

**eTable1.** Sociodemographic and clinical characteristics at baseline and follow up by ethnicity

	At baseline (n=5580)				At follow-up (n=5336)**			
	Chinese (n=2234)	Malays (n=1474)	Indians (n=1872)	P-value*	Chinese (n=2118)	Malays (n=1406)	Indians (n=1812)	P-value*
Age, year	57.4 (8.6)	55.2 (9.4)	55.4 (8.6)	< 0.001	62.9 (8.5)	61.3 (9.3)	61.3 (8.5)	< 0.001
Gender, Male, N (%)	1089 (48.7)	667 (45.3)	946 (50.5)	0.009	1028 (48.5)	635 (45.2)	920 (50.8)	0.007
Secondary/above education, N (%)	1178 (52.7)	552 (37.4)	939 (50.2)	< 0.001	1201 (56.7)	490 (34.9)	972 (53.6)	< 0.001
Diabetes mellitus, N (%)	335 (15)	376 (25.5)	627(33.5)	< 0.001	370 (17.5)	422 (30)	737 (40.7)	< 0.001
Hypertension, N (%)	1198 (53.6)	892 (60.5)	996 (53.2)	< 0.001	1347 (63.6)	976 (69.6)	1184 (65.3)	0.002
Current smoking, N (%)	288 (12.9)	288 (19.5)	260 (13.9)	< 0.001	227 (10.7)	248 (17.6)	229 (12.6)	< 0.001
Dyslipidemia, N (%)	976 (43.7)	552 (37.4)	828 (44.2)	< 0.001	1195 (56.4)	786 (55.9)	1130 (62.4)	< 0.001
Cardiovascular disease, N (%)	111 (5)	101 (6.9)	197 (10.5)	< 0.001	116 (5.5)	106 (7.5)	232 (12.8)	< 0.001
Obesity, N (%)	700 (31.3)	879 (59.6)	1066 (56.9)	< 0.001	689 (32.5)	883 (62.8)	1070 (59.1)	< 0.001
Body mass index, kg/m <sup>2</sup>	23.7 (3.6)	26.5 (4.9)	26.2 (4.4)	< 0.001	23.7 (3.7)	26.9 (5.1)	26.4 (4.5)	< 0.001
Blood glucose, mmol/L	6.2 (2.4)	6.4 (3.4)	6.9 (3.2)	< 0.001	6.3 (2.6)	6.9 (3.3)	7.3 (3.5)	< 0.001
HbA1c, %	6 (0.8)	6.3 (1.5)	6.3 (1.3)	< 0.001	5.8 (0.9)	6.3 (1.4)	6.4 (1.4)	< 0.001
Diabetes control^, N (%)	159 (47.6)	137 (36.4)	293 (47.3)	0.001	181 (48.9)	169 (40.1)	292 (39.6)	0.008

Anti-diabetic medication use <sup>^</sup> , N (%)	195 (58.2)	191 (50.8)	411 (65.8)	<0.001	241 (65.8)	270 (64.0)	519 (70.4)	0.058
Systolic blood pressure, mm Hg	134 (18)	142 (22)	133 (19)	< 0.001	139 (21)	140 (20)	135 (18)	< 0.001
Diastolic blood pressure, mm Hg	78 (10)	79 (11)	78 (10)	0.003	76 (10)	77 (10)	77 (9)	< 0.001
Pulse pressure, mm Hg	56.5 (14.6)	62.9 (16.7)	55.2 (14.9)	< 0.001	63.6 (16.6)	62.2 (15.9)	57.9 (14.8)	< 0.001
Blood pressure control <sup>†</sup> , N (%)	351 (29.3)	145 (16.3)	323 (32.4)	<0.001	377 (28.0)	294 (30.1)	488 (41.2)	<0.001
Antihypertensive medication use <sup>†</sup> , N (%)	654 (54.6)	343 (38.5)	603 (60.5)	< 0.001	784 (58.2)	531 (54.4)	772 (65.2)	< 0.001
ACE inhibitor/ARB <sup>†</sup> , N (%)	271 (22.6)	86 (9.6)	303 (30.4)	<0.001	364 (27.0)	298 (30.5)	428 (36.1)	<0.001
Total cholesterol, mmol/L	5.5 (1.0)	5.6 (1.1)	5.2 (1.1)	< 0.001	5.5 (1.1)	5.5 (1.3)	5.2 (1.2)	< 0.001
HDL cholesterol, mmol/L	1.3 (0.4)	1.4 (0.3)	1.1 (0.3)	< 0.001	1.4 (0.4)	1.3 (0.3)	1.2 (0.3)	< 0.001
Estimated GFR, mL/min/1.73 m <sup>2</sup>	92.8 (13.5)	82.9 (14.1)	91.5 (13.4)	< 0.001	87.6 (14.8)	85.6 (18.3)	87.7 (15.0)	0.038

