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**Figure 1.** **Patient attrition flow chart**

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Abbreviations: CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes; UACR, urine albumin to creatinine ratio.

\* Two eGFR or two UACR laboratory results indicating kidney disease must have been at least 90 days apart and at most 365 days apart from January 2008 onwards.

†Diagnoses which could cause chronic kidney disease (CKD) from causes other than T2D: lomerulonephritis, focal glomerulosclerosis/focal sclerosing glomerulonephritis, membranous nephropathy, membranoproliferative glomerulonephritis type 1/diffuse membranoproliferative glomerulosclerosis, IgA nephropathy/Berger’s disease, rapidly progressive systemic lupus erythematosus nephritis, other proliferative glomerulonephritis, Wegener’s granulomatosis, other vasculitis with kidney involvement, interstitial nephritis/pyelonephritis from analgesic abuse, gouty nephropathy, acquired obstructive uropathy, chronic pyelonephritis/reflux nephropathy, chronic interstitial nephritis, acute interstitial nephritis, urolithiasis, renal artery stenosis, renal artery occlusion, polycystic kidneys (adult type), renal tumor (malignant), multiple myeloma, AIDS nephropathy and tubular necrosis, renal agenesis, dysgenesis, hypoplasia and sickle cell disease. Codes and detailed definitions for selection criteria variables are provided within the Supplementary Materials.

**Table 1. Baseline medication use among T2D patients with incident CKD**

|  |  |
| --- | --- |
|   | **T2D patients with incident CKD diagnosis** |
| N=106,369 |
| **Concomitant medications** |  |
| Statins, n (%) | 69,354 (65.2%) |
| **Anti-hypertensive medications, n(%)** |  |
| ACEis  | 51,483 (48.4%) |
| ARBs  | 26,067 (24.5%) |
| Beta blockers  | 34,209 (32.2%) |
| Diuretics  | 51,915 (48.8%) |
| Calcium Channel Blockers  | 33,398 (31.4%) |
| MRAs  | 4,594 (4.3%) |
| Alpha blockers  | 3,319 (3.1%) |
| Alpha-2 receptor agonists  | 66 (0.1%) |
| Combined alpha and beta blockers | 4,181 (3.9%) |
| Central agonists  | 3 (0.0%) |
| Peripheral adrenergic inhibitors  | 2,289 (2.2%) |
| **Glucose lowering medication classes, n(%)** |  |
| Insulin | 23,554 (22.1%) |
| Dipeptidyl-Peptidase-4 Inhibitor (DPP-4i) | 13,319 (12.5%) |
| Glucagon-like peptide-1 Receptor Agonist (GLP1) | 4,402 (4.1%) |
| Alpha Glucosidase Inhibitor | 336 (0.3%) |
| Sodium-glucose Cotransporter-2 Inhibitors (SGLT2i) | 2,514 (2.4%) |
| Thiazolidinedione (TZD) | 10,426 (9.8%) |
| Sulfonylurea (SU) | 34,612 (32.5%) |
| Biguanides (monotherapy) | 52,486 (49.3%) |
| Biguanides (mono- and combination therapy) | 59,128 (55.6%) |
| Bile acid sequestrants | 940 (0.9%) |
| Meglitinides | 1,059 (1.0%) |
| Number of glucose lowering medications, categories, n(%) |  |
| ...1 | 35,535 (33.4%) |
| ...>= 2 | 45,169 (42.5%) |

*Abbreviations: ACEI, angiotensin-converting-enzyme inhibitor; ARB, angiotensin receptor blocker; CKD, chronic kidney disease; IQR, interquartile range; MRA, mineralocorticoid receptor antagonist; SD, standard deviation; T2D, Type 2 diabetes mellitus*

Patients with ESRD, CKD, kidney transplant, dialysis, or conditions other than diabetes that may cause CKD during the 365-day baseline period were excluded. Resistant hypertension is defined as 4 or more unique antihypertensive medication prescription claims within a 30 day period.

