**Table S1. Availability of baseline variables**

|  |  |
| --- | --- |
| **Variable** | **n (%)** |
| Age | 8583 (100.0) |
| Gender | 8583 (100.0) |
| Race/ethnicity | 8583 (100.0) |
| Relationship to recipient | 8559 (99.7) |
| Family history variables |  |
| 1st degree relative with hypertension | 7847 (91.4) |
| 1st degree relative with diabetes | 8004 (93.3) |
| 1st degree relative with kidney disease | 8228 (95.9) |
| 1st degree relative with heart disease | 7831 (91.2) |
| Body mass index (kg/m2) | 8583 (100.0) |
| Systolic BP (mmHg) | 8553 (99.7) |
| Diastolic BP (mmHg) | 8553 (99.7) |
| Smoking | 8384 (97.7) |
| Total cholesterol (mg/dL) | 4229 (49.3) |
| LDL (mg/dL) | 2546 (29.7) |
| HDL (mg/dL) | 2707 (31.5) |
| Triglyceride (mg/dL) | 4336 (50.5) |
| Fasting plasma glucose (mg/dL) | 8119 (94.6) |
| Serum creatinine (mg/dL) | 8549 (99.6) |
| eGFR at evaluation (mL/min/1.73m2) | 8549 (99.6) |

ESKD, end-stage kidney disease; LDL, low-density lipoprotein; HLD, high-density lipoprotein

**Table S2. Availability of outcome variables**

|  |  |
| --- | --- |
|  | **Data available, n (%)** |
| **Vital status** |  |
| RELIVE main questionnaire | 7591 (100.0) |
| **Cardiovascular disease** | 8569 (99.8) |
| RELIVE main questionnaire | 8569 (99.8) |
| Additional self-report: |  |
| Stroke | 2950 (34.4) |
| Heart attack | 2894 (33.7) |
| Myocardial infarction (heart attack) | 2392 (27.9) |
| Heart failure | 2888 (33.7) |
| Heart bypass surgery | 2893 (33.7) |
| Coronary balloon angioplasty or stenting | 2884 (33.6) |
| Operation to unclog or bypass the arteries | 2393 (27.9) |
| **Diabetes** | 7879 (91.8) |
| RELIVE main questionnaire |  |
| Fasting plasma glucose ≥126 mg/dL | 7636 (89.0) |
| Diabetic kidney disease | 2402 (28.0) |
| Had diabetic retinopathy | 2402 (28.0) |
| Additional self-report: |  |
| On diabetes treatment | 2802 (32.7) |
| The donor being told they had diabetes | 2809 (32.7) |
| **Hypertension** | 8582 (100.0) |
| RELIVE main questionnaire |  |
| Diagnosed hypertension (≥140/90mmHg) | 7669 (89.4) |
| Additional variables indicating blood pressure ≥140/90mmHg | 8579 (100.0) |
| On treatment for hypertension | 892 (10.4) |
| Additional self-report: |  |
| Told by health care professional having hypertension | 2405 (28.0) |
| On treatment for hypertension | 2405 (28.0) |
| **Proteinuria** | 7687 (89.6) |
| RELIVE main questionnaire |  |
| Proteinuria, main variable | 7491 (87.3) |
| Proteinuria, additional variables from sub-studies | 2239 (26.1) |
| Self-report | 2872 (33.5) |
| **eGFR / creatinine** | 8374 (97.6) |
| **ESKD** | 8016 (93.4) |

Donor may have outcome events defined by more than one variable; ESKD, end-stage kidney

disease; eGFR, estimated glomerular filtration rate.

