

Supplemental Table 1. Population characteristics

Characteristics	Total Population (n= 2797)	Albumin-to-creatinine ratio (mg/g)		
		<10 (n=2387)	10-29 (n=248)	> 29 (n=162)
Age, years	56.7 (6.6)	56.6 (6.4)	57.6 (6.9)	57.9 (7.5)
Men	1237 (44.2)	1062(44.5)	106(42.7)	69(42.6)
Systolic blood pressure, mmHg	132.0 (18.7)	131.3(18.2)	135.1(20.5)	138.4(21.4)
Diastolic blood pressure, mmHg	82.3 (10.9)	82.1(10.6)	82.9(11.9)	84.6(12.5)
Body mass index, kg/m ²	27.5 (4.3)	27.4(4.2)	27.8(4.8)	28.6(5.1)
Alcohol				
Moderate drinker	1685 (60.2)	1455(61.0)	132(53.2)	98(60.5)
Heavy drinker	819 (29.3)	698(29.2)	77(31.0)	44(27.2)
Smoking				
Current	732 (26.2)	592(24.8)	86(34.7)	54(33.3)
Former	1215 (43.4)	1059(44.4)	90(36.3)	66(40.7)
Total cholesterol, mmol/l	5.5 (1.0)	5.6(1.0)	5.5(1.1)	5.4(1.1)
HDL, mmol/l	1.4 (0.4)	1.4(0.4)	1.4(0.5)	1.3(0.4)
MMSE, points	28 [27, 29]	28 [27, 29]	28 [27, 29]	28 [27, 29]
Diabetes mellitus	216 (7.7)	147(6.2)	36(14.5)	33(20.4)
History of coronary heart disease	100 (3.6)	79(3.3)	12(4.8)	9(25.6)
History of stroke	60 (2.1)	46(1.9)	5(2.0)	9(5.6)
History of dementia	9 (0.3)	5 (0.2)	2(0.8)	2 (1.2)
Antihypertensive medication	621 (22.2)	485(20.3)	79 (31.9)	57 (35.2)
Lipid lowering medication	602 (21.5)	498 (20.9)	54(21.8)	50(30.9)
GFRcr, mL/min/1.73 m ²	86.1 (13.5)	86.2(13.2)	87.5(12.4)	82.7(18.7)
GFRcys, mL/min/1.73 m ²	86.2 (15.7)	86.8(15.2)	83.9(16.3)	81.2(20.7)
GFRcrcys, mL/min/1.73 m ²	86.3 (13.3)	86.6(12.8)	85.9(13.3)	81.9(19.3)
Albumin-to-creatinine ratio, mg/g	3.5 [2.1, 6.3]	3.0[2.0, 4.7]	15.1[11.8, 19.8]	55.4[38.6,92.8]
CBF, mL/min/100mL brain volume	58.4 (9.8)	58.6(9.7)	58.1(8.8)	56.9(11.4)

Categorical variables: number (percentage), continuous variables: mean (standard deviation), albumin-to-creatinine ratio was presented as median [Interquartile range]

Abbreviations: eGFRcr = Estimated glomerular filtration rate based on creatinine; eGFRcys = Estimated glomerular filtration rate based on cystatin C; eGFRcrcys = Estimated glomerular filtration rate based on creatinine and cystatin

Supplemental Table 2. Association of age and markers of kidney function with cerebral blood flow

	Cerebral blood flow (mL/min/100mL brain volume)		
	Difference	95%CI	Ratio* (years)
Age, per year	-0.18	-0.23, -0.13	-
ACR	-0.31	-0.58, -0.03	1.7
eGFR _{cr}	0.37	-0.03, 0.77	2.0

