
Clinical Outcomes in Patients with CKD and Rapid or Non-Rapid eGFR Decline: A Report from the DISCOVER CKD Retrospective Cohort

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Supplementary Material

Table S1. Baseline characteristics of patients with CKD with rapid and non-rapid eGFR decline (2 years post-index)

Variable	UK CPRD (N = 206,364)		US TriNetX (N = 462,352)		US LCED (N = 95,739)		Japan MDV (N = 39,782)	
	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid
N (%)	10,183 (4.9)	196,181 (95.1)	83,508 (18.1)	378,844 (81.9)	11,939 (12.5)	83,800 (87.5)	4864 (12.2)	34,918 (87.8)
Follow-up time per patient (from index), years, median (IQR)	4.5 (3.1–5.0)	5.0 (3.4–5.0)	3.8 (2.8–5.0)	4.0 (2.9–5.0)	3.7 (2.8–4.9)	3.8 (2.9–5.0)	3.3 (2.6–4.7)	3.6 (2.7–5.0)
Age, years, mean (SD)	72.1 (11.9)	69.3 (11.6)	65.9 (12.7)	65.4 (12.1)	70.0 (12.5)	68.3 (12.0)	74.0 (12.2)	71.2 (12.4)
Female, %	54.7	54.6	58.6	58.4	57.5	56.2	51.7	51.1
Blood pressure, mmHg, systolic/diastolic, mean (SD)	132.2/73.7 (17.9/10.5)	133.5/76.1 (15.0/9.4)	130.0/73.8 (19.2/11.5)	129.5/75.1 (17.5/10.6)	128.1/71.8 (18.8/11.7)	129.0/74.3 (16.8/10.5)	NR	NR
Missing data, %	7.7/7.7	16.3/16.3	29.4/29.4	33.4/33.4	16.2/16.4	21.0/21.2	100	100
HbA1c, %, median (IQR)	6.6 (5.9–7.6)	6.3 (5.7–7.1)	6.5 (5.8–7.7)	6.2 (5.7–7.1)	6.5 (5.9–7.5)	6.2 (5.7–7.0)	6.1 (5.6–6.8)	6.0 (5.6–6.6)
Missing data, %	56.4	72.7	57.6	66.8	59.3	68.3	36.3	45.7

sK ⁺ , mmol/L, mean (SD)	4.6 (0.5)	4.5 (0.4)	4.3 (0.5)	4.2 (0.5)	4.3 (0.5)	4.3 (0.4)	4.3 (0.5)	4.3 (0.4)
Missing data, %	4.7	19.2	16.5	24.9	13.1	26.1	9.6	21.9
eGFR, mL/min/1.73 m ² , median (IQR)	50.1 (41.1–57.8)	68.4 (60.4–75.9)	54.9 (43.9–64.1)	68.8 (59.6–77.8)	53.9 (43.3–64.0)	67.9 (58.6–76.5)	52.0 (40.9–60.4)	64.3 (54.7–72.4)
Number of eGFR tests per patient*, mean (SD)	6.9 (7.4)	3.0 (3.5)	10.9 (17.1)	5.5 (9.9)	10.5 (14.7)	4.6 (7.1)	12.7 (11.1)	7.7 (7.9)
eGFR category, mL/min/1.73 m ² , n (%)								
15–< 30	86 (0.8)	1453 (0.7)	2348 (2.8)	7398 (2.0)	241 (2.0)	1256 (1.5)	158 (3.3)	784 (2.3)
30–< 45	521 (5.1)	8514 (4.3)	8190 (9.8)	27,325 (7.2)	1166 (9.8)	6281 (7.5)	487 (10.0)	3133 (9.0)
45–< 60	2357 (23.1)	42,753 (21.8)	20,768 (24.9)	90,238 (23.8)	3142 (26.3)	21,104 (25.2)	1282 (26.4)	9653 (27.6)
60–75	7214 (70.8)	143,299 (73.0)	51,781 (62.0)	251,896 (66.5)	7357 (61.6)	54,970 (65.6)	2930 (60.2)	21,267 (60.9)
UACR, mg/g, median (IQR)	18.4 (6.6–79.7)	10.5 (4.8–30.1)	25.0 (9.6–157.1)	15.0 (6.7–52.1)	18.0 (7.0–74.0)	10.1 (4.4–32.9)	NR	NR
Missing data, %	64.1	80.9	98.6	99.1	96.1	97.6	100	100
CRP, mg/L, mean (SD)	17.19 (39.95)	9.81 (23.44)	13.18 (36.50)	9.05 (26.17)	28.60 (57.56)	18.25 (42.62)	8.74 (20.77)	6.66 (17.88)
Missing data, %	73.1	83.5	91.9	94.3	95.8	97.5	42.9	58.4

