

Web appendix: Development and validation of a General Population Renal Risk Score

Analyses performed with CKD-EPI equation to estimate GFR instead of the MDRD equation.

Table 1: Baseline characteristics for subjects with and without progressive CKD

	No progressive CKD	Progressive CKD
N (6809)	6531	278
Gender (% male)	49.7	55.4
Age (yrs)	48.9 (11.9)	62.6 (9.4)
Known hypertension (%)	9.9	35.3
Known diabetes (%)	1.2	5.8
Smoking (%)	36.4	31.3
Waist circumference (cm)	88.0 (12.8)	93.7 (12.0)
SBP (mmHg)	127 (19)	147 (24)
DBP (mmHg)	73 (10)	80 (10)
Antihypertensive medication (%)	13.2	43.7
Cholesterol (mmol/L)	5.6 (1.1)	5.9 (1.2)
Triglycerides (mmol/l) [#]	1.1 (0.83-1.66)	1.46 (1.0-2.18)
Lipid lowering medication (%)	5.7	14.9
Glucose (mmol/L)	4.8 (1.1)	5.6 (2.3)
Antidiabetic medication (%)	1.3	6.9
CRP (mg/l) [#]	1.2 (0.5-2.8)	2.2 (1.0-4.5)
UAE (mg/24h) [#]	9.0 (6.2-15.5)	16.1 (7.9-47.4)
Urinary urea excretion (mmol/24 h)	359 (104)	338 (97)
Urinary sodium excretion (mmol/24 h)	143 (51)	138 (50)
Baseline eGFR (ml/min/1.73m ²)	84.6 (14.4)	68.9 (10.0)
Change in eGFR per year (ml/min/1.73m ²)	-0.60 (1.44)	-3.42 (1.59)

Values are given as mean (standard deviation) or median (interquartile range) in case of skewed data ([#]) distribution. Abbreviations are: eGFR; estimated glomerular filtration rate, SBP; systolic blood pressure, DBP; diastolic blood pressure, CRP; C-reactive protein UAE; urinary albumin excretion.

Table 2: Results of the univariable logistic regression analyses for progressive CKD

	OR	95% CI	P-value
Age (yrs)	1.089	1.076-1.102	<0.001
Female gender	1.10	0.85-1.45	0.473
CVD history (yes/no)	2.075	1.23-3.50	0.006
Known hypertension (yes/no)	5.17	3.86-6.91	<0.001
Known diabetes (yes/no)	5.99	2.99-12.0	<0.001
Positive fam history CVD (yes/no)	1.27	0.97-1.65	0.078
Positive fam history CKD (yes/no)	0.77	0.30-1.98	0.594
Smoking (yes/no)	0.86	0.65-1.15	0.303
BMI (kg/m^2)	1.10	1.07-1.13	<0.001
SBP (mmHg)	1.04	1.03-1.05	<0.001
Total cholesterol (mmol/l)	1.18	1.07-1.32	0.002
Glucose (mmol/l)	1.30	1.21-1.39	<0.001
Triglycerides (mmol/l), <i>In-transformed</i>	2.00	1.58-2.53	<0.001
UAE (mg/24hr), <i>In-transformed</i>	1.69	1.49-1.92	<0.001
CRP (mg/l), <i>In-transformed</i>	1.53	1.36-1.71	<0.001
Urinary sodium excretion (mmol/24hr)	0.998	0.996-0.999	0.001
Urinary urea excretion (mmol/24hr)	0.997	0.994-1.00	0.035
Baseline eGFR ($\text{ml}/\text{min}/1.73\text{m}^2$)	0.914	0.90-0.93	<0.001

Table 3: multivariable logistic regression model for progressive CKD

	OR	95% CI	P-value
Baseline eGFR* (<i>ml/min/1.73m²</i>)	0.936	0.92-0.95	<0.001
Age (<i>yrs</i>)	1.02	1.003-1.037	0.020
UAE (<i>mg/24hr</i>), <i>ln-transformed</i>	1.21	1.04-1.4	0.015
CRP (<i>mg/l</i>), <i>ln-transformed</i>	1.25	1.10-1.43	0.001
SBP (<i>mmHg</i>)	1.02	1.01-1.02	<0.001
Known hypertension (<i>yes/no</i>)	1.46	1.04-2.06	0.029
Known diabetes (<i>yes/no</i>)	2.29	1.02-5.12	0.044

Table 4: Results of the univariable and multivariable logistic regression analyses for progressive CKD.