**Table S3. Number of donors with serial post-donation creatinine measurements**

|  |  |  |
| --- | --- | --- |
| **Number of measurements** | **Number of donors** | **Percent** |
| 1 | 2,361 | 27.51 |
| 2 | 1,539 | 17.93 |
| 3 | 1,813 | 21.12 |
| 4 | 1112 | 12.96 |
| 5 | 625 | 7.28 |
| 6 | 314 | 3.66 |
| 7 | 210 | 2.45 |
| ≥8 | 117 | 4.98 |
| Missing | 209 | 2.44 |
| Total | 8,583 | 100% |

**Table S4. Primary cause of death**

|  |  |
| --- | --- |
|  |  |
| **Cause of death** | **No (%)** |
| Accidents | 11 (2.6) |
| Cancer | 66 (15.8) |
| Cardiac | 42 (10.0) |
| Dementia | 2 (0.5) |
| Diabetes | 5 (1.2) |
| ESKD | 3 (0.7) |
| Influenza/Pneumonia | 4 (1.0) |
| Liver Disease | 8 (1.9) |
| Pulmonary Embolism | 8 (1.9) |
| Septicemia/Infection | 14 (3.3) |
| Stroke | 2 (0.5) |
| Suicide | 37 (8.9) |
| Unknown | 216 (51.7) |

**Table S5. Multivariable risk of diabetes and hypertension: Cox regression using continuous BMI (per 1 unit kg/m2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1 (N=6974)** | | **Model 2 (N=7011)** | |
| **Diabetes** | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.01 (0.99, 1.02) | 0.25 | 1.01 (1.00, 1.02) | 0.14 |
| Male | 0.96 (0.74, 1.24) | 0.74 | 0.96 (0.74, 1.24) | 0.73 |
| Non-White | 1.14 (0.74, 1.75) | 0.56 | 1.11 (0.72, 1.69) | 0.64 |
| Related to the recipient | 0.79 (0.50, 1.25) | 0.31 | 0.82 (0.52, 1.29) | 0.39 |
| BMI (kg/m2) | 1.11 (1.08, 1.13) | <0.001 | 1.11 (1.08, 1.13) | <0.001 |
| Systolic BP (mmHg) | 1.01 (1.00, 1.03) | 0.10 | 1.02 (1.00, 1.03) | 0.03 |
| Diastolic BP (mmHg) | 0.99 (0.96, 1.01) | 0.26 | 0.99 (0.97, 1.01) | 0.36 |
| Fasting plasma glucose (mg/dL) | 1.03 (1.02, 1.04) | <0.001 | 1.03 (1.02, 1.04) | <0.001 |
| eGFR (ml/min/1.73m2) | 1.00 (0.99, 1.01) | 0.64 | 1.00 (0.99, 1.01) | 0.52 |
| Smoking | 1.21 (0.95, 1.56) | 0.12 | 1.24 (0.97, 1.59) | 0.08 |
| Hyperlipidemia | 1.10 (0.83, 1.45) | 0.50 | 1.10 (0.83, 1.45) | 0.51 |
| Post-donation hypertension | 1.03 (1.01, 1.04) | 0.01 | -- | -- |
| Post-donation ESKD | 1.00 (0.97, 1.04) | 0.87 | -- | -- |
|  | **Model 1 (N=6328)** | | **Model 2 (N=6924)** | |
| **Hypertension** | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.02 (1.02, 1.03) | <0.001 | 1.02 (1.01, 1.02) | <0.001 |
| Male | 1.12 (1.02, 1.24) | 0.02 | 1.15 (1.05, 1.26) | 0.004 |
| Non-White | 1.63 (1.42, 1.88) | <0.001 | 1.62 (1.41, 1.86) | <0.001 |
| Related to the recipient | 0.93 (0.81, 1.06) | 0.25 | 0.93 (0.81, 1.05) | 0.24 |
| BMI (kg/m2) | 1.05 (1.04, 1.06) | <0.001 | 1.05 (1.04, 1.06) | <0.001 |
| Systolic BP (mmHg) | 1.04 (1.04, 1.05) | <0.001 | 1.05 (1.04, 1.05) | <0.001 |
| Diastolic BP (mmHg) | 0.99 (0.98, 1.00) | 0.03 | 0.99 (0.98, 1.00) | 0.02 |
| Fasting plasma glucose (mg/dL) | 1.01 (1.01, 1.01) | <0.001 | 1.01 (1.01, 1.01) | <0.001 |
| eGFR (ml/min/1.73m2) | 1.00 (1.00, 1.01) | 0.04 | 1.00 (1.00, 1.01) | 0.07 |
| Smoking | 0.99 (0.90, 1.09) | 0.85 | 1.00 (0.91, 1.09) | 0.95 |
| Hyperlipidemia | 0.88 (0.79, 0.98) | 0.02 | 0.91 (0.82, 1.00) | 0.06 |
| Post-donation diabetes | 1.01 (1.00, 1.02) | 0.16 | -- | -- |
| Post-donation ESKD | 1.02 (1.00, 1.05) | 0.08 | -- | -- |