Abbreviations: GFR, glomerular filtration rate

Data presented were frequency (percentage) or means (standard deviation)

\*p-value represents difference in characteristics by ethnicity based on Kruskal-Wallis rank sum test or Chi-square test as appropriate for the variable.

<sup>^</sup>Among those with diabetes. Diabetes control data at baseline and at follow up were missing in 8 and 1 participants, respectively. Anti-diabetic medication data were missing in 2 participants at baseline and 4 participants at follow-up.

<sup>†</sup>Among those with self-reported hypertension

\*\*Removed 244 participants at follow-up for missing dyslipidemia (n=193), body mass index (41), hypertension (5), or smoking status (5).

**eTable 2.** Annual incidence of CKD

Ethnicity	Sample Size	Incident CKD	Crude Cumulative Incidence (%)	Crude Annual* Incidence (%)	Age-standardized Cumulative Incidence (%)	Age-standardized Annual* Incidence (%)	Follow-up Period, Median Years (Interquartile range)
Chinese	2234	137	6.13 (5.15-7.25)	1.05 (0.88-1.24)	5.38 (4.51-6.4)	0.91 (0.76-1.08)	6.01 (5.26-6.51)
Malays	1474	148	10.04 (8.49-11.79)	1.52 (1.29-1.79)	8.6 (7.26-10.15)	1.28 (1.08-1.51)	6.65 (5.68-7.29)
Indians	1872	108	5.77 (4.73-6.97)	0.96 (0.79-1.16)	4.86 (3.96-5.94)	0.81 (0.66-0.99)	5.94 (5.54-6.56)
Total	5580	393	7.04 (6.36-7.77)	1.15 (1.04-1.27)	6.54 (5.9-7.23)	1.06 (0.96-1.18)	6.10 (5.52-6.71)

\* Annual incidence = Number of new cases / summed person-years

**eTable 3.** Multivariable OR (95% CI) of the predictors of incident CKD by ethnicity (n=5580), including SBP vs. excluding SBP

