Projecting the population level burden of CKD progression according to urine albumin-to-creatinine ratio categories

Authors: *Luca De Nicola[1], Ricardo Correa-Rotter[2], Juan F. Navarro-González[3,4,5], Albert Power[6], Michal Nowicki[7], Istvan Wittmann[8], Jean-Michel Halimi[9,10], Juan Jose Garcia Sanchez[11], Claudia Cabrera[12], Salvatore Barone[13], Timothy Coker[14], and Lise Retat[14]*

[1]University Luigi, Vanvitelli, Naples, Italy

[2]Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Ciudad de Mexico, Mexico

[3]Hospital Universitario Nuestra Señora de Candelaria, Santa Cruz de Tenerife, Spain

[4] RICORS2040, Instituto de Salud Carlos III, Madrid, Spain; ITB, Universidad de La Laguna, Santa Cruz de Tenerife, Spain

[5]Universidad Fernando Pessoa Canarias, Las Palmas de Gran Canaria, Spain

[6]North Bristol NHS Trust, Bristol, UK

[7]Medical University of Lodz, Poland

[8]2nd Department of Medicine and Nephrology-Diabetes Center, University of Pécs Medical School, Hungary

[9]Service de Néphrologie-HTA, Dialyses, Transplantation Rénale, CHU Tours, University of Tours, Tours, France

[10]INSERM UMR1327, University of Tours, Tours, France.

[11]Health Economic and Payer Evidence, Biopharmaceuticals, AstraZeneca, Cambridge, UK

[12]Real World Science and Analytics, AstraZeneca, Gothenburg, Sweden

[13]Global Medical Affairs, BioPharmaceuticals, AstraZeneca, Gaithersburg, MD, USA

[14]HealthLumen Limited, London, UK

Corresponding author: Juan Jose Garcia Sanchez

Address: Academy House, 136 Hills Road, Cambridge, United Kingdom, CB2 8PA

Email : juanjose.garciasanchez@astrazeneca.com

Tel : +44 73848 067

Supplementary data

Table S1. Projected cumulative transitions from CKD stage G3 to G4 and G4 to G5 (ESKD) (2022-2027) per KDIGO uACR category in the diagnosed and undiagnosed CKD population for 31 countries and regions

Country or region	Transition: CKD stage 3 to 4 KDIGO uACR category, n (%)			Transition: CKD stage 4 to 5 (ESKD) KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Australia	30,908 (73.9)	9,596 (22.9)	1,337 (3.2)	9,332 (80.2)	2,059 (17.7)	242 (2.1)
Belgium	53,896 (85.8)	8,511 (13.6)	373 (0.6)	20,004 (88.0)	2,641 (11.6)	98 (0.4)
Brazil	88,371 (78.9)	7,355 (6.6)	16,209 (14.5)	47,181 (87.8)	2,251 (4.2)	4,278 (8.0)
Canada	153,029 (83.8)	28,093 (15.4)	1,481 (0.8)	37,728 (85.9)	5,951 (13.6)	239 (0.5)
China	586,467 (75.2)	168,680 (21.6)	24,396 (3.1)	138,874 (79.9)	31,248 (18.0)	3,615 (2.1)
Colombia	58,840 (84.0)	10,474 (15.0)	692 (1.0)	17,910 (90.9)	1,690 (8.6)	93 (0.5)
Denmark	1,794 (68.7)	774 (29.6)	44 (1.7)	1,476 (85.8)	235 (13.7)	9 (0.5)
France	15,325 (64.3)	8,125 (34.1)	394 (1.7)	12,257 (88.6)	1,534 (11.1)	44 (0.3)
Germany	105,544 (75.8)	32,180 (23.1)	1,439 (1.0)	20,954 (80.8)	4,866 (18.8)	122 (0.5)
Greece	3,031 (73.4)	1,034 (25.0)	65 (1.6)	2,549 (90.9)	244 (8.7)	12 (0.4)
Hungary	2,392 (66.8)	1,138 (31.8)	50 (1.4)	2,031 (86.5)	303 (12.9)	15 (0.6)
India	767,609 (82.9)	134,946 (14.6)	23,943 (2.6)	109,468 (85.2)	16,695 (13.0)	2,258 (1.8)
Israel	12,545 (68.2)	4,745 (25.8)	1,103 (6.0)	4,945 (72.7)	1,579 (23.2)	281 (4.1)
Italy	11,685 (75.4)	3,290 (21.2)	516 (3.3)	7,023 (89.9)	677 (8.7)	111 (1.4)
Japan	1,080,736 (78.9)	261,365 (19.1)	28,267 (2.1)	123,393 (79.9)	28,234 (18.3)	2,822 (1.8)
Saudi Arabia	91,767 (79.3)	19,309 (16.7)	4,586 (4.0)	45,116 (86.7)	5,622 (10.8)	1,275 (2.5)
Mexico	34,587 (50.3)	14,111 (20.5)	20,095 (29.2)	15,847 (76.0)	2,452 (11.8)	2,551 (12.2)
Netherlands	4,679 (64.4)	2,448 (33.7)	143 (2.0)	3,124 (86.4)	473 (13.1)	18 (0.5)
Philippines	11,564 (69.5)	1,558 (9.4)	3,523 (21.2)	9,818 (88.5)	413 (3.7)	857 (7.7)
Poland	8,380 (64.9)	3,572 (27.7)	960 (7.4)	5,733 (84.0)	904 (13.3)	185 (2.7)
Romania	3,169 (75.2)	995 (23.6)	52 (1.2)	3,427 (94.4)	189 (5.2)	14 (0.4)

