# Supplemental Materials

## Table S1 Healthcare resource utilization by CKD stage (commercially insured population)

|  | **Annual Incidence Rate** |  |  |
| --- | --- | --- | --- |
| **ADPKDCohort1** | **Non-ADPKD Cohort** | **Incidence Rate Ratio (95% CI)2[A] / [B]** | **p-value** |
| **Overall** | **N = 7,861** | **N = 22,928** |   |   |
| Inpatient admissions | 0.2 ± 0.7 | 0.1 ± 0.3 | 3.28 [2.98, 3.61] | <0.001\* |
| Inpatient days | 1.2 ± 5.9 | 0.3 ± 2.2 | 4.14 [3.58, 4.78] | <0.001\* |
| Emergency room visits | 0.8 ± 2.8 | 0.4 ± 1.1 | 1.83 [1.68, 1.99] | <0.001\* |
| Outpatient visits | 22.5 ± 39.6 | 9.6 ± 13.6 | 2.34 [2.25, 2.45] | <0.001\* |
| **Unknown CKD Stage3** | **N = 3,629** | **N = 10,495** |   |   |
| Inpatient admissions | 0.1 ± 0.5 | 0.1 ± 0.3 | 1.66 [1.40, 1.96] | <0.001\* |
| Inpatient days | 0.6 ± 4.4 | 0.3 ± 2.2 | 1.93 [1.44, 2.60] | <0.001\* |
| Emergency room visits | 0.7 ± 1.5 | 0.4 ± 1.0 | 1.61 [1.49, 1.76] | <0.001\* |
| Outpatient visits | 12.2 ± 13.4 | 9.0 ± 12.5 | 1.36 [1.30, 1.42] | <0.001\* |
| **CKD Stage I4** | **N = 421** | **N = 1,228** |   |   |
| Inpatient admissions | 0.1 ± 0.4 | 0.1 ± 0.4 | 1.43 [0.90, 2.26] | 0.131 |
| Inpatient days | 0.6 ± 3.4 | 0.3 ± 2.5 | 2.19 [0.99, 4.82] | 0.052 |
| Emergency room visits | 0.7 ± 1.6 | 0.5 ± 1.2 | 1.44 [1.09, 1.89] | 0.009\* |
| Outpatient visits | 14.4 ± 14.7 | 9.0 ± 11.9 | 1.61 [1.42, 1.82] | <0.001\* |
| **CKD Stage II4** | **N = 572** | **N = 1,667** |   |   |
| Inpatient admissions | 0.1 ± 0.5 | 0.1 ± 0.3 | 2.12 [1.40, 3.21] | <0.001\* |
| Inpatient days | 0.6 ± 3.2 | 0.2 ± 1.9 | 2.73 [1.52, 4.92] | <0.001\* |
| Emergency room visits | 0.6 ± 1.2 | 0.5 ± 1.0 | 1.30 [1.08, 1.56] | 0.006\* |
| Outpatient visits | 15.1 ± 14.1 | 8.9 ± 12.0 | 1.69 [1.53, 1.87] | <0.001\* |
| **CKD Stage III4** | **N = 1,333** | **N = 3,907** |  |  |
| Inpatient admissions | 0.2 ± 0.8 | 0.1 ± 0.3 | 3.36 [2.59, 4.36] | <0.001\* |
| Inpatient days | 1.1 ± 6.1 | 0.3 ± 2.1 | 3.98 [2.75, 5.77] | <0.001\* |
| Emergency room visits | 0.7 ± 3.1 | 0.5 ± 1.5 | 1.61 [1.26, 2.07] | <0.001\* |
| Outpatient visits | 16.5 ± 16.6 | 10.3 ± 13.3 | 1.60 [1.50, 1.71] | <0.001\* |
| **CKD Stage IV4** | **N = 340** | **N = 1,007** |   |   |
| Inpatient admissions | 0.3 ± 0.8 | 0.1 ± 0.3 | 4.54 [2.98, 6.93] | <0.001\* |
| Inpatient days | 1.9 ± 6.6 | 0.3 ± 2.4 | 5.58 [3.17, 9.82] | <0.001\* |
| Emergency room visits | 0.7 ± 1.2 | 0.5 ± 1.1 | 1.49 [1.19, 1.87] | <0.001\* |
| Outpatient visits | 27.5 ± 31.8 | 10.4 ± 19.5 | 2.64 [2.23, 3.12] | <0.001\* |
| **CKD Stage V4** | **N = 166** | **N = 485** |   |   |
| Inpatient admissions | 0.6 ± 0.9 | 0.1 ± 0.3 | 10.56 [6.36, 17.52] | <0.001\* |
| Inpatient days | 3.4 ± 10.6 | 0.3 ± 1.4 | 12.92 [6.25, 26.70] | <0.001\* |
| Emergency room visits | 1.0 ± 2.3 | 0.5 ± 1.0 | 2.18 [1.48, 3.22] | <0.001\* |
| Outpatient visits | 43.9 ± 54.1 | 10.5 ± 13.4 | 4.20 [3.36, 5.25] | <0.001\* |