	<b>Chinese, n = 2234</b>		<b>Malays, n = 1474</b>		<b>Indians, n = 1872</b>	
	<b>Incident CKD, n = 137 (6.1%)</b>		<b>Incident CKD, n = 148 (10.0%)</b>		<b>Incident CKD, n = 108 (5.8%)</b>	
Variable	Included SBP	Excluded SBP	Included SBP	Excluded SBP	Included SBP	Excluded SBP
Age, per 10 years increase	1.68 (1.26-2.25)	1.79 (1.35-2.38)	1.95 (1.53-2.49)	2.06 (1.62-2.62)	1.75 (1.28-2.38)	1.87 (1.38-2.53)
Gender, Male vs. Female	1.12 (0.68-1.82)	1.11 (0.68-1.81)	1.00 (0.64-1.56)	0.95 (0.61-1.47)	0.68 (0.41-1.14)	0.62 (0.37-1.02)
Secondary and above education vs. primary and below	0.78 (0.49-1.22)	0.77 (0.49-1.21)	1.05 (0.64-1.71)	1.01 (0.62-1.64)	0.84 (0.50-1.39)	0.8 (0.49-1.33)
Current smoking, Yes vs. No	1.11 (0.60-2.07)	1.07 (0.57-2.00)	1.45 (0.82-2.54)	1.44 (0.82-2.51)	1.60 (0.73-3.51)	1.6 (0.74-3.49)
Diabetes, Yes vs. No	4.56 (2.84-7.31)	4.41 (2.76-7.04)	3.32 (2.23-4.93)	3.31 (2.23-4.89)	3.65 (2.20-6.05)	3.64 (2.21-6.00)
Hypertension, Yes vs. No	1.26 (0.65-2.42)	1.73 (0.97-3.08)	3.13 (1.49-6.57)	5.11 (2.58-10.13)	1.41 (0.68-2.92)	2.3 (1.19-4.43)
Dyslipidemia, Yes vs. No	0.84 (0.53-1.32)	0.83 (0.53-1.31)	0.77 (0.51-1.15)	0.78 (0.52-1.16)	0.94 (0.56-1.56)	0.92 (0.56-1.52)
Systolic blood pressure, per SD increase	1.31 (1.02-1.69)	-	1.46 (1.18-1.81)	-	1.55 (1.20-2.00)	-
Estimated glomerular filtration rate, per unit decrease	1.13 (1.10-1.15)	1.12 (1.10-1.15)	1.05 (1.03-1.07)	1.05 (1.03-1.07)	1.12 (1.10-1.15)	1.12 (1.09-1.15)
Obesity, Yes vs. No	1.38 (0.89-2.16)	1.39 (0.89-2.17)	1.30 (0.86-1.97)	1.22 (0.81-1.84)	0.85 (0.52-1.40)	0.85 (0.52-1.38)
Cardiovascular disease, Yes vs. No	1.54 (0.80-2.96)	1.41 (0.74-2.72)	2.26 (1.22-4.17)	1.92 (1.05-3.51)	1.35 (0.74-2.45)	1.18 (0.66-2.12)

SD, standard deviation; SBP, systolic blood pressure

**eTable 4.** Multivariable predictors of percentage reduction in estimated glomerular filtration rate by ethnicity (n=5580)

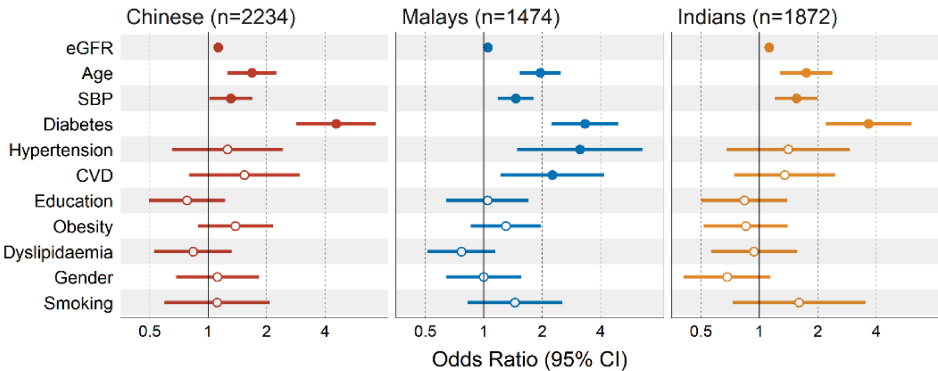
Variable	Chinese, n = 2234		Malays, n = 1474		Indians, n = 1872	
	Incident CKD, n = 137 (6.1%)		Incident CKD, n = 148 (10.0%)		Incident CKD, n = 108 (5.8%)	
	Age, sex-adjusted Coefficient (95% CI)	Multivariable Coefficient (95% CI)	Age, sex- adjusted Coefficient (95% CI)	Multivariable Coefficient (95% CI)	Age, sex-adjusted Coefficient (95% CI)	Multivariable Coefficient (95% CI)
Age, per 10 years increase	2.03 (1.45, 2.61)	3.5 (2.77, 4.22)	7.12 (5.95, 8.29)	8.70 (7.47, 9.93)	3.07 (2.41, 3.73)	4.58 (3.80, 5.37)
Gender, Male vs. Female	-0.1 (-1.09, 0.90)	1.94 (0.86, 3.02)	0.55 (-1.65, 2.76)	5.74 (3.49, 7.99)	-1.84 (-2.98, -0.71)	-0.27 (-1.48, 0.94)
Secondary and above education vs. primary and below	-0.62 (-1.66, 0.41)	0.16 (-0.84, 1.16)	-1.69 (-4.13, 0.75)	-0.33 (-2.44, 1.78)	-0.31 (-1.49, 0.86)	0.37 (-0.75, 1.49)
Current smoking, Yes vs. No	0.23 (-1.36, 1.81)	-0.17 (-1.68, 1.34)	1.89 (-1.26, 5.04)	1.96 (-0.78, 4.69)	0.45 (-1.32, 2.22)	0.48 (-1.21, 2.16)
Diabetes, Yes vs. No	6.69 (5.30, 8.08)	5.84 (4.46, 7.22)	10.65 (8.15, 13.15)	7.82 (5.55, 10.08)	3.46 (2.24, 4.68)	2.54 (1.34, 3.74)
Hypertension, Yes vs. No	1.45 (0.38, 2.52)	0.26 (-1.03, 1.55)	3.59 (1.17, 6.00)	0.41 (-2.25, 3.08)	1.00 (-0.22, 2.22)	-1.48 (-2.92, -0.05)
Dyslipidemia, Yes vs. No	0.89 (-0.14, 1.92)	0.38 (-0.62, 1.39)	-0.20 (-2.51, 2.11)	-0.58 (-2.59, 1.43)	0.75 (-0.44, 1.93)	0.6 (-0.54, 1.75)