Country or region	Transition: CKD stage 3 to 4 KDIGO uACR category, n (%)			Transition: CKD stage 4 to 5 (ESKD) KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Singapore	1,418 (49.4)	1,182 (41.2)	268 (9.3)	1,540 (76.9)	391 (19.5)	71 (3.5)
South Korea	79,540 (74.3)	23,902 (22.3)	3,550 (3.3)	26,755 (85.0)	4,177 (13.3)	559 (1.8)
Spain	143,848 (87.8)	18,782 (11.5)	1,294 (0.8)	37,244 (90.7)	3,651 (8.9)	189 (0.5)
Sweden	2,068 (67.5)	823 (26.9)	173 (5.6)	1,319 (86.2)	183 (12.0)	29 (1.9)
Taiwan	35,799 (73.8)	11,126 (23)	1,553 (3.2)	11,280 (83.4)	1,984 (14.7)	258 (1.9)
Thailand	363,263 (82.0)	67,852 (15.3)	11,683 (2.6)	113,286 (85.8)	16,331 (12.4)	2,404 (1.8)
Turkey	221,591 (73.3)	69,016 (22.8)	11,903 (3.9)	33,906 (75.7)	9,440 (21.1)	1,462 (3.3)
UAE	249 (53.5)	170 (36.6)	46 (9.9)	385 (83.2)	65 (14.0)	13 (2.8)
UK	276,353 (84.5)	48,357 (14.8)	2,263 (0.7)	59,419 (85.5)	9,650 (13.9)	408 (0.6)
USA	833,375 (70.9)	284,269 (24.2)	58,077 (4.9)	146,621 (75.5)	39,961 (20.6)	7,698 (4.0)
Total, n	5,083,822	1,247,778	220,478	1,069,945	196,093	32,230
Percentage unweighted average, % (SD)	72.8 (9.8)	22.2 (8.1)	5.0 (6.3)	84.4 (5.3)	13.2 (4.8)	2.4 (2.7)
Percentage weighted average, %	77.6	19.0	3.4	82.4	15.1	2.5

Abbreviations – ESKD: end-stage kidney disease; KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S2. Projected cumulative incidence of heart failure and myocardial infarction (2022-2027) per KDIGO uACR category in the diagnosed and undiagnosed CKD population (CKD stages G3–G5) for 31 countries and regions

Country or region	Heart failure KDIGO uACR category, n (%)			Myocardial infarction KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Australia	66,731 (85.3)	10,221 (13.1)	1,281 (1.6)	17,191 (84.6)	2,774 (13.6)	359 (1.8)
Belgium	49,350 (89.1)	5,849 (10.6)	218 (0.4)	28,491 (88.8)	3,438 (10.7)	157 (0.5)
Brazil	596,406 (91.3)	20,030 (3.1)	36,772 (5.6)	311,198 (90.4)	11,932 (3.5)	21,057 (6.1)
Canada	195,046 (88.3)	24,677 (11.2)	1,067 (0.5)	101,665 (88.0)	13,214 (11.4)	602 (0.5)
China	257,419 (90.2)	23,600 (8.3)	4,502 (1.6)	1,533,796 (84.9)	239,856 (13.3)	32,903 (1.8)
Colombia	123,058 (93.6)	7,990 (6.1)	413 (0.3)	65,735 (93.5)	4,390 (6.2)	209 (0.3)
Denmark	27,644 (90.1)	2,917 (9.5)	118 (0.4)	20,749 (89.9)	2,232 (9.7)	91 (0.4)
France	127,274 (89.1)	14,989 (10.5)	645 (0.5)	38,884 (89.8)	4,206 (9.7)	217 (0.5)
Germany	26,506 (84.1)	4,743 (15.1)	250 (0.8)	4,869 (83.5)	943 (16.2)	22 (0.4)
Greece	38,121 (93.9)	2,383 (5.9)	94 (0.2)	53,569 (93.1)	3,813 (6.6)	175 (0.3)
Hungary	79,801 (91.3)	7,363 (8.4)	259 (0.3)	17,560 (90.6)	1,766 (9.1)	59 (0.3)
India	1,229,418 (89.2)	128,180 (9.3)	20,107 (1.5)	1,274,460 (88.5)	145,013 (10.1)	21,144 (1.5)
Israel	10,088 (75.2)	2,849 (21.3)	469 (3.5)	4,419 (75.9)	1,171 (20.1)	233 (4.0)
Italy	105,128 (92.8)	7,275 (6.4)	842 (0.7)	150,126 (92.1)	11,392 (7.0)	1,481 (0.9)
Japan	813,771 (84.2)	138,653 (14.3)	14,535 (1.5)	886,547 (83.6)	157,323 (14.8)	16,391 (1.5)
Saudi Arabia	78,493 (84.4)	11,987 (12.9)	2,543 (2.7)	42,459 (85.1)	6,236 (12.5)	1,188 (2.4)
Mexico	160,295 (76.4)	25,887 (12.3)	23,673 (11.3)	192,673 (76.4)	30,509 (12.1)	28,974 (11.5)
Netherlands	59,182 (89.8)	6,491 (9.8)	260 (0.4)	66,100 (89.8)	7,205 (9.8)	339 (0.5)
Philippines	207,878 (91.5)	6,816 (3.0)	12,401 (5.5)	222,908 (91.3)	7,521 (3.1)	13,837 (5.7)
Poland	162,053 (87.7)	19,029 (10.3)	3620 (2.0)	154,777 (88.0)	17,562 (10.0)	3,527 (2.0)
Romania	787,67 (96.8)	2,509 (3.1)	92 (0.1)	71,150 (96.9)	2,179 (3.0)	94 (0.1)
Singapore	6,070 (88.4)	637 (9.3)	162 (2.4)	20,239 (79.0)	4,518 (17.6)	872 (3.4)
South Korea	75,412 (84.0)	12,920 (14.4)	1,476 (1.6)	21,071 (84.3)	3,507 (14.0)	409 (1.6)
Spain	194,883 (93.0)	14,066 (6.7)	705 (0.3)	101,151 (92.3)	8,113 (7.4)	303 (0.3)