| **ESRD-RRT4** | **N = 1,400** | **N = 4,139** |   |   |
| Inpatient admissions | 0.5 ± 1.0 | 0.1 ± 0.4 | 7.07 [5.92, 8.45] | <0.001\* |
| Inpatient days | 3.0 ± 8.7 | 0.3 ± 2.3 | 8.60 [6.72, 11.01] | <0.001\* |
| Emergency room visits | 1.3 ± 5.1 | 0.4 ± 1.0 | 3.04 [2.43, 3.81] | <0.001\* |
| Outpatient visits | 56.7 ± 75.9 | 10.7 ± 15.6 | 5.29 [4.87, 5.75] | <0.001\* |
| **Dialysis4** | **N = 388** | **N = 1,138** |   |   |
| Inpatient admissions | 0.8 ± 1.1 | 0.1 ± 0.3 | 10.91 [8.04, 14.79] | <0.001\* |
| Inpatient days | 4.9 ± 9.6 | 0.3 ± 2.1 | 14.89 [9.79, 22.64] | <0.001\* |
| Emergency room visits | 2.5 ± 9.2 | 0.4 ± 1.0 | 6.14 [4.17, 9.03] | <0.001\* |
| Outpatient visits | 119.8 ± 102.5 | 10.7 ± 19.2 | 11.23 [9.82, 12.85] | <0.001\* |
| **Post-transplant4** | **N = 1,012** | **N = 3,001** |   |   |
| Inpatient admissions | 0.4 ± 1.0 | 0.1 ± 0.4 | 5.63 [4.50, 7.04] | <0.001\* |
| Inpatient days | 2.3 ± 8.2 | 0.4 ± 2.3 | 6.40 [4.66, 8.80] | <0.001\* |
| Emergency room visits | 0.8 ± 1.7 | 0.4 ± 1.0 | 1.87 [1.59, 2.19] | <0.001\* |
| Outpatient visits | 32.5 ± 43.0 | 10.7 ± 13.9 | 3.03 [2.76, 3.33] | <0.001\* |

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| --- |
| *ADPKD: autosomal dominant polycystic kidney disease; CKD: chronic kidney disease; ESRD-RRT: end stage renal disease requiring renal replacement therapy (dialysis or transplant) ICD-9-CM: International Classification of Diseases, Ninth Revision; ICD-10-CM: International Classification of Diseases, Tenth Revision; ICD-9-PCS: International Classification of Diseases, Ninth Revision, Procedures; ICD-10-PCS: International Classification of Diseases, Tenth Revision, Procedures; CPT: Current Procedural Terminology; HCPC: Healthcare Common Procedure Coding.* |
| *\* Statistically significant at the 5% level***Notes**: |   |   |   |   |   |   |
| 1. Diagnosis of ADPKD is defined as ICD-9-CM codes 753.13, 753.12 and ICD-10-CM codes Q61.2, Q61.3. |
| 2. After matching, the incidence rates ratio between the ADPKD Cohort and the non-ADPKD Cohort are estimated using generalized linear models with a Poisson distribution. |
| 3. Patients without any recorded diagnosis or procedure of CKD stage, dialysis, or renal transplant at any time are categorized into the unknown CKD stage group. |
| 4. CKD stage I–stage V, ESRD-RRT (dialysis), and ESRD-RRT (Post-transplant) are defined using ICD-9-CM, ICD-10-CM, ICD-9-PCS, ICD-10-PCS, CPT, and HCPCS codes listed in Appendix A. Only indicators associated with disease progression (upward transition) are used for the definition of a patient’s index stage. The index stage of a patient is based on the patient’s latest stage indicator among those considered before the index date. If no stage indicator was observed before the index date, the first observed stage after the index date is defined as the patient’s index stage.  |