**Table 2. Patient characteristics of patients with T2D and incident CKD, during a 365-day baseline period. Characteristics are stratified by prevalent comorbidities.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
|   | **T2D and CKD diagnosis (N = 106,369)**  |
| No HF during baseline (N=94,574) | HF during baseline (N=11,795) | No resistant hypertension during baseline (N=89,480) | Resistant hypertension during baseline (N=16,889) | No anemia during baseline (N=86,608) | Anemia during baseline (N=19,761) |
| Demographics |   |   |   |   |
| eGFR value on CED |  |  |  |  |  |  |
|  -- Mean (SD) | 55.06 (15.77) | 50.68 (12.81) | 55.10 (15.83) | 51.75 (13.44) | 55.15 (15.96) | 52.02 (13.22) |
| UACR value on CED |  |  |  |  |  |  |
|  -- Mean (SD) | 181.47 (432.37) | 207.72 (413.81) | 176.06 (376.53) | 231.33 (684.93) | 182.41 (440.73) | 189.88 (364.23) |
| Age (years) |  |  |  |  |  |  |
|  -- Mean (SD) | 70.12 (12.84) | 74.43 (12.53) | 70.37 (13.06) | 71.78 (11.81) | 70.08 (12.85) | 72.86 (12.79) |
|  -- Median [IQR] | 70 [63, 77] | 74 [67, 81] | 71 [63, 78] | 71 [65, 78] | 70 [63, 77] | 73 [66, 80] |
| Gender |  |  |  |  |  |  |
|  -- Male, n (%) | 41,049 (43.4%) | 5,214 (44.2%) | 39,601 (44.3%) | 6,662 (39.4%) | 39,231 (45.3%) | 7,032 (35.6%) |
|  -- Female, n (%) | 53,490 (56.6%) | 6,576 (55.8%) | 49,848 (55.7%) | 10,218 (60.5%) | 47,341 (54.7%) | 12,725 (64.4%) |
|  -- Missing n (%) | 35 (0.0%) | 5 (0.0%) | 31 (0.0%) | 9 (0.1%) | 36 (0.0%) | 4 (0.0%) |
| Race |  |  |  |  |  |  |
|  -- White, n(%)  | 54,391 (57.5%) | 7,007 (59.4%) | 51,760 (57.8%) | 9,638 (57.1%) | 50,178 (57.9%) | 11,220 (56.8%) |
|  -- Asian, n(%)  | 3,517 (3.7%) | 252 (2.1%) | 3,326 (3.7%) | 443 (2.6%) | 3,093 (3.6%) | 676 (3.4%) |
|  -- Black, n(%)  | 10,308 (10.9%) | 1,557 (13.2%) | 9,112 (10.2%) | 2,753 (16.3%) | 9,213 (10.6%) | 2,652 (13.4%) |
|  -- Hispanic, n(%)  | 12,604 (13.3%) | 1,308 (11.1%) | 11,968 (13.4%) | 1,944 (11.5%) | 11,449 (13.2%) | 2,463 (12.5%) |
|  -- Unknown, n(%) | 13754 (14.5%) | 1671 (14.2%) | 13314 (14.9%) | 2111 (12.5%) | 12675 (14.6%) | 2750 (13.9%) |
| Region |   |  |   |   |  |   |
|  -- Northeast, n(%)  | 9,284 (9.8%) | 1,251 (10.6%) | 9,049 (10.1%) | 1,486 (8.8%) | 7,582 (8.8%) | 2,953 (14.9%) |
|  -- Midwest, n(%)  | 9,034 (9.6%) | 1,227 (10.4%) | 8,581 (9.6%) | 1,680 (9.9%) | 8,620 (10.0%) | 1,641 (8.3%) |
|  -- South, n(%)  | 54,229 (57.3%) | 6,749 (57.2%) | 50,616 (56.6%) | 10,362 (61.4%) | 49,378 (57.0%) | 11,600 (58.7%) |
|  -- West, n(%)  | 21,676 (22.9%) | 2,515 (21.3%) | 20,875 (23.3%) | 3,316 (19.6%) | 20,683 (23.9%) | 3,508 (17.8%) |
|  -- Missing, n(%) | 351 (0.4%) | 53 (0.4%) | 359 (0.4%) | 45 (0.3%) | 345 (0.4%) | 59 (0.3%) |
| Provider Specialty  |  |  |  |  |  |  |
|  -- Endocrinologist, n(%)  | 2,279 (2.4%) | 211 (1.8%) | 2,135 (2.4%) | 355 (2.1%) | 2,076 (2.4%) | 414 (2.1%) |
|  -- Nephrologist, n(%)  | 303 (0.3%) | 53 (0.4%) | 273 (0.3%) | 83 (0.5%) | 267 (0.3%) | 89 (0.5%) |
|  -- Cardiologist, n(%)  | 1,586 (1.7%) | 717 (6.1%) | 1,795 (2.0%) | 508 (3.0%) | 1,700 (2.0%) | 603 (3.1%) |
|  -- General Practitioner / Internist, n(%)  | 45,851 (48.5%) | 5,653 (47.9%) | 43,179 (48.3%) | 8,325 (49.3%) | 42,704 (49.3%) | 8,800 (44.5%) |
|  -- Urologist, n(%) | 229 (0.2%) | 30 (0.3%) | 229 (0.3%) | 30 (0.2%) | 208 (0.2%) | 51 (0.3%) |
|  -- Inpatient facility, n(%) | 1,787 (1.9%) | 342 (2.9%) | 1,720 (1.9%) | 409 (2.4%) | 1,626 (1.9%) | 503 (2.5%) |
|  -- Outpatient facility, n(%) | 1,378 (1.5%) | 197 (1.7%) | 1,305 (1.5%) | 270 (1.6%) | 1,313 (1.5%) | 262 (1.3%) |
|  -- Missing, n(%) | 50,843 (53.8%) | 6,628 (56.2%) | 48,085 (53.7%) | 9,386 (55.6%) | 47,396 (54.7%) | 10,075 (51.0%) |
| Comorbidity score |   |   |   |   |   |   |
| Deyo comorbidity score |  |  |  |  |  |  |