Country or region	Heart failure KDIGO uACR category, n (%)			Myocardial infarction KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Sweden	41,047 (90.8)	3,637 (8.0)	535 (1.2)	14,245 (90.7)	1,255 (8.0)	199 (1.3)
Taiwan	35,163 (85.8)	5,161 (12.6)	663 (1.6)	23,261 (84.7)	3,725 (13.6)	464 (1.7)
Thailand	154,247 (91.8)	11,455 (6.8)	2,360 (1.4)	532,826 (85.6)	77,882 (12.5)	12,068 (1.9)
Turkey	121,290 (79.6)	26,731 (17.6)	4,277 (2.8)	62,727 (78.1)	15,396 (19.2)	2,162 (2.7)
UAE	4,083 (84.7)	604 (12.5)	132 (2.7)	2,250 (85.0)	326 (12.3)	72 (2.7)
UK	174,043 (88.1)	22,517 (11.4)	988 (0.5)	102,225 (88.4)	12,746 (11.0)	639 (0.6)
USA	1,120,440 (79.2)	249,829 (17.7)	43,954 (3.1)	395,807 (79.3)	86,535 (17.3)	16,619 (3.3)
Total, n	6,419,107	821,997	179,413	6,535,131	888,679	176,867
Percentage unweighted average, % (SD)	87.7 (5.1)	10.4 (4.3)	1.9 (2.2)	86.8 (5.2)	11.1 (4.4)	2.0 (2.3)
Percentage weighted average, %	86.5	11.1	2.4	86.0	11.7	2.3

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S3. Projected cumulative incidence of stroke and all-cause mortality (2022-2027) per KDIGO uACR category in the diagnosed and undiagnosed CKD population (CKD stages G3–G5) for 31 countries and regions

Country or region	Stroke			Death (all-cause)		
	KDIGO uACR category, n (%)			KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Australia	22,194 (74.7)	6,557 (22.1)	950 (3.2)	230,469 (74.0)	68,840 (22.1)	12,161 (3.9)
Belgium	25,410 (84.6)	4,443 (14.8)	189 (0.6)	377,644 (84.2)	67,467 (15.0)	3,574 (0.8)
Brazil	257,825 (84.3)	14,863 (4.9)	33,189 (10.9)	4,056,180 (82.7)	233,188 (4.8)	614,907 (12.5)
Canada	150,062 (83.3)	28,595 (15.9)	1,500 (0.8)	938,265 (82.6)	185,171 (16.3)	12,042 (1.1)
China	1,394,268 (79.6)	314,073 (17.9)	43,980 (2.5)	9,080,382 (77.1)	2,289,022 (19.4)	402,140 (3.4)
Colombia	14,374 (90.6)	1,396 (8.8)	96 (0.6)	552,495 (88.7)	65,603 (10.5)	4,757 (0.8)
Denmark	23,225 (84.3)	4,092 (14.9)	222 (0.8)	178,124 (83.0)	34,305 (16.0)	2,136 (1.0)
France	95,935 (83.9)	17,408 (15.2)	1,066 (0.9)	988,901 (81.8)	206,987 (17.1)	12,870 (1.1)
Germany	10,928 (76.9)	3,140 (22.1)	144 (1.0)	692,284 (76.3)	203,717 (22.5)	11,010 (1.2)
Greece	43,624 (90.2)	4,507 (9.3)	253 (0.5)	322,503 (88.8)	38,182 (10.5)	2,609 (0.7)
Hungary	36,369 (85.8)	5,788 (13.7)	236 (0.6)	324,471 (84.5)	56,758 (14.8)	2,940 (0.8)
India	965,288 (84.3)	154,183 (13.5)	25,144 (2.2)	8,434,339 (82.9)	1,444,771 (14.2)	290,007 (2.9)
Israel	6,991 (64.2)	3,154 (28.9)	751 (6.9)	101,743 (63.0)	47,428 (29.4)	12,270 (7.6)
Italy	120,477 (88.2)	14,017 (10.3)	2,061 (1.5)	783,685 (87.6)	93,690 (10.5)	17,733 (2.0)
Japan	518,357 (77.4)	134,388 (20.1)	16,923 (2.5)	4,300,349 (77.2)	1,111,792 (20.0)	156,997 (2.8)
Saudi Arabia	21,650 (74.7)	5,882 (20.3)	1,436 (5.0)	221,803 (70.9)	71,320 (22.8)	19,516 (6.2)
Mexico	77,086 (64.3)	19,913 (16.6)	22,922 (19.1)	1,203,806 (59.7)	337,077 (16.7)	475,375 (23.6)
Netherlands	47,633 (84.0)	8,604 (15.2)	447 (0.8)	389,071 (82.9)	75,552 (16.1)	4,599 (1.0)
Philippines	135,087 (85.5)	7,012 (4.4)	15,892 (10.1)	1,003,425 (83.2)	55,991 (4.6)	147,347 (12.2)
Poland	313,354 (86.9)	40,278 (11.2)	6,928 (1.9)	831,452 (74.9)	220,417 (19.9)	58,463 (5.3)
Romania	155,272 (96.6)	5,256 (3.3)	205 (0.1)	303,490 (94.5)	16,852 (5.2)	793 (0.2)
Singapore	8,653 (73.0)	2,682 (22.6)	511 (4.3)	74,776 (69.3)	26,361 (24.4)	6,775 (6.3)
South Korea	45,108 (77.5)	11,427 (19.6)	1,655 (2.8)	322,801 (76.1)	86,939 (20.5)	14,301 (3.4)
Spain	91,161 (88.1)	11,558 (11.2)	800 (0.8)	1,244,076 (88.8)	146,141 (10.4)	10,074 (0.7)