## Table S2 Healthcare resource utilization by CKD stage (Medicare Supplemental population)

|  | **Annual Incidence Rate** |  |  |  |
| --- | --- | --- | --- | --- |
| **ADPKDCohort1** | **Non-ADPKD Cohort** |  | **Incidence Rate Ratio (95% CI)2[A] / [B]** | **p-value** |
| **Overall** | **N = 1,366** | **N = 3,922** |   |   |   |
| Inpatient admissions | 0.5 ± 0.8 | 0.3 ± 0.6 |   | 1.95 [1.74, 2.19] | <0.001\* |
| Inpatient days | 3.2 ± 9.2 | 1.4 ± 4.3 |   | 2.26 [1.89, 2.71] | <0.001\* |
| Emergency room visits | 1.2 ± 2.1 | 0.7 ± 1.5 |   | 1.76 [1.57, 1.98] | <0.001\* |
| Outpatient visits | 39.0 ± 49.8 | 18.4 ± 20.0 |   | 2.12 [1.97, 2.29] | <0.001\* |
| **Unknown CKD Stage3** | **N = 397** | **N = 1,166** |   |   |   |
| Inpatient admissions | 0.2 ± 0.5 | 0.2 ± 0.5 |   | 1.18 [0.92, 1.52] | 0.193 |
| Inpatient days | 1.2 ± 3.3 | 1.2 ± 4.2 |   | 1.02 [0.72, 1.43] | 0.924 |
| Emergency room visits | 0.9 ± 1.7 | 0.6 ± 1.3 |   | 1.49 [1.19, 1.87] | <0.001\* |
| Outpatient visits | 21.4 ± 16.6 | 17.8 ± 19.6 |   | 1.20 [1.09, 1.33] | <0.001\* |
| **CKD Stage I4** | **N = 13** | **N = 37** |   |   |   |
| Inpatient admissions | 0.1 ± 0.3 | 0.2 ± 0.4 |   | 0.43 [0.06, 3.24] | 0.412 |
| Inpatient days | 0.2 ± 0.6 | 0.6 ± 1.4 |   | 0.26 [0.03, 2.00] | 0.196 |
| Emergency room visits | 0.6 ± 0.9 | 0.5 ± 0.9 |   | 1.20 [0.47, 3.04] | 0.700 |
| Outpatient visits | 24.4 ± 31.3 | 14.5 ± 10.0 |   | 1.69 [0.82, 3.45] | 0.153 |
| **CKD Stage II4** | **N = 51** | **N = 147** |   |   |   |
| Inpatient admissions | 0.3 ± 0.5 | 0.3 ± 0.6 |   | 0.96 [0.50, 1.85] | 0.910 |
| Inpatient days | 1.0 ± 1.9 | 1.3 ± 3.5 |   | 0.75 [0.37, 1.52] | 0.430 |
| Emergency room visits | 1.2 ± 2.0 | 0.8 ± 2.9 |  | 1.49 [0.65, 3.41] | 0.341 |
| Outpatient visits | 22.2 ± 16.4 | 16.4 ± 14.5 |  | 1.36 [1.05, 1.76] | 0.020\* |
| **CKD Stage III4** | **N = 377** | **N = 1,077** |  |  |  |
| Inpatient admissions | 0.4 ± 0.7 | 0.3 ± 0.6 |   | 1.63 [1.30, 2.04] | <0.001\* |
| Inpatient days | 2.6 ± 6.6 | 1.4 ± 3.8 |   | 1.91 [1.41, 2.61] | <0.001\* |
| Emergency room visits | 1.0 ± 1.7 | 0.7 ± 1.5 |   | 1.46 [1.18, 1.80] | <0.001\* |
| Outpatient visits | 25.6 ± 19.1 | 18.7 ± 20.5 |   | 1.37 [1.24, 1.52] | <0.001\* |
| **CKD Stage IV4** | **N = 144** | **N = 416** |   |   |   |
| Inpatient admissions | 0.5 ± 0.7 | 0.3 ± 0.6 |   | 1.60 [1.16, 2.21] | 0.004\* |
| Inpatient days | 3.3 ± 6.1 | 1.8 ± 4.3 |   | 1.81 [1.23, 2.66] | 0.003\* |
| Emergency room visits | 1.1 ± 2.3 | 0.7 ± 1.3 |   | 1.65 [1.13, 2.42] | 0.010\* |
| Outpatient visits | 28.5 ± 25.3 | 19.9 ± 23.2 |   | 1.43 [1.19, 1.72] | <0.001\* |
| **CKD Stage V4** | **N = 36** | **N = 94** |   |   |   |
| Inpatient admissions | 0.8 ± 0.8 | 0.3 ± 0.7 |   | 2.40 [1.32, 4.35] | 0.004\* |
| Inpatient days | 4.1 ± 5.1 | 1.7 ± 4.7 |   | 2.48 [1.23, 5.00] | 0.011\* |
| Emergency room visits | 1.3 ± 1.4 | 0.7 ± 1.2 |   | 2.00 [1.23, 3.26] | 0.005\* |
