·28E-01	9·66E-01	4	3·71E-03	3·83E-03	3·81E-01	4·91E-01	3
Medication	binary	Anticoagulants	NA	1·00E-03	1·05E-03	3·81E-01	4·75E-01	2	3·66E-04	1·52E-03	5·48E-01	6·75E-01	4	2·54E-04	3·29E-04	7·17E-01	7·59E-01	3
Medication	binary	Anti-dementia medication	NA	3·26E-03	1·49E-03	1·14E-01	1·84E-01	2	1·59E-08	1·30E-04	9·97E-01	9·97E-01	4	NA	NA	1·00E+00	1·00E+00	3
Medication	binary	Mirtazapine	NA	1·09E-03	5·52E-04	3·61E-01	4·48E-01	2	9·92E-04	4·35E-04	3·23E-01	4·72E-01	4	1·29E-02	1·98E-03	9·46E-03	2·84E-02	3
Medication	binary	Muscle relaxants	NA	7·36E-04	2·25E-03	4·53E-01	5·31E-01	2	2·97E-03	1·44E-03	8·66E-02	2·31E-01	4	1·23E-02	2·45E-03	1·12E-02	3·02E-02	3
Medication	binary	Muscle relaxants, centrally acting agents	NA	7·36E-04	2·21E-03	4·53E-01	5·31E-01	2	2·97E-03	1·38E-03	8·66E-02	2·31E-01	4	1·23E-02	2·49E-03	1·12E-02	3·02E-02	3
Sleep	continous	Sleep inertia on free days	3·00E-17	1·93E-02	1·30E-02	2·83E-02	6·06E-02	2	8·27E-03	9·04E-03	8·80E-02	2·16E-01	4	2·40E-03	4·49E-03	4·20E-01	5·17E-01	3
Cardiovascular system	binary	Year of the 1st stroke	NA	6·54E-05	1·14E-03	8·24E-01	8·55E-01	2	5·39E-04	1·02E-03	4·69E-01	6·11E-01	4	3·37E-05	2·50E-04	8·96E-01	9·06E-01	3
Baseline	binary	Fasting status on the day of examination with regard to food	NA	2·08E-04	2·05E-04	6·90E-01	7·28E-01	2	5·27E-03	1·12E-03	2·23E-02	9·52E-02	4	NA	NA	1·00E+00	1·00E+00	3
Medication	binary	Trizyclika	NA	1·62E-03	1·14E-03	2·66E-01	3·53E-01	2	2·02E-03	1·45E-03	1·58E-01	3·07E-01	4	8·11E-04	7·72E-04	5·16E-01	5·78E-01	3
Physical activity	catological	Duration of cycling on weekdays (self-reported)	NA	5·53E-03	4·65E-03	3·74E-01	6·20E-01	2	3·94E-03	3·57E-03	4·20E-01	7·57E-01	4	5·09E-03	2·92E-03	6·18E-01	7·55E-01	3
Hypothyroidism	ordinal	Diagnosed hypothyroidism	NA	6·56E-03	5·24E-03	1·69E-01	3·62E-01	2	6·38E-03	3·38E-03	9·66E-02	3·93E-01	4	1·14E-02	5·47E-03	1·13E-01	2·40E-01	3
Cholesterol and triglycerides	continous	Elevated cholesterol or triglyceride levels within last 12 month	2·66E-01	1·69E-02	1·42E-02	5·21E-02	1·38E-01	2	9·84E-04	6·39E-03	5·73E-01	7·15E-01	4	2·69E-03	6·27E-03	4·91E-01	6·02E-01	3
Medication	binary	Bisphosphonates	NA	1·27E-03	5·68E-04	3·23E-01	4·25E-01	2	6·39E-04	6·47E-04	4·27E-01	5·68E-01	4	4·75E-03	1·14E-03	1·16E-01	1·78E-01	3
Cholesterol and triglycerides	continous	HDL - cholesterol	1·19E-09	1·33E-04	1·65E-03	7·49E-01	7·98E-01	2	7·85E-04	1·92E-03	3·79E-01	5·36E-01	4	5·94E-03	7·07E-03	7·85E-02	1·33E-01	3
Physical activity	ordinal	Current physical condition (self-reported)	NA	6·08E-03	5·81E-03	1·97E-01	4·00E-01	2	3·02E-03	2·42E-03	3·94E-01	6·85E-01	4	4·21E-03	3·79E-03	5·34E-01	6·65E-01	3
Cardiovascular system	binary	Inpatient treated stroke (self-reported)	NA	3·29E-04	1·08E-03	6·16E-01	6·78E-01	2	7·16E-04	9·47E-04	4·01E-01	5·44E-01	4	1·11E-04	7·39E-04	8·10E-01	8·38E-01	3
Neurodegenerative disorders and neuropathies	ordinal	Parkinson screening: Feeling that the feet are stuck to the floor (self-reported)	NA	1·31E-02	9·52E-03	5·66E-02	2·55E-01	2	3·04E-03	4·10E-03	3·56E-01	5·80E-01	4	NA	NA	1·00E+00	1·00E+00	3
Physical activity	continous	Time usually spend outdoors in winter (self-reported)	7·96E-28	7·03E-03	6·17E-03	2·00E-02	6·94E-02	2	1·05E-04	1·12E-03	7·48E-01	8·25E-01	4	1·68E-04	2·75E-03	7·68E-01	8·07E-01	3
Diabetes	ordinal	Age at diagnosis of validated diabetes mellitus with type indication	NA	1·42E-02	5·25E-03	5·64E-01	8·21E-01	2	2·08E-02	4·72E-03	6·40E-02	5·77E-01	4	1·83E-02	4·37E-03	1·65E-01	3·56E-01	3
Physical activity	ordinal	Success rates of diets (self-reported)	NA	6·92E-03	2·33E-03	2·56E-01	4·76E-01	2	7·41E-03	3·89E-03	1·18E-01	4·65E-01	4	3·45E-02	3·77E-03	1·05E-03	1·10E-02	3
Medication	binary	Other antihypertensives (except diuretics, beta-blokers, ACE inhibitors, calcium and angiotensin antagonists)	NA	2·28E-04	1·25E-03	6·76E-01	7·31E-01	2	1·17E-04	3·32E-04	7·34E-01	8·03E-01	4	4·28E-03	1·83E-03	1·35E-01	2·14E-01	3
Inflammation	ordinal	Phlebitis in superficial veins within last 12 months	NA	1·37E-03	3·57E-03	7·12E-01	7·76E-01	2	1·99E-03	2·08E-03	5·28E-01	6·96E-01	4	7·64E-04	5·77E-04	8·20E-01	8·73E-01	3
Neurodegenerative disorders and neuropathies	catological	Diagnosed nerve damage (neuropathy, polyneuropathy or diabetic foot) within last 12 months	NA	2·24E-04	5·66E-04	7·60E-01	8·16E-01	2	9·62E-07	3·69E-04	9·83E-01	9·87E-01	4	2·07E-02	5·61E-03	4·03E-02	1·33E-01	3
Baseline	binary	Sex	NA	0·00E+00	0·00E+00	1·00E+00	1·00E+00	2	5·97E-03	4·23E-03	1·49E-02	8·54E-02	4	6·00E-04	2·60E-03	5·77E-01	6·41E-01	3

Supplementary table 6: Association analyses of dicarbonyls with lead SNPs of GWA-studies on BMI, glucose, GFR, GGT, and systolic blood pressure (SBP).

2,385 leads SNPs of available previously published GWA studies on traits selected by RDA in both studies (Figures 2B and 2C) were selected for genotypic association analyses with the dicarbonyls MG, GO, and 3-DG. These analyses were done with an extended model that accounted for the dependency of the dicarbonyls on intake and excretion. One SNP (highlighted in green) overcame the Bonferroni-corrected significance threshold of $0.05/1,890 = 2.65E-05$. The effective number of 1,890 was used for correction because some SNPs were in linkage disequilibrium. Nominally significant results are shown ($p<0.05$).