Country or region	Stroke KDIGO uACR category, n (%)			Death (all-cause) KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Sweden	25,071 (85.7)	3,493 (11.9)	685 (2.3)	205,190 (84.4)	30,728 (12.6)	7,055 (2.9)
Taiwan	12,868 (76.7)	3,414 (20.3)	502 (3.0)	181,999 (76.6)	47,824 (20.1)	7,815 (3.3)
Thailand	218,130 (80.5)	45,674 (16.9)	7,223 (2.7)	1,658,852 (77.3)	403,642 (18.8)	84,494 (3.9)
Turkey	53,298 (69.4)	19,942 (26.0)	3,567 (4.6)	988,877 (69.4)	366,716 (25.7)	68,661 (4.8)
UAE	1,811 (76.8)	436 (18.5)	111 (4.7)	7,757 (70.3)	2,499 (22.7)	775 (7.0)
UK	241,497 (83.2)	46,239 (15.9)	2,381 (0.8)	2,025,603 (83.1)	388,633 (15.9)	23,252 (1.0)
USA	912,004 (70.0)	323,086 (24.8)	67,423 (5.2)	5,246,667 (65.1)	2,206,843 (27.4)	601,431 (7.5)
Total, n	6,045,011	1,265,500	259,392	47,271,478	10,630,456	3,088,878
Percentage unweighted average, % (SD)	80.8 (7.6)	15.8 (6.2)	3.3 (3.9)	78.7 (8.2)	17.0 (6.4)	4.3 (4.8)
Percentage unweighted average, %	79.9	16.7	3.4	77.5	17.4	5.1

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S4. Projected costs associated with heart failure and myocardial infarction in the diagnosed population (CKD stages G3–G5) (prevalence – 2027) per uACR category for 31 countries and regions

Country or region	Heart failure (billion USD) KDIGO uACR category, n (%)		
	A1	A2	A3
Australia	3.091 (43.3)	3.551 (49.8)	0.493 (6.9)
Belgium	1.423 (73.9)	0.481 (25.0)	0.022 (1.2)
Brazil	4.118 (78.8)	0.383 (7.3)	0.726 (13.9)
Canada	3.980 (71.1)	1.543 (27.6)	0.077 (1.4)
China	10.693 (21.0)	34.382 (67.4)	5.935 (11.6)
Colombia	1.478 (75.6)	0.449 (23.0)	0.027 (1.4)
Denmark	0.369 (71.0)	0.144 (27.8)	0.006 (1.2)
France	2.621 (65.0)	1.340 (33.2)	0.072 (1.8)
Germany	0.246 (31.9)	0.508 (65.7)	0.019 (2.4)
Greece	1.018 (72.3)	0.365 (25.9)	0.025 (1.7)
Hungary	0.035 (69.2)	0.015 (29.6)	0.001 (1.2)
India	12.640 (36.2)	19.005 (54.5)	3.236 (9.3)
Israel	0.09 (43.2)	0.098 (47.1)	0.020 (9.7)
Italy	6.779 (56.9)	4.498 (37.8)	0.629 (5.3)
Japan	25.646 (57.3)	17.256 (38.6)	1.828 (4.1)
Saudi Arabia	3.310 (42.2)	2.244 (28.6)	2.296 (29.2)
Mexico	0.916 (68.4)	0.402 (30.1)	0.020 (1.5)
Netherlands	2.660 (64.8)	0.485 (11.8)	0.958 (23.3)
Philippines	3.230 (61.3)	1.664 (31.6)	0.375 (7.1)
Poland	0.518 (82.3)	0.108 (17.2)	0.003 (0.5)
Romania	3.609 (54.8)	2.470 (37.5)	0.510 (7.7)
Singapore	0.237 (43.2)	0.252 (45.9)	0.060 (10.9)
South Korea	0.065 (44.5)	0.073 (49.4)	0.009 (6.1)
Spain	5.758 (78.1)	1.531 (20.8)	0.085 (1.2)
Sweden	0.700 (66.5)	0.299 (28.4)	0.053 (5.1)
Taiwan	0.096 (41.3)	0.119 (51.1)	0.018 (7.6)
Thailand	2.083 (69.6)	0.775 (25.9)	0.134 (4.5)
Turkey	0.585 (43.5)	0.649 (48.2)	0.112 (8.3)
UAE	0.192 (53.5)	0.137 (38.1)	0.030 (8.3)
UK	0.123 (73.1)	0.043 (25.6)	0.002 (1.3)
USA	77.352 (45.6)	76.695 (45.2)	15.560 (9.2)
Total, n	175.662	171.965	33.341
Percentage unweighted average, % (SD)	58.0 (16.0)	35.0 (14.5)	6.5 (6.6)
Percentage weighted average, %	46.1	45.1	8.8

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S5. Projected costs associated with myocardial infarction in the diagnosed population (CKD stages G3–G5) (prevalence – 2027) per uACR category for 31 countries and regions

Country or region	Myocardial infarction (billion USD) KDIGO uACR category, n (%)		
	A1	A2	A3
Australia	1.366 (46.6)	1.387 (47.3)	0.179 (6.1)
Belgium	1.642 (68.2)	0.723 (30.0)	0.042 (1.8)
Brazil	16.815 (83.0)	1.301 (6.4)	2.145 (10.6)
Canada	3.269 (69.1)	1.383 (29.2)	0.08 (1.7)
China	32.406 (27.2)	75.425 (63.3)	11.284 (9.5)
Colombia	22.048 (75.0)	6.909 (23.5)	0.428 (1.5)
Denmark	1.355 (71.1)	0.525 (27.5)	0.025 (1.3)
France	1.835 (56.7)	1.314 (40.6)	0.088 (2.7)
Germany	0.298 (26.2)	0.802 (70.6)	0.036 (3.2)
Greece	1.166 (79.6)	0.282 (19.2)	0.017 (1.2)
Hungary	0.111 (69.8)	0.046 (28.9)	0.002 (1.3)
India	13.632 (40.4)	17.172 (50.9)	2.911 (8.6)
Israel	0.277 (38.3)	0.364 (50.3)	0.082 (11.3)
Italy	7.844 (63.7)	3.898 (31.7)	0.570 (4.6)
Japan	75.412 (60.4)	44.779 (35.9)	4.662 (3.7)
Saudi Arabia	40.679 (42.5)	27.843 (29.1)	27.148 (28.4)
Mexico	0.838 (62.8)	0.469 (35.1)	0.028 (2.1)
Netherlands	1.242 (68.3)	0.202 (11.1)	0.376 (20.7)
Philippines	4.706 (61.4)	2.424 (31.6)	0.534 (7.0)
Poland	0.610 (82.6)	0.124 (16.7)	0.005 (0.7)
Romania	4.413 (53.5)	3.199 (38.8)	0.641 (7.8)
Singapore	0.926 (49.7)	0.767 (41.1)	0.171 (9.2)
South Korea	0.923 (45.6)	0.972 (48.0)	0.13 (6.4)
Spain	4.417 (81.8)	0.944 (17.5)	0.039 (0.7)
Sweden	0.196 (64.0)	0.093 (30.2)	0.018 (5.8)
Taiwan	0.065 (46.4)	0.067 (47.8)	0.008 (5.8)
Thailand	3.246 (70.8)	1.160 (25.3)	0.178 (3.9)
Turkey	0.154 (51.9)	0.126 (42.4)	0.017 (5.7)
UAE	0.161 (52.2)	0.122 (39.5)	0.026 (8.3)
UK	0.202 (69.7)	0.083 (28.6)	0.005 (1.7)
USA	20.796 (44.2)	21.866 (46.5)	4.359 (9.3)
Total, n	263.051	216.770	56.234
Percentage unweighted average, % (SD)	58.8 (15.5)	35.0 (14.3)	6.2 (5.9)
Percentage weighted average, %	49.1	40.4	10.5