| Outpatient visits | 47.3 ± 38.4 | 18.2 ± 15.2 |   | 2.59 [1.89, 3.56] | <0.001\* |
| **ESRD-RRT4** | **N = 348** | **N = 985** |   |   |   |
| Inpatient admissions | 0.9 ± 1.1 | 0.3 ± 0.6 |   | 3.22 [2.65, 3.92] | <0.001\* |
| Inpatient days | 6.5 ± 15.4 | 1.6 ± 5.0 |   | 3.99 [2.91, 5.48] | <0.001\* |
| Emergency room visits | 1.7 ± 2.6 | 0.7 ± 1.5 |   | 2.42 [1.96, 2.99] | <0.001\* |
| Outpatient visits | 80.1 ± 78.8 | 18.5 ± 20.0 |   | 4.32 [3.81, 4.89] | <0.001\* |
| **Dialysis4** | **N = 151** | **N = 423** |   |   |   |
| Inpatient admissions | 1.2 ± 1.3 | 0.3 ± 0.6 |   | 3.46 [2.67, 4.48] | <0.001\* |
| Inpatient days | 9.3 ± 20.2 | 2.1 ± 5.5 |   | 4.44 [2.88, 6.85] | <0.001\* |
| Emergency room visits | 2.3 ± 3.0 | 0.8 ± 1.5 |   | 2.85 [2.16, 3.75] | <0.001\* |
| Outpatient visits | 125.9 ± 90.6 | 19.1 ± 20.1 |   | 6.60 [5.66, 7.69] | <0.001\* |
| **Post-transplant4** | **N = 197** | **N = 562** |   |   |   |
| Inpatient admissions | 0.7 ± 1.0 | 0.2 ± 0.6 |   | 2.95 [2.20, 3.96] | <0.001\* |
| Inpatient days | 4.4 ± 9.8 | 1.3 ± 4.6 |   | 3.43 [2.22, 5.28] | <0.001\* |
| Emergency room visits | 1.2 ± 2.2 | 0.6 ± 1.5 |   | 1.99 [1.45, 2.74] | <0.001\* |
| Outpatient visits | 45.0 ± 43.1 | 18.1 ± 19.9 |   | 2.48 [2.11, 2.93] | <0.001\* |
|  |   |   |   |   |   |
| *ADPKD: autosomal dominant polycystic kidney disease; CKD: chronic kidney disease; ESRD-RRT: end stage renal disease requiring renal replacement therapy (dialysis or transplant); ICD-9-CM: International Classification of Diseases, Ninth Revision; ICD-10-CM: International Classification of Diseases, Tenth Revision; ICD-9-PCS: International Classification of Diseases, Ninth Revision, Procedures; ICD-10-PCS: International Classification of Diseases, Tenth Revision, Procedures; CPT: Current Procedural Terminology; HCPC: Healthcare Common Procedure Coding.**\* Statistically significant at the 5% level* |
| **Notes**: |   |   |   |   |   |   |
| 1. Diagnosis of ADPKD is defined as ICD-9-CM codes 753.13, 753.12 and ICD-10-CM codes Q61.2, Q61.3. |
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| 3. Patients without any recorded diagnosis or procedure of CKD stage, dialysis, or renal transplant at any time are categorized into the unknown CKD stage group. |
| 4. CKD stage I–stage V, ESRD-RRT (dialysis), and ESRD-RRT (Post-transplant) are defined using ICD-9-CM, ICD-10-CM, ICD-9-PCS, ICD-10-PCS, CPT, and HCPCS codes listed in Appendix A. Only indicators associated with disease progression (upward transition) are used for the definition of a patient’s index stage. The index stage of a patient is based on the patient’s latest stage indicator among those considered before the index date. If no stage indicator was observed before the index date, the first observed stage after the index date is defined as the patient’s index stage.  |