Systolic blood pressure, per SD increase	0.81 (0.27, 1.35)	0.7 (0.07, 1.34)	2.68 (1.50, 3.87)	2.78 (1.50, 4.06)	1.38 (0.79, 1.98)	1.73 (1.05, 2.41)
Estimated glomerular filtration rate, per unit decrease	-0.3 (-0.34, -0.25)	-0.3 (-0.34, -0.25)	-0.79 (-0.86, -0.71)	-0.77 (-0.84, -0.7)	-0.34 (-0.39, -0.30)	-0.33 (-0.38, -0.29)
Obesity, Yes vs. No	0.55 (-0.53, 1.63)	-0.06 (-1.11, 1.00)	0.8 (-1.45, 3.06)	-0.36 (-2.36, 1.65)	-0.42 (-1.57, 0.74)	-0.5 (-1.62, 0.62)
Cardiovascular disease, Yes vs. No	4.52 (2.19, 6.85)	4.19 (1.94, 6.44)	4.45 (0.10, 8.81)	4.04 (0.27, 7.81)	2.38 (0.48, 4.28)	2.19 (0.34, 4.05)

Abbreviations: SD, standard deviation

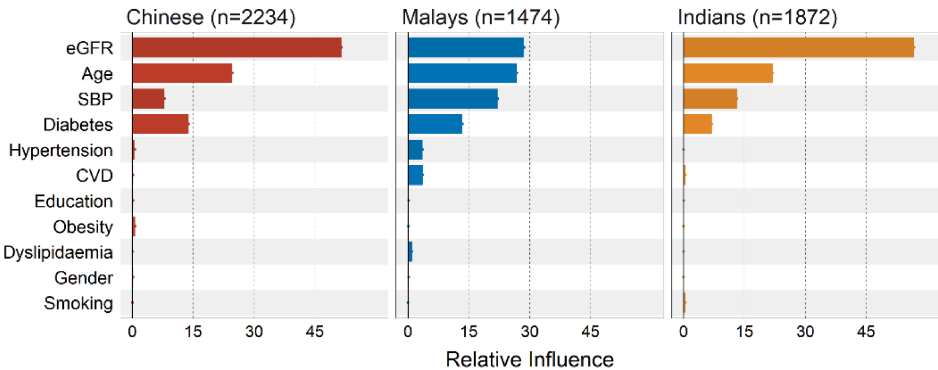
Multivariable model adjusted for age, gender, education, current smoking, diabetes, dyslipidemia, systolic blood pressure, obesity and cardiovascular disease.