SNP	Chr	Pos	EA	OA	Trait	eaf	beta	SE	p-value	Trait	eaf	beta	SE	p-value	Sample size	2nd Trait	eaf	beta	SE	p-value	Sample size
rs1741177	14	35383219	A	G	3-DG	0·684	0·053	0·012	2·33E-05	eGFR	0·703	-0·002	0·000	8·82E-10	1156030						
rs10797067	1	154237638	T	G	3-DG	0·369	0·041	0·012	9·85E-04	GGT	0·367	0·003	0·001	9·90E-10	437194						
rs1625427	11	131957293	C	T	3-DG	0·346	-0·039	0·012	1·08E-03	BMI	0·350	-0·013	0·002	1·40E-12	676334						
rs11983783	7	96463812	T	C	3-DG	0·581	0·037	0·012	1·34E-03	SBP	0·581	0·176	0·031	9·48E-09	728171						
rs11670142	19	49650471	G	T	3-DG	0·418	0·037	0·012	1·36E-03	BMI	0·394	0·011	0·002	4·70E-10	681469						
rs183869	5	139531018	T	C	3-DG	0·181	-0·048	0·015	1·49E-03	GGT	0·172	0·004	0·001	5·00E-10	437194						
rs62055084	16	73097845	T	C	3-DG	0·275	-0·043	0·015	3·60E-03	SBP	0·268	0·297	0·037	5·94E-16	640761						
rs702395	5	140086677	T	C	3-DG	0·442	-0·033	0·011	3·66E-03	SBP	0·437	0·232	0·031	3·24E-14	727577						
rs2161097	5	103945178	T	C	3-DG	0·433	-0·033	0·012	4·02E-03	BMI	0·444	0·010	0·002	2·50E-08	692354						
rs12615778	2	102436738	G	A	3-DG	0·327	0·035	0·012	4·31E-03	BMI	0·306	-0·010	0·002	3·90E-08	684324						
rs1365466	18	36182440	T	C	3-DG	0·722	-0·036	0·013	4·92E-03	BMI	0·741	-0·014	0·002	3·30E-13	791868						
rs2613765	19	5066330	A	G	3-DG	0·491	0·033	0·012	4·97E-03	SBP	0·475	-0·235	0·030	5·32E-15	738552						
rs10942267	5	80841914	G	A	3-DG	0·289	0·036	0·013	5·06E-03	BMI	0·309	-0·016	0·002	3·90E-17	689084						
rs11071738	15	63580155	C	T	3-DG	0·485	0·033	0·012	5·30E-03	eGFR	0·450	0·003	0·000	1·59E-23	1201590						
rs12894354	14	102987884	C	T	3-DG	0·631	-0·034	0·012	5·47E-03	eGFR	0·653	0·002	0·000	2·98E-11	1150630						
rs10782230	6	126228512	A	G	3-DG	0·498	0·032	0·012	5·85E-03	SBP	0·485	0·211	0·030	2·91E-12	732600						
rs35889227	14	90055468	T	G	3-DG	0·603	0·034	0·012	6·43E-03	Glucose	0·617	-0·013	0·002	3·37E-10	166896						
rs7535253	1	214744893	C	T	3-DG	0·788	0·040	0·015	6·78E-03	eGFR	0·760	-0·002	0·000	2·16E-13	1199770						
rs6587552	1	151018861	G	A	3-DG	0·766	0·038	0·014	6·82E-03	BMI	0·759	-0·017	0·002	1·60E-17	689723						
rs111230791	11	10270621	C	T	3-DG	0·166	0·042	0·015	7·05E-03	SBP	0·186	0·478	0·039	5·17E-35	735584						
rs6468118	8	32399290	G	C	3-DG	0·588	0·032	0·012	7·33E-03	eGFR	0·629	0·002	0·000	2·92E-15	1200740						
rs281380	19	49214470	C	T	3-DG	0·387	0·032	0·012	7·40E-03	eGFR	0·405	0·002	0·000	8·72E-16	1151060						
rs818524	1	85201228	C	T	3-DG	0·713	0·034	0·013	7·76E-03	BMI	0·694	0·011	0·002	3·40E-08	670078						
rs4516268	17	1846831	A	C	3-DG	0·188	-0·038	0·015	8·45E-03	BMI	0·193	-0·022	0·002	5·20E-25	786617						
rs903959	8	142630782	A	T	3-DG	0·410	0·031	0·012	8·74E-03	BMI	0·397	0·011	0·002	1·60E-09	689895						
rs217671	14	62360464	G	A	3-DG	0·246	-0·036	0·014	9·19E-03	BMI	0·272	0·014	0·002	1·30E-13	691456						
rs4858193	3	20441050	C	T	3-DG	0·314	0·032	0·012	9·63E-03	BMI	0·278	-0·013	0·002	1·60E-11	686850						
rs2354862	8	64501744	C	A	3-DG	0·357	-0·032	0·012	9·65E-03	SBP	0·359	-0·251	0·032	2·42E-15	723156						
rs35530564	2	192112050	G	T	3-DG	0·305	-0·034	0·013	9·83E-03	GGT	0·324	0·011	0·001	4·50E-87	437194						
rs4980515	11	63744609	C	T	3-DG	0·458	0·030	0·012	9·98E-03	SBP	0·501	-0·225	0·030	9·73E-14	727998						
rs6557155	6	151910126	G	T	3-DG	0·595	0·031	0·012	1·03E-02	SBP	0·599	-0·191	0·031	1·14E-09	706941						
rs1879057	4	111335722	T	C	3-DG	0·795	-0·036	0·014	1·07E-02	SBP	0·795	-0·325	0·038	1·67E-17	704405						
rs12033039	1	22257202	T	G	3-DG	0·130	-0·045	0·018	1·11E-02	SBP	0·107	-0·270	0·049	4·89E-08	720556						
rs7963801	12	79685226	C	T	3-DG	0·591	0·030	0·012	1·11E-02	SBP	0·578	0·236	0·031	2·87E-14	709837						
rs6991885	8	143500243	C	T	3-DG	0·711	0·032	0·013	1·12E-02	SBP	0·693	0·183	0·033	3·20E-08	715747						
rs7209235	17	73759552	A	G	3-DG	0·688	0·034	0·014	1·18E-02	BMI	0·695	-0·011	0·002	8·00E-09	683445						
rs7703560	5	67678506	G	A	3-DG	0·289	0·032	0·013	1·22E-02	SBP	0·300	0·225	0·033	1·51E-11	714892						

rs60580012	17	45969808	T	C	3-DG	0·351	-0·031	0·012	1·25E-02	eGFR	0·322	-0·002	0·000	4·24E-12	1159620
rs3814828	14	93406702	G	A	3-DG	0·615	-0·031	0·012	1·31E-02	eGFR	0·634	-0·002	0·000	4·62E-15	1153390
rs7324484	13	48648079	A	G	3-DG	0·645	0·030	0·012	1·32E-02	eGFR	0·648	0·002	0·000	4·41E-15	1196300
rs551619	11	78597949	G	C	3-DG	0·344	-0·031	0·013	1·48E-02	GGT	0·352	0·006	0·001	4·70E-30	437194
rs11228824	11	56634316	A	G	3-DG	0·206	0·035	0·014	1·53E-02	BMI	0·188	-0·013	0·002	7·60E-09	679916
rs7439567	4	138464842	T	C	3-DG	0·397	-0·028	0·012	1·54E-02	SBP	0·411	0·254	0·031	2·31E-16	723243
rs7187540	16	85318302	A	C	3-DG	0·318	0·033	0·014	1·54E-02	SBP	0·335	-0·195	0·034	1·02E-08	657562
rs2652812	15	63406170	T	C	3-DG	0·736	0·032	0·013	1·56E-02	SBP	0·754	-0·252	0·035	1·03E-12	727494
rs34905952	3	138104635	A	G	3-DG	0·168	0·037	0·015	1·57E-02	SBP	0·161	0·287	0·041	3·00E-12	729433
rs11752007	6	7242605	C	T	3-DG	0·114	-0·046	0·019	1·57E-02	GGT	0·126	0·007	0·001	3·70E-18	437194
rs6433243	2	171605495	C	T	3-DG	0·667	-0·030	0·012	1·70E-02	BMI	0·654	-0·010	0·002	1·20E-08	691231
rs34357137	6	41672041	G	C	3-DG	0·239	-0·034	0·014	1·70E-02	eGFR	0·269	0·003	0·000	1·25E-25	1159620
rs1117080	20	43428323	G	C	3-DG	0·284	0·032	0·013	1·85E-02	BMI	0·299	-0·011	0·002	7·00E-09	690702
rs78998485	12	434755	G	C	3-DG	0·234	-0·033	0·014	1·90E-02	SBP	0·256	0·245	0·035	1·48E-12	732650
rs6849518	4	20120274	T	C	3-DG	0·135	-0·040	0·017	1·91E-02	BMI	0·126	0·017	0·003	2·60E-11	687979
rs12762034	10	33969931	C	T	3-DG	0·083	0·049	0·021	1·91E-02	BMI	0·076	0·024	0·003	7·30E-14	692191
rs2198679	13	89131240	G	A	3-DG	0·427	-0·028	0·012	1·95E-02	BMI	0·468	-0·011	0·002	5·60E-10	688014
rs839755	1	43856410	C	A	3-DG	0·366	0·029	0·013	2·06E-02	SBP	0·385	0·267	0·031	5·41E-18	736630