aHR, adjusted hazard ratio; CI, confidence interval; BMI; body mass index, eGFR; estimated glomerular filtration rate, BP; blood pressure.

Model 1: Adjusted for post-donation diabetes, hypertension, and end-stage kidney disease (ESKD) as time-dependent covariates.

Model 2: Not adjusted for post-donation diabetes, hypertension, and end-stage kidney disease (ESKD)

**Table S6. Multivariable risk of proteinuria: Cox regression using continuous BMI (per 1 unit kg/m2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1 (N=7029)** | | **Model 2 (N=7068)** | |
|  | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.00 (1.00, 1.01) | 0.43 | 1.00 (1.00, 1.01) | 0.50 |
| Male | 1.13 (0.99, 1.30) | 0.07 | 1.14 (1.00, 1.30) | 0.06 |
| Non-White | 1.28 (1.03, 1.58) | 0.02 | 1.27 (1.03, 1.57) | 0.02 |
| Related to the recipient | 0.54 (0.46, 0.63) | <0.001 | 0.54 (0.46, 0.63) | <0.001 |
| BMI (kg/m2) | 1.05 (1.04, 1.07) | <0.001 | 1.05 (1.04, 1.07) | <0.001 |
| Systolic BP (mmHg) | 1.01 (1.00, 1.02) | 0.01 | 1.01 (1.00, 1.02) | 0.00 |
| Diastolic BP (mmHg) | 0.98 (0.97, 0.99) | 0.003 | 0.98 (0.97, 0.99) | 0.002 |
| Fasting plasma glucose (mg/dL) | 1.00 (1.00, 1.01) | 0.20 | 1.00 (1.00, 1.01) | 0.07 |
| eGFR (ml/min/1.73m2) | 0.98 (0.98, 0.99) | <0.001 | 0.98 (0.98, 0.99) | <0.001 |
| Smoking | 0.98 (0.86, 1.11) | 0.71 | 0.99 (0.87, 1.13) | 0.90 |
| Hyperlipidemia | 1.56 (1.36, 1.78) | <0.001 | 1.58 (1.38, 1.80) | <0.001 |
| Post-donation diabetes | 1.02 (1.01, 1.03) | 0.003 | -- | -- |
| Post-donation hypertension | 1.00 (0.99, 1.02) | 0.46 | -- | -- |

aHR, adjusted hazard ratio; CI, confidence interval; BMI; body mass index, eGFR; estimated glomerular filtration rate, BP; blood pressure.

Model 1: Adjusted for post-donation diabetes and hypertension as time-dependent covariates.