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S6. Projected costs associated with stroke in the diagnosed population (CKD stages G3–G5) (prevalence – 2027) per uACR category for 31 countries and regions

Country or region	Stroke (billion USD) KDIGO uACR category, n (%)		
	A1	A2	A3
Australia	0.067 (39.7)	0.087 (51.6)	0.015 (8.7)
Belgium	1.036 (65.5)	0.52 (32.8)	0.027 (1.7)
Brazil	0.334 (72.5)	0.039 (8.5)	0.087 (19.0)
Canada	3.380 (63.8)	1.811 (34.2)	0.108 (2.0)
China	9.117 (26.5)	21.947 (63.7)	3.382 (9.8)
Colombia	0.480 (69.7)	0.195 (28.4)	0.013 (1.9)
Denmark	0.569 (65.1)	0.287 (32.9)	0.018 (2.0)
France	6.481 (54.8)	5.029 (42.5)	0.327 (2.8)
Germany	0.539 (25.1)	1.531 (71.2)	0.080 (3.7)
Greece	0.612 (75.5)	0.186 (22.9)	0.013 (1.6)
Hungary	0.246 (65.6)	0.123 (32.8)	0.006 (1.6)
India	14.098 (40.5)	17.569 (50.5)	3.114 (9.0)
Israel	0.267 (35.4)	0.384 (51.0)	0.102 (13.6)
Italy	4.804 (58.4)	2.971 (36.1)	0.446 (5.4)
Japan	10.066 (55.4)	7.214 (39.7)	0.893 (4.9)
Saudi Arabia	0.992 (31.4)	0.939 (29.7)	1.231 (38.9)
Mexico	0.494 (59.0)	0.324 (38.7)	0.020 (2.3)
Netherlands	1.430 (59.0)	0.296 (12.2)	0.696 (28.7)
Philippines	9.077 (56.0)	5.695 (35.2)	1.424 (8.8)
Poland	1.306 (77.7)	0.359 (21.4)	0.015 (0.9)
Romania	1.186 (45.3)	1.159 (44.3)	0.270 (10.3)
Singapore	0.435 (41.6)	0.495 (47.4)	0.115 (11)
South Korea	1.131 (36.2)	1.697 (54.3)	0.299 (9.6)
Spain	2.687 (73.7)	0.899 (24.7)	0.058 (1.6)
Sweden	0.573 (60.0)	0.311 (32.6)	0.070 (7.3)
Taiwan	0.077 (38.3)	0.107 (53.0)	0.018 (8.7)
Thailand	1.283 (64.3)	0.606 (30.4)	0.107 (5.4)
Turkey	0.870 (38.0)	1.187 (51.8)	0.233 (10.2)
UAE	0.023 (43.4)	0.024 (44.9)	0.006 (11.7)
UK	0.166 (66.3)	0.079 (31.8)	0.005 (1.8)
USA	60.486 (38.9)	76.617 (49.2)	18.557 (11.9)
Total, n	134.313	150.689	31.756
Percentage unweighted average, % (SD)	53.0 (15.3)	38.7 (14.0)	8.3 (8.3)
Percentage weighted average, %	42.4	47.6	10.0

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S7. Projected costs associated with CKD management stages G3a and G3b in the diagnosed population (prevalence – 2027) per uACR category for 31 countries and regions

