**SUPPLEMENTAL MATERIAL**

Supplemental Appendices and Supplemental Tables

**Cohort Selection Methods**

This was a retrospective cohort study of SEER-Medicare patients diagnosed with mRCC from 2007-2015 who were enrolled in Medicare Part D for at least 1 year after diagnosis or until death (Figure 1). Full cohort selection details are described in Supplemental Appendix file. SEER data from 2007-2014 were used to select an initial cohort defined by a first primary SEER diagnosis of renal cell carcinoma with a stage of 1 or higher at diagnosis; linked Medicare claims from 2005 through 2015 provided a year of prior claims for detection of existing comorbidities and one year of follow-up claims to ascertain receipt of OAA. Patients were required to have at least 12 months of continuous enrollment in Medicare fee-for-service parts A and B before the SEER RCC diagnosis date. Patients were limited to those with metastatic disease as follows: for patients who were Stage 4 at SEER diagnosis, a diagnosis of primary renal cell carcinoma on an inpatient, outpatient, or carrier-based Medicare claim within 2 months of SEER diagnosis date was required (Supplemental Appendix A). If patients were Stage 1 - 3 at diagnosis, they were included only if they also had a later diagnosis of metastatic cancer (ICD-9-CM/ICD-10/CM 196.\*, 197.\*, 198.\*, C77.\*, C78.\*, C79.\*) on 2 inpatient, outpatient, carrier, home health Medicare claims on two separate days [23]. The date of the first code claim for metastatic disease then served as the metastatic RCC index date for these cases. Patients were required to have continuous Medicare fee-for-service Parts A and B enrollment from the time of SEER diagnosis until the metastatic index date. For all patients, Medicare fee-for-service coverage for Parts A, B, and D was required for 12 months after the metastatic index date or until death. Patients were excluded if their metastatic diagnosis occurred at autopsy or death, if they were < age 65 at metastatic index date, or if they had a second primary diagnosis of cancer at another site between the initial SEER RCC diagnosis date and their metastatic index date.

**Appendix A: Coding definitions for metastatic renal cell carcinoma and cancer treatments**

|  |  |
