Supplemental Table 1. Modifier codes used to exclude AVF or AVG placement codes from counting as a new placement\*

|  |  |  |
| --- | --- | --- |
| **HCPCS Code Modifier** | **Definition** | **Reason for Exclusion** |
| 53 | Discontinued procedure | Discontinued placement not counted as a complete placement |
| 58 | Staged or Related Procedure or Service by the Same Physician During the Postoperative Period | Avoid duplication of placement when stages coded on multiple claim lines; only primary claim line without modifier counted  |
| 73 | Discontinued Out-Patient Hospital/Ambulatory Surgery Center (ASC) Procedure Prior to the Administration of Anesthesia | Discontinued placement not counted as a complete placement |
| 74 | Discontinued Out-Patient Hospital/Ambulatory Surgery Center (ASC) Procedure After Administration of Anesthesia | Discontinued placement not counted as a complete placement |
| 80 | Surgical assistant services | Avoid double-counting of placement when surgical assistant coded on separate claim line |
| 81 | Minimum Assistant Surgeon | Avoid double-counting of placement when surgical assistant coded on separate claim line |
| 82 | Assistant Surgeon (when qualified resident surgeon not available) | Avoid double-counting of placement when surgical assistant coded on separate claim line |

\*HCPCS codes used to identify AVF and AVG placement included 36818 – 36821, 36825, and 36830.

AVF, arteriovenous fistula; AVG, prosthetic arteriovenous graft; HCPCS, Healthcare common procedure coding system

Supplemental Table 2. Healthcare Common Procedure Coding System (HCPCS) Codes used to identify interventions to assist maturation

|  |  |
| --- | --- |
| **Intervention** | **HCPCS Codes** |
| Angioplasty | 35458, 35460, 35475, 35476, 37224, 75962, 75978, G0392, G0393 |
| Declotting/thrombectomy | 34101, 35321, 35484, 35875, 35876, 36550, 36593, 36831, 36860, 36861, 36870, 37201, 37241, 75896, G0159 |
| Revision | 35190, 35900, 35903, 35910, 36534, 36575, 36596, 36597, 36815, 36832-36834, 36838, 37190, 37607, M0900 |
| Stent placement | 37205-37208, 37236-37239, 75960 |
| Catheter replacement | 36581, 77001 |
| Catheter placement\* | 36011, 36489, 36491, 36533, 36556, 36558, 36565, 36800, 36810, 76937 |

Catheter placement not evaluated as intervention but only as part of sustained use definition