|  -- Mean (SD) | 2.07 (1.36) | 3.92 (1.69) | 2.23 (1.50) | 2.51 (1.61) | 2.15 (1.40) | 2.86 (1.84) |
|  -- Median [IQR] | 2 [1, 3] | 4 [3, 5] | 2 [1, 3] | 2 [1, 3] | 2 [1, 3] | 2 [1, 4] |
| Comorbidities |   |   |   |   |   |   |
| Angina pectoris, n(%)  | 18,820 (19.9%) | 6,889 (58.4%) | 20,180 (22.6%) | 5,529 (32.7%) | 19,221 (22.2%) | 6,488 (32.8%) |
| Acute coronary syndrome, n(%)  | 1,690 (1.8%) | 1,223 (10.4%) | 2,183 (2.4%) | 730 (4.3%) | 1,922 (2.2%) | 991 (5.0%) |
| Anemia, n(%)  | 16,108 (17.0%) | 3,653 (31.0%) | 16,071 (18.0%) | 3,690 (21.8%) | 0 (0.0%) | 19,761 (100.0%) |
| Atrial fibrillation, n(%)  | 6,539 (6.9%) | 4,334 (36.7%) | 8,081 (9.0%) | 2,792 (16.5%) | 7,887 (9.1%) | 2,986 (15.1%) |
| Chronic lung/pulmonary disease, n(%)  | 15,698 (16.6%) | 5,120 (43.4%) | 16,911 (18.9%) | 3,907 (23.1%) | 15,546 (17.9%) | 5,272 (26.7%) |
| Coronary artery disease, n(%)  | 10,016 (10.6%) | 4,347 (36.9%) | 11,263 (12.6%) | 3,100 (18.4%) | 10,497 (12.1%) | 3,866 (19.6%) |
| Depression, n(%)  | 8,889 (9.4%) | 1,737 (14.7%) | 8,907 (10.0%) | 1,719 (10.2%) | 7,804 (9.0%) | 2,822 (14.3%) |
| Edema, n(%)  | 8,108 (8.6%) | 3,066 (26.0%) | 8,066 (9.0%) | 3,108 (18.4%) | 7,909 (9.1%) | 3,265 (16.5%) |
| Fatigue & sleep related disorders, n(%) | 21,636 (22.9%) | 4,369 (37.0%) | 21,383 (23.9%) | 4,622 (27.4%) | 18,832 (21.7%) | 7,173 (36.3%) |
| Heart Failure, n(%) | 0 (0.0%) | 11,795 (100.0%) | 8,529 (9.5%) | 3,266 (19.3%) | 8,142 (9.4%) | 3,653 (18.5%) |
| Hyperkalemia, n(%)  | 1,742 (1.8%) | 515 (4.4%) | 1,826 (2.0%) | 431 (2.6%) | 1,533 (1.8%) | 724 (3.7%) |
|  --Hyperkalemia indicated by ICD codes, n(%) | 1,688 (1.8%) | 506 (4.3%) | 1,771 (2.0%) | 423 (2.5%) | 1,493 (1.7%) | 701 (3.5%) |
|  --Hyperkalemia indicated by lab values, n(%) | 80 (0.1%) | 23 (0.2%) | 86 (0.1%) | 17 (0.1%) | 63 (0.1%) | 40 (0.2%) |
| Hypokalemia, n(%)  | 2,540 (2.7%) | 988 (8.4%) | 2,553 (2.9%) | 975 (5.8%) | 2,216 (2.6%) | 1,312 (6.6%) |
| Hyponatremia, n(%) | 1,674 (1.8%) | 631 (5.3%) | 1,769 (2.0%) | 536 (3.2%) | 1,324 (1.5%) | 981 (5.0%) |
| Hyperlipidemia, n(%)  | 78,429 (82.9%) | 10,123 (85.8%) | 74,148 (82.9%) | 14,404 (85.3%) | 71,425 (82.5%) | 17,127 (86.7%) |
| Hypertension , n(%)  | 83,893 (88.7%) | 11,215 (95.1%) | 78,806 (88.1%) | 16,302 (96.5%) | 76,705 (88.6%) | 18,403 (93.1%) |
| Microvascular disease, n(%)  | 29,484 (31.2%) | 4,692 (39.8%) | 28,299 (31.6%) | 5,877 (34.8%) | 27,065 (31.2%) | 7,111 (36.0%) |
| Myocardial infarction, n(%)  | 946 (1.0%) | 916 (7.8%) | 1,358 (1.5%) | 504 (3.0%) | 1,178 (1.4%) | 684 (3.5%) |
| Obesity, n(%) | 17,095 (18.1%) | 3,210 (27.2%) | 16,361 (18.3%) | 3,944 (23.4%) | 16,208 (18.7%) | 4,097 (20.7%) |
| Pain disorders, n(%) | 63,713 (67.4%) | 9,746 (82.6%) | 61,072 (68.3%) | 12,387 (73.3%) | 57,630 (66.5%) | 15,829 (80.1%) |
| Peripheral vascular disease, n(%)  | 13,179 (13.9%) | 3,532 (29.9%) | 13,446 (15.0%) | 3,265 (19.3%) | 12,332 (14.2%) | 4,379 (22.2%) |
| Resistant hypertension, n(%)  | 13,623 (14.4%) | 3,266 (27.7%) | 0 (0.0%) | 16,889 (100.0%) | 13,199 (15.2%) | 3,690 (18.7%) |
| Respiratory failure, n(%)  | 884 (0.9%) | 1,257 (10.7%) | 1,550 (1.7%) | 591 (3.5%) | 1,249 (1.4%) | 892 (4.5%) |
| Sleep apnea, n(%)  | 9,142 (9.7%) | 2,446 (20.7%) | 9,070 (10.1%) | 2,518 (14.9%) | 9,140 (10.6%) | 2,448 (12.4%) |
| Stroke, n(%)  | 3,530 (3.7%) | 1,073 (9.1%) | 3,642 (4.1%) | 961 (5.7%) | 3,256 (3.8%) | 1,347 (6.8%) |
| Concomitant medications |  |  |  |  |  |  |
| Statins, n (%) | 61,406 (64.9%) | 7,948 (67.4%) | 56,388 (63.0%) | 12,966 (76.8%) | 56,729 (65.5%) | 12,625 (63.9%) |
| Anti-hypertensive agents |  |  |  |  |  |  |
| ACEIs, n (%) | 45,555 (48.2%) | 5,928 (50.3%) | 40,705 (45.5%) | 10,778 (63.8%) | 42,323 (48.9%) | 9,160 (46.4%) |