| --- | --- |
| **Diagnosis or Procedure** | **Codes** |
| RCC or metastatic cancer diagnosis in first diagnosis position | ICD-9 or ICD-10: 189.\*, 196.\*, 197.\*, 198.\*, C77.\*, C78.\*, C79.\*, C46.1\*, C46.2\*, C46.9\* |
| Code for administration of chemotherapy, immunotherapy, or radiation in first diagnosis position | ICD-9 or ICD-10: V58.1\*, Z51.1\*, Z51.0\* |
| CPT for administration of antineoplastic chemotherapy, immunotherapy, or radiation therapy | CPT codes: Q0083-Q0085, G0355-G0363, J8510-J9999, 96400- 96549 |
| Procedure code for nephrectomy  | ICD-9 or 10 PCS, 55.4\*, 55.5\*, 0TB00ZZ, 0TB03ZZ , 0TB04ZZ,0TB07ZZ, 0TB08ZZ, 0TB10ZZ, 0TB13ZZ, 0TB14ZZ, 0TB17ZZ,0TB18ZZ, 0TB30ZZ, 0TB33ZZ, 0TB34ZZ, 0TB37ZZ, 0TB38ZZ,0TB40ZZ, 0TB43ZZ, 0TB44ZZ, 0TB47ZZ, 0TB48ZZ, 0TT30ZZ,0TT34ZZ, 0TT37ZZ, 0TT38ZZ, 0TT40ZZ, 0TT44ZZ, 0TT47ZZ,0TT48ZZ, 0TT00ZZ, 0TT00ZZ, 0TT04ZZ, 0TT04ZZ, 0TT10ZZ,0TT10ZZ, 0TT14ZZ, 0TT14ZZ, 0TT60ZZ, 0TT64ZZ, 0TT67ZZ,0TT68ZZ, 0TT70ZZ, 0TT74ZZ, 0TT77ZZ, 0TT78ZZ, 0TT00ZZ,0TT04ZZ, 0TT10ZZ, 0TT14ZZ, 0TT00ZZ, 0TT04ZZ, 0TT10ZZ,0TT14ZZ, 0TT20ZZ, 0TT24ZZ |
| CPT for nephrectomy | CPT codes: 50230, 50545, 50546, 50220, 50225, 50240, 50280, 50290, 50542, 50543 |
| CPT for renal cryoablation/radiofrequency ablation | CPT: 50250, 50542, 50592, 50593, |
| ICD-9/10 PCS for renal ablation | 55.3\* , 0T900ZZ, 0T903ZZ, 0T904ZZ, 0T907ZZ, 0T908ZZ, 0T910ZZ,0T913ZZ, 0T914ZZ, 0T917ZZ, 0T918ZZ, 0T930ZZ, 0T933ZZ,0T934ZZ, 0T937ZZ, 0T938ZZ, 0T940ZZ, 0T943ZZ, 0T944ZZ,0T947ZZ, 0T948ZZ, 0T500ZZ, 0T510ZZ, 0T530ZZ, 0T503ZZ,0T513ZZ, 0T533ZZ, 0T543ZZ, 0T504ZZ, 0T514ZZ, 0T534ZZ,0T544ZZ, 0T507ZZ, 0T508ZZ, 0T517ZZ, 0T518ZZ, 0T537ZZ,0T538ZZ, 0T547ZZ, 0T548ZZ, 0T500ZZ, 0T503ZZ, 0T504ZZ, 0T507ZZ ,0T508ZZ, 0T510ZZ, 0T513ZZ, 0T514ZZ, 0T517ZZ,0T518ZZ,0T530ZZ, 0T533ZZ, 0T534ZZ, 0T537ZZ, 0T538ZZ, 0T540ZZ,0T543ZZ, 0T544ZZ, 0T547ZZ, 0T548ZZ, 0TB00ZZ, 0TB03ZZ,0TB04ZZ, 0TB07ZZ, 0TB08ZZ, 0TB10ZZ, 0TB13ZZ, 0TB14ZZ,0TB17ZZ, 0TB18ZZ, 0TB30ZZ, 0TB33ZZ, 0TB34ZZ, 0TB37ZZ,0TB38ZZ, 0TB40ZZ, 0TB43ZZ, 0TB44ZZ, 0TB47ZZ, 0TB48ZZ |
| CPT for thoracotomies | 32120, 32160,32110, 32140, 32100, 32124, 32150, 32151, 32141, 32098, 32096, 32097, 32507, 32506, 32505 |