Country or region	CKD stage G3a (billion USD) KDIGO uACR category			CKD stage G3b (billion USD) KDIGO uACR category		
	A1	A2	A3	A1	A2	A3
Australia	0.757 (85.7)	0.113 (12.8)	0.014 (1.6)	0.138 (81.4)	0.028 (16.5)	0.003 (2.0)
Belgium	0.884 (90.2)	0.092 (9.4)	0.004 (0.4)	0.282 (89.4)	0.032 (10.3)	0.001 (0.3)
Brazil	4.318 (92.5)	0.121 (2.6)	0.229 (4.9)	2.235 (91.0)	0.079 (3.2)	0.141 (5.7)
Canada	2.971 (89.6)	0.329 (9.9)	0.015 (0.4)	1.180 (87.9)	0.155 (11.6)	0.006 (0.5)
China	15.277 (85.9)	2.237 (12.6)	0.280 (1.6)	2.591 (82.6)	0.488 (15.6)	0.058 (1.9)
Colombia	0.806 (96.4)	0.029 (3.4)	0.001 (0.2)	0.139 (91.0)	0.013 (8.6)	0.001 (0.5)
Denmark	0.172 (92.1)	0.014 (7.6)	0.001 (0.3)	0.039 (88.1)	0.005 (11.4)	0.000 (0.4)
France	3.722 (92.0)	0.309 (7.6)	0.014 (0.3)	0.782 (86.7)	0.115 (12.8)	0.005 (0.5)
Germany	4.249 (87.0)	0.607 (12.4)	0.026 (0.5)	0.848 (82.5)	0.174 (16.9)	0.005 (0.5)
Greece	0.216 (95.2)	0.010 (4.6)	0.000 (0.2)	0.031 (91.8)	0.003 (7.8)	0.000 (0.3)
Hungary	0.217 (93.4)	0.015 (6.4)	0.000 (0.2)	0.076 (89.3)	0.009 (10.3)	0.000 (0.3)
India	10.172 (90.0)	0.984 (8.7)	0.149 (1.3)	1.646 (86.5)	0.225 (11.8)	0.031 (1.7)
Israel	0.405 (79.3)	0.088 (17.3)	0.017 (3.4)	0.158 (74.6)	0.045 (21.3)	0.009 (4.0)
Italy	1.290 (93.1)	0.086 (6.2)	0.010 (0.7)	0.663 (91.3)	0.056 (7.7)	0.007 (0.9)
Japan	8.973 (86.0)	1.332 (12.8)	0.133 (1.3)	3.088 (83.8)	0.543 (14.7)	0.053 (1.4)
Saudi Arabia	1.488 (79.9)	0.188 (10.1)	0.187 (10)	0.539 (73.6)	0.094 (12.9)	0.099 (13.6)
Mexico	0.454 (92.5)	0.035 (7.2)	0.001 (0.3)	0.084 (86.8)	0.012 (12.7)	0.000 (0.5)
Netherlands	0.379 (92.4)	0.011 (2.7)	0.020 (4.9)	0.078 (90.3)	0.003 (3.5)	0.005 (6.2)
Philippines	0.028 (91.4)	0.002 (7.3)	0.000 (1.3)	0.017 (84.3)	0.003 (13.3)	0.000 (2.4)
Poland	0.685 (98.0)	0.014 (2)	0.000 (0.1)	0.060 (94.0)	0.004 (5.8)	0.000 (0.2)
Romania	4.979 (87.2)	0.615 (10.8)	0.118 (2.1)	2.310 (84.9)	0.343 (12.6)	0.068 (2.5)
Singapore	0.530 (81.6)	0.101 (15.6)	0.019 (2.8)	0.111 (77.9)	0.027 (19.0)	0.004 (3.1)
South Korea	1.204 (87.7)	0.150 (10.9)	0.019 (1.4)	0.196 (81.5)	0.040 (16.5)	0.005 (2.0)
Spain	2.277 (93.6)	0.147 (6.1)	0.008 (0.3)	1.500 (92.1)	0.123 (7.5)	0.006 (0.4)

Country or region	CKD stage G3a (billion USD) KDIGO uACR category			CKD stage G3b (billion USD) KDIGO uACR category		
	A1	A2	A3	A1	A2	A3
Sweden	0.298 (94.0)	0.016 (5.2)	0.003 (0.8)	0.191 (89.2)	0.0200 (9.3)	0.003 (1.5)
Taiwan	0.890 (88.2)	0.106 (10.5)	0.013 (1.3)	0.140 (82.3)	0.027 (15.8)	0.003 (1.9)
Thailand	0.816 (88.1)	0.096 (10.4)	0.014 (1.6)	0.291 (86.3)	0.041 (12.1)	0.005 (1.6)
Turkey	1.256 (81.6)	0.243 (15.8)	0.041 (2.7)	0.407 (78.6)	0.097 (18.7)	0.014 (2.7)
UAE	0.059 (90.5)	0.005 (8.0)	0.001 (1.5)	0.023 (82.7)	0.004 (14.4)	0.001 (2.9)
UK	0.144 (89.9)	0.015 (9.6)	0.001 (0.4)	0.047 (88.6)	0.006 (10.9)	0.000 (0.4)
USA (commercial)	18.030 (86.4)	2.345 (11.2)	0.500 (2.4)	3.442 (77.6)	0.788 (17.8)	0.203 (4.6)
USA (Medicare)	29.043 (77.8)	7.071 (18.9)	1.221 (3.3)	20.251 (77.4)	5.065 (19.4)	0.843 (3.2)
Total, n	117.0	17.5	3.1	43.58	8.67	1.58
Percentage unweighted average, % (SD)	89.1 (5.1)	9.2 (4.3)	1.7 (2.0)	85.3 (5.5)	12.5 (4.5)	2.2 (2.7)
Percentage weighted average, %	85.0	12.7	2.2	81.0	16.1	2.9

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S8. Projected costs associated with CKD management stages G4 and G5 in the diagnosed population (prevalence – 2027) per uACR category for 31 countries and regions