| ARBs, n (%) | 22,941 (24.3%) | 3,126 (26.5%) | 18,713 (20.9%) | 7,354 (43.5%) | 20,938 (24.2%) | 5,129 (26.0%) |
| Beta blockers, n (%) | 29,228 (30.9%) | 4,981 (42.2%) | 22,358 (25.0%) | 11,851 (70.2%) | 27,295 (31.5%) | 6,914 (35.0%) |
| Thiazide, potassium-sparing, and loop diuretics, n (%) | 43,422 (45.9%) | 8,493 (72.0%) | 36,059 (40.3%) | 15,856 (93.9%) | 41,553 (48.0%) | 10,362 (52.4%) |
| Calcium Channel Blockers, n (%) | 29,415 (31.1%) | 3,983 (33.8%) | 21,070 (23.5%) | 12,328 (73.0%) | 26,767 (30.9%) | 6,631 (33.6%) |
| MRAs, n (%) | 2,592 (2.7%) | 2,002 (17.0%) | 2,543 (2.8%) | 2,051 (12.1%) | 3,338 (3.9%) | 1,256 (6.4%) |
| Alpha blockers, n (%) | 2,840 (3.0%) | 479 (4.1%) | 1,708 (1.9%) | 1,611 (9.5%) | 2,664 (3.1%) | 655 (3.3%) |
| Alpha-2 receptor agonists, n (%) | 54 (0.1%) | 12 (0.1%) | 33 (0.0%) | 33 (0.2%) | 47 (0.1%) | 19 (0.1%) |
| Combined alpha and beta blockers, n (%) | 3,539 (3.7%) | 642 (5.4%) | 1,462 (1.6%) | 2,719 (16.1%) | 3,205 (3.7%) | 976 (4.9%) |
| Central agonists, n (%) | 3 (0.0%) | 0 (0.0%) | 2 (0.0%) | 1 (0.0%) | 3 (0.0%) | 0 (0.0%) |
| Peripheral adrenergic inhibitors, n (%) | 1,660 (1.8%) | 629 (5.3%) | 772 (0.9%) | 1,517 (9.0%) | 1,698 (2.0%) | 591 (3.0%) |
| Glucose lowering agent classes |  |  |  |  |  |  |
| Insulin, n (%) | 20,242 (21.4%) | 3,312 (28.1%) | 18,982 (21.2%) | 4,572 (27.1%) | 19,167 (22.1%) | 4,387 (22.2%) |
| Dipeptidyl-Peptidase-4 Inhibitor (DPP-4i), n (%) | 12,071 (12.8%) | 1,248 (10.6%) | 11,090 (12.4%) | 2,229 (13.2%) | 10,868 (12.5%) | 2,451 (12.4%) |
| Glucagon-like peptide-1 Receptor Agonist (GLP1), n (%) | 4,049 (4.3%) | 353 (3.0%) | 3,669 (4.1%) | 733 (4.3%) | 3,686 (4.3%) | 716 (3.6%) |
| Alpha Glucosidase Inhibitor, n (%) | 294 (0.3%) | 42 (0.4%) | 266 (0.3%) | 70 (0.4%) | 265 (0.3%) | 71 (0.4%) |
| Sodium-glucose Cotransporter-2 Inhibitors (SGLT2i), n (%) | 2,359 (2.5%) | 155 (1.3%) | 2,204 (2.5%) | 310 (1.8%) | 2,215 (2.6%) | 299 (1.5%) |
| Thiazolidinedione (TZD), n (%) | 9,678 (10.2%) | 748 (6.3%) | 8,712 (9.7%) | 1,714 (10.1%) | 8,399 (9.7%) | 2,027 (10.3%) |
| Sulfonylurea (SU), n (%) | 30,816 (32.6%) | 3,796 (32.2%) | 28,084 (31.4%) | 6,528 (38.7%) | 28,376 (32.8%) | 6,236 (31.6%) |
| Biguanides (monotherapy), n (%) | 47,524 (50.3%) | 4,962 (42.1%) | 42,970 (48.0%) | 9,516 (56.3%) | 43,260 (49.9%) | 9,226 (46.7%) |
| Biguanides (mono- and combination therapy), n (%) | 53,671 (56.8%) | 5,457 (46.3%) | 48,556 (54.3%) | 10,572 (62.6%) | 48,729 (56.3%) | 10,399 (52.6%) |
| Bile acid sequestrants, n (%) | 832 (0.9%) | 108 (0.9%) | 765 (0.9%) | 175 (1.0%) | 761 (0.9%) | 179 (0.9%) |
| Meglitinides, n (%) | 927 (1.0%) | 132 (1.1%) | 877 (1.0%) | 182 (1.1%) | 809 (0.9%) | 250 (1.3%) |
| Number of different classes of glucose lowering agents |  |  |  |  |  |  |
|  -- Mean (SD) | 1.47 (1.23) | 1.33 (1.15) | 1.42 (1.22) | 1.65 (1.19) | 1.46 (1.21) | 1.40 (1.24) |
|  -- Median (IQR) | 1 [1, 2] | 1 [0, 2] | 1 [0, 2] | 1 [1, 2] | 1 [1, 2] | 1 [0, 2] |
| Number of glucose lowering agents, categories |  |  |  |  |  |  |
| ...1; n (%) | 31,449 (33.3%) | 4,086 (34.6%) | 29,431 (32.9%) | 6,104 (36.1%) | 29,390 (33.9%) | 6,145 (31.1%) |
| ...>= 2; n (%) | 40,616 (42.9%) | 4,553 (38.6%) | 36,941 (41.3%) | 8,228 (48.7%) | 36,969 (42.7%) | 8,200 (41.5%) |
| Abbreviations: ACEI, angiotensin-converting-enzyme inhibitor; ARB, angiotensin receptor blockers; CKD, chronic kidney disease; Dx, diagnosis; HF, heart failure; IQR, interquartile range; SD, standard deviation; T2D, Type 2 diabetes mellitus; |
| Patients with ESRD, CKD, kidney transplant, dialysis, or other diagnoses which could cause CKD from causes other than T2D during the 365-day baseline period were excluded.  |
| Resistant hypertension is defined as 4 or more unique antihypertensive medication prescription claims within a 30 day period.  |