rs7165200	15	66937421	A	G	3-DG	0·436	-0·028	0·012	2·11E-02	SBP	0·440	0·201	0·030	2·87E-11	738706
rs28621435	12	13860990	A	G	3-DG	0·107	-0·046	0·020	2·13E-02	SBP	0·115	-0·298	0·048	6·47E-10	720349
rs1474698	6	56064197	T	C	3-DG	0·528	-0·026	0·011	2·15E-02	SBP	0·552	-0·177	0·031	6·73E-09	724276
rs17789218	6	100600097	C	T	3-DG	0·208	0·039	0·017	2·17E-02	BMI	0·239	0·013	0·002	7·40E-12	793904
rs946824	1	243684019	C	T	3-DG	0·864	0·039	0·017	2·18E-02	BMI	0·859	-0·021	0·003	1·10E-15	689849
rs7826312	8	32400115	C	T	3-DG	0·569	0·027	0·012	2·19E-02	BMI	0·588	0·010	0·002	4·90E-10	785343
rs9747973	17	37905107	T	C	3-DG	0·459	0·027	0·012	2·19E-02	eGFR	0·497	0·002	0·000	7·40E-09	1159620
rs3811417	1	151804907	C	T	3-DG	0·115	-0·041	0·018	2·24E-02	GGT	0·133	0·006	0·001	1·10E-15	437194
rs55834529	6	27072542	G	A	3-DG	0·091	0·048	0·021	2·24E-02	eGFR	0·101	-0·003	0·001	8·14E-11	1027640
rs7405696	17	36102035	C	G	3-DG	0·402	0·029	0·013	2·28E-02	eGFR	0·434	-0·002	0·000	1·42E-08	1142060
rs55944332	2	145726621	G	A	3-DG	0·252	-0·030	0·013	2·33E-02	SBP	0·237	0·261	0·036	1·79E-13	729179
rs28374392	20	61189717	T	C	3-DG	0·612	-0·029	0·013	2·40E-02	SBP	0·623	0·192	0·034	1·21E-08	640744
rs58117425	2	145681570	A	G	3-DG	0·252	-0·030	0·013	2·54E-02	eGFR	0·228	-0·002	0·000	3·44E-09	1201810
rs3860770	5	173301427	A	G	3-DG	0·319	0·028	0·012	2·55E-02	SBP	0·292	-0·266	0·033	1·20E-15	729395
rs8142376	22	32001037	T	C	3-DG	0·474	-0·026	0·012	2·61E-02	SBP	0·491	0·168	0·030	2·19E-08	744681
rs1891730	9	130309028	C	T	3-DG	0·373	0·027	0·012	2·61E-02	SBP	0·383	0·181	0·031	7·74E-09	714729
rs7412	19	45412079	T	C	3-DG	0·087	0·047	0·021	2·63E-02	SBP	0·082	-0·434	0·057	4·04E-14	696370
rs236671	7	75061419	G	A	3-DG	0·541	-0·029	0·013	2·69E-02	GGT	0·580	0·004	0·001	3·50E-15	437194
rs11690717	2	205093360	T	G	3-DG	0·386	-0·027	0·012	2·71E-02	SBP	0·373	-0·202	0·032	1·92E-10	712479
rs10433609	3	51311574	A	T	3-DG	0·831	-0·036	0·016	2·74E-02	BMI	0·832	0·016	0·002	1·70E-12	689684
rs62477728	7	75132471	C	G	3-DG	0·527	-0·027	0·012	2·83E-02	SBP	0·555	0·179	0·032	1·52E-08	680539
rs10744146	12	17212881	A	G	3-DG	0·495	-0·026	0·012	2·83E-02	BMI	0·515	-0·012	0·002	1·40E-12	689141
rs273504	19	18215247	G	A	3-DG	0·404	0·026	0·012	2·84E-02	BMI	0·427	0·015	0·002	4·40E-18	690672
rs11671389	19	18210922	T	A	3-DG	0·232	0·031	0·014	2·85E-02	GGT	0·254	0·008	0·001	9·70E-41	437194
rs13250058	8	112270826	T	G	3-DG	0·678	-0·027	0·012	2·86E-02	BMI	0·677	0·011	0·002	2·90E-10	787870
rs4745794	10	77534000	G	A	3-DG	0·484	-0·026	0·012	2·87E-02	BMI	0·516	0·011	0·002	7·20E-11	678128
rs907091	17	37921742	T	C	3-DG	0·469	0·025	0·012	3·05E-02	GGT	0·486	-0·003	0·001	1·40E-10	437194
rs10447437	6	126258892	G	A	3-DG	0·470	0·025	0·012	3·07E-02	eGFR	0·468	0·002	0·000	1·68E-09	1148220

rs11619319	13	28487599	G	A	3-DG	0·181	0·032	0·015	3·13E-02	Glucose	0·234	0·017	0·002	3·41E-20	197615						
rs1784460	11	118938371	A	T	3-DG	0·393	0·026	0·012	3·16E-02	BMI	0·404	0·013	0·002	9·00E-14	680042						
rs11123169	2	113967075	T	C	3-DG	0·645	0·028	0·013	3·17E-02	eGFR	0·675	0·003	0·000	2·73E-21	1195190						
rs7526754	1	209233764	T	C	3-DG	0·632	0·026	0·012	3·19E-02	BMI	0·645	-0·010	0·002	1·80E-08	675804						
rs7912283	10	133773019	A	G	3-DG	0·610	0·026	0·012	3·22E-02	SBP	0·647	-0·214	0·032	2·94E-11	703775						
rs580114	1	28566173	A	G	3-DG	0·301	0·027	0·013	3·23E-02	eGFR	0·285	-0·002	0·000	3·45E-11	1201900						
rs7123876	11	72444583	C	T	3-DG	0·246	0·029	0·014	3·25E-02	BMI	0·246	0·012	0·002	2·20E-10	793551						
rs10015716	4	95548550	A	G	3-DG	0·631	0·027	0·013	3·33E-02	eGFR	0·642	0·002	0·000	7·01E-09	1158670						
rs17695092	5	173337853	G	T	3-DG	0·333	0·026	0·012	3·34E-02	BMI	0·308	-0·011	0·002	3·40E-09	775102						
rs4319878	19	21924452	T	C	3-DG	0·569	-0·026	0·012	3·38E-02	SBP	0·561	0·169	0·031	3·77E-08	717097						
rs2293605	3	184044433	T	C	3-DG	0·136	-0·038	0·018	3·39E-02	BMI	0·131	-0·017	0·003	3·60E-10	668940	eGFR	0·120	0·002	0·000	4·59E-09	1134700
rs4812536	20	40258709	G	A	3-DG	0·327	0·026	0·012	3·42E-02	SBP	0·342	-0·271	0·032	4·09E-17	713714						
rs12460791	19	1842919	G	A	3-DG	0·206	0·032	0·015	3·45E-02	SBP	0·208	-0·230	0·038	1·11E-09	712694						
rs3935648	17	79085335	G	C	3-DG	0·214	-0·031	0·015	3·45E-02	BMI	0·233	-0·013	0·002	6·80E-09	629303						
rs1336486	13	40784814	G	T	3-DG	0·305	-0·027	0·013	3·46E-02	BMI	0·321	0·014	0·002	1·80E-14	688180						
rs61373376	19	46183586	T	C	3-DG	0·166	0·034	0·016	3·49E-02	SBP	0·158	0·230	0·042	4·54E-08	718900						
rs28590346	16	2080653	T	A	3-DG	0·353	-0·026	0·012	3·60E-02	SBP	0·340	0·271	0·033	3·37E-16	685757						
rs6804842	3	25106437	G	A	3-DG	0·582	-0·025	0·012	3·65E-02	BMI	0·572	0·016	0·002	3·60E-21	789179						
rs5742643	12	102837863	C	T	3-DG	0·742	-0·028	0·013	3·69E-02	SBP	0·751	0·223	0·035	1·53E-10	732162						
rs11915371	3	70539559	C	A	3-DG	0·218	-0·029	0·014	3·69E-02	BMI	0·204	0·015	0·002	2·60E-12	690829						
rs12148121	15	67494922	C	T	3-DG	0·212	-0·030	0·014	3·70E-02	eGFR	0·275	-0·002	0·000	2·60E-11	1200950						
rs6864049	5	124330522	G	A	3-DG	0·516	-0·025	0·012	3·71E-02	BMI	0·539	0·013	0·002	6·70E-14	776397						
rs10163018	15	53525415	T	C	3-DG	0·387	0·026	0·012	3·72E-02	BMI	0·375	-0·011	0·002	1·50E-10	689715						
rs17207196	7	75101065	T	C	3-DG	0·410	0·028	0·013	3·79E-02	BMI	0·412	-0·022	0·002	2·10E-35	668894						
rs813412	10	32284825	T	C	3-DG	0·755	0·028	0·014	3·83E-02	SBP	0·751	-0·210	0·035	1·87E-09	730888						
rs138289	22	32182708	T	A	3-DG	0·452	-0·025	0·012	3·84E-02	BMI	0·483	-0·010	0·002	3·30E-09	687258						
rs73039433	19	33524604	A	G	3-DG	0·064	0·051	0·025	3·88E-02	GGT	0·047	0·015	0·001	9·70E-33	437194						
rs10144318	14	53189731	C	A	3-DG	0·520	-0·024	0·012	3·90E-02	BMI	0·511	-0·009	0·002	1·40E-08	794528						
rs9816226	3	185834499	T	A	3-DG	0·815	-0·032	0·016	3·96E-02	BMI	0·820	0·032	0·002	1·60E-52	778333						