	N (total)	N (events)	OR (univariable)	95% CI	OR (multivariable)	95%CI
Age (yrs)						
<50 (Reference)	3747	35	1.00		1.00	
50 - 70	2673	184	4.69	3.38-6.51	1.42	0.98-2.05
>70	389	59	9.20	5.93-14.26	1.52	0.90-2.56
eGFR (ml/min/1.73m²)						
>90 (Reference)	2339	8	1.00		1.00	
>75 - 90	2579	60	7.93	3.14-20.06	6.92	2.62-18.23
60 - 75	1546	164	38.98	15.86-95.80	29.56	11.28-75.87
<=60	345	64	72.49	28.47-184.58	40.04	14.62-109.69
UAE (mg/24 hr)						
<30 (Reference)	5911	179	1.00		1.00	
30- ≤150	728	69	3.21	2.10-4.90	1.94	1.20-3.14
150 - 300	75	10	4.69	1.52-14.50	2.30	0.65-8.12
>300	79	20	11.31	4.74-27.0	3.40	1.20-9.66
SBP (mmHg)						
<160 (Reference)	6329	204	1.00			
160-180	365	47	3.88	2.46-6.11	1.49	0.89-2.49
>180	113	27	9.35	5.27-16.58	3.55	1.80-6.98
CRP (mg/l)						
<3 (Reference)	4959	162	1.00			
3-10	1275	82	1.61	1.17-2.22	1.19	0.84-1.67
>=10	253	17	3.06	1.86-5.03	2.92	1.67-5.11
Known Hypertension						
No (Reference)	6062	180	1.00			
Yes	747	98	5.17	3.86-6.91	1.90	1.35-2.66
Known Diabetes mellitus						
No (Reference)	6716	262	1.00			
Yes	93	16	5.99	2.99-12.0	2.51	1.10-5.76

Table 5: Score chart. For each individual subject for all predictors the category and the accompanying points should be determined. Subsequently all the scores are added to calculate the 'Total Score'. The risk (in percentage) of developing progressive CKD within 6.4 years of follow-up can be determined based on the total score.

Score chart	
Characteristic	Points
Age (yrs)	
<50 (Reference)	0
50-70	2
>70	3
eGFR (ml/min/1.73m²)	
>90 (Reference)	0
>75-90	12
>60-75	22
<=60	24
UAE (mg/24 hr)	
<30 (Reference)	0
30-150	4
>150-300	5
>300	8
SBP (mmHg)	
<160 (Reference)	0
160-180	3
>180	8
CRP (mg/l)	
<3	0
3-10	1
>10	7
Known Hypertension	
No (Reference)	0
Yes	4
Known Diabetes Mellitus	
No (Reference)	0
Yes	6

Total score	Risk (%)
≤20	0% - <5%
21-24	≥5% - <10%
25-29	≥10% - <20%
30-32	≥20% - <30%
33-35	≥30% - <40%
36-37	≥40% - <50%
38-40	≥50% - <60%
41-42	≥60% - <70%
43-45	≥70% - <80%
46-50	≥80% - <90%
≥51	≥90% - <97%

Table 6: Diagnostic characteristics of the prediction model

Total Score	% population	Identified events (%)	Sensitivity (%)	Specificity (%)	PPV	NPV
≥42	0.1	1.1	1.1	100.0	50.0	99.8
≥41	0.1	1.1	1.1	99.9	25.0	99.8
≥40	0.2	2.1	2.1	99.8	33.3	99.8
≥39	0.3	2.1	2.1	99.8	28.6	99.8
≥38	0.4	2.1	2.1	99.6	16.7	99.8
≥37	0.7	5.3	5.3	99.5	26.3	99.8
≥36	1.0	6.3	6.3	99.2	23.1	99.8
≥35	1.4	8.4	8.4	98.9	21.1	99.8
≥34	1.7	12.6	12.6	98.7	25.5	99.8
≥33	2.1	13.7	13.7	98.3	22.8	99.8
≥32	2.3	14.7	14.7	98.2	22.6	99.8
≥31	3.5	14.7	14.7	96.9	14.6	99.8
≥30	4.6	20.0	20.0	95.9	15.1	99.8
≥29	5.7	24.2	24.2	94.9	14.7	99.8
≥28	8.0	30.5	30.5	92.8	13.3	99.8
≥27	9.4	40.0	40.0	91.7	14.9	99.8
≥26	11.2	42.1	42.1	89.9	13.1	99.8
≥25	14.2	47.4	47.4	87.0	11.7	99.8
≥20	30.9	78.9	78.9	70.9	8.9	99.8
≥15	37.6	82.1	82.1	64.1	7.6	99.7
≥10	68.0	96.8	96.8	33.0	5.0	99.5
≥5	70.8	98.9	98.9	30.2	4.9	99.5
≥0	100.0	100.0	100.0	0.0	0.0	100.0