 |

**Table 3. Clinical outcomes of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment, or the end of data. Results are stratified by relevant comorbidities.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|   | **T2D and CKD diagnosis (n=106,369)** |
| **No HF during baseline (N=94,574)** | **HF during baseline (N=11,795)** | **No resistant hypertension during baseline (N=89,480)** | **Resistant hypertension during baseline (N=16,889)** | **No anemia during baseline (N=86,608)** | **Anemia during baseline (N=19,761)** |
| Outcomes |   |   |   |   |   |   |
| All-cause hospitalization |   |   |   |   |   |   |
|  -- Total number of events | 30,519 | 6,251 | 29,953 | 6,817 | 28,266 | 8,504 |
|  -- Rate (events/1000 person-years), (95% CI) | 170.96 (169.04, 172.88) | 397.82 (387.96, 407.68) | 181.89 (179.83, 183.95) | 230.68 (225.20, 236.15) | 173.95 (171.92, 175.97) | 268.03 (262.33, 273.73) |
|  -- Mean time to event (days), (SD) | 582.20 (592.95) | 404.09 (472.45) | 555.86 (579.11) | 534.61 (573.51) | 577.48 (591.44) | 466.97 (522.62) |
| CV hospitalization as defined by MI, stroke, or HF diagnosis codes |   |   |   |   |   |   |
|  -- Total number of events | 7,796 | 3,260 | 8,508 | 2,548 | 8,401 | 2,655 |
|  -- Rate (events/1000 person-years), (95% CI) | 34.40 (33.63, 35.16) | 150.99 (145.81, 156.17) | 40.61 (39.75, 41.47) | 65.78 (63.22, 68.33) | 41.03 (40.15, 41.91) | 61.03 (58.71, 63.35) |
|  -- Mean time to event (days), (SD) | 826.11 (719.77) | 529.86 (571.79) | 742.57 (692.58) | 726.04 (693.39) | 763.50 (703.44) | 660.47 (651.84) |
| Renal hospitalization as defined by CKD diagnosis codes |   |   |   |   |   |   |
|  -- Total number of events | 2,538 | 800 | 2,436 | 902 | 2,524 | 814 |
|  -- Rate (events/1000 person-years), (95% CI) | 10.78 (10.36, 11.20) | 31.38 (29.20, 33.55) | 11.10 (10.66, 11.54) | 21.71 (20.29, 23.12) | 11.76 (11.30, 12.22) | 17.58 (16.38, 18.79) |
|  -- Mean time to event (days), (SD) | 1,063.62 (816.82) | 800.75 (722.70) | 1,008.55 (810.19) | 979.20 (783.50) | 1,024.74 (810.05) | 925.83 (776.70) |
| Kidney failure as defined by ESRD or Stage 5 CKD, kidney transplant, or dialysis codes |   |   |   |   |   |   |
|  -- Total number of events | 5,586 | 1,207 | 5,351 | 1,442 | 5,209 | 1,584 |
|  -- Rate (events/1000 person-years), (95% CI) | 24.57 (23.93, 25.22) | 49.51 (46.71, 52.30) | 25.25 (24.58, 25.93) | 36.22 (34.36, 38.09) | 25.12 (24.44, 25.80) | 35.75 (33.99, 37.51) |
|  -- Mean time to event (days), (SD) | 745.96 (672.25) | 610.09 (591.58) | 726.55 (662.99) | 704.29 (651.76) | 746.30 (669.80) | 641.32 (623.03) |
| Acute kidney failure |   |   |   |   |   |   |
|  -- Total number of events | 14,735 | 3,285 | 14,267 | 3,753 | 13,718 | 4,302 |
|  -- Rate (events/1000 person-years), (95% CI) | 69.58 (68.46, 70.70) | 154.29 (149.01, 159.56) | 72.33 (71.14, 73.52) | 104.79 (101.44, 108.15) | 71.03 (69.84, 72.22) | 107.72 (104.51, 110.94) |
|  -- Mean time to event (days), (SD) | 711.64 (682.41) | 520.74 (561.39) | 687.03 (670.85) | 638.10 (646.22) | 705.46 (679.74) | 585.57 (611.67) |
| Kidney transplant  |   |   |   |   |   |   |
|  -- Total number of events | 374 | 25 | 348 | 51 | 318 | 81 |
|  -- Rate (events/1000 person-years), (95% CI) | 1.57 (1.41, 1.73) | 0.95 (0.58, 1.32) | 1.57 (1.40, 1.73) | 1.20 (0.87, 1.53) | 1.46 (1.30, 1.62) | 1.72 (1.34, 2.09) |
|  -- Mean time to event (days), (SD) | 752.40 (691.59) | 650.68 (537.70) | 745.53 (684.29) | 749.43 (679.71) | 769.25 (697.09) | 654.88 (619.47) |
| Dialysis |   |   |   |   |   |   |
|  -- Total number of events | 1,072 | 262 | 1,015 | 319 | 1,029 | 305 |
|  -- Rate (events/1000 person-years), (95% CI) | 4.51 (4.24, 4.78) | 10.04 (8.82, 11.25) | 4.59 (4.30, 4.87) | 7.53 (6.71, 8.36) | 4.75 (4.46, 5.04) | 6.50 (5.77, 7.23) |
|  -- Mean time to event (days), (SD) | 955.61 (734.79) | 764.82 (696.08) | 904.31 (723.59) | 962.13 (753.69) | 946.00 (737.65) | 824.12 (701.28) |
| Hyperkalemia |   |   |   |   |   |   |
|  -- Total number of events | 5,897 | 1,163 | 5,890 | 1,170 | 5,360 | 1,700 |
|  -- Rate (events/1000 person-years), (95% CI) | 25.93 (25.27, 26.59) | 47.34 (44.62, 50.06) | 27.85 (27.14, 28.56) | 28.87 (27.22, 30.53) | 25.80 (25.11, 26.49) | 38.46 (36.63, 40.29) |
|  -- Mean time to event (days), (SD) | 703.88 (703.64) | 615.67 (647.52) | 690.71 (694.77) | 682.50 (699.00) | 712.71 (710.67) | 615.70 (639.68) |
| Abbreviations: ACR, albumin to creatine ratio; ; CI, confidence interval; CKD, chronic kidney disease; CV, cardiovascular; eGFR, estimated glomerular filtration rate; ESRD, end stage renal disease; HF, heart failure; MI, myocardial infarction; SD, standard deviation; T2D, type 2 diabetes  |
| All patients were required to have a minimum of 365 days of baseline enrollment prior to cohort entry. Patients included people aged 18 or older enrolled in the Optum CDM database.  |
| Patients with ESRD, CKD, kidney transplant, dialysis, or other diagnoses which could cause CKD from causes other than T2D during the 365-day baseline period were excluded from Cohort 1.  |
| Resistant hypertension is defined as 4 or more unique antihypertensive medication prescription claims within a 30 day period.  |