| ICD-9/10 PCS for thoracotomy | 340\*,342\*, 344\*,0W9800Z, 0W980ZZ, 0W9830Z, 0W983ZZ, 0W9840Z,0W984ZZ, 0WP80JZ, 0WP83JZ, 0WP84JZ, 02JA0ZZ,0WJC0ZZ, 0W390ZZ, 0W3B0ZZ, 0W3D0ZZ,0W3Q0ZZ, 0W9930Z, 0W9B30Z, 0W190JG,0W194JG, 0W1B0JG, 0W1B4JG, 0W9940Z,0W994ZZ, 0W9B40Z, 0W9B4ZZ, 0B9N0ZZ,0B9N80Z, 0B9P0ZZ, 0B9P80Z, 0BHQ0YZ,0BHQ3YZ, 0BHQ4YZ, 0BHQ7YZ, 0BHQ8YZ,0BPQ0YZ, 0BPQ3YZ, 0BPQ4YZ, 0BPQ7YZ, 0BPQ8YZ ,0BWQ0YZ, 0BWQ3YZ, 0BWQ4YZ, 0BWQ7YZ, 0BWQ8YZ,0W9900Z, 0W990ZZ, 0W9B00Z, 0W9B0ZZ, 0WC90ZZ,0WC93ZZ, 0WC94ZZ, 0WCB0ZZ, 0WCB3ZZ, 0WCB4ZZ,0BBN4ZX, 0BBP4ZX, 0BJ04ZZ, 0WJQ4ZZ, 0WJC4ZZ,0WJD4ZZ, 0W980ZX, 0W983ZX, 0W984ZX, 0WB80ZX, 0WB83ZX, 0WB84ZX, 0WB8XZX, 0B9N0ZX, 0B9N3ZX, 0B9N4ZX, 0B9N8ZX, 0B9P0ZX, 0B9P3ZX, 0B9P4ZX,0B9P8ZX, 0BBN0ZX, 0BBN3ZX, 0BBN8ZX, 0BBP0ZX, 0BBP3ZX, 0BBP8ZX, 0W990ZX, 0W993ZX, 0W994ZX,0W9B0ZX, 0W9B3ZX, 0W9B4ZX, 0W9C3ZX, 0W9C4ZX,0WBC3ZX, 0WBC4ZX, 0W9C0ZX, 0WBC0ZX, 0B9T0ZX, 0B9T3ZX, 0B9T4ZX, 0BBT0ZX, 0BBT3ZX, 0BBT4ZX,0BJQ0ZZ, 0BJQ4ZZ, 0BJT0ZZ, 0BJT4ZZ, 0WJ80ZZ,0WJ84ZZ, 0WJC3ZZ, 0WB80ZZ, 0WB83ZZ, 0WB84ZZ,0WB8XZZ |
| Mediastinoscopies | 39401, 39402 |
|  | ICD-9/10 341\*, 343\*0W9C00Z, 0W9C0ZZ, 0W9C40Z, 0W9C4ZZ, 0WCC0ZZ,0WCC3ZZ, 0WCC4ZZ, 0WBC0ZZ, 0WBC3ZZ, 0WBC4ZZ  |
| Craniotomies for tumor removal | CPT 61520, 61518, 61519,61521 |
| ICD-9/10 for craniotomy | 012\*, 013\*0NH00NZ 0NP00NZ 0N9000Z 0N900ZZ 0N9040Z 0N904ZZ 00P00MZ 00P03MZ 00P04MZ 00P60MZ 00P63MZ 00P64MZ 00P6XMZ 0NP00MZ 0NP03MZ 0NP04MZ 0NP0XMZ0WJ10ZZ 00J00ZZ 00W00JZ 00W00KZ 0N800ZZ 0N803ZZ0N804ZZ 0NC10ZZ 0NC13ZZ 0NC14ZZ 0NC30ZZ 0NC33ZZ 0NC34ZZ 0NC40ZZ 0NC43ZZ 0NC44ZZ 0NC50ZZ 0NC53ZZ 0NC54ZZ 0NC60ZZ 0NC63ZZ 0NC64ZZ 0NC70ZZ 0NC73ZZ 0NC74ZZ 0NH00MZ 0NH03MZ 0NH04MZ 0NP000Z 0NP004Z0NP005Z 0NP007Z 0NP00KZ 0NP00SZ 0NP030Z 0NP034Z 0NP037Z 0NP03KZ 0NP03SZ 0NP040Z 0NP044Z 0NP047Z 0NP04KZ 0NP04SZ 0NP0X4Z 0NP0XSZ 0NW000Z 0NW004Z 0NW005Z 0NW007Z 0NW00JZ 0NW00KZ 0NW00MZ 0NW00SZ 0NW030Z 0NW034Z 0NW035Z 0NW037Z 0NW03JZ 0NW03KZ0NW03MZ 0NW03SZ 0NW040Z 0NW044Z 0NW045Z 0NW047Z0NW04JZ 0NW04KZ 0NW04MZ 0NW04SZ 0W9100Z 0W910ZZ 0W9130Z 0W913ZZ 0W9140Z 0W914ZZ 0WC10ZZ 0WC13ZZ 0WC14ZZ 0WH10YZ 0WH13YZ 0WH14YZ 0WJ10ZZ 0WP100Z0WP101Z 0WP10JZ 0WP10YZ 0WP130Z 0WP131Z 0WP13JZ 0WP13YZ 0WP140Z 0WP141Z 0WP14JZ 0WP14YZ 0WW100Z 0WW101Z 0WW103Z 0WW10JZ 0WW10YZ 0WW130Z 0WW131Z 0WW133Z 0WW13JZ 0WW13YZ 0WW140Z 0WW141Z 0WW143Z0WW14JZ 0WW14YZ 0N500ZZ 0N503ZZ 0N504ZZ 0NB00ZZ 0NB03ZZ 0NB04ZZ 0NT10ZZ 0NT30ZZ 0NT40ZZ 0NT50ZZ 0NT60ZZ 0NT70ZZ 0WH103Z 