*Number of eGFR tests per patient during the period after index and up to 2 years (used to calculate eGFR slope).

CKD chronic kidney disease, *CPRD* Clinical Practice Research Datalink, *CRP* C-reactive protein, *eGFR* estimated glomerular filtration rate, *HbA1c* glycated hemoglobin, *IQR* interquartile range, *LCED* Limited Claims and Electronic Health Record Dataset, *MDV* Medical Data Vision, *NR* not reported, *SD* standard deviation, *sK⁺* serum potassium, *UACR* urine albumin-to-creatinine ratio.

Table S2. Baseline characteristics of patients with CKD with and without eGFR slope data (2 years post-index)

Variable	UK CPRD		US TriNetX		US LCED		Japan MDV	
	With	Without	With	Without	With	Without	With	Without
eGFR slope data								
<i>N</i>	206,364	33,245	462,352	50,519	95,739	14,188	39,782	4,082
Age, years, mean (SD)	69.5 (11.6)	66.1 (13.0)	65.5 (12.2)	63.4 (12.9)	68.5 (12.0)	66.6 (12.5)	71.6 (12.4)	71.3 (12.9)
Female, %	54.6	58.9	58.4	60.7	56.4	57.7	51.1	54.8
Ethnicity, %								
Hispanic or Latino	0	0	2.7	2.0	0	0	0	0
Not Hispanic or Latino	0	0	57.0	63.6	0	0	0	0
Unavailable	100	100	0	0	100	100	100	100
Unknown	0	0	40.3	34.5	0	0	0	0
Race, %,								
American Indian or Alaska Native	0	0	0.4	0.4	0	0	0	0

Asian	1.7	1.3	1.2	1.2	0	0	0	0
Black or African American	1.4	2.1	19.6	20.4	0	0	0	0
Native Hawaiian or other Pacific Islander	0	0	0.1	0.1	0	0	0	0
Other	1.0	1.0	0	0	0	0	0	0
Unavailable	0	0	0	0	100	100	100	100
Unknown	12.6	14.8	0.8	0.4	0	0	0	0
White	83.2	80.9	78.0	77.5	0	0	0	0
Drinker of alcohol, %								
No	30.3	24.7	0	0	30.4	21.3	0	0
Quit	3.6	2.3	0	0	0.1	0.1	0	0
Yes	60.6	64.7	0	0	24.4	21.9	1.5	0.8
Smoking status, %								
Current	11.9	12.7	0	0	5.9	4.9	0	0
Former	35.1	28.4	0	0	21.6	15.1	0	0
Never	0	0	0	0	45.6	41.4	0	0

Non	52.8	58.6	0	0	0.2	0.2	0	0
Passive	0	0	0	0	0.3	0.2	0	0

CKD chronic kidney disease, CPRD Clinical Practice Research Datalink, eGFR estimated glomerular filtration rate, LCED Limited Claims and Electronic Health Record

Dataset, MDV Medical Data Vision, SD standard deviation.