Model 2: Not adjusted for post-donation diabetes and hypertension.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1 (N=7089)** | | **Model 2 (N=7684)** | |
|  | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| **eGFR<60 ml/min/1.73m2** |  |  |  |  |
| Age (years) | 1.01 (1.01, 1.02) | <0.001 | 1.01 (1.01, 1.01) | <0.001 |
| Male | 1.21 (1.13, 1.28) | <0.001 | 1.20 (1.13, 1.27) | <0.001 |
| Non-White | 1.38 (1.25, 1.53) | <0.001 | 1.35 (1.23, 1.49) | <0.001 |
| Related to the recipient | 0.79 (0.74, 0.84) | <0.001 | 0.80 (0.74, 0.85) | <0.001 |
| BMI (kg/m2) | 1.03 (1.02, 1.03) | <0.001 | 1.03 (1.02, 1.03) | <0.001 |
| Systolic BP (mmHg) | 1.01 (1.01, 1.01) | <0.001 | 1.01 (1.01, 1.01) | <0.001 |
| Diastolic BP (mmHg) | 0.98 (0.98, 0.99) | <0.001 | 0.98 (0.98, 0.99) | <0.001 |
| Fasting plasma glucose (mg/dL) | 1.00 (1.00, 1.01) | <0.001 | 1.00 (1.00, 1.01) | <0.001 |
| eGFR (ml/min/1.73m2) | 0.98 (0.98, 0.98) | <0.001 | 0.98 (0.98, 0.98) | <0.001 |
| Smoking | 0.94 (0.89, 1.00) | 0.06 | 0.96 (0.91, 1.02) | 0.17 |
| Hyperlipidemia | 0.85 (0.80, 0.91) | <0.001 | 0.86 (0.81, 0.92) | <0.001 |
| Post-donation diabetes | 0.99 (0.98, 1.00) | 0.13 | -- | -- |
| Post-donation hypertension | 0.99 (0.98, 1.00) | 0.04 | -- | -- |
| **eGFR<45 ml/min/1.73m2** |  |  |  |  |
| Age (years) | 1.04 (1.03, 1.05) | <0.001 | 1.04 (1.03, 1.05) | <0.001 |
| Male | 1.55 (1.34, 1.80) | <0.001 | 1.45 (1.26, 1.67) | <0.001 |
| Non-White | 1.24 (0.99, 1.56) | 0.07 | 1.18 (0.95, 1.48) | 0.14 |
| Related to the recipient | 0.95 (0.80, 1.12) | 0.52 | 0.95 (0.81, 1.12) | 0.54 |
| BMI (kg/m2) | 1.05 (1.03, 1.06) | <0.001 | 1.05 (1.03, 1.06) | <0.001 |
| Systolic BP (mmHg) | 1.01 (1.00, 1.02) | 0.01 | 1.01 (1.00, 1.02) | 0.01 |
| Diastolic BP (mmHg) | 0.98 (0.97, 0.99) | 0.001 | 0.98 (0.97, 0.99) | 0.001 |
| Fasting plasma glucose (mg/dL) | 1.00 (1.00, 1.01) | 0.32 | 1.00 (1.00, 1.01) | 0.17 |
| eGFR (ml/min/1.73m2) | 0.95 (0.94, 0.95) | <0.001 | 0.95 (0.95, 0.96) | <0.001 |
| Smoking | 0.87 (0.76, 1.01) | 0.07 | 0.93 (0.81, 1.07) | 0.31 |
| Hyperlipidemia | 0.79 (0.68, 0.91) | 0.001 | 0.77 (0.67, 0.89) | <0.001 |
| Post-donation diabetes | 1.00 (0.99, 1.02) | 0.81 | -- | -- |
| Post-donation hypertension | 1.01 (0.99, 1.03) | 0.19 | -- | -- |
| **eGFR<30 ml/min/1.73m2** |  |  |  |  |
| Age (years) | 1.07 (1.04, 1.10) | <0.001 | 1.08 (1.05, 1.11) | <0.001 |
| Male | 1.53 (0.89, 2.64) | 0.13 | 1.58 (0.94, 2.67) | 0.08 |
| Non-White | 3.50 (1.59, 7.70) | 0.002 | 3.47 (1.62, 7.46) | 0.001 |
| Related to the recipient | 4.60 (0.61, 34.49) | 0.14 | 4.92 (0.66, 36.49) | 0.12 |
| BMI (kg/m2) | 1.10 (1.05, 1.16) | <0.001 | 1.12 (1.07, 1.17) | <0.001 |
| eGFR ml/min/1.73m2) | 0.98 (0.96, 1.00) | 0.07 | 0.99 (0.97, 1.01) | 0.22 |
| Post-donation diabetes | 1.02 (0.99, 1.04) | 0.19 | -- | -- |
| Post-donation hypertension | 1.02 (0.98, 1.07) | 0.25 | -- | -- |