**Table 4. Rates of all-cause hospitalization of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| **Rate (events/1000 person-years) of all-cause hospitalization; 95% CI** | **Stage of CKD by eGFR classification** |
| **Stage 1(>90 ml/min/ 1.73m2)** | **Stage 2(60-89 ml/min/ 1.73m2)** | **Stage 3a (45-59 ml/min/ 1.73m2)** | **Stage 3b(30-44 ml/min/ 1.73m2)** | **Stage 4(15-29 ml/min/ 1.73m2)** | **Stage 5(<15 ml/min/ 1.73m2)** | **Missing** |
| **Stage of Albuminuria** | **A1 (<30 mg/g)** |  |  | 134.73 (129.95, 139.52) | 197.51 (183.51, 211.52) | 193.30 (143.55, 243.05) | 127.06 (54.85, 250.36) |  |
| **A2 (30-300 mg/g)** | 115.37 (107.90, 122.85) | 155.74 (148.30, 163.19) | 204.53 (195.26, 213.79) | 249.65 (228.84, 270.45) | 328.32 (255.46, 401.18) | 456.54 (198.23, 714.84) | 141.92 (136.13, 147.70) |
| **A3 (>300 mg/g)** | 186.12 (161.96, 210.28) | 222.24 (200.88, 243.59) | 258.37 (235.33, 281.41) | 342.79 (298.29, 387.28) | 539.14 (401.57, 676.71) | 375.97 (77.53, 1,098.73) | 209.57 (192.86, 226.29) |
| **Missing** |  |  | 190.32 (187.47, 193.17) | 271.43 (264.26, 278.61) | 420.60 (390.75, 450.44) | 605.06 (465.30, 744.81) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 5. Rates of CV hospitalization of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |
| --- |
|  |
| **Rate (events/1000 person-years) of CV hospitalization as defined by MI, stroke, or HF diagnosis codes** | **Stage of CKD by eGFR classification** |
| **Stage 1(>90 ml/min/ 1.73m2)** | **Stage 2(60-89 ml/min/ 1.73m2)** | **Stage 3a (45-59 ml/min/ 1.73m2** | **Stage 3b(30-44 ml/min/ 1.73m2 )** | **Stage 4(15-29 ml/min/ 1.73m2)** | **Stage 5(<15 ml/min/ 1.73m2)** | **Missing** |
| **Stage of Albuminuria** | **A1 (<30 mg/g)** |  |  | 25.56 (23.68, 27.45) | 40.81 (35.34, 46.28) | 41.94 (22.57, 61.32) | 13.81 (0.35, 76.93) |  |
| **A2 (30-300 mg/g)** | 19.75 (16.85, 22.65) | 36.22 (32.90, 39.54) | 49.59 (45.60, 53.58) | 65.85 (56.68, 75.02) | 79.26 (49.90, 108.61) | 43.99 (5.33, 158.91) | 34.25 (31.65, 36.86) |
| **A3 (>300 mg/g)** | 33.98 (24.65, 43.30) | 72.21 (61.09, 83.33) | 85.73 (74.08, 97.38) | 100.19 (79.94, 120.45) | 191.49 (122.97, 260.01) | 234.05 (28.34, 845.47) | 67.27 (58.74, 75.80) |
| **Missing** |  |  | 43.31 (42.11, 44.50) | 65.61 (62.62, 68.60) | 110.55 (98.04, 123.06) | 65.47 (29.88, 101.06) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 6. Rates of renal-related hospitalizations of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| **Rate (events/1000 person-years) of Renal hospitalization as defined by CKD diagnosis codes** | **Stage of CKD by eGFR classification** |
| **Stage 1(>90 ml/min/ 1.73m2)** | **Stage 2(60-89 ml/min/ 1.73m2)** | **Stage 3a (45-59 ml/min/ 1.73m2)** | **Stage 3b(30-44 ml/min/ 1.73m2)** | **Stage 4(15-29 ml/min/ 1.73m2)** | **Stage 5(<15 ml/min/ 1.73m2)** | **Missing** |
| **Stage of Albuminuria** | **A1 (<30 mg/g)** |  |  | 6.59 (5.65, 7.53) | 18.07 (14.51, 21.64) | 18.07 (7.80, 35.61) | 0.00 (0.00, 49.26) |  |
| **A2 (30-300 mg/g)** | 1.52 (0.72, 2.31) | 5.19 (3.95, 6.42) | 13.76 (11.73, 15.79) | 33.96 (27.53, 40.40) | 42.15 (21.50, 62.80) | 70.69 (14.58, 206.59) | 5.79 (4.74, 6.84) |
| **A3 (>300 mg/g)** | 1.92 (0.40, 5.62) | 15.68 (10.69, 20.66) | 38.89 (31.38, 46.40) | 62.60 (47.02, 78.19) | 146.07 (87.63, 204.51) | 232.26 (28.13, 839.01) | 15.61 (11.66, 19.56) |
| **Missing** |  |  | 10.02 (9.46, 10.58) | 26.18 (24.34, 28.01) | 72.11 (62.26, 81.96) | 154.11 (97.03, 211.19) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 7.** **Rates of kidney failure of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| Rate (events/1000 person-years) of kidney failure; 95% CI | Stage of CKD by eGFR classification |
| Stage 1(>90 ml/min/1.73m^2) | Stage 2(60-89 ml/min/1.73m^2) | Stage 3a (45-59 ml/min/1.73m^2) | Stage 3b(30-44 ml/min/1.73m^2) | Stage 4(15-29 ml/min/1.73m^2) | Stage 5(<15 ml/min/1.73m^2) | Missing |