0WH133Z 0WH143Z 0WP103Z 0WP133Z 0WP143Z 0WP1X3Z 00H033Z 0NP00NZ 009100Z 00910ZZ 00C10ZZ 00C13ZZ 00C14ZZ 00800ZZ 00803ZZ 00804ZZ 00870ZZ 00873ZZ 00874ZZ 009000Z 00900ZZ 009030Z 00903ZZ 009040Z 00904ZZ 00C00ZZ 00C03ZZ 00C04ZZ 00H002Z 00H003Z 00H00YZ 00H032Z 00H033Z 00H03YZ 00H042Z 00H043Z 00H04YZ 00H602Z 00H603Z 00H60YZ 00H632Z 00H633Z 00H63YZ 00H642Z 00H643Z 00H64YZ 00P000Z 00P002Z 00P032Z 00P033Z 00P037Z 00P03JZ 00P03KZ 00P03YZ 00P040Z 00P042Z 00P043Z 00P047Z 00P04JZ 00P04KZ 00P04YZ00P600Z 00P602Z 00P603Z 00P60YZ 00P630Z 00P632Z 00P633Z 00P63YZ 00P640Z 00P642Z 00P643Z 00P64YZ 00P6X2Z 00W000Z 00W002Z 00W003Z 00W007Z 00W00MZ 00W00YZ 00W030Z 00W032Z 00W033Z 00W037Z 00W03JZ 00W03KZ 00W03MZ 00W03YZ 00W040Z 00W042Z 00W043Z 00W047Z 00W04JZ 00W04KZ 00W04MZ 00W04YZ 00W600Z 00W602Z 00W603Z 00W60MZ 00W60YZ 00W630Z 00W632Z 00W633Z 00W63MZ 00W63YZ 00W640Z 00W642Z 00W643Z 00W64MZ 00W64YZ |
| Laminectomies for biopsy/neoplasm removal | 63290, 63275, 63277, 63278, 63276, 63280, 63282, 63281, 63285, 63287, 63283 |
|  | ICD-9 0301, 0302, 030900C30ZZ 00C33ZZ 00C34ZZ 00CT0ZZ 00CT3ZZ 00CT4ZZ 00CU0ZZ 00CU3ZZ 00CU4ZZ 00CW0ZZ 00CW3ZZ 00CW4ZZ 00CX0ZZ 00CX3ZZ00CX4ZZ 00CY0ZZ 00CY3ZZ 00CY4ZZ 00JU0ZZ 00JV0ZZ 009T00Z 009T0ZZ 009T30Z 009T3ZZ 009T40Z 009T4ZZ 009U00Z 009U0ZZ009W00Z 009W0ZZ 009W30Z 009W3ZZ 009W40Z009W4ZZ 009X00Z 009X0ZZ 009X30Z 009X3ZZ 009X40Z 009X4ZZ 009Y00Z 009Y0ZZ 009Y30Z 009Y3ZZ 009Y40Z 009Y4ZZ 00JU0ZZ00JV0ZZ 00NW0ZZ 00NW3ZZ 00NW4ZZ 00NX0ZZ00NX3ZZ 00NX4ZZ 00NY0ZZ 00NY3ZZ 00NY4ZZ 0RB00ZZ 0RB03ZZ 0RB04ZZ 0RB10ZZ 0RB13ZZ 0RB14ZZ 0RB40ZZ 0RB43ZZ 0RB44ZZ 0RB60ZZ 0RB63ZZ 0RB64ZZ 0RBA0ZZ 0RBA3ZZ 0RBA4ZZ 0SB00ZZ 0SB03ZZ 0SB04ZZ 0SB30ZZ 0SB33ZZ 0SB34ZZ 0SB50ZZ 0SB53ZZ 0SB54ZZ 0SB60ZZ0SB63ZZ 0SB64ZZ 0SB70ZZ 0SB73ZZ 0SB74ZZ 0SB80ZZ 0SB83ZZ 0SB84ZZ  |

Appendix B: Coding definitions for patient comorbid conditions

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| **Baseline Deyo-Charlson Comorbidity Index** | The Deyo-Charlson Comorbidity will be created during the baseline period based on the following score:* + 1 each: Myocardial infarction, congestive heart failure, peripheral vascular disease, dementia, cerebrovascular disease, chronic pulmonary disease, rheumatologic disease, peptic ulcer disease, mild liver disease, diabetes (mild to moderate).