**Table S7. Multivariable risk of eGFR<60, eGFR<45 and eGFR<30 ml/min/1.73m2: Cox regression using continuous BMI (per 1 unit kg/m2)**

aHR, adjusted hazard ratio; CI, confidence interval; BMI; body mass index, eGFR; estimated glomerular filtration rate, BP; blood pressure.

Model 1: Adjusted for post-donation diabetes and hypertension as time-dependent covariates.

Model 2: Not adjusted for post-donation diabetes and hypertension.

**Table S8. Multivariable risk of ESKD and eGFR <30 ml/min/1.73m2 or ESKD: Cox regression using continuous BMI (per 1 unit kg/m2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1 (N=7787)** | | **Model 2 (N=7993)** | |
| **ESKD** | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.02 (0.99, 1.05) | 0.28 | 1.03 (1.00, 1.05) | 0.04 |
| Male | 1.47 (0.73, 2.98) | 0.28 | 1.30 (0.71, 2.39) | 0.40 |
| Non-White | 5.02 (2.07, 12.15) | <0.001 | 3.94 (1.82, 8.52) | <0.001 |
| Related to the recipient | 0.41 (0.09, 1.81) | 0.24 | 0.49 (0.12, 2.04) | 0.33 |
| BMI (kg/m2) | 1.08 (1.01, 1.16) | 0.02 | 1.12 (1.07, 1.18) | <0.001 |
| Post-donation diabetes | 1.03 (1.00, 1.06) | 0.09 | -- | -- |
| Post-donation hypertension | 1.03 (0.98, 1.09) | 0.20 | -- | -- |
|  | **Model 1 (N=7846)** | | **Model 2 (N=8528)** | |
| **eGFR<30 ml/min/1.73m2 or ESKD** | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.05 (1.02, 1.07) | <0.001 | 1.05 (1.03, 1.08) | <0.001 |
| Male | 1.31 (0.82, 2.09) | 0.25 | 1.28 (0.84, 1.96) | 0.25 |
| Non-White | 4.09 (2.23, 7.52) | <0.001 | 3.58 (2.02, 6.36) | <0.001 |
| Related to the recipient | 1.47 (0.49, 4.48) | 0.49 | 1.98 (0.67, 5.85) | 0.22 |
| BMI (kg/m2) | 1.09 (1.05, 1.14) | <0.001 | 1.12 (1.08, 1.16) | <0.001 |
| Post-donation diabetes | 1.02 (1.00, 1.04) | 0.07 | -- | -- |
| Post-donation hypertension | 1.04 (1.00, 1.08) | 0.049 | -- | -- |

aHR, adjusted hazard ratio; CI, confidence interval; BMI; body mass index, eGFR; estimated glomerular filtration rate.

Model 1: Adjusted for post-donation diabetes and hypertension as time-dependent covariates.

Model 2: Not adjusted for post-donation diabetes and hypertension.