Country or region	CKD stage G4 (billion USD) KDIGO uACR category, n (%)			CKD stage G5 (billion USD) KDIGO uACR category, n (%)		
	A1	A2	A3	A1	A2	A3
Australia	0.184 (69.8)	0.069 (26.3)	0.010 (3.8)	0.070 (78.2)	0.018 (20.0)	0.002 (1.8)
Belgium	0.223 (84.0)	0.041 (15.4)	0.002 (0.6)	0.187 (87.4)	0.026 (12.2)	0.001 (0.4)
Brazil	0.601 (83.5)	0.039 (5.4)	0.080 (11.1)	0.175 (88.6)	0.009 (4.5)	0.014 (6.9)
Canada	0.541 (80.1)	0.128 (19.0)	0.006 (0.9)	0.508 (85.3)	0.085 (14.2)	0.003 (0.5)
China	1.321 (63.8)	0.652 (31.5)	0.097 (4.7)	0.262 (79.7)	0.064 (19.3)	0.003 (1.0)
Colombia	0.044 (78.0)	0.012 (20.6)	0.001 (1.4)	0.015 (90.6)	0.002 (9.1)	0.000 (0.3)
Denmark	0.012 (76.4)	0.003 (22.4)	0.000 (1.2)	0.007 (85.8)	0.001 (13.8)	0.000 (0.4)
France	0.764 (83.6)	0.144 (15.7)	0.007 (0.7)	0.000 (0.0)	0.000 (0.0)	0.000 (0.0)
Germany	0.289 (69.3)	0.122 (29.3)	0.006 (1.3)	0.207 (79)	0.054 (20.5)	0.001 (0.5)
Greece	0.023 (81.1)	0.005 (17.7)	0.000 (1.1)	0.014 (90)	0.001 (9.6)	0.000 (0.4)
Hungary	0.013 (74.3)	0.004 (24.7)	0.000 (0.9)	0.006 (86.3)	0.001 (13.2)	0.000 (0.5)
India	0.369 (74.4)	0.109 (21.9)	0.018 (3.7)	0.207 (84.1)	0.036 (14.7)	0.003 (1.2)
Israel	0.071 (67.4)	0.028 (26.7)	0.006 (5.8)	0.053 (72.0)	0.018 (24.0)	0.003 (4.0)
Italy	0.344 (84.2)	0.057 (13.9)	0.008 (1.9)	0.110 (90.1)	0.011 (9.1)	0.001 (0.9)
Japan	3.364 (74.8)	1.026 (22.8)	0.105 (2.3)	0.548 (79.0)	0.135 (19.4)	0.011 (1.6)
Saudi Arabia	0.173 (58.5)	0.051 (17.3)	0.072 (24.2)	0.224 (68.9)	0.058 (17.8)	0.043 (13.3)
Mexico	0.027 (73.2)	0.009 (25.4)	0.001 (1.4)	0.019 (85.5)	0.003 (14.1)	0.000 (0.4)
Netherlands	0.022 (78.6)	0.002 (7.0)	0.004 (14.4)	0.053 (90.8)	0.002 (3.9)	0.003 (5.3)
Philippines	0.007 (70.5)	0.002 (23.6)	0.001 (5.9)	0.001 (75.8)	0.000 (21.5)	0.000 (2.7)
Poland	0.016 (80.0)	0.004 (19.0)	0.000 (0.9)	0.010 (94.5)	0.001 (5.1)	0.000 (0.4)
Romania	1.243 (81.2)	0.234 (15.3)	0.054 (3.5)	1.287 (87.2)	0.153 (10.4)	0.035 (2.4)
Singapore	0.030 (64.1)	0.014 (29.7)	0.003 (6.1)	0.015 (75.8)	0.004 (21.7)	0.000 (2.5)
South Korea	0.167 (75.1)	0.049 (21.8)	0.007 (3.1)	0.091 (82.2)	0.018 (15.9)	0.002 (1.9)
Spain	0.366 (83.8)	0.066 (15.1)	0.005 (1.0)	0.169 (90.7)	0.017 (8.9)	0.001 (0.4)

Country or region	CKD stage G4 (billion USD) KDIGO uACR category, n (%)			CKD stage G5 (billion USD) KDIGO uACR category, n (%)		
	A1	**A2**	**A3**	**A1**	**A2**	**A3**
Sweden	0.084 (80.4)	0.017 (16.3)	0.003 (3.3)	0.021 (87.0)	0.003 (11.6)	0.000 (1.4)
Taiwan	0.195 (74.2)	0.059 (22.6)	0.008 (3.2)	0.027 (81.0)	0.006 (17.0)	0.001 (2.0)
Thailand	0.122 (79.7)	0.027 (17.5)	0.004 (2.8)	0.176 (84.5)	0.029 (14.0)	0.003 (1.5)
Turkey	0.449 (68.5)	0.177 (27.0)	0.03 (4.5)	0.073 (73.1)	0.024 (23.8)	0.003 (3.0)
UAE	0.020 (78.9)	0.004 (16.9)	0.001 (4.1)	0.003 (83.5)	0.000 (13.6)	0.000 (2.8)
UK	0.016 (80.0)	0.004 (19.2)	0.000 (0.9)	0.009 (85.3)	0.002 (14.1)	0.000 (0.6)
USA (commercial)	1.052 (56.2)	0.631 (33.7)	0.188 (10.1)	0.286 (78.5)	0.057 (15.5)	0.022 (6.0)
USA (Medicare)	4.586 (66.6)	1.942 (28.2)	0.363 (5.3)	1.156 (73.1)	0.361 (22.9)	0.063 (4.0)
Total, n	16.738	5.733	1.089	5.989	1.197	0.219
Percentage unweighted average, % (SD)	75.0 (7.6)	20.7 (6.6)	4.3 (4.9)	83.2 (6.5)	14.5 (5.6)	2.3 (2.7)
Percentage weighted average, %	71.0	24.3	4.6	80.9	16.2	3.0

Abbreviations – KDIGO: Kidney Disease: Improving Global Outcomes; SD: standard deviation; uACR: urinary albumin-creatinine ratio