	+ 2 each: Hemiplegia or paraplegia, renal disease, diabetes with complication, any malignancy (leukemia, lymphoma).
	+ 3 each: Moderate or severe liver disease.

6 each: Malignant tumor, acquired immunodeficiency syndrome (AIDS). |
| Myocardial infarction | ICD-9-CM code 410.\*, 412.\* or ICD-10-CM I21.\*, I22.\*, 'I25.2\*' |
| Congestive heart failure | ICD-9-CM codes 398.91','402.01','402.11','402.91','404.01','404.03','404.11','404.13','404.91','404.93','425.4\*','425.5\*','425.7\*','425.8\*','425.9\*','428.\*', ICD-10-CM codes 'I09.81', 'I11.0\*', 'I13.0\*' ,'I13.2\*','I42.0\*', 'I42.5\*', 'I42.6\*', 'I42.7\*', 'I42.8\*','I42.9\*', 'I43.\*', 'I50.\*'  |
| Peripheral vascular disease | ICD-9-CM codes'093.0\*','437.3\*','440.\*','441.\*','443.1\*','443.2\*','443.8\*','443.9\*','447.1\*','557.1\*','557.9\*','V43.4\*'ICD-10-CM codes'A52.01', 'E08.51', 'E08.52', 'E09.51', 'E09.52', 'E10.51', 'E10.52', 'E11.51', 'E11.52', 'E13.51', 'E13.52', 'I67.0\*','I67.1\*','I70.\*', 'I71.\*','I73.1\*', 'I73.8\*','I73.9\*','I77.7\*', 'I79.\*','K55.1\*','K55.8\*', 'K55.9\*','Z95.82' |
| Hypertension | ICD-9-CM codes '401.\*','402.\*','403.\*','404.\*','405.\*',437.2\*ICD-10-CM codes'I10.\*','I11.\*','I12.\*','I13.\*','I15.0\*','I15.2\*','I15.8\*','I15.9\*','I16.\*','I67.4\*' |
| Dementia | ICD-9-CM codes '290.\*','294.1\*','331.2\*'ICD-10-CM codes'F01.\*', 'F02.\*','F03.9\*', 'G31.1\*' |
| Cerebrovascular disease | ICD-9-CM codes '362.34','430.\*','431.\*','432.\*','433.\*','434.\*','435.\*','436.\*','437.\*','438.\*'ICD-10-CM codes'G45.0\*', 'G45.1\*', 'G45.2\*', 'G45.4\*', 'G45.8\*', 'G45.9\*', 'G46.\*', 'H34.0\*', 'I60.\*', 'I61.\*', 'I62.\*', 'I63.\*', 'I65.\*', 'I66.\*', 'I67.1\*','I67.2\*','I67.4\*','I67.5\*', 'I67.6\*','I67.7\*', 'I67.81', 'I67.82','I67.84', 'I67.89', 'I67.9\*', 'I68.\*', 'I69.\*' |
| Chronic pulmonary disease | ICD-9-CM codes '416.8\*','416.9\*','490.\*', '491.\*', '492.\*', '493.\*', '494.\*', '495.\*', '496.\*', '500.\*', '501.\*', '502.\*', '503.\*', '504.\*', '505.\*',' 506.4\*', '508.1\*', '508.8\*'ICD-10-CM codes'I27.2\*', 'I27.81', 'I27.89', 'I27.9\*','J40.\*', 'J41.\*','J42.\*', 'J43.\*', 'J44.\*', 'J45.2\*', 'J45.3\*', 'J45.4\*', 'J45.5\*', 'J45.90', 'J45.99', 'J47.\*', 'J60.\*', 'J61.\*', 'J62.\*', 'J63.\*','J64.\*', 'J65.\*', 'J66.\*', 'J67.\*', 'J68.4\*', 'J70.1\*', 'J70.2\*', 'J70.3\*', 'J70.4\*', 'J70.8\*' |