**Table S9. Multivariable risk of mortality: Cox regression using continuous BMI (per 1 unit kg/m2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Model 1 (N=7187)** | | **Model 2 (N=7846)** | |
| **A. Adjusting for the time-varying post-donation ESKD** | **aHR (95% CI)** | **p-value** | **aHR (95% CI)** | **p-value** |
| Age (years) | 1.13 (1.11, 1.15) | <0.001 | 1.10 (1.09, 1.11) | <0.001 |
| Male | 1.31 (0.97, 1.77) | 0.08 | 1.42 (1.14, 1.77) | 0.002 |
| Non-White | 1.77 (1.09, 2.87) | 0.02 | 1.57 (1.06, 2.34) | 0.03 |
| Related to the recipient | 0.84 (0.42, 1.70) | 0.64 | 0.90 (0.52, 1.57) | 0.72 |
| BMI (kg/m2) | 1.02 (0.98, 1.07) | 0.27 | 1.01 (0.98, 1.04) | 0.66 |
| Systolic BP (mmHg) | 1.01 (0.99, 1.02) | 0.26 | 1.00 (0.99, 1.01) | 0.64 |
| Diastolic BP (mmHg) | 1.01 (0.98, 1.04) | 0.48 | 1.00 (0.98, 1.02) | 0.83 |
| Fasting plasma glucose (mg/dL) | 1.01 (1.00, 1.01) | 0.25 | 1.00 (1.00, 1.01) | 0.25 |
| eGFR (ml/min/1.73m2) | 1.02 (1.01, 1.03) | 0.003 | 1.01 (1.00, 1.02) | 0.003 |
| Smoking | 1.93 (1.44, 2.60) | <0.001 | 1.95 (1.57, 2.44) | <0.001 |
| Hyperlipidemia | 1.26 (0.92, 1.71) | 0.15 | 1.25 (1.00, 1.57) | 0.052 |
| Post-donation diabetes | 1.00 (0.98, 1.01) | 0.78 | -- | -- |
| Post-donation hypertension | 0.97 (0.96, 0.98) | <0.001 | -- | -- |
| Post-donation ESKD | 1.01 (0.98, 1.05) | 0.45 | -- | -- |
| **B. Adjusting for obesity/ESKD status** | **aHR (95% CI)** | **p-value** |  |  |
| Age (years) | 1.13 (1.11, 1.15) | <0.001 | -- | -- |
| Male | 1.33 (0.99, 1.79) | 0.06 | -- | -- |
| Non-White | 1.78 (1.09, 2.89) | 0.02 | -- | -- |
| Related to the recipient | 0.84 (0.42, 1.70) | 0.63 | -- | -- |
| Systolic BP (mmHg) | 1.01 (0.99, 1.02) | 0.25 | -- | -- |
| Diastolic BP (mmHg) | 1.01 (0.98, 1.04) | 0.43 | -- | -- |
| Fasting plasma glucose (mg/dL) | 1.01 (1.00, 1.01) | 0.26 | -- | -- |
| eGFR (ml/min/1.73m2) | 1.02 (1.01, 1.03) | 0.002 | -- | -- |
| Smoking | 1.92 (1.43, 2.59) | <0.001 | -- | -- |
| Hyperlipidemia | 1.28 (0.94, 1.74) | 0.12 | -- | -- |
| Post-donation diabetes | 1.00 (0.98, 1.01) | 0.88 | -- | -- |
| Post-donation hypertension | 0.97 (0.96, 0.98) | <0.001 | -- | -- |
| Obesity/ESKD subgroup |  |  | -- | -- |
| Non-obese/no ESKD post donation | (reference) |  | -- | -- |
| Obese/no ESKD post donation | 1.13 (0.74, 1.73) | 0.58 | -- | -- |
| Non-obese/ESKD post donation | 1.35 (0.48, 3.76) | 0.57 | -- | -- |
| Obese/ESKD post donation | 1.88 (0.16, 21.49) | 0.61 | -- | -- |

aHR, adjusted hazard ratio; CI, confidence interval; BMI; body mass index, eGFR; estimated glomerular filtration rate, BP; blood pressure.

Model 1: Adjusted for post-donation diabetes, hypertension, and end-stage kidney disease (ESKD) as time-dependent covariates.

Model 2: Not adjusted for post-donation diabetes, hypertension, and end-stage kidney disease (ESKD)