Table S3. Additional baseline characteristics of patients with CKD with rapid and non-rapid eGFR decline (2 years post-index)

Variable	UK CPRD (N = 206,364)		US TriNetX (N = 462,352)		US LCED (N = 95,739)		Japan MDV (N = 39,782)	
	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid
N (%)	10,183 (4.9)	196,181 (95.1)	83,508 (18.1)	378,844 (81.9)	11,939 (12.5)	83,800 (87.5)	4864 (12.2)	34,918 (87.8)
BMI, kg/m ² , mean (SD)	29.46 (6.58)	29.09 (6.00)	29.12 (5.37)	28.87 (5.17)	30.48 (7.34)	30.17 (6.77)	NR	NR
Missing data, %	37.8	47.2	52.9	55.0	16.8	21.3	100	100
Serum albumin, g/dL, mean (SD)	4.07 (0.50)	4.19 (0.40)	3.87 (0.56)	4.00 (0.47)	4.14 (0.42)	4.24 (0.34)	3.91 (0.54)	4.09 (0.46)
Missing data, %	18.2	31.3	32.2	41.2	93.3	93.2	26.2	36.4
Cystatin C, mg/L, mean (SD)	NR	NR	1.82 (0.85)	1.36 (0.61)	1.52 (0.62)	1.18 (0.42)	NR	NR
Missing data, %	100	100	99.7	99.9	99.9	100	100	100
Serum Ca, mg/dL, mean (SD)	9.35 (0.57)	9.42 (0.46)	9.34 (0.61)	9.40 (0.52)	9.30 (0.60)	9.40 (0.49)	9.09 (0.62)	9.17 (0.51)
Missing data, %	69.1	78.5	19.2	28.9	25.4	34.9	54.7	68.4
Serum Na, mg/dL, mean (SD)	139.49 (3.30)	140.07 (2.87)	139.15 (3.20)	139.50 (2.86)	139.50 (3.15)	139.78 (2.81)	140.65 (2.95)	140.90 (2.70)

Missing data, %	4.8	18.9	17.0	25.4	14.7	26.8	10.7	23.3
Total cholesterol, mg/dL, mean (SD)	177.19 (47.65)	184.65 (44.05)	174.73 (46.54)	178.67 (42.05)	171.55 (44.15)	177.84 (40.92)	183.38 (39.05)	186.64 (35.47)
Missing data, %	28.3	35.3	49.0	48.3	43.0	43.6	39.0	45.3
HDL cholesterol, mmol/L, mean (SD)	1.35 (0.46)	1.42 (0.43)	1.25 (0.42)	1.31 (0.42)	1.28 (0.45)	1.34 (0.43)	1.43 (0.42)	1.50 (0.42)
Missing data, %	36.8	41.7	54.5	52.9	48.3	47.8	34.4	39.8
LDL cholesterol, mmol/L, mean (SD)	2.51 (1.06)	2.72 (1.01)	2.51 (0.97)	2.61 (0.90)	2.41 (0.93)	2.57 (0.88)	2.76 (0.80)	2.79 (0.73)
Missing data, %	50.4	52.9	47.1	46.2	43.3	43.0	40.7	42.7
Hb, g/dL, mean (SD)	12.68 (1.76)	13.67 (1.48)	12.73 (2.00)	13.44 (1.77)	12.63 (1.94)	13.49 (1.69)	12.57 (1.96)	13.39 (1.74)
Missing data, %	20.1	38.3	22.4	35.1	30.2	46.0	8.2	19.6

BMI body mass index, *Ca* calcium, *CKD* chronic kidney disease, *CPRD* Clinical Practice Research Datalink, *eGFR* estimated glomerular filtration rate, *Hb* hemoglobin, *HDL* high-density lipoprotein, *LCED* Limited Claims and Electronic Health Record Dataset, *LDL* low-density lipoprotein, *MDV* Medical Data Vision, *Na* sodium, *NR* not reported, *SD* standard deviation.