| Rheumatologic disease | ICD-9-CM codes '446.5\*','710.0\*','710.1\*','710.2\*','710.3\*','710.4\*','714.0\*','714.1\*','714.2\*','714.8\*','725.\*’ICD-10-CM codes'M05.\*','M06.\*','M31.5\*','M31.6\*','M32.\*','M33.\*','M34.\*','M35.0\*','M35.3\*','M36.0\*' |
| Peptic ulcer disease | ICD-9-CM codes '531.\*', '532.\*', '533.\*', '534.\*'ICD-10-CM codes'K25.\*', 'K26.\*', 'K27.\*', 'K28.\*' |
| Mild liver disease | ICD-9-CM codes '070.22', '070.23', '070.32', '070.33', '070.44', '070.54', '070.6\*', '070.9\*', '570.\*', '571.\*', '573.3\*', '573.4\*', '573.8\*', '573.9\*', 'V42.7\*'ICD-10-CM codes'B17.9\*', 'B18.0\*', 'B18.1\*', 'B18.2\*', 'B19.0\*','B19.9\*','K70.0\*', 'K70.1\*', 'K70.2\*', 'K70.3\*', 'K70.40', 'K70.9\*', 'K71.0\*', 'K71.10', 'K71.2\*', 'K71.3\*', 'K71.4\*', 'K71.5\*', 'K71.6\*', 'K71.7\*', 'K71.8\*', 'K71.9\*','K72.00', 'K73.\*', 'K74.0\*', 'K74.1\*', 'K74.2\*', 'K74.3\*', 'K74.4\*', 'K74.5\*', 'K74.6\*', 'K75.2\*', 'K75.3\*', 'K75.4\*', 'K75.8\*', 'K75.9\*', 'K76.0\*', 'K76.1\*', 'K76.2\*', 'K76.3\*', 'K76.4\*', 'K76.5\*', 'K76.89', 'K76.9\*', 'K77.\*', 'Z48.23', 'Z94.4\*' |
| Diabetes (mild to moderate) | ICD-9-CM codes '250.0\*', '250.1\*', '250.2\*', '250.3\*', '250.8\*', '250.9\*'ICD-10-CM codes'E10.1\*','E10.618', 'E10.62','E10.63','E10.64','E10.65','E10.69','E10.8\*','E10.9\*','E11.0\*', 'E11.1\*', 'E11.618', 'E11.62', 'E11.63', 'E11.64', 'E11.65', 'E11.69', 'E11.8\*', 'E119', 'E13.00', 'E13.01', 'E13.10', 'E13.11', 'E13.618', 'E13.62', 'E13.63', 'E13.64', 'E13.65', 'E13.69', 'E13.8\*', 'E13.9\*' |
| Hemiplegia or paraplegia | ICD-9-CM codes '334.1\*', '342.\*', '343.\*', '344.0\*', '344.1\*', '344.2\*', '344.3\*', '344.4\*', '344.5\*', '344.6\*', '344.9\*'ICD-10-CM codes'G04.1\*', 'G11.4\*', 'G80.\*', 'G81.\*', 'G82.\*', 'G83.0\*', 'G83.1\*', 'G83.2\*', 'G83.3\*', 'G83.4\*', 'G83.9\*' |
| End Stage Renal Disease | 585.6, N18.6 or ESRD eligibility flag |
| Diabetes with complication | ICD-9-CM codes '250.4\*', '250.5\*', '250.6\*', '250.7\*'ICD-10-CM codes'E10.2\*', 'E10.3\*', 'E10.4\*', 'E10.5\*', 'E10.610', 'E11.2\*', 'E11.3\*', 'E11.4\*', 'E11.5\*', 'E11.610', 'E13.2\*', 'E13.3\*', 'E13.4\*', 'E13.5\*', 'E13.610' |
| Moderate or severe liver disease | ICD-9-CM codes '456.0\*', '456.1\*', '456.2\*', '572.2\*', '572.3\*', '572.4\*', '572.8\*'ICD-10-CM codes'I85.\*', 'K70.41', 'K71.11', 'K72.01', 'K72.1\*', 'K72.9\*', 'K76.6\*', 'K76.7\*' |
| Acquired immunodeficiency syndrome (AIDS) | ICD-9-CM codes '042.\*', '043.\*', '044.\*'ICD-10-CM codesB20.\* |

Supplemental Table 1: Type of OAA dispensed at first prescription in the 12 months following a patient’s metastatic RCC diagnosis (N=907)