rs4683096	3	45374496	G	T	3-DG	0·569	-0·024	0·012	4·14E-02	BMI	0·561	-0·012	0·002	2·80E-11	682633						
rs79539362	3	154680449	C	T	3-DG	0·108	-0·038	0·019	4·18E-02	SBP	0·101	-0·400	0·050	2·09E-15	729915						
rs17806379	20	51107290	T	C	3-DG	0·153	0·032	0·016	4·19E-02	BMI	0·179	-0·026	0·002	1·50E-30	690043						
rs2842870	1	156200671	C	T	3-DG	0·360	0·025	0·012	4·20E-02	eGFR	0·365	0·002	0·000	6·34E-11	1201620						
rs756717	16	72996162	A	G	3-DG	0·387	-0·026	0·013	4·22E-02	BMI	0·397	-0·015	0·002	5·40E-18	771976						
rs3784924	16	11644842	G	A	3-DG	0·292	-0·027	0·013	4·29E-02	GGT	0·314	0·007	0·001	4·70E-34	437194						
rs3918226	7	150690176	T	C	3-DG	0·077	-0·046	0·023	4·33E-02	SBP	0·081	0·664	0·058	8·46E-31	680941	eGFR	0·083	-0·003	0·001	2·51E-11	1017730
rs55924785	9	136929586	T	C	3-DG	0·183	0·030	0·015	4·35E-02	eGFR	0·162	-0·002	0·000	1·54E-08	1135840						
rs779206	3	118023515	A	G	3-DG	0·729	0·027	0·013	4·40E-02	BMI	0·734	-0·013	0·002	1·10E-10	689160						
rs17257081	2	135630498	G	A	3-DG	0·232	-0·027	0·014	4·43E-02	SBP	0·194	-0·227	0·039	6·35E-09	705214						
rs7560871	2	145616899	A	G	3-DG	0·077	-0·044	0·022	4·49E-02	BMI	0·073	0·022	0·003	9·60E-11	691571						
rs13245051	7	113362799	G	A	3-DG	0·531	-0·026	0·013	4·51E-02	eGFR	0·548	0·002	0·000	2·27E-13	1030500						
rs61311941	9	92285323	G	A	3-DG	0·075	-0·047	0·024	4·54E-02	eGFR	0·121	0·003	0·000	5·61E-10	1142110						
rs6056413	20	9106087	T	A	3-DG	0·811	-0·030	0·015	4·55E-02	BMI	0·829	-0·013	0·002	1·10E-08	748884						
rs9326846	5	111301546	G	A	3-DG	0·328	0·025	0·012	4·60E-02	BMI	0·311	0·011	0·002	7·10E-09	688531						
rs7249143	19	12992579	T	G	3-DG	0·268	-0·027	0·014	4·61E-02	BMI	0·308	0·013	0·002	3·60E-11	678777						
rs1048303	7	100804140	T	C	3-DG	0·602	0·024	0·012	4·63E-02	BMI	0·586	-0·011	0·002	2·70E-10	690582						

rs1075901	17	15943910	C	T	3-DG	0·577	-0·023	0·012	4·65E-02	BMI	0·564	0·012	0·002	1·20E-13	794789
rs1133400	10	134459388	G	A	3-DG	0·214	0·028	0·014	4·65E-02	SBP	0·214	0·298	0·038	2·53E-15	709605
rs11000570	10	75025252	C	G	3-DG	0·068	-0·046	0·023	4·66E-02	eGFR	0·119	-0·003	0·001	2·76E-08	1141960
rs11856921	15	39278107	A	C	3-DG	0·410	-0·024	0·012	4·70E-02	eGFR	0·413	0·003	0·000	3·18E-25	1158520
rs6921291	6	97066242	T	C	3-DG	0·186	-0·030	0·015	4·72E-02	SBP	0·191	0·358	0·039	1·58E-20	731010
rs35599935	6	32886487	C	T	3-DG	0·054	0·054	0·027	4·78E-02	eGFR	0·066	0·003	0·001	2·75E-09	1172510
rs629864	11	100699139	T	C	3-DG	0·623	0·023	0·012	4·80E-02	SBP	0·650	-0·187	0·032	4·69E-09	720099
rs825680	16	73606563	T	A	3-DG	0·378	-0·027	0·014	4·81E-02	BMI	0·417	-0·010	0·002	6·70E-09	680731
rs1808056	20	62890932	A	G	3-DG	0·387	0·025	0·013	4·81E-02	eGFR	0·440	0·002	0·000	8·25E-11	1201620
rs11672660	19	46180184	T	C	3-DG	0·211	0·028	0·014	4·87E-02	BMI	0·205	-0·034	0·002	1·70E-60	768426
rs12149704	16	69789516	A	G	3-DG	0·060	-0·056	0·029	4·90E-02	SBP	0·063	0·588	0·068	8·56E-18	622172
rs10750441	11	130469044	T	C	3-DG	0·606	-0·026	0·013	4·94E-02	SBP	0·662	0·175	0·032	3·74E-08	733371
rs3741841	12	21695584	G	A	3-DG	0·128	0·035	0·018	4·94E-02	GGT	0·138	0·005	0·001	5·00E-11	437194
rs9436446	1	50590638	A	G	3-DG	0·201	0·029	0·015	4·96E-02	BMI	0·219	0·017	0·002	4·00E-17	692423
rs112175548	16	71754040	C	T	3-DG	0·363	0·024	0·012	4·99E-02	eGFR	0·361	0·002	0·000	7·32E-14	1201910
rs7784465	7	6418275	C	T	GO	0·144	-0·049	0·013	8·47E-05	BMI	0·139	0·016	0·003	1·10E-10	685477
rs35680304	7	130973495	T	C	GO	0·559	0·033	0·009	1·30E-04	SBP	0·593	0·269	0·031	3·76E-18	720141
rs6767619	3	156893782	C	G	GO	0·335	-0·029	0·009	1·30E-03	BMI	0·345	0·012	0·002	8·10E-11	691865
rs243067	2	60621643	T	G	GO	0·436	0·028	0·009	1·37E-03	eGFR	0·396	0·001	0·000	1·74E-08	1049430
rs6849518	4	20120274	T	C	GO	0·133	-0·039	0·013	1·99E-03	BMI	0·126	0·017	0·003	2·60E-11	687979
rs967532	4	128160430	A	G	GO	0·642	0·027	0·009	2·77E-03	eGFR	0·645	-0·002	0·000	9·53E-13	1192700
rs9989141	14	94006257	T	C	GO	0·649	-0·027	0·009	2·78E-03	BMI	0·639	0·016	0·002	3·60E-21	752768
rs12035349	1	77557339	G	A	GO	0·114	0·045	0·015	2·79E-03	BMI	0·130	0·019	0·003	1·10E-12	666990
rs2979470	8	30288272	C	T	GO	0·523	-0·026	0·009	2·99E-03	SBP	0·510	-0·199	0·030	4·62E-11	727290
rs17360994	1	27278573	C	T	GO	0·070	0·049	0·017	3·96E-03	GGT	0·080	-0·007	0·001	2·10E-16	437194
rs2865805	7	69318195	C	A	GO	0·270	0·028	0·010	4·62E-03	BMI	0·308	0·011	0·002	2·50E-09	691404
rs2973564	5	73151033	G	A	GO	0·273	0·027	0·010	4·62E-03	BMI	0·284	-0·011	0·002	3·30E-09	690248
rs629864	11	100699139	T	C	GO	0·631	0·025	0·009	4·71E-03	SBP	0·650	-0·187	0·032	4·69E-09	720099
rs9521715	13	111015333	T	G	GO	0·223	-0·030	0·011	5·33E-03	GGT	0·227	0·004	0·001	1·10E-10	437194
rs571689	19	49207554	T	C	GO	0·465	0·024	0·009	5·73E-03	SBP	0·520	0·228	0·030	6·77E-14	727109
rs1123571	1	2326009	A	G	GO	0·442	-0·027	0·010	5·91E-03	eGFR	0·444	0·002	0·000	6·39E-09	1190600
rs4980379	11	1888614	T	C	GO	0·371	0·026	0·010	6·07E-03	SBP	0·372	0·576	0·032	2·47E-72	701947
rs3887080	12	121661966	A	G	GO	0·117	-0·037	0·014	6·43E-03	BMI	0·121	0·018	0·003	5·10E-12	690624
rs11785629	8	142367559	A	G	GO	0·694	0·027	0·010	6·65E-03	SBP	0·705	-0·197	0·034	4·32E-09	714047
rs8066234	17	17099717	T	G	GO	0·682	-0·025	0·009	7·75E-03	eGFR	0·662	0·002	0·000	3·35E-09	1158670
rs11619319	13	28487599	G	A	GO	0·189	0·030	0·011	7·83E-03	Glucose	0·234	0·017	0·002	3·41E-20	197615
rs2781649	6	131876637	G	A	GO	0·231	-0·028	0·010	7·93E-03	eGFR	0·241	-0·003	0·000	6·20E-21	1120110
rs303937	13	72372524	A	T	GO	0·376	-0·023	0·009	8·75E-03	eGFR	0·436	0·003	0·000	2·73E-27	1159620
rs17391694	1	78623626	T	C	GO	0·115	0·034	0·013	1·00E-02	BMI	0·119	0·032	0·003	7·50E-38	767720
rs12369179	12	122963550	T	C	GO	0·097	0·040	0·016	1·01E-02	BMI	0·088	-0·036	0·003	2·50E-31	674260
rs1982441	8	28021769	T	G	GO	0·150	-0·030	0·012	1·03E-02	BMI	0·138	0·018	0·003	7·00E-12	687705