Table S9. Inside CKD Scientific Steering Committee

Country or region	Expert	Affiliation
Australia	Prof. Steven Chadban	Royal Prince Alfred Hospital, Sydney, Australia
Belgium	Prof. Michel Jadoul	Cliniques Universitaires Saint-Luc, Université catholique de Louvain, Brussels, Belgium
Brazil	Prof. Marcelo Costa Batista	Hospital Israelita Albert Einstein, São Paulo, Brazil
Canada	Dr Navdeep Tangri	University of Manitoba, Winnipeg, Canada
China	Prof. Guisen Li	Sichuan Provincial People's Hospital, Chengdu, China
Colombia	Prof. José Javier Arango Álvarez	Universidad del Quindío, Quindío, Colombia
Denmark	Professor Christian Fynbo Christiansen	Aarhus University Hospital, Denmark
France	Prof. Jean-Michel Halimi	Service de Néphrologie-HTA, Dialyses, Transplantation Rénale, CHU Tours, Tours, France
Germany	Prof. Kai-Uwe Eckardt	Department of Nephrology and Medical Intensive Care, Charité Universitätsmedizin Berlin, Berlin, Germany
Greece	Dr. Panagiotis Stafylas	Medical Research & Innovation (HealThink), Thessaloniki, Greece, and Laboratory of Clinical Pharmacology, School of Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece
Hungary	Prof. Istvan Wittmann	President of Hungarian Diabetes Society and Hungarian College of nephrologists and Head of the Internal Medicine Department II. at University of Pécs.
India	Prof. Vivekanand Jha	George Institute for Global Health India, New Delhi, India
Israel	Prof. Avraham Karasik	Maccabi Institute for Research and Innovation, Tel-Aviv, Israel
Israel	Prof. Gil Chernin	Kaplan Medical Center, Faculty of Medicine, Hebrew University of Jerusalem, Jerusalem, Israel
Italy	Prof. Francesco Saverio Mennini	CEIS-EEHTA, Faculty of Economics, University of Rome Tor Vergata, Rome, Italy
Italy	Prof. Luca De Nicola	Department of Advanced Medical and Surgical Sciences, University of Campania Luigi Vanvitelli, Naples, Italy
Japan	Prof. Eiichiro Kanda	Kawasaki Medical University, Okayama, Japan
Mexico	Prof. José Ricardo Correa-Rotter	Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán Mexico City, Mexico
Netherlands	Dr Chris Hagen	Meander Medical Centre
Philippines, Singapore, and Thailand	Assoc. Prof. Jason Choo Chon Jun	Singapore General Hospital, Singapore
Poland	Prof. Michał Nowicki	Warsaw University of Technology
Romania	Prof. Dr. Ismail Gener	Fundeni Institute

Country or region	Expert	Affiliation
Saudi Arabia	Prof. Saeed M. G. Al-Ghamdi	King Abdulaziz University Hospital and King Faisal Specialist Hospital and Research Centre, Jeddah, Saudi Arabia
South Korea	Prof. Kook-Hwan Oh	Seoul National University College of Medicine, Seoul, South Korea
Spain	Prof. Juan Francisco Navarro-González	Research Unit and Nephrology Service, University Hospital Nuestra Señora de Candelaria, Santa Cruz de Tenerife, Spain
Sweden	Prof. Johan Ärnlöv	Department of Neurobiology, Care Sciences and Society, Division of Family Medicine and Primary Care, Karolinska Institute, Stockholm, Sweden
Taiwan	Prof. Mai-Szu Wu	Division of Nephrology, Taipei Medical University, Taipei, Taiwan
Turkey	Prof. Mustafa ARICI	Hacettepe University Faculty of Medicine, Department of Nephrology, Ankara, Turkey
United Arab Emirates	Prof. Stephen Holt	SEHA Kidney Care, Abu Dhabi, UAE
United Kingdom	Dr Albert Power	North Bristol NHS Trust, Bristol, UK
United States of America	Prof. Glenn Chertow	Stanford University School of Medicine, California, USA
United States of America	Prof. Jay Wish	Indiana University School of Medicine, Indianapolis, USA

Table S10. GATHER checklist

Checklist of information that should be included in new reports of global health estimates

Item #	Checklist item	Reported on page #
Objectives and funding		
1	Define the indicator(s), populations (including age, sex, and geographic entities), and time period(s) for which estimates were made.	7
2	List the funding sources for the work.	20
Data Inputs		
For all data inputs from multiple sources that are synthesized as part of the study:		
3	Describe how the data were identified and how the data were accessed.	9 -11 (Pecoits-Filho et al, 2021; Levey et al 2011; Jha et al, 2023)
4	Specify the inclusion and exclusion criteria. Identify all ad-hoc exclusions.	9 -11 (Pecoits-Filho et al, 2021; Levey et al 2011; Jha et al, 2023)
5	Provide information on all included data sources and their main characteristics. For each data source used, report reference information or contact name/institution, population represented, data collection method, year(s) of data collection, sex and age range, diagnostic criteria or measurement method, and sample size, as relevant.	9 -11 (Pecoits-Filho et al, 2021; Levey et al 2011; Jha et al, 2023)
6	Identify and describe any categories of input data that have potentially important biases (e.g., based on characteristics listed in item 5).	18-19
For data inputs that contribute to the analysis but were not synthesized as part of the study:		
7	Describe and give sources for any other data inputs.	11
For all data inputs:		
8	Provide all data inputs in a file format from which data can be efficiently extracted (e.g., a spreadsheet rather than a PDF), including all relevant meta-data listed in item 5. For any data inputs that cannot be shared because of ethical or legal reasons, such as third-party ownership, provide a contact name or the name of the institution that retains the right to the data.	Available on request
Data analysis		
9	Provide a conceptual overview of the data analysis method. A diagram may be helpful.	7
10	Provide a detailed description of all steps of the analysis, including mathematical formulae. This description should cover, as relevant, data cleaning, data pre-processing, data adjustments and weighting of data sources, and mathematical or statistical model(s).	7 + Tangri et al
11	Describe how candidate models were evaluated and how the final model(s) were selected.	7 + Tangri et al
12	Provide the results of an evaluation of model performance, if done, as well as the results of any relevant sensitivity analysis.	8 +16
13	Describe methods for calculating uncertainty of the estimates. State which sources of uncertainty were, and were not, accounted for in the uncertainty analysis.	18
14	State how analytic or statistical source code used to generate estimates can be accessed.	11

Results and Discussion		
15	Provide published estimates in a file format from which data can be efficiently extracted.	Supplementary file p 2-19
16	Report a quantitative measure of the uncertainty of the estimates (e.g. uncertainty intervals).	12 – 13 and Supplementary files p 2 - 19
17	Interpret results in light of existing evidence. If updating a previous set of estimates, describe the reasons for changes in estimates.	16-19
18	Discuss limitations of the estimates. Include a discussion of any modelling assumptions or data limitations that affect interpretation of the estimates.	18

This checklist should be used in conjunction with the GATHER statement and Explanation and Elaboration document, found on gather-statement.org