|  |  |
| --- | --- |
| Type of OAA dispensed | N (%) |
| Sunitinib Malate | 523 (57.7%) |
| Pazopanib Hydrochloride | 252 (27.8%) |
| Sorafenib Tosylate | 77 (8.5%) |
| Everolimus | 38 (4.2%) |
| Axitinib | 17 (1.2) |

Supplemental Figure 1: Percentage of metastatic renal cell carcinoma patients receiving various treatment classes in the 12 months following metastatic diagnosis (N=2,792)



Supplemental Table 2: Full multivariable-adjusted relative cost ratios for all covariable associations for total Medicare costs, total cancer-specific Medicare costs, and total inpatient admission-specific Medicare costs in the 12 months following a patient’s metastatic RCC diagnosis

| *Parameter* | *Total costs**Adjusted RCR (95%)* | *Cancer-specific costs**Adjusted RCR (95%)* | *Inpatient admission costs**Adjusted RCR (95%)* |
| --- | --- | --- | --- |
| Used an OAA | **1.36 (1.28-1.45)** | **1.47 (1.34-1.61)** | **1.08 (1.01-1.16)** |
| Race/Ethnicity (ref Non-Hispanic White) |  |  |  |
| Non-Hispanic Black | 1.00 (0.88-1.14) | 0.92 (0.76-1.11) | 1.07 (0.93-1.23) |
| Hispanic | **1.19 (1.06-1.33)** | **1.20 (1.01-1.41)** | 1.09 (0.97-1.23) |
| Other | 1.04 (0.92-1.18) | 1.02 (0.85-1.22) | 1.08 (0.94-1.24) |
| Age at Diagnosis (ref 66-70) |  |  |  |
| 71-75 | 0.98 (0.90-1.06) | 1.01 (0.90-1.14) | 0.91 (0.83-1.00) |
| 76-80 | **0.84 (0.77-0.92)** | **0.83 (0.74-0.94)** | **0.88 (0.81-0.97)** |
| 81+ | **0.69 (0.63-0.75)** | **0.67 (0.59-0.75)** | **0.70 (0.64-0.77)** |
| Male | 0.95 (0.89-1.01) | 0.94 (0.86-1.03) | 1.05(0.98-1.13) |
| Stage at initial SEER Diagnosis (ref. Stage IV) |  |  |  |
|  I | **1.21 (1.09-1.35)** | 1.14 (0.97-1.32) | 1.08 (0.95-1.22) |
|  II | 1.05 (0.88-1.24) | 1.04 (0.81-1.32) | 1.03 (0.84-1.27) |
|  III | 1.00 (0.90-1.11) | 1.05 (0.91-1.22) | 0.94 (0.84-1.06) |
|  Unknown | 1.07 (0.9-1.28) | 1.1 8(0.92-1.52) | **0.76 (0.62-0.94)** |
| Clear cell histology | 0.92 (0.83-1.02) | 0.92 (0.79-1.06) | 0.71 (0.64-0.8) |
| U.S. Region of residence (ref. West) |  |  |  |
| Midwest | 0.92 (0.83-1.02) | 0.92 (0.79-1.06) | 0.71 (0.64-0.80) |
| Other | **0.82 (0.72-0.93)** | **0.78 (0.65-0.93)** | **0.67 (0.58-0.77)** |
| Northeast | 1.10 (1.01-1.20) | 1.07 (0.95-1.21) | 0.91 (0.83-1.00) |
| South | 1.00 (0.91-1.10) | 0.94 (0.82-1.08) | **0.74 (0.67-0.82)** |
| Married | **1.12 (1.05-1.2)** | **1.13 (1.03-1.24)** | 1.03 (0.96-1.10) |