rs2954022	8	126482621	A	C	GO	0·470	0·022	0·009	1·04E-02	GGT	0·465	-0·009	0·001	4·00E-65	437194
rs1454148	3	176341188	T	C	GO	0·272	0·024	0·010	1·07E-02	BMI	0·267	0·011	0·002	4·60E-08	691136
rs34460334	1	27215079	C	T	GO	0·071	0·042	0·017	1·12E-02	eGFR	0·085	0·003	0·001	2·10E-12	1043920
rs12042924	1	197297417	C	T	GO	0·482	-0·022	0·009	1·19E-02	SBP	0·472	0·181	0·030	2·62E-09	725176
rs10942267	5	80841914	G	A	GO	0·285	0·024	0·010	1·19E-02	BMI	0·309	-0·016	0·002	3·90E-17	689084

rs1371108	2	81816251	A	C	GO	0·325	-0·023	0·009	1·20E-02	BMI	0·325	0·012	0·002	9·00E-11	684620						
rs4839104	1	111708627	A	G	GO	0·106	0·034	0·014	1·25E-02	GGT	0·108	-0·007	0·001	2·40E-20	437194						
rs2267161	22	30953295	T	C	GO	0·329	0·022	0·009	1·27E-02	eGFR	0·315	0·002	0·000	4·68E-11	1150400						
rs10151563	14	31721103	A	G	GO	0·610	0·022	0·009	1·36E-02	eGFR	0·621	-0·002	0·000	1·09E-12	1201700						
rs7315980	12	53449321	A	G	GO	0·070	0·042	0·017	1·40E-02	SBP	0·083	0·480	0·056	7·35E-18	715521						
rs11187142	10	94468685	C	T	GO	0·883	0·034	0·014	1·42E-02	SBP	0·895	-0·331	0·050	2·53E-11	725644						
rs1790998	7	134138380	A	C	GO	0·452	-0·022	0·009	1·42E-02	SBP	0·454	-0·209	0·031	9·09E-12	718632						
rs1006896	3	88104411	C	A	GO	0·095	0·036	0·015	1·43E-02	BMI	0·106	-0·023	0·003	5·50E-18	691892						
rs911554	14	103999371	T	G	GO	0·380	0·022	0·009	1·46E-02	eGFR	0·397	-0·002	0·000	1·78E-08	1153100						
rs2611774	17	56732304	A	G	GO	0·335	-0·023	0·009	1·48E-02	SBP	0·338	0·219	0·032	6·85E-12	731230						
rs17767510	4	68156598	C	G	GO	0·173	-0·029	0·012	1·51E-02	BMI	0·170	0·013	0·002	1·90E-08	683125						
rs6557780	8	21937441	A	G	GO	0·832	-0·032	0·013	1·55E-02	GGT	0·835	-0·013	0·001	4·70E-78	437194						
rs7539054	1	186618699	C	A	GO	0·260	-0·024	0·010	1·66E-02	eGFR	0·290	0·002	0·000	2·79E-14	1199260						
rs194518	7	89853149	A	G	GO	0·558	-0·020	0·009	1·67E-02	Glucose	0·520	0·010	0·002	8·76E-09	166893						
rs6968865	7	17287269	T	A	GO	0·641	0·022	0·009	1·71E-02	eGFR	0·596	0·002	0·000	1·13E-19	1197150						
rs9326846	5	111301546	G	A	GO	0·326	0·022	0·009	1·74E-02	BMI	0·311	0·011	0·002	7·10E-09	688531						
rs3757387	7	128576086	C	T	GO	0·411	0·021	0·009	1·77E-02	eGFR	0·430	-0·003	0·000	6·54E-27	1158180	SBP	0·450	-0·190	0·030	4·01E-10	726716
rs10892873	11	122535333	C	G	GO	0·374	0·021	0·009	1·82E-02	GGT	0·368	0·004	0·001	1·30E-16	437194						
rs12065553	1	80793118	G	A	GO	0·277	-0·022	0·010	1·87E-02	BMI	0·293	0·012	0·002	8·90E-10	691372						
rs1000294	8	23080135	A	G	GO	0·236	0·024	0·010	1·92E-02	GGT	0·247	0·004	0·001	3·10E-09	437194						
rs17236194	15	59002755	C	T	GO	0·134	0·030	0·013	1·92E-02	BMI	0·135	0·015	0·002	8·30E-11	790933						
rs486359	6	160774441	C	G	GO	0·493	-0·020	0·009	1·96E-02	BMI	0·485	0·011	0·002	1·60E-11	770999						
rs75248620	11	9909127	A	G	GO	0·074	-0·038	0·016	1·96E-02	eGFR	0·081	0·004	0·001	2·25E-13	1001420						
rs883541	17	66449122	A	G	GO	0·788	-0·025	0·011	2·00E-02	eGFR	0·739	-0·002	0·000	6·17E-19	1191470						
rs7562149	2	63008414	C	T	GO	0·332	-0·021	0·009	2·03E-02	GGT	0·325	0·005	0·001	1·60E-21	437194						
rs8084719	18	46315420	G	C	GO	0·294	-0·023	0·010	2·05E-02	eGFR	0·309	0·002	0·000	2·51E-08	1159620						
rs35021865	16	10618314	T	C	GO	0·096	0·035	0·015	2·09E-02	GGT	0·103	-0·005	0·001	3·20E-08	437194						
rs6972171	7	156267032	C	A	GO	0·246	0·023	0·010	2·12E-02	eGFR	0·299	0·002	0·000	3·08E-18	1200360						
rs2907948	7	150638484	A	G	GO	0·220	0·024	0·010	2·12E-02	BMI	0·243	-0·014	0·002	1·30E-13	794299						
rs4371687	4	69989998	A	G	GO	0·484	-0·020	0·009	2·30E-02	GGT	0·482	-0·004	0·001	2·80E-16	437194						
rs2160077	14	92428410	A	G	GO	0·443	-0·019	0·008	2·32E-02	BMI	0·429	0·009	0·002	1·60E-08	795067						
rs11128904	3	18742270	C	G	GO	0·711	0·022	0·010	2·35E-02	BMI	0·727	0·011	0·002	4·50E-08	691222						
rs10815254	9	5630344	T	C	GO	0·269	0·022	0·010	2·44E-02	GGT	0·281	-0·004	0·001	2·00E-13	437194						
rs6905288	6	43758873	A	G	GO	0·565	0·020	0·009	2·44E-02	SBP	0·568	0·190	0·031	1·09E-09	701811						
rs6968554	7	17287106	G	A	GO	0·647	0·020	0·009	2·46E-02	BMI	0·640	0·010	0·002	3·50E-09	794218						
rs3828783	6	33767727	A	G	GO	0·196	-0·024	0·011	2·46E-02	BMI	0·181	-0·017	0·002	5·60E-15	792749						
rs4665624	2	23875990	C	A	GO	0·392	-0·021	0·010	2·49E-02	SBP	0·384	-0·181	0·032	1·35E-08	694783						
rs2832283	21	30690558	A	G	GO	0·222	0·025	0·011	2·49E-02	BMI	0·221	0·012	0·002	5·80E-09	792324						
rs6851147	4	55056566	G	C	GO	0·274	0·022	0·010	2·51E-02	SBP	0·273	0·189	0·034	2·55E-08	724973						
rs3098186	15	50810621	T	C	GO	0·510	0·019	0·009	2·61E-02	SBP	0·516	-0·242	0·030	1·41E-15	726862						
rs2126474	8	76878957	T	G	GO	0·401	-0·020	0·009	2·62E-02	SBP	0·413	-0·260	0·031	1·87E-17	735582						
rs6597650	9	133787225	G	A	GO	0·397	-0·021	0·010	2·63E-02	BMI	0·406	0·012	0·002	7·90E-12	665828						
rs17216707	20	52732362	C	T	GO	0·194	0·026	0·012	2·64E-02	eGFR	0·190	0·005	0·000	6·88E-46	1146580						
rs1743259	6	118609205	G	C	GO	0·081	-0·035	0·016	2·65E-02	SBP	0·081	0·398	0·056	8·87E-13	726510						
rs7165200	15	66937421	A	G	GO	0·429	-0·020	0·009	2·72E-02	SBP	0·440	0·201	0·030	2·87E-11	738706						
rs72661887	1	38416310	T	C	GO	0·454	0·019	0·009	2·75E-02	SBP	0·453	0·246	0·031	3·88E-15	696848						

rs10487796	7	15063430	A	T	GO	0·465	-0·019	0·009	2·77E-02	Glucose	0·484	-0·026	0·002	4·62E-52	199033
rs6766610	3	11664859	A	C	GO	0·541	-0·019	0·009	2·78E-02	BMI	0·556	-0·009	0·002	1·40E-08	777389
rs281380	19	49214470	C	T	GO	0·393	-0·020	0·009	2·79E-02	eGFR	0·405	0·002	0·000	8·72E-16	1151060
rs3119304	6	160628557	C	T	GO	0·112	-0·031	0·014	2·86E-02	eGFR	0·121	-0·008	0·000	1·07E-96	1158180
rs7172627	15	31877690	G	A	GO	0·474	0·019	0·009	2·88E-02	BMI	0·472	0·012	0·002	1·10E-11	690458
rs9816226	3	185834499	T	A	GO	0·818	-0·025	0·012	2·95E-02	BMI	0·820	0·032	0·002	1·60E-52	778333