**Supplemental Table 3. Characteristics of patient cohort by placement status at first dialysis event**

|  |  |  |
| --- | --- | --- |
|   | **AVFs** | **AVGs** |
| **Placement status at first dialysis event** | **No evidence of mature or maturing placement**  | **Mature or maturing placement**  | **No evidence of mature or maturing placement**  | **Mature or maturing placement**  |
| **Patients** | 23,084 | 10,007 | 7,276 | 4,307 |
| **Placements** | 26,572 | 11,463 | 7,965 | 4,824 |
| **Median number of post-ESRD placements per patient [range]** | 1 [1-7] | 1 [1-5] | 1 [1-5] | 1 [1-6] |
| First access placement | 19,960 (86%) | 8,703 (87%) | 6,651 (91%) | 3,843 (89%) |
| Second access placement | 2,801 (12%) | 1,173 (12%) | 567 (8%) | 419 (10%) |
| Third access placement | 290 (1%) | 114 (1%) | 53 (1%) | 40 (1%) |
| Fourth access placement | 27 (<1%) | 13 (<1%) | \* | \* |
| Fifth or greater access placement | \* | \* | \* | \* |
| **Access used on first outpatient dialysis** |   |   |   |   |
| Fistula | 0 (0%) | 988 (10%) | 0 (0%) | 564 (13%) |
| Graft | 0 (0%) | 307 (3%) | 0 (0%) | 344 (8%) |
| Catheter | 23,084 (100%) | 7,719 (77%) | 7,276 (100%) | 3,141 (73%) |
| Other | 0 (0%) | 61 (1%) | 0 (0%) | 17 (<1%) |
| Missing | 0 (0%) | 932 (9%) | 0 (0%) | 241 (6%) |
| **Year of first placement** |   |   |   |   |
| 2012 | 7,558 (33%) | 3,332 (33%) | 2,521 (35%) | 1,397 (32%) |
| 2013 | 10,203 (44%) | 4,419 (44%) | 3,226 (44%) | 1,957 (45%) |
| 2014 | 5,323 (23%) | 2,256 (23%) | 1,529 (21%) | 953 (22%) |
| **Sex** |   |   |   |   |
| Male | 13,129 (57%) | 5,685 (57%) | 3,048 (42%) | 1,996 (46%) |
| Female | 9,955 (43%) | 4,322 (43%) | 4,228 (58%) | 2,311 (54%) |
| **Age at first ESRD service** | 69.5 (12.1) | 67.8 (12.5) | 71.2 (12.1) | 69.2 (12.3) |
| 0-17 | \* | \* | \* | 0 (0%) |
| 18-21 | \* | \* | \* | \* |
| 22-44 | 896 (4%) | 506 (5%) | 237 (3%) | 197 (5%) |
| 45-64 | 5,216 (23%) | 2,666 (27%) | 1,416 (19%) | 1,024 (24%) |
| 65-74 | 8,435 (37%) | 3,616 (36%) | 2,459 (34%) | 1,520 (35%) |
| 75+ | 8,528 (37%) | 3,212 (32%) | 3,161 (43%) | 1,564 (36%) |
| **Years with ESRD as of end of 2014** |   |   |   |   |
| <=1 | 2,896 (13%) | 1,328 (13%) | 752 (10%) | 481 (11%) |
| 1-2 | 9,853 (43%) | 4,065 (41%) | 3,004 (41%) | 1,696 (39%) |
| 2-3 | 10,335 (45%) | 4,614 (46%) | 3,520 (48%) | 2,130 (49%) |
| **Race** |   |   |   |   |
| White | 16,846 (73%) | 7,011 (70%) | 4,484 (62%) | 2,575 (60%) |
| Black | 5,173 (22%) | 2,497 (25%) | 2,475 (34%) | 1,529 (36%) |
| Asian | 793 (3%) | 375 (4%) | 277 (4%) | 178 (4%) |
| Native American | 251 (1%) | 113 (1%) | 35 (<1%) | 21 (<1%) |
| Other | 21 (<1%) | 11 (<1%) | \* | \* |
| **Hispanic ethnicity** |   |   |   |   |
| No | 20,225 (88%) | 8,876 (89%) | 6,499 (89%) | 3,892 (90%) |
| Yes | 2,848 (12%) | 1,122 (11%) | 774 (11%) | 411 (10%) |
| Missing | 11 (<1%) | \* | \* | \* |
| **Alive at last follow-up date (Dec. 31, 2014)** | 16,479 (71%) | 7,501 (75%) | 4,909 (67%) | 3,154 (73%) |
| **Received a transplant** | 349 (2%) | 237 (2%) | 55 (1%) | 85 (2%) |
| **Comorbidities** |   |   |   |   |
| Smoking/tobacco use | 1,316 (6%) | 647 (6%) | 373 (5%) | 240 (6%) |
| Obesity | 9,202 (40%) | 4,166 (42%) | 2,735 (38%) | 1,700 (39%) |
| Diabetes | 13,937 (60%) | 6,168 (62%) | 4,300 (59%) | 2,671 (62%) |
| Cardiovascular disease | 10,328 (45%) | 4,388 (44%) | 3,194 (44%) | 1,853 (43%) |
| Hypertension | 20,315 (88%) | 8,926 (89%) | 6,440 (89%) | 3,812 (89%) |
| Cancer | 1,991 (9%) | 770 (8%) | 623 (9%) | 346 (8%) |
| **Primary disease causing ESRD** |   |   |   |   |
| Diabetes | 11,105 (48%) | 5,245 (52%) | 3,338 (46%) | 2,207 (51%) |
| Hypertension | 7,473 (32%) | 3,048 (30%) | 2,548 (35%) | 1,427 (33%) |
| Glomerulonephritis | 1,050 (5%) | 523 (5%) | 322 (4%) | 222 (5%) |
| Cystic Kidney Disease | 172 (1%) | 125 (1%) | 57 (1%) | 50 (1%) |
| Other/Unknown | 3,269 (14%) | 1,056 (11%) | 1,005 (14%) | 396 (9%) |
| Missing | 15 (<1%) | 10 (<1%) | \* | \* |

\*Unable to present data due to small number of patients