| Lives in metropolitan region | **1.17 (1.08-1.27)** | 1.11 (0.99-1.25) | **1.18 (1.08-1.29)** |
| Dual enrolled | **0.82 (0.76-0.89)** | **0.77 (0.69-0.87)** | 0.93 (0.86-1.01) |
| Zip Code-level SES measures |  |  |  |
|  Highest quartile: black race | **0.90 (0.83-0.99)** | **0.88 (0.77-0.99)** | 0.94 (0.86-1.03) |
|  Highest quartile: adults 25+ with less than high school education | 1.00 (0.92-1.09) | 1.01 (0.89-1.13) | 1.00 (0.91-1.09) |
|  Highest quartile: households living below poverty level | 0.98 (0.9-1.06) | 0.96 (0.85-1.08) | 1.05 (0.96-1.15) |
| Nephrectomy (ref. No nephrectomy) |  |  |  |
|  Partial | **0.72 (0.57-0.91)** | **0.71 (0.51-0.98)** | **0.65 (0.51-0.84)** |
|  Radical | 0.96 (0.86-1.08) | 1.03 (0.88-1.22) | 0.98 (0.86-1.12) |
| Myocardial infarction | 0.97 (0.87-1.07) | 0.89 (0.76-1.03) | 0.95 (0.85-1.06) |
| Hypertension | 1.09 (1.00-1.19) | 1.10 (0.97-1.25) | 1.0 5(0.95-1.15) |
| Peripheral vascular disease | 0.98 (0.91-1.05) | 0.90 (0.82-1.00) | 1.08 (1.00-1.17) |
| Congestive heart failure | **0.91 (0.84-0.98)** | **0.78 (0.70-0.87)** | 1.01 (0.93-1.10) |
| Dementia | **0.74 (0.64-0.86)** | **0.60 (0.48-0.74)** | 0.98 (0.83-1.14) |
| Cardiovascular disease | 1.04 (0.96-1.12) | 1.04 (0.93-1.15) | 1.02 (0.94-1.11) |
| Rheumatologic disease | 1.08 (0.94-1.24) | 1.10 (0.90-1.34) | 1.10 (0.95-1.28) |
| Peptic ulcer disease | 0.92 (0.77-1.09) | 0.88 (0.68-1.12) | 1.11 (0.92-1.35) |
| Mild liver disease | 0.96 (0.89-1.05) | 0.99 (0.87-1.11) | 0.95 (0.87-1.05) |
| End stage renal disease | **0.91 (0.85-0.98)** | **0.84 (0.76-0.93)** | 0.96 (0.89-1.04) |
| Diabetes | 0.98 (0.91-1.05) | 0.93 (0.84-1.03) | 1.04 (0.96-1.12) |
| Diabetes with complications | 1.06 (0.96-1.16) | 0.88 (0.77-1.00) | 1.11 (1.00-1.22) |
| Hemiplegia or paraplegia | 0.94 (0.77-1.13) | 0.91 (0.70-1.20) | 1.07 (0.88-1.30) |
| Year of diagnosis (ref 2007) |  |  |  |
|  2008 | 1.02 (0.89-1.17) | 1.18 (0.97-1.44) | 1.02 (0.89-1.18) |
|  2009 | 1.04 (0.91-1.20) | 1.23 (1.00-1.50) | 1.11 (0.96-1.29) |
|  2010 | 1.02 (0.89-1.17) | 1.15 (0.94-1.40) | 1.07 (0.92-1.23) |
|  2011 | 0.98 (0.85-1.11) | 1.15 (0.95-1.40) | **0.86 (0.75-0.99)** |
|  2012 | 0.96 (0.84-1.10) | 1.10 (0.91-1.33) | 0.92 (0.80-1.05) |
|  2013 | 0.88 (0.77-1.00) | 0.97 (0.81-1.17) | 0.89 (0.78-1.01) |
|  2014 | 0.94 (0.83-1.07) | 1.09 (0.91-1.32) | 0.87 (0.76-1.00) |
|  2015 | 0.89 (0.78-1.02) | **0.81 (0.67-0.98)** | **0.84 (0.73-0.97)** |
| Total costs in prior year/1000 | **1.01 (1.01-1.02)** | 1.01 (1.00-1.01) | 1.01(1.00-1.01) |