| Stage of Albuminuria | A1 (<30 mg/g) |  |  | 14.26 (12.86, 15.67) | 31.82 (26.98, 36.66) | 57.60 (33.53, 81.66) | 27.84 (3.37, 100.58) |  |
| A2 (30-300 mg/g) | 6.66 (4.99, 8.33) | 10.81 (9.02, 12.60) | 25.98 (23.14, 28.83) | 56.02 (47.50, 64.55) | 72.15 (43.87, 100.44) | 186.35 (68.39, 405.61) | 12.01 (10.49, 13.53) |
| A3 (>300 mg/g) | 15.70 (9.42, 21.98) | 23.65 (17.45, 29.84) | 62.63 (52.86, 72.39) | 104.23 (83.27, 125.19) | 262.62 (176.83, 348.40) | 222.73 (26.97, 804.58) | 31.08 (25.43, 36.74) |
| Missing |  |  | 23.26 (22.39, 24.12) | 55.89 (53.11, 58.67) | 163.23 (146.97, 179.49) | 451.63 (332.27, 570.98) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 8.** **Rates of acute kidney failure of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| Rate (events/1000 person-years) of acute kidney failure; 95% CI | Stage of CKD by eGFR classification |
| Stage 1(>90 ml/min/1.73m^2) | Stage 2(60-89 ml/min/1.73m^2) | Stage 3a (45-59 ml/min/1.73m^2) | Stage 3b(30-44 ml/min/1.73m^2) | Stage 4(15-29 ml/min/1.73m^2) | Stage 5(<15 ml/min/1.73m^2) | Missing |
| Stage of Albuminuria | A1 (<30 mg/g) |  |  | 50.17 (47.46, 52.88) | 112.42 (102.63, 122.20) | 181.82 (134.20, 229.45) | 58.88 (16.04, 150.77) |  |
| A2 (30-300 mg/g) | 17.53 (14.81, 20.26) | 35.42 (32.14, 38.70) | 83.90 (78.56, 89.23) | 157.50 (142.10, 172.89) | 274.79 (211.75, 337.82) | 458.60 (174.36, 742.84) | 38.02 (35.27, 40.77) |
| A3 (>300 mg/g) | 44.34 (33.65, 55.04) | 81.77 (69.86, 93.68) | 137.49 (122.16, 152.82) | 248.11 (212.45, 283.76) | 494.90 (364.10, 625.69) | 247.50 (29.97, 894.05) | 75.59 (66.52, 84.66) |
| Missing |  |  | 71.74 (70.16, 73.32) | 150.36 (145.47, 155.25) | 358.49 (331.53, 385.46) | 768.57 (592.26, 944.87) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 9.** **Rates of kidney transplant of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| Rate (events/1000 person-years) of kidney transplant; 95% CI | Stage of CKD by eGFR classification |
| Stage 1(>90 ml/min/1.73m^2) | Stage 2(60-89 ml/min/1.73m^2) | Stage 3a (45-59 ml/min/1.73m^2) | Stage 3b(30-44 ml/min/1.73m^2) | Stage 4(15-29 ml/min/1.73m^2) | Stage 5(<15 ml/min/1.73m^2) | Missing |
| Stage of Albuminuria | A1 (<30 mg/g) |  |  | 1.19 (0.79, 1.58) | 1.42 (0.61, 2.80) | 2.22 (0.06, 12.35) | 0.00 (0.00, 49.26) |  |
| A2 (30-300 mg/g) | 1.63 (0.80, 2.45) | 1.98 (1.22, 2.74) | 2.17 (1.36, 2.97) | 2.13 (0.86, 4.39) | 5.00 (0.61, 18.05) | 0.00 (0.00, 77.91) | 1.88 (1.28, 2.48) |
| A3 (>300 mg/g) | 2.57 (0.70, 6.59) | 2.46 (0.90, 5.35) | 3.96 (1.62, 6.30) | 0.92 (0.02, 5.10) | 5.36 (0.14, 29.85) | 0.00 (0.00, 372.25) | 1.54 (0.56, 3.35) |
| Missing |  |  | 1.22 (1.02, 1.41) | 1.58 (1.14, 2.02) | 2.87 (1.31, 5.46) | 9.63 (1.17, 34.78) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 10.** **Rates of dialysis of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| Rate (events/1000 person-years) of dialysis; 95% CI | Stage of CKD by eGFR classification |
| Stage 1(>90 ml/min/1.73m^2) | Stage 2(60-89 ml/min/1.73m^2) | Stage 3a (45-59 ml/min/1.73m^2) | Stage 3b(30-44 ml/min/1.73m^2) | Stage 4(15-29 ml/min/1.73m^2) | Stage 5(<15 ml/min/1.73m^2) | Missing |
| Stage of Albuminuria | A1 (<30 mg/g) |  |  | 1.43 (0.99, 1.86) | 3.38 (1.86, 4.90) | 9.06 (2.47, 23.19) | 0.00 (0.00, 49.26) |  |
| A2 (30-300 mg/g) | 1.52 (0.72, 2.31) | 1.83 (1.10, 2.56) | 3.79 (2.73, 4.85) | 11.06 (7.45, 14.67) | 12.48 (4.05, 29.13) | 94.13 (25.65, 241.00) | 2.22 (1.57, 2.87) |
| A3 (>300 mg/g) | 1.28 (0.16, 4.63) | 4.92 (2.13, 7.70) | 18.25 (13.19, 23.31) | 39.33 (27.29, 51.37) | 69.36 (30.12, 108.61) | 222.73 (26.97, 804.58) | 6.71 (4.13, 9.30) |
| Missing |  |  | 3.77 (3.43, 4.11) | 10.57 (9.42, 11.72) | 43.84 (36.27, 51.40) | 161.91 (101.94, 221.89) |  |

Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes

**Table 11**. **Rates of hyperkalemia of patients with T2D and incident CKD diagnosis followed until the occurrence of an outcome, death, discontinued enrollment categorized by eGFR and ACR laboratory results**

|  |  |
| --- | --- |
| Rate (events/1000 person-years) of hyperkalemia; 95% CI | Stage of CKD by eGFR classification |
| Stage 1(>90 ml/min/1.73m^2) | Stage 2(60-89 ml/min/1.73m^2) | Stage 3a (45-59 ml/min/1.73m^2) | Stage 3b(30-44 ml/min/1.73m^2) | Stage 4(15-29 ml/min/1.73m^2) | Stage 5(<15 ml/min/1.73m^2) | Missing |
| Stage of Albuminuria | A1 (<30 mg/g) |  |  | 21.20 (19.48, 22.92) | 38.51 (33.17, 43.85) | 39.28 (20.04, 58.53) | 27.08 (3.28, 97.80) |  |
| A2 (30-300 mg/g) | 9.30 (7.32, 11.27) | 17.49 (15.20, 19.78) | 31.67 (28.52, 34.83) | 51.20 (43.14, 59.26) | 92.04 (59.11, 124.98) | 139.60 (45.33, 325.78) | 17.74 (15.88, 19.60) |
| A3 (>300 mg/g) | 17.01 (10.47, 23.55) | 32.04 (24.79, 39.29) | 48.76 (40.24, 57.27) | 69.92 (53.18, 86.66) | 114.45 (62.99, 165.91) | 107.02 (2.71, 596.29) | 32.21 (26.43, 38.00) |
| Missing |  |  | 25.95 (25.04, 26.87) | 43.82 (41.40, 46.24) | 83.07 (72.29, 93.86) | 149.72 (92.17, 207.27) |  |

|  |
| --- |
| Abbreviations: ACR, albumin to creatine ratio; CKD, chronic kidney disease; CI, confidence interval; eGFR, estimated glomerular filtration rate; T2D, type 2 diabetes |
| Index date of both cohorts was the next eGFR or UACR test that indicated kidney disease that occurred at least 90 days and at most 365 days after the first test indicating kidney disease.  |
| Patients were categorized according to the laboratory value used for cohort entry and the nearest laboratory value of the other test. If there is no other recent laboratory value the result is categorized as missing.  |