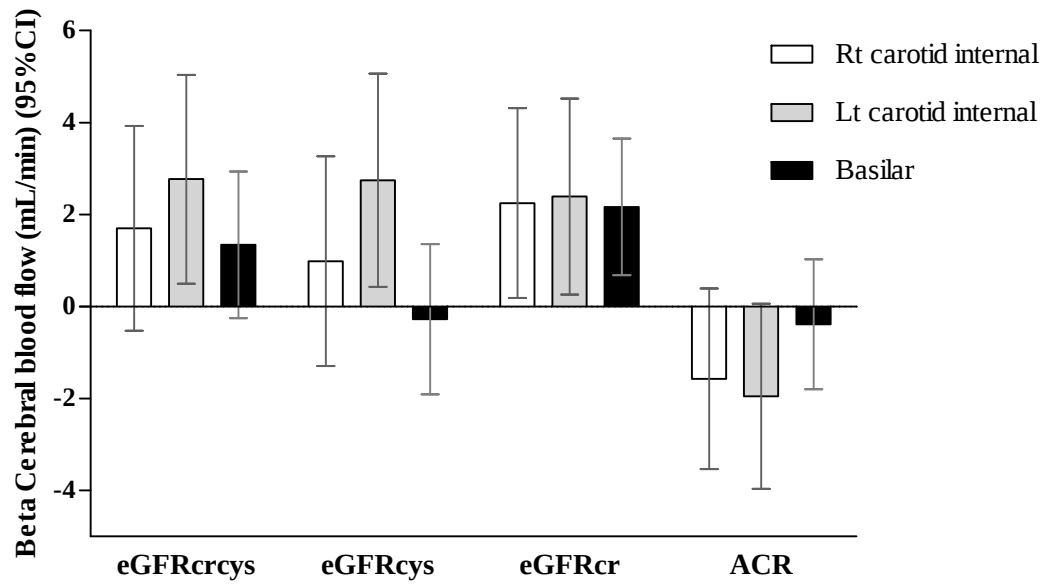
*Ratios are calculated by dividing the beta (per SD) of eGFR or beta per doubling of albumin-to-creatinine ratio by the beta of age.

Differences (betas) are calculated per each standard deviation increase in eGFR. Beta values for albumin-to-creatinine ratio presents cerebral blood flow values (mL/min/100mL brain volume) per doubling of albumin-to-creatinine ratio. All analyses are adjusted for age and sex.

Abbreviations: CI: confidence interval, ACR: albumin-to-creatinine ratio, eGFR_{cr} = Estimated glomerular filtration rate based on creatinine and cystatin.

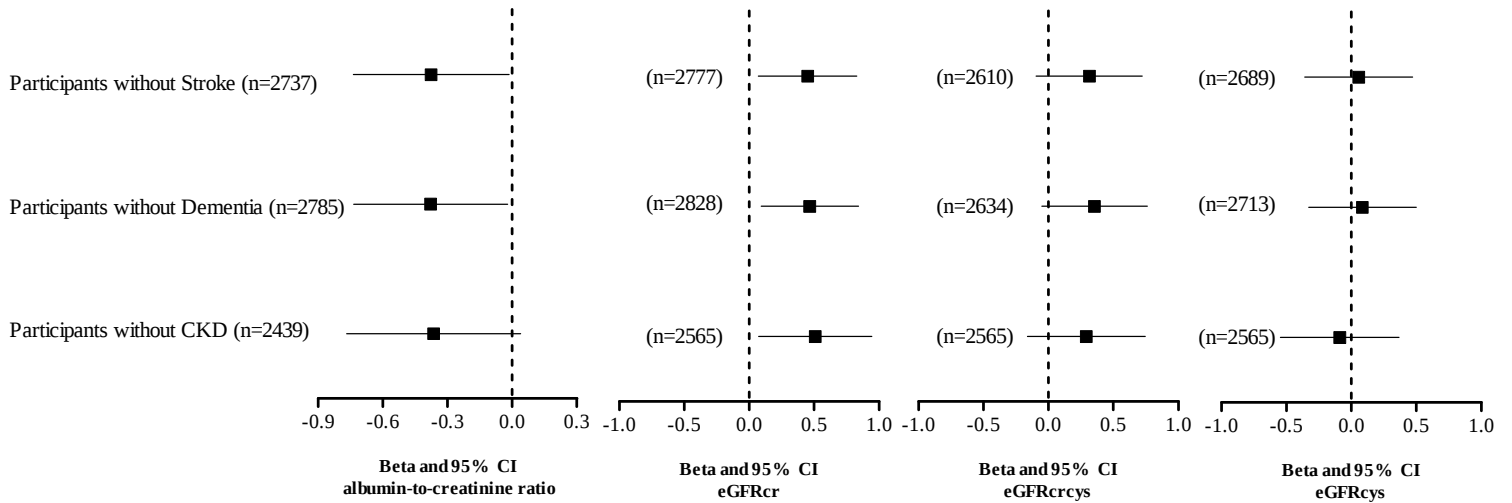
Each standard deviation eGFR_{cr}=13.4

Supplemental Figure 1. Association of kidney function markers with cerebral blood flow in different arteries