rs4666821	2	183077254	T	G	GO	0·499	0·019	0·009	3·00E-02	eGFR	0·521	0·002	0·000	7·10E-15	1199260
rs13012099	2	47010742	A	G	GO	0·347	0·020	0·009	3·05E-02	BMI	0·341	-0·014	0·002	1·20E-14	686541
rs1519845	8	129916890	G	A	GO	0·397	-0·019	0·009	3·13E-02	eGFR	0·376	-0·002	0·000	1·64E-11	1196300
rs1391980	4	129218126	T	C	GO	0·551	-0·019	0·009	3·17E-02	eGFR	0·552	0·002	0·000	1·48E-08	1191600
rs475805	11	65848738	A	G	GO	0·755	-0·021	0·010	3·19E-02	GGT	0·765	-0·004	0·001	6·60E-12	437194
rs12153395	5	179411477	A	G	GO	0·122	0·029	0·013	3·20E-02	SBP	0·115	-0·330	0·049	1·07E-11	700177
rs742493	6	40998167	C	T	GO	0·132	-0·028	0·013	3·21E-02	GGT	0·112	-0·004	0·001	9·20E-09	437194
rs17405819	8	76806584	C	T	GO	0·298	-0·020	0·009	3·26E-02	BMI	0·301	-0·022	0·002	4·30E-33	795493
rs11056875	12	16470918	C	T	GO	0·849	-0·025	0·012	3·27E-02	BMI	0·853	-0·014	0·002	1·10E-08	691176
rs2440452	8	6264879	G	T	GO	0·852	-0·027	0·013	3·39E-02	BMI	0·866	-0·014	0·003	4·30E-08	692117
rs4854645	3	132204810	A	G	GO	0·484	0·019	0·009	3·46E-02	eGFR	0·483	-0·002	0·000	1·33E-10	1201650
rs2007231	1	115266306	T	C	GO	0·638	-0·019	0·009	3·52E-02	BMI	0·639	-0·010	0·002	5·20E-09	691969
rs2273654	10	102689217	C	T	GO	0·454	-0·019	0·009	3·53E-02	SBP	0·440	-0·176	0·031	7·89E-09	725875
rs962796	13	54385284	C	T	GO	0·792	0·022	0·011	3·57E-02	BMI	0·795	-0·015	0·002	5·90E-12	692479
rs6927301	6	154872080	G	T	GO	0·328	-0·019	0·009	3·59E-02	GGT	0·315	-0·004	0·001	1·10E-15	437194
rs10069690	5	1279790	T	C	GO	0·244	-0·023	0·011	3·60E-02	SBP	0·258	0·310	0·037	4·47E-17	654501
rs10184839	2	181946115	T	A	GO	0·714	0·020	0·009	3·64E-02	SBP	0·709	0·185	0·033	2·40E-08	732550
rs12448738	16	56489343	C	A	GO	0·130	-0·027	0·013	3·67E-02	BMI	0·137	0·017	0·003	2·80E-11	691932
rs7095788	10	95384152	T	C	GO	0·331	0·020	0·009	3·72E-02	Glucose	0·358	-0·011	0·002	1·98E-09	178446
rs2235564	1	6713114	T	C	GO	0·339	0·019	0·009	3·79E-02	BMI	0·347	0·013	0·002	3·70E-13	691544
rs12950305	17	1361363	G	A	GO	0·693	-0·020	0·010	3·87E-02	SBP	0·708	0·242	0·034	9·12E-13	710077
rs2160236	2	40557276	C	G	GO	0·387	0·019	0·009	3·96E-02	SBP	0·380	-0·244	0·032	1·22E-14	705705
rs17085528	6	154876716	G	T	GO	0·191	-0·022	0·011	4·01E-02	eGFR	0·182	0·002	0·000	2·08E-11	1194850
rs4957026	5	361148	G	A	GO	0·666	0·019	0·009	4·05E-02	SBP	0·660	-0·198	0·032	8·12E-10	716315
rs927315	9	4117713	T	C	GO	0·477	0·018	0·009	4·09E-02	SBP	0·471	0·169	0·030	2·44E-08	725247
rs1867324	5	112539955	G	A	GO	0·663	0·018	0·009	4·23E-02	GGT	0·681	-0·004	0·001	7·40E-13	437194
rs9522285	13	112230701	A	G	GO	0·411	0·018	0·009	4·27E-02	BMI	0·414	0·013	0·002	2·50E-13	690681
rs2652812	15	63406170	T	C	GO	0·740	0·020	0·010	4·33E-02	SBP	0·754	-0·252	0·035	1·03E-12	727494
rs2246012	6	131898208	C	T	GO	0·179	-0·024	0·012	4·34E-02	BMI	0·163	0·016	0·002	3·10E-13	795598
rs62035088	15	81165842	A	G	GO	0·181	-0·025	0·012	4·36E-02	eGFR	0·164	0·003	0·000	6·73E-16	1154210
rs13174863	5	139080745	G	A	GO	0·148	0·026	0·013	4·36E-02	BMI	0·155	0·019	0·002	2·90E-16	773762
rs2270778	3	124692689	T	C	GO	0·567	-0·018	0·009	4·41E-02	BMI	0·584	-0·010	0·002	4·30E-09	794903
rs17713396	2	227201	T	C	GO	0·361	-0·018	0·009	4·45E-02	eGFR	0·338	-0·002	0·000	1·61E-17	1200810
rs634501	5	180218668	G	A	GO	0·758	0·022	0·011	4·46E-02	GGT	0·734	-0·004	0·001	5·90E-12	437194
rs16871902	5	3488462	A	G	GO	0·485	0·017	0·009	4·50E-02	BMI	0·488	0·013	0·002	4·60E-13	690830
rs8096658	18	77156537	G	C	GO	0·493	0·020	0·010	4·50E-02	eGFR	0·472	-0·005	0·000	1·88E-75	1059950
rs7340705	3	53734443	C	T	GO	0·314	0·018	0·009	4·55E-02	SBP	0·327	0·243	0·032	4·87E-14	727632
rs329122	5	133864599	A	G	GO	0·419	-0·018	0·009	4·62E-02	BMI	0·423	-0·013	0·002	4·30E-14	792745
rs6419734	3	78458928	C	T	GO	0·836	0·024	0·012	4·63E-02	BMI	0·848	-0·017	0·003	1·90E-12	688250
rs7117842	11	122534504	C	T	GO	0·375	0·018	0·009	4·65E-02	BMI	0·379	0·011	0·002	6·30E-11	784222

rs62187537	20	1333060	T	C	GO	0·058	-0·038	0·019	4·66E-02	eGFR	0·067	0·004	0·001	2·07E-11	1039570						
rs2419077	2	71648425	T	G	GO	0·262	-0·020	0·010	4·72E-02	SBP	0·260	0·197	0·034	1·07E-08	729470						
rs2274786	9	112225774	C	T	GO	0·358	0·018	0·009	4·81E-02	eGFR	0·355	-0·002	0·000	2·79E-09	1158520						
rs1575290	6	7715689	T	C	GO	0·469	-0·017	0·009	4·82E-02	SBP	0·473	0·197	0·030	5·59E-11	735850						
rs6792725	3	24520283	G	A	GO	0·661	0·019	0·010	4·85E-02	GGT	0·692	-0·003	0·001	3·50E-10	437194						
rs665731	11	114032484	T	C	GO	0·180	0·024	0·012	4·88E-02	eGFR	0·184	-0·002	0·000	1·36E-10	1174480						
rs13110266	4	162129844	A	G	GO	0·405	0·017	0·009	4·93E-02	BMI	0·407	-0·012	0·002	1·90E-12	791087						
rs911554	14	103999371	T	G	MG	0·382	0·039	0·010	1·12E-04	eGFR	0·397	-0·002	0·000	1·78E-08	1153100						
rs11708118	3	160110255	A	G	MG	0·251	0·039	0·011	3·29E-04	GGT	0·262	0·007	0·001	3·10E-35	437194						
rs9294260	6	83433228	A	G	MG	0·475	0·033	0·010	5·83E-04	BMI	0·473	0·015	0·002	1·80E-19	783533						
rs12148121	15	67494922	C	T	MG	0·222	-0·040	0·012	6·01E-04	eGFR	0·275	-0·002	0·000	2·60E-11	1200950						
rs2241358	19	14588476	G	C	MG	0·317	0·040	0·012	7·15E-04	eGFR	0·313	0·002	0·000	6·16E-10	1144310						
rs9894634	17	1967501	T	C	MG	0·603	0·034	0·010	8·75E-04	eGFR	0·572	-0·002	0·000	3·66E-14	1200730						
rs9807214	18	42782952	A	G	MG	0·310	0·036	0·011	8·79E-04	eGFR	0·292	-0·002	0·000	2·73E-13	1201920						
rs10282122	7	2529623	T	C	MG	0·658	-0·034	0·010	9·55E-04	SBP	0·668	-0·302	0·033	2·46E-20	706826						
rs3808356	7	100492322	T	C	MG	0·279	-0·034	0·011	1·46E-03	SBP	0·284	0·197	0·034	4·91E-09	720360						
rs2065418	11	30422068	G	T	MG	0·349	-0·032	0·010	1·52E-03	BMI	0·362	-0·017	0·002	3·60E-20	691707						
rs8075273	17	61728881	A	C	MG	0·295	-0·033	0·011	1·97E-03	BMI	0·282	-0·013	0·002	3·70E-13	795026						