A) Multivariate Logistic Regression

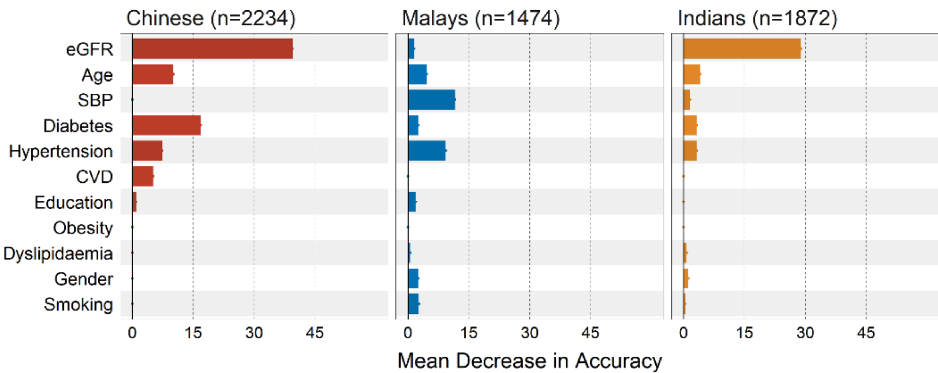


**eFigure 1.** Variables associated with incident CKD in each ethnic group, analysed by (A) Logistic Regression (LR), (B) Gradient Boosted Machine and (C) Random Forest. The odds ratio for estimated glomerular filtration rate refers to per unit decrease.

B) Gradient Boosting Machine



C) Random Forest





**eTable 5.** Population attributable risks\* for incident chronic kidney disease in the multivariate model

$$\text{PAR\%} = \frac{\text{Prevalence} \times (\text{Relative Risk} - 1) \times 100}{[\text{Prevalence} \times (\text{Relative Risk} - 1) + 1]}$$
, Relative Risk replaced by odds Ratio

	PAR using crude prevalence			PAR using age-standardized prevalence		
	Chinese	Malays	Indians	Chinese	Malays	Indians
Diabetes	34.8	37.2	47	33.2	35.4	45.2
Hypertension		56.3			54.7	
Cardiovascular Disease		7.9			7.5	

\* For binary risk factors that were significant in the multivariable model i.e. diabetes in Chinese and Indians and diabetes, hypertension and cardiovascular disease in Malays.

**eTable 6.** Multivariable predictors of incident CKD by ethnicity in 1338 participants with diabetes

	Multivariable OR (95% CI)		
	Chinese with diabetes, n = 277	Malays with diabetes, n = 298	Indians with diabetes, n = 555
	Incident diabetic CKD, n = 58 (17.3%)	Incident diabetic CKD, n = 78 (20.7%)	Incident diabetic CKD, n = 72 (11.5%)
Age, per 10 years increase	1.39 (0.81-2.39)	1.93 (1.29-2.89)	1.38 (0.91-2.11)
Gender, Male vs. Female	0.81 (0.34-1.92)	0.65 (0.33-1.29)	0.62 (0.32-1.21)
Secondary and above education vs. primary and below	0.70 (0.31-1.60)	0.91 (0.43-1.91)	0.90 (0.46-1.74)
Current smoking, Yes vs. No	1.01 (0.33-3.13)	1.39 (0.56-3.46)	0.64 (0.17-2.42)
Hypertension, Yes vs. No	0.74 (0.20-2.67)	9.31 (1.92-45.23)	2.21 (0.72-6.74)
Dyslipidemia, Yes vs. No	0.61 (0.26-1.41)	0.62 (0.34-1.13)	1.33 (0.65-2.7)
Systolic blood pressure, per SD increase	1.52 (0.97-2.39)	1.57 (1.15-2.14)	1.53 (1.09-2.13)
Estimated glomerular filtration rate, per unit decrease	1.13 (1.09-1.17)	1.03 (1.01-1.06)	1.11 (1.08-1.15)
Obesity, Yes vs. No	1.57 (0.69-3.53)	1.52 (0.77-3.03)	0.64 (0.33-1.26)
Cardiovascular disease, Yes vs. No	0.92 (0.3-2.84)	1.28 (0.52-3.16)	1.57 (0.76-3.23)
HbA1c %, per SD increase	1.30 (0.89-1.91)	1.75 (1.30-2.37)	1.46 (1.05-2.03)