Abbreviations: eGFRcr = Estimated glomerular filtration rate based on creatinine; eGFRcys = Estimated glomerular filtration rate based on cystatin C; eGFRcr, cys = Estimated glomerular filtration rate based on creatinine and cystatin, ACR= albumin-to-creatinine ratio

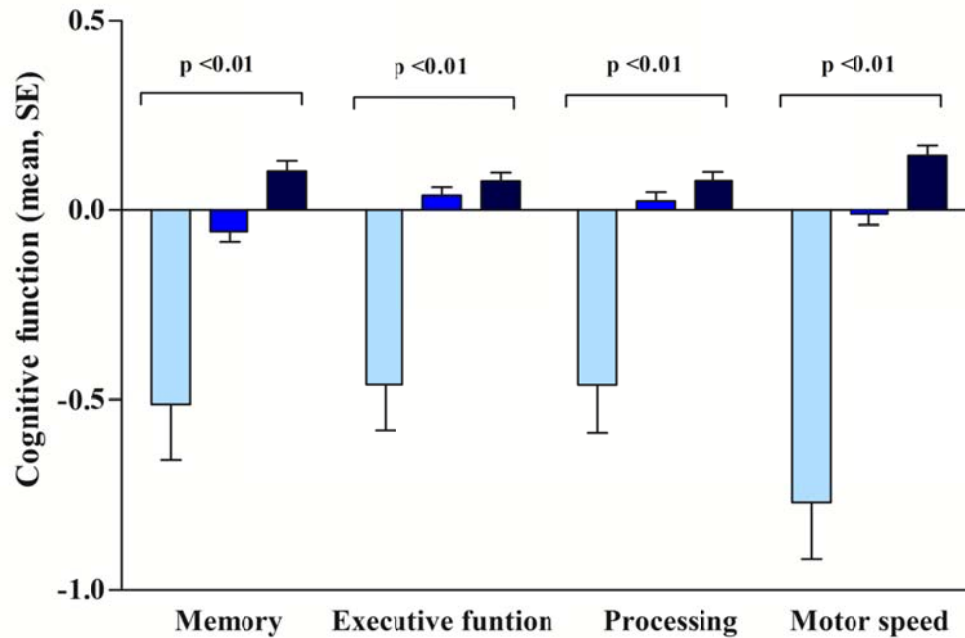
Supplemental Figure 2. The association of albumin-to-creatinine ratio, eGFRcys, eGFRcr, and eGFRcrcys with cerebral blood flow, excluding participants with stroke, dementia, and chronic kidney disease (eGFRcrcys < 60 mL/min/1.73 m²).



All analyses are adjusted for age, and sex.

Abbreviation: CKD= chronic kidney disease, eGFRcr = Estimated glomerular filtration rate based on creatinine; eGFRcys = Estimated glomerular filtration rate based on cystatin C; eGFRcrcys = Estimated glomerular filtration rate based on creatinine and cystatin

Supplemental Figure 3. Different domains of cognitive function in categories of kidney function and cerebral blood flow.