rs6972171	7	156267032	C	A	MG	0·245	0·035	0·011	2·04E-03	eGFR	0·299	0·002	0·000	3·08E-18	1200360						
rs1811081	17	61996506	A	C	MG	0·252	-0·036	0·012	2·18E-03	GGT	0·244	-0·003	0·001	5·20E-09	437194						
rs1006896	3	88104411	C	A	MG	0·097	0·050	0·016	2·38E-03	BMI	0·106	-0·023	0·003	5·50E-18	691892						
rs2246754	15	96767312	T	C	MG	0·208	0·035	0·012	2·57E-03	SBP	0·211	0·250	0·037	1·17E-11	735372						
rs4577304	2	73403040	C	T	MG	0·488	0·028	0·010	3·45E-03	SBP	0·477	0·177	0·030	4·99E-09	726869						
rs11753995	6	160575366	A	G	MG	0·163	0·037	0·013	3·62E-03	eGFR	0·166	0·004	0·000	1·63E-22	1035970						
rs11071738	15	63580155	C	T	MG	0·468	0·029	0·010	3·89E-03	eGFR	0·450	0·003	0·000	1·59E-23	1201590						
rs12042924	1	197297417	C	T	MG	0·467	-0·029	0·010	4·23E-03	SBP	0·472	0·181	0·030	2·62E-09	725176						
rs12615778	2	102436738	G	A	MG	0·316	0·029	0·010	4·26E-03	BMI	0·306	-0·010	0·002	3·90E-08	684324						
rs662138	6	160564476	G	C	MG	0·171	0·036	0·013	4·90E-03	GGT	0·186	-0·005	0·001	1·10E-12	437194						
rs7539054	1	186618699	C	A	MG	0·258	-0·032	0·011	5·19E-03	eGFR	0·290	0·002	0·000	2·79E-14	1199260						
rs248139	5	167352783	A	G	MG	0·185	-0·035	0·013	5·39E-03	BMI	0·193	0·013	0·002	1·20E-09	683675						
rs762147	21	39238610	G	A	MG	0·739	-0·031	0·011	5·75E-03	BMI	0·729	0·012	0·002	3·30E-09	692496						
rs3829849	9	129390800	T	C	MG	0·344	0·031	0·011	6·44E-03	BMI	0·359	0·010	0·002	5·90E-09	793851						
rs17420882	1	100818728	G	T	MG	0·295	-0·029	0·011	6·70E-03	eGFR	0·286	-0·002	0·000	5·06E-20	1196300						
rs12614953	2	43421461	C	T	MG	0·483	-0·029	0·011	6·85E-03	eGFR	0·504	0·003	0·000	4·79E-24	1159620						
rs2652812	15	63406170	T	C	MG	0·743	0·030	0·011	7·24E-03	SBP	0·754	-0·252	0·035	1·03E-12	727494						
rs1337101	1	219726100	T	G	MG	0·286	-0·027	0·010	7·82E-03	GGT	0·317	-0·003	0·001	1·10E-09	437194						
rs13240600	7	99064466	G	A	MG	0·144	0·036	0·014	8·20E-03	BMI	0·155	-0·020	0·002	3·50E-17	692233						
rs12628891	22	38317137	T	C	MG	0·304	0·029	0·011	8·54E-03	BMI	0·317	-0·011	0·002	3·00E-09	686575						
rs6851147	4	55056566	G	C	MG	0·270	0·029	0·011	9·05E-03	SBP	0·273	0·189	0·034	2·55E-08	724973						
rs2275848	9	95887320	T	G	MG	0·797	-0·033	0·013	1·10E-02	eGFR	0·811	0·002	0·000	5·04E-10	1132270						
rs72869573	4	78830584	T	C	MG	0·130	0·036	0·014	1·15E-02	GGT	0·146	0·004	0·001	7·50E-09	437194						
rs7154723	14	98590629	A	G	MG	0·394	0·025	0·010	1·19E-02	SBP	0·385	0·253	0·031	2·72E-16	738875						
rs1528435	2	181550962	T	C	MG	0·628	0·025	0·010	1·33E-02	BMI	0·633	0·016	0·002	9·10E-23	794198						
rs2906163	7	2516594	T	C	MG	0·633	-0·026	0·011	1·34E-02	eGFR	0·665	0·001	0·000	2·81E-08	1153920						
rs4952668	2	43386568	A	G	MG	0·634	-0·026	0·010	1·39E-02	SBP	0·623	-0·248	0·031	2·60E-15	721184						
rs10224210	7	151413194	C	T	MG	0·276	0·028	0·011	1·40E-02	eGFR	0·277	-0·008	0·000	1·57E-139	978562	SBP	0·279	0·383	0·034	1·60E-29	717138

rs62173695	2	178122727	A	G	MG	0·341	-0·026	0·011	1·42E-02	eGFR	0·349	0·003	0·000	3·27E-35	1159620						
rs813412	10	32284825	T	C	MG	0·747	0·027	0·011	1·43E-02	SBP	0·751	-0·210	0·035	1·87E-09	730888						
rs2272168	7	99102777	C	G	MG	0·142	0·034	0·014	1·43E-02	GGT	0·152	-0·004	0·001	1·30E-08	437194						
rs28850910	11	27291960	A	G	MG	0·299	0·026	0·011	1·49E-02	SBP	0·319	-0·207	0·032	1·66E-10	730267						
rs12190287	6	134214525	G	C	MG	0·376	0·025	0·010	1·53E-02	eGFR	0·383	-0·002	0·000	2·02E-11	1157380						
rs57946343	10	63499951	C	T	MG	0·148	-0·033	0·014	1·54E-02	SBP	0·147	-0·716	0·043	2·10E-63	731715						
rs9373263	6	140553414	A	G	MG	0·234	0·027	0·011	1·57E-02	GGT	0·204	-0·004	0·001	4·40E-10	437194						
rs8092503	18	52479487	G	A	MG	0·219	0·028	0·012	1·63E-02	BMI	0·232	0·017	0·002	2·30E-17	777619						
rs62325228	4	54318751	T	G	MG	0·137	0·034	0·014	1·67E-02	eGFR	0·144	0·002	0·000	3·33E-10	1201910						
rs8904	14	35871217	A	G	MG	0·379	-0·024	0·010	1·67E-02	SBP	0·368	0·306	0·031	1·71E-22	728260						
rs12939549	17	78611724	G	A	MG	0·437	-0·023	0·010	1·70E-02	BMI	0·434	-0·018	0·002	2·70E-28	793950						
rs6265	11	27679916	T	C	MG	0·198	-0·028	0·012	1·73E-02	BMI	0·195	-0·041	0·002	1·00E-86	795458						
rs55754617	22	19128559	T	C	MG	0·203	0·028	0·012	1·77E-02	eGFR	0·191	0·002	0·000	1·07E-08	1159620						
rs5402	3	170727739	A	T	MG	0·124	0·036	0·015	1·78E-02	GGT	0·121	0·016	0·001	5·70E-95	437194						
rs427943	21	46570896	C	A	MG	0·535	0·023	0·010	1·94E-02	BMI	0·567	0·017	0·002	7·30E-23	712095						
rs10433609	3	51311574	A	T	MG	0·830	-0·030	0·013	1·95E-02	BMI	0·832	0·016	0·002	1·70E-12	689684						
rs9812319	3	136238860	T	C	MG	0·335	-0·023	0·010	2·09E-02	eGFR	0·335	0·002	0·000	1·12E-17	1196300						
rs6879279	5	106878792	C	G	MG	0·154	-0·032	0·014	2·14E-02	GGT	0·154	-0·012	0·001	6·90E-61	437194						
rs10746963	9	77238558	G	A	MG	0·808	0·029	0·013	2·25E-02	SBP	0·817	0·218	0·039	2·05E-08	738423						
rs1047891	2	211540507	A	C	MG	0·289	-0·025	0·011	2·28E-02	eGFR	0·304	-0·007	0·000	4·91E-116	1158670	SBP	0·319	-0·253	0·033	1·37E-14	711099
rs4480845	17	1958609	C	T	MG	0·629	0·024	0·011	2·34E-02	SBP	0·635	-0·316	0·032	1·85E-23	720266						
rs6137201	20	20957669	T	A	MG	0·115	-0·035	0·016	2·42E-02	SBP	0·122	-0·267	0·047	1·64E-08	702173						
rs11663085	18	782898	G	A	MG	0·089	0·040	0·018	2·52E-02	GGT	0·105	0·005	0·001	9·80E-09	437194						
rs1076485	11	116772441	T	C	MG	0·138	-0·031	0·014	2·52E-02	SBP	0·130	0·339	0·046	1·19E-13	715764						
rs2061813	16	7071254	T	A	MG	0·740	-0·025	0·011	2·58E-02	BMI	0·742	-0·011	0·002	3·20E-08	678583						
rs12575164	11	128349430	C	T	MG	0·198	0·027	0·012	2·58E-02	eGFR	0·215	0·002	0·000	1·90E-10	1201410						
rs1021066	8	106368050	G	T	MG	0·523	-0·021	0·010	2·61E-02	BMI	0·524	0·010	0·002	2·50E-08	690198						
rs1365466	18	36182440	T	C	MG	0·724	-0·023	0·011	2·71E-02	BMI	0·741	-0·014	0·002	3·30E-13	791868						