Table S4. Comorbidity burden in patients with CKD with rapid and non-rapid eGFR decline at baseline (2 years post-index)

	UK CPRD (N = 206,364)		US TriNetX (N = 462,352)		US LCED (N = 95,739)		Japan MDV (N = 39,782)	
eGFR decline category	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid
N (%)	10,183 (4.9)	196,181 (95.1)	83,508 (18.1)	378,844 (81.9)	11,939 (12.5)	83,800 (87.5)	4864 (12.2)	34,918 (87.8)
Comorbidity, n (%)								
Hyperkalemia	248 (2.4)	1190 (0.6)	7174 (8.6)	14,778 (3.9)	817 (6.8)	2786 (3.3)	201 (4.1)	493 (1.4)
Atrial fibrillation	1834 (18.0)	17,747 (9.1)	13,170 (15.8)	40,328 (10.7)	2340 (19.6)	10,260 (12.2)	967 (19.9)	4424 (12.7)
Anemia	1652 (16.2)	16,676 (8.5)	30,396 (36.4)	90,564 (23.9)	4523 (37.9)	20,985 (25.0)	1798 (37.0)	8855 (25.4)

CKD chronic kidney disease, CPRD Clinical Practice Research Datalink, eGFR estimated glomerular filtration rate, LCED Limited Claims and Electronic Health Record Dataset, MDV Medical Data Vision.

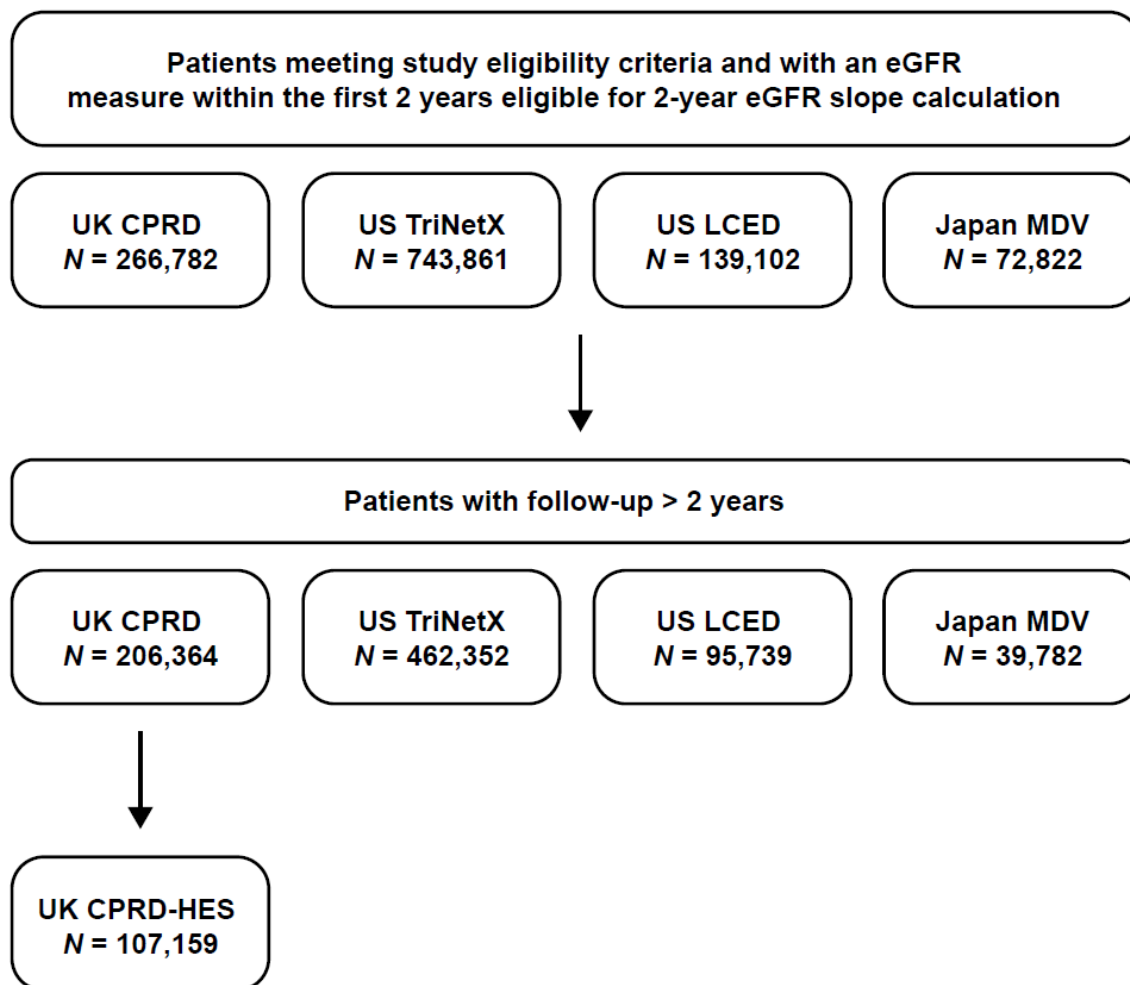
Table S5. Proportion of patients with CKD with prescribed medications at baseline (2 years post-index)