Duration of diabetes, per 10 years increase	1.50 (0.98-2.31)	1.66 (1.08-2.54)	1.14 (0.81-1.62)
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Abbreviations: SD, standard deviation

**eTable 7.** Baseline characteristics of participants without CKD who attended the follow up visit compared with those who did not attend

	Attended follow-up	Did not attend follow-up	P-value
	(n = 5945)	(n = 2437)	
Age, year	56.4 (9)	59.7 (11.2)	<0.001
Gender, Male, N (%)	2851 (48)	1248 (51.2)	0.007
Ethnicity, N (%)			<0.001
Chinese	2427 (40.8)	540 (22.2)	
Malays	1517 (25.5)	912 (37.4)	
Indians	2001 (33.7)	985 (40.4)	
Secondary/above education, N (%)	2788 (46.9)	800 (32.9)	<0.001
Diabetes mellitus, N (%)	1455 (24.5)	810 (33.2)	<0.001
Hypertension, N (%)	3340 (56.3)	1634 (67.2)	<0.001
Current smoking, N (%)	879 (14.8)	516 (21.2)	<0.001
Dyslipidemia, N (%)	2530 (42.7)	1016 (42.3)	0.750
Cardiovascular disease, N (%)	445 (7.5)	293 (12)	<0.001
Obesity, N (%)	2798 (47.1)	1195 (49.5)	0.054
Body mass index, kg/m <sup>2</sup>	25.3 (4.4)	25.5 (5.2)	0.209

Blood glucose, mmol/L	6.5 (3)	7 (3.8)	<0.001
HbA1c, %	6.2 (1.2)	6.4 (1.5)	<0.001
Diabetes control <sup>^</sup> , N (%)	636 (44)	324 (40.3)	0.096
Anti-diabetic medication use <sup>^</sup> , N (%)	865 (59.5)	444 (54.8)	0.036
Systolic blood pressure, mm Hg	136.2 (19.9)	142.7 (22.6)	<0.001
Diastolic blood pressure, mm Hg	78.1 (10.2)	79.1 (10.9)	0.009
Pulse pressure, mm Hg	58.1 (15.7)	63.6 (18.1)	<0.001
Blood pressure control <sup>†</sup> , N (%)	891 (26.7)	333 (20.4)	<0.001
Antihypertensive medication use <sup>†</sup> , N (%)	1749 (52.4)	764 (46.8)	<0.001
ACE inhibitor/ARB <sup>†</sup> , N (%)	721 (21.6)	326 (20)	0.196
Total cholesterol, mmol/L	5.4 (1.1)	5.4 (1.2)	0.608
HDL cholesterol, mmol/L	1.2 (0.4)	1.2 (0.4)	0.951
Estimated GFR, mL/min/1.73 m <sup>2</sup>	89.7 (14.3)	86.5 (15.2)	<0.001

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GFR, glomerular filtration rate

Data presented are mean (standard deviation) or frequency (%), where appropriate

\*p-value represents difference in characteristics by ethnicity based on Kruskal-Wallis rank sum test or Chi-square test where appropriate and denotes attending participants vs those who did not attend follow-up exam.

<sup>^</sup>Among those with diabetes.

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†Among those with self-reported hypertension

**eTable 8.** Population attributable risks\* for incident chronic kidney disease in the multivariate model

$$PAR\% = Pr(\text{exposure} | \text{incident CKD}) \left(1 - \frac{1}{RR}\right) \times 100$$

$$PAR\% = \left(1 - \frac{E}{O}\right) \times 100$$

Pr(exposure| incident CKD): proportion of incident CKD cases exposed to the risk factor.

Relative risk is approximated by the adjusted odds ratio under the rare disease assumption.

*E*: The number of incident CKD cases predicted by multivariable logistic regression model when the exposure is set to absent.

*O*: The number of incident CKD cases observed

	Chinese	Malays	Indians	Chinese	Malays	Indians
Diabetes	33.0	36.8	48.4	25.8	30.6	38.6
Hypertension		63.4			54.8	
Cardiovascular Disease		7.5			5.7	

\* For binary risk factors that were significant in the multivariable model i.e. diabetes in Chinese and Indians and diabetes, hypertension and cardiovascular disease in Malays.