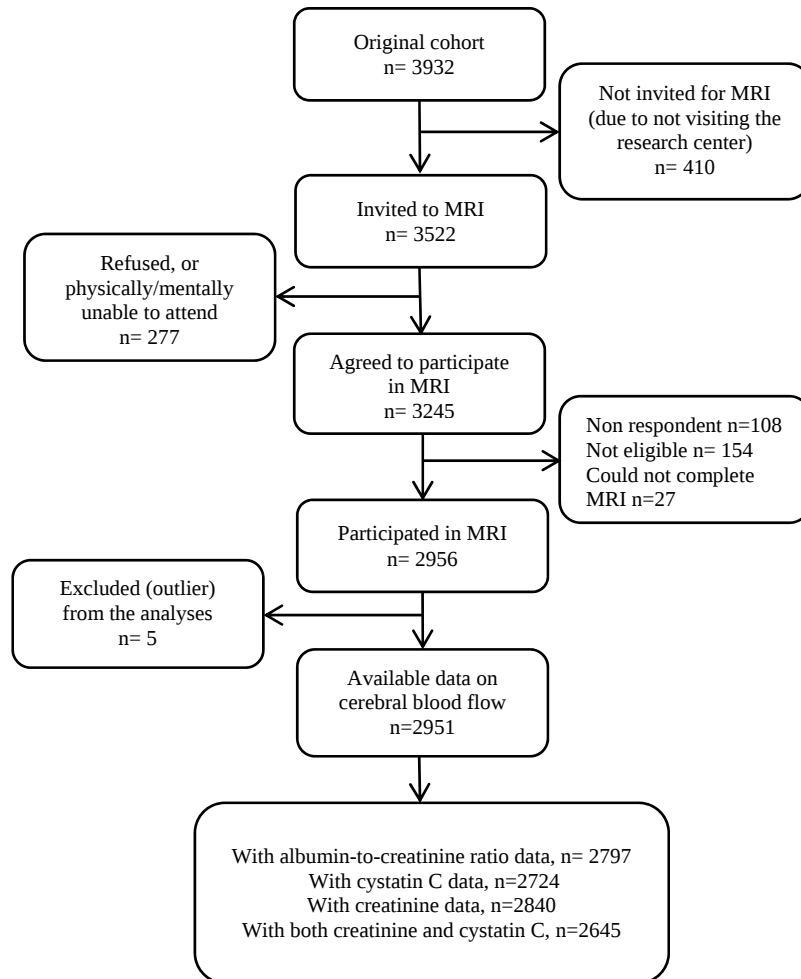


Cut offs for eGFR is 60 mL/min/1.73 m² and for CBF is based on the median (CBF= 57 mL/min/100mL brain volume).

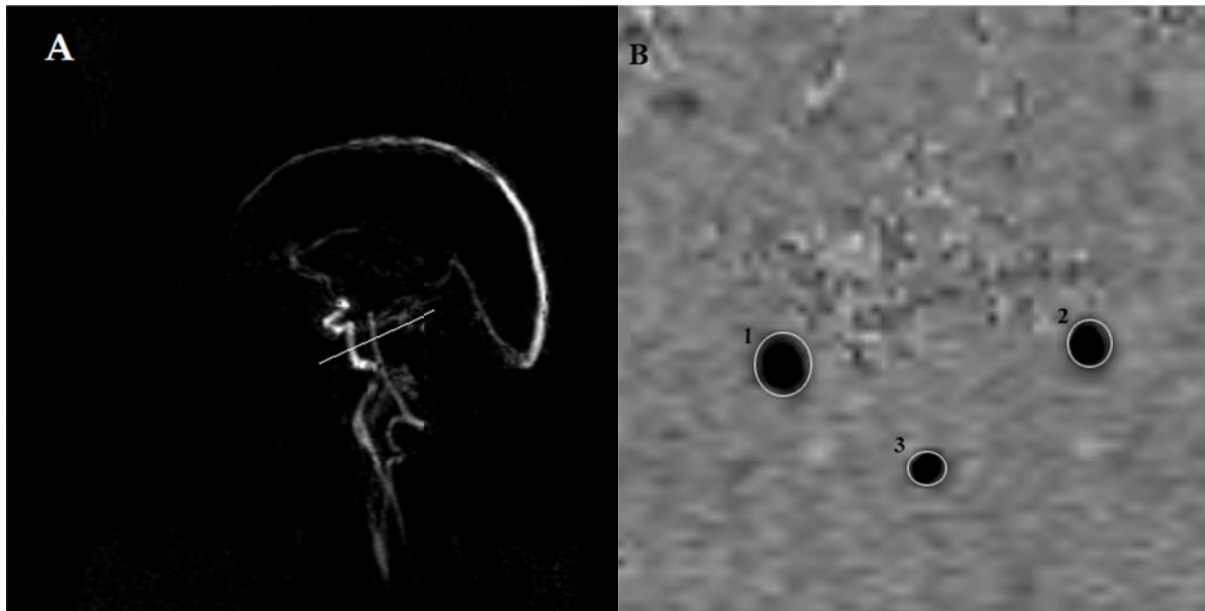
Abbreviations: eGFR = Estimated glomerular filtration rate based on creatinine and cystatin, CBF=Cerebral blood flow

- Participants with both low eGFR and low CBF (n=46)
- Participants with either low eGFR or low CBF (n=1267)
- Participants with both high eGFR and high CBF (n=1321)

Supplemental Figure 4. Population for analyses



Supplemental Figure 5. Two-dimensional phase-contrast MRI cerebral blood flow measurement



A) Sagittal 2D phase-contrast MRI angiographic scout image for localization of the phase-contrast imaging plane (white line) perpendicular to the carotid and basilar arteries.

B) Two dimensional phase-contrast MR image orientation is shown by the white line in section A. White circles are manually placed drawings around arteries of interest.

1=right carotid artery, 2=left carotid artery, and 3=basilar artery.