Medication, %	UK CPRD (N = 206,364)		US TriNetX (N = 462,352)		US LCED (N = 95,739)		Japan MDV (N = 39,782)	
	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid	Rapid	Non-rapid
RAASi*	58.5	42.2	14.5	10.8	36.1	31.3	43.3	33.7
MRA	9.7	1.8	2.5	1.1	5.7	2.3	10.0	3.3
Diuretics	47.4	25.0	14.8	8.9	34.4	23.7	24.0	10.5
SGLT2i	0.7	0.4	0.3	0.2	1.3	0.9	1.7	1.2
Insulin	8.4	2.7	7.6	3.2	11.7	5.0	9.7	5.1
K ⁺ binders	< 0.1	< 0.1	0.4	0.1	0.6	0.1	1.9	0.5
Statins	53.0	44.8	13.9	10.5	37.3	32.7	28.2	28.8
Antiplatelets	35.6	25.1	2.6	1.4	7.2	4.3	26.4	20.8
Anticoagulants	14.2	6.5	8.3	4.4	16.5	8.2	13.1	8.7
Beta blockers	35.3	22.0	13.1	8.1	31.7	22.5	20.4	13.3

*RAASi included angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and MRAs.

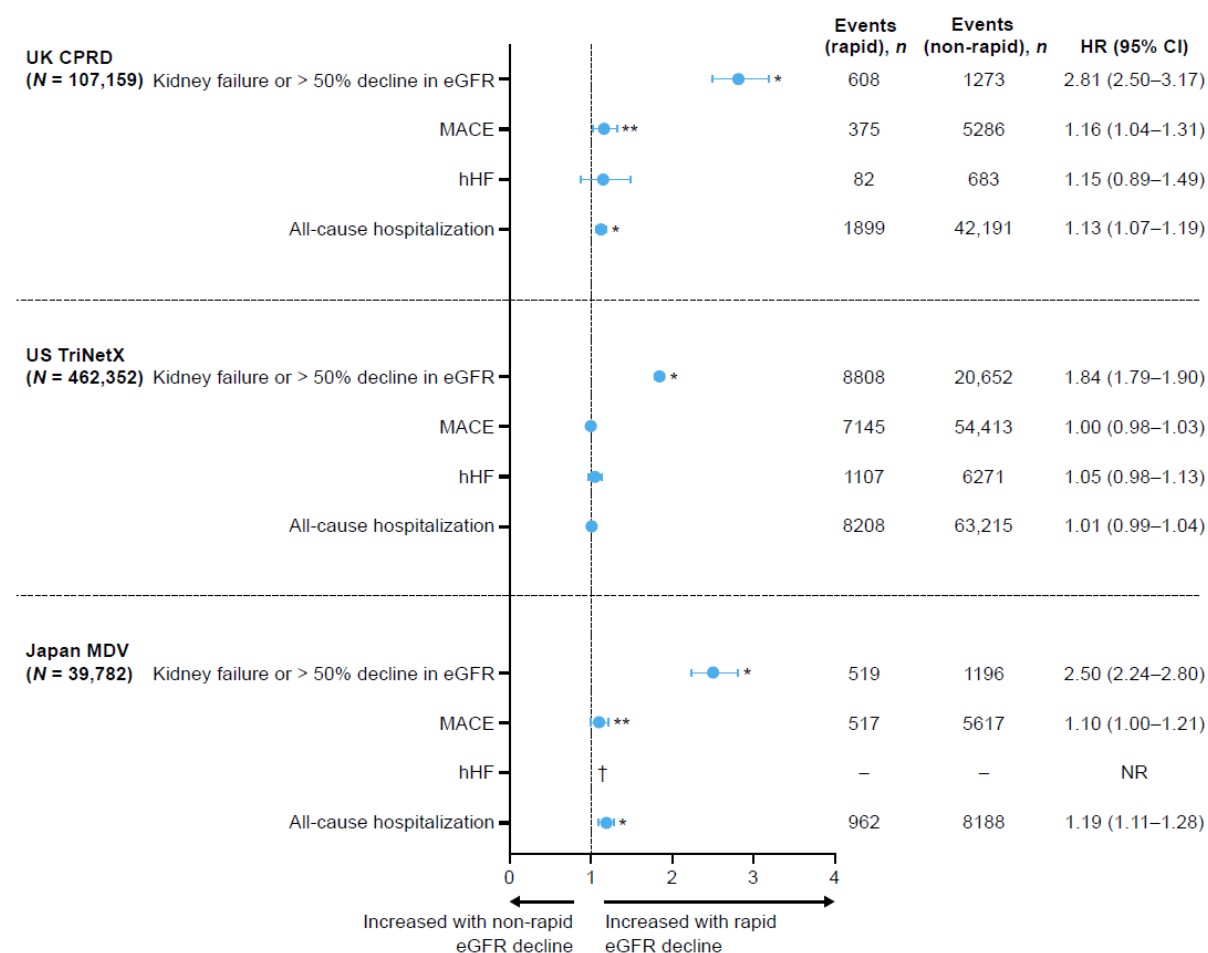
CKD chronic kidney disease, CPRD Clinical Practice Research Datalink, K⁺ potassium, LCED Limited Claims and Electronic Health Record Dataset, MDV Medical Data Vision, MRA mineralocorticoid receptor antagonist, RAASi renin-angiotensin-aldosterone system inhibitor, SGLT2i sodium-glucose co-transporter-2 inhibitor.

Fig. S1. Patients' attrition by database



CPRD Clinical Practice Research Datalink, *eGFR* estimated glomerular filtration rate, *HES* hospital episode statistics, *LCED* Limited Claims and Electronic Health Record Dataset, *MDV* Medical Data Vision.

Fig. S2. Competing risks analysis of clinical outcomes in patients with rapid versus non-rapid eGFR decline (2 years post-index)



* $P < 0.01$ for rapid versus non-rapid progressors; ** $P < 0.05$ for rapid versus non-rapid progressors. †Data not available.

Cox proportional hazards models adjusted for baseline age, sex, race (where available), diastolic blood pressure, systolic blood pressure, body mass index, high- and low-density lipoprotein, eGFR, urine albumin-to-creatinine ratio, medications, log (natural logarithm) of the number of eGFR tests recorded prior to 2 years post-index, hemoglobin, serum potassium, and history of hypertension, type 2 diabetes, heart failure, stroke, and MI. MACE includes non-fatal MI, non-fatal stroke, and cardiovascular death, defined by diagnostic codes. Competing risks analyses were performed with mortality as competing.

CI confidence interval, CPRD Clinical Practice Research Datalink, eGFR estimated glomerular filtration rate, hHF hospitalization for heart failure, HR hazard ratio, MACE major adverse cardiovascular event, MDV Medical Data Vision, MI myocardial infarction, NR not reported.