rs7784465	7	6418275	C	T	MG	0·138	-0·032	0·014	2·72E-02	BMI	0·139	0·016	0·003	1·10E-10	685477						
rs13270267	8	11444837	T	C	MG	0·448	-0·022	0·010	2·74E-02	eGFR	0·464	0·002	0·000	1·04E-16	1046490						
rs7042372	9	6959840	G	A	MG	0·336	-0·022	0·010	2·84E-02	BMI	0·343	-0·012	0·002	3·80E-11	681234						
rs3746778	20	61341472	A	G	MG	0·400	-0·027	0·012	2·85E-02	GGT	0·420	-0·004	0·001	5·90E-11	437194						
rs754466	10	79680434	T	A	MG	0·277	-0·024	0·011	2·93E-02	GGT	0·253	0·017	0·001	6·90E-192	437194						
rs6011457	20	61530915	A	T	MG	0·494	-0·021	0·010	2·96E-02	BMI	0·498	-0·012	0·002	2·70E-11	690692						
rs28374392	20	61189717	T	C	MG	0·600	-0·025	0·011	3·00E-02	SBP	0·623	0·192	0·034	1·21E-08	640744						
rs7095788	10	95384152	T	C	MG	0·335	0·023	0·011	3·01E-02	Glucose	0·358	-0·011	0·002	1·98E-09	178446						
rs227426	14	70456664	T	G	MG	0·532	-0·021	0·010	3·02E-02	SBP	0·561	0·186	0·030	8·59E-10	734458						
rs6519133	22	39096602	C	T	MG	0·398	-0·022	0·010	3·04E-02	GGT	0·395	0·007	0·001	6·70E-40	437194						
rs80282103	10	899071	T	A	MG	0·084	0·039	0·018	3·09E-02	eGFR	0·087	-0·008	0·001	2·91E-62	1201760						
rs2731684	5	171861204	A	C	MG	0·398	0·022	0·010	3·14E-02	GGT	0·378	-0·003	0·001	4·50E-09	437194						
rs1215469	13	80707408	C	A	MG	0·769	0·025	0·012	3·27E-02	SBP	0·770	0·212	0·037	6·16E-09	709331						
rs7963577	12	82174115	C	T	MG	0·235	0·024	0·011	3·44E-02	eGFR	0·215	-0·002	0·000	2·02E-11	1163680						
rs33996239	1	203109801	T	C	MG	0·053	-0·050	0·024	3·46E-02	SBP	0·060	-0·366	0·066	3·39E-08	677241						
rs7966357	12	51209838	G	C	MG	0·309	-0·023	0·011	3·52E-02	eGFR	0·330	-0·002	0·000	1·74E-11	1201800						
rs1792	13	99088006	A	G	MG	0·246	-0·025	0·012	3·55E-02	GGT	0·225	0·004	0·001	3·80E-09	437194						
rs6963840	7	78144371	T	C	MG	0·149	0·028	0·013	3·61E-02	BMI	0·211	0·015	0·002	3·40E-10	637209						

rs72830437	10	111960190	A	G	MG	0·066	-0·040	0·019	3·65E-02	eGFR	0·070	-0·003	0·001	2·99E-08	1201660
rs676387	17	40706273	A	C	MG	0·259	0·023	0·011	3·66E-02	GGT	0·285	0·003	0·001	2·00E-08	437194
rs7235205	18	63373762	G	A	MG	0·298	0·022	0·011	3·68E-02	BMI	0·266	0·014	0·002	4·40E-14	789016
rs4812536	20	40258709	G	A	MG	0·333	0·021	0·010	3·76E-02	SBP	0·342	-0·271	0·032	4·09E-17	713714
rs2276153	11	58407740	G	C	MG	0·248	-0·024	0·011	3·80E-02	SBP	0·243	-0·330	0·035	6·56E-21	734236
rs17457340	20	10640042	C	T	MG	0·072	0·040	0·019	3·86E-02	GGT	0·076	-0·006	0·001	1·30E-09	437194
rs6453319	5	76847499	C	A	MG	0·567	-0·021	0·010	3·90E-02	eGFR	0·574	-0·001	0·000	3·85E-08	973658
rs7541882	1	64121569	C	A	MG	0·172	0·026	0·013	4·01E-02	GGT	0·190	0·004	0·001	1·80E-09	437194
rs28578714	22	50727921	C	T	MG	0·392	-0·024	0·012	4·10E-02	SBP	0·394	-0·207	0·033	2·53E-10	666583
rs11641374	16	1347717	A	C	MG	0·602	-0·025	0·012	4·14E-02	SBP	0·600	-0·194	0·031	3·26E-10	726309
rs13107261	4	63768826	A	G	MG	0·365	-0·021	0·010	4·16E-02	SBP	0·369	-0·178	0·031	1·57E-08	723080
rs1465900	11	76473138	C	A	MG	0·231	-0·023	0·011	4·21E-02	BMI	0·219	-0·013	0·002	4·80E-10	779748
rs7600699	2	156018263	G	C	MG	0·165	-0·027	0·013	4·23E-02	BMI	0·158	0·015	0·002	6·40E-10	691202
rs72722767	8	129205103	A	G	MG	0·294	0·021	0·010	4·24E-02	SBP	0·298	-0·180	0·033	4·64E-08	732239
rs9436446	1	50590638	A	G	MG	0·210	0·025	0·012	4·24E-02	BMI	0·219	0·017	0·002	4·00E-17	692423
rs10189186	2	53025757	G	A	MG	0·445	0·020	0·010	4·25E-02	SBP	0·470	-0·189	0·030	3·91E-10	727116
rs1813937	11	50468801	T	C	MG	0·782	-0·025	0·012	4·25E-02	eGFR	0·750	0·002	0·000	1·75E-09	1173960
rs10962549	9	16719445	T	C	MG	0·159	0·027	0·014	4·29E-02	BMI	0·168	0·020	0·002	2·50E-17	692271
rs56213443	3	160309043	A	C	MG	0·545	0·019	0·010	4·30E-02	SBP	0·536	-0·174	0·031	1·39E-08	717702
rs7120873	11	49459474	T	C	MG	0·119	0·030	0·015	4·36E-02	BMI	0·111	0·017	0·003	3·40E-10	691850
rs4912637	5	141720261	A	G	MG	0·333	-0·021	0·011	4·36E-02	BMI	0·346	-0·010	0·002	1·50E-08	691647
rs263041	3	183522231	G	A	MG	0·643	-0·020	0·010	4·37E-02	BMI	0·633	-0·012	0·002	2·20E-12	692268
rs11607862	11	35244574	T	C	MG	0·281	-0·022	0·011	4·40E-02	GGT	0·288	0·003	0·001	9·80E-09	437194
rs13432055	2	56603985	C	T	MG	0·265	0·023	0·011	4·46E-02	BMI	0·286	0·012	0·002	8·90E-11	790223
rs2913920	5	141726983	T	C	MG	0·745	-0·023	0·011	4·50E-02	SBP	0·765	0·242	0·036	1·62E-11	720146
rs4430672	14	63094407	C	T	MG	0·806	-0·025	0·013	4·56E-02	BMI	0·800	-0·013	0·002	3·90E-09	691400
rs62187537	20	1333060	T	C	MG	0·063	-0·040	0·020	4·62E-02	eGFR	0·067	0·004	0·001	2·07E-11	1039570
rs2607775	3	14220095	G	C	MG	0·480	-0·020	0·010	4·67E-02	eGFR	0·479	-0·002	0·000	3·82E-09	1201900
rs17115145	14	30122409	T	C	MG	0·386	0·020	0·010	4·67E-02	SBP	0·397	0·178	0·031	7·39E-09	737491
rs11114051	12	109167803	C	T	MG	0·302	0·021	0·011	4·79E-02	GGT	0·304	-0·007	0·001	2·00E-34	437194
rs10015716	4	95548550	A	G	MG	0·646	0·020	0·010	4·81E-02	eGFR	0·642	0·002	0·000	7·01E-09	1158670
rs17405819	8	76806584	C	T	MG	0·302	-0·021	0·011	4·83E-02	BMI	0·301	-0·022	0·002	4·30E-33	795493
rs28735420	17	12139964	G	T	MG	0·059	0·047	0·024	4·83E-02	eGFR	0·071	-0·003	0·001	1·91E-10	1152640
rs2608882	17	73934130	A	G	MG	0·221	-0·023	0·012	4·87E-02	SBP	0·224	-0·252	0·036	3·43E-12	733270
rs268263	2	164954174	A	T	MG	0·749	0·022	0·011	4·87E-02	SBP	0·750	0·594	0·035	1·77E-63	713147
rs10184839	2	181946115	T	A	MG	0·718	0·021	0·011	4·89E-02	SBP	0·709	0·185	0·033	2·40E-08	732550
rs10501410	11	72088806	A	G	MG	0·082	-0·035	0·018	4·91E-02	SBP	0·069	0·412	0·061	1·10E-11	717203
rs10757831	9	29282192	T	C	MG	0·184	-0·024	0·012	4·91E-02	BMI	0·188	0·012	0·002	2·60E-08	691189
rs6662924	1	100894419	A	C	MG	0·179	0·024	0·012	4·92E-02	Glucose	0·198	0·014	0·002	3·34E-10	165515
rs10144318	14	53189731	C	A	MG	0·524	-0·019	0·010	4·94E-02	BMI	0·511	-0·009	0·002	1·40E-08	794528
rs907183	8	8729761	C	G	MG	0·449	-0·020	0·010	4·98E-02	SBP	0·463	0·319	0·